ATTACHMENT 5

SHIP MANEUVERING SIMULATION STUDY OF PROPOSED CHANNEL MODIFICATIONS; HSC-ECIP FEASIBILITY STUDY, TEXAS

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Ship Maneuvering Simulation Study of Proposed Channel Modifications; Houston Ship Channel Expansion Channel Improvement Project Feasibility Study, Texas

FINAL REPORT

April 13, 2018
Revised June 25 2019
Performed for
Port of Houston Authority
By
Waterway Simulation Technology, Inc.
&
Maritime Pilots Institute

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Executive Summary

On November 17, 2017, the USACE Galveston District and the Port of Houston, in consortia with the Houston Pilots and G&H Towing, concluded ship maneuvering simulations in support of a feasibility study for the US Army Corps of Engineers (USACE) Houston Ship Channel Expansion Channel Improvement Project (HSC ECIP). This overall study is evaluating potential channel improvements for the Houston Ship Channel (HSC) considering changing demands for admitting ships larger than the existing project and increasing efficiency of navigation for the existing vessel fleet. The study formulated to improve safety and efficiency of maritime operations on the HSC and related projects.

Project participants included the Port of Houston, the Houston Pilots, with the USACE in attendance as oversight. Simulations were conducted using the Kongsberg Polaris Full-Bridge Ship and Tug Simulators located at the San Jacinto Maritime College Maritime Technology and Training Center (SJMCMTTC) in LaPorte, Texas. The simulation study was conducted with cooperation between Waterway Simulation Technology (WST) and LOCUS. The project analyzed a number of proposed design alternatives aimed at increasing safety and efficiency of navigation by widening the navigation channel, easing bends, enlarging turning basins, and generally improving navigable space for the Houston Ship Channel (HSC), Bayport Ship Channel (BSC), and Barbours Cut Channel (BCC) based on specific design test vessels.

This feasibility-level assessment entailed two months of technical development, one week of simulation model vetting and one week of simulation-based testing which involved conducting 64 simulation runs using the various design alternatives. The simulation test runs performed are documented in Appendix C.

The ship and simulation model data bases, including data bases of the proposed project for the Portable Pilots Unit (PPU), were developed jointly by WST and LOCUS. The Engineering Research and Development Center (ERDC) in Vicksburg, Mississippi provided three-dimensional hydrodynamic current model output that was used by WST to generate depth-averaged current vector fields in ebb and flood conditions for the ship maneuvering simulations. Ship models were existing models available at the SJMCMTTC. Wind was provided as a global condition with directions of north and southeast at 10-20 knots. Simulations were conducted with Houston Ship Pilots and G&H Towing operators conning and operating the design vessels and tugs, respectively.

This report is provided with the understanding that it is a feasibility-level assessment of proposed design alternatives of the HSC in support of USACE 216 processes. This feasibility-level assessment was arrived at using simulations with ideal situations of visibility, simplicity in the simulated navigation channels in the Galveston Bay, predicted vessel traffic, available ship and tug models, and known piloting conditions. This project evaluation is a preliminary assessment by the project participants of the safety of navigation for pilotage in the proposed channel alternatives for the HSC. The results were evaluated using Houston Pilots Simulation-Based Evaluation Standards of Care included in Appendix I. The following summarizes results from the five areas of the HSC tested during the Houston 216 simulation study, see Figure 1.

Figure 1. Six Study Segments for the HSC ECIP Feasibility Study

A final debriefing was conducted following the completion of the simulations. A summary of the results of this debriefing is provided below. Specific simulated situations and conditions, locations, and ship models used are described in the full report.

Results of Two-way Traffic in the Proposed HSC Improvements

The results of two-way meeting situations in the Galveston Bay reaches of the HSC are summarized in this section. This includes meetings that took place in all three straight reaches of the HSC Bay Channels and the bends between the three reaches; i.e., Bolivar Roads to Redfish Bar (Channel Markers 51-52), Redfish Bar to Channel Markers 75-76 (Bayport), Channel Markers 75-76 to Morgan's Point (Barbors Cut).

- Meetings involving two design containerships in a straight reach of the 650-ft design channel were considered to be a high-risk maneuver.
- Meetings between the design containerships and tankers in a straight reach of the 650-ft design channel were considered to be a risky maneuver.
- No meetings between any of the design ships in the 650-ft design channel bends were simulated as the pilots considered such maneuvers unsafe.
- Meetings between two design containerships and between a design containership and tanker in both 700-ft design channel straight reaches and in 1030-ft Apex Cutoff Bends were considered to be acceptable.
- Design ships overtaking tows in the 700-ft design channel affected the tows as expected; this situation needs further analysis.
- It is acceptable for a design containership may meet another ship below Channel Markers 75-76 and then turn into the Bayport Ship Channel design as tested.

Results of Barbours Cut Channel Simulations

The results of the design containership conducting various maneuvers between Barbours Cut Channel and the HSC are reported in this section. In addition, tests of the design tanker were also conducted for a design widener at Barbours Cut for in- and out-bound transits. These results are also reported in this section. In all cases three tugs are considered required and wind limits of 15 knots maximum should be observed. For tug operations, the standards of care should be observed which requires a maximum speed of the ship of 7 knots when using a stern tug.

- The turning at the entrance to the Barbours Cut Channel and backing to a terminal berth of a design containership could be accomplished with good room and the design tested is acceptable.
- The transit of a design containership through the Barbours Cut Channel was considered acceptable.
- For a design containership exiting the Barbours Cut Channel and turning into the HSC there was good room and the design was acceptable.
- The design containership was able to turn with good room in the design turning basin and the basin design was considered acceptable.
- The transit of a design tanker, both inbound and outbound, between the Barbours Cut Channel and the HSC was considered acceptable with the design widener in place.

Results of Bayport Ship Channel Simulations

The results of the ship maneuvering simulations in the Bayport Ship Channel and between the Bayport Ship Channel and the HSC are reported in this section. In all cases three tugs of the 3075 type were considered required and wind limits of 15 knots maximum should be observed. For tug operations, the standards of care should be observed which requires a maximum speed of the ship of 7 knots when using a stern tug.

- The turning, both inbound and outbound, through the design 4,000-ft radius flared entrance of a design containership was considered to be acceptable.
- The meeting of another design ship below the entrance to the design Bayport Ship Channel with the design 4,000-ft radius and then making the turn into the Bayport Ship Channel by a design containership was considered to be acceptable.
- Use of the design "RO/RO Turning Basin near the land entrance of the Bayport Ship Channel was preferred for use when approaching the terminal's Berths 1-3. This would allow two inbound

ships to approach the container terminal at the same time with one going to Berths 4-6 and the other bound for Berths 1-3 with the full benefit of four daylight inbound transits per day.
- The design 455-ft bay channel was found to be acceptable.
- The design 400-ft land channel section was marginally acceptable; however, due to the drift angle required with cross-winds, a 455-ft design for the land channel is preferred.
- The inner Turning Basin was considered to be acceptable.

Results of Meetings in the Improved Boggy Bayou to Greens Bayou Sections of the HSC

The results of the simulated meetings of design ships in the widened HSC and deepened channel section between Boggy Bayou and Greens Bayou are reported in this section.
- Meetings between a design Aframax and design Panamax in the design HSC Channel was found acceptable both below the Texas 8 Highway Bridge and above that bridge.
- Meetings between a design Suezmax and design Panamax in the design HSC Channel was found acceptable both below the Texas 8 Highway Bridge and above that bridge.

Results of Ship Turning in the Enlarged Brady Island Turning Basin

The results of turning the design Panamax ship in the design 900-ft turning basin was considered acceptable with sufficient room when two tugs of the 2460 class assisted the turn. This includes turning the design ship in the design turning basin with ships and bunkering barges alongside are at Wharfs 26-28. No wind restrictions were considered necessary.

Summary

As a result, the findings from the ship maneuvering simulation feasibility study are:
- Widen the HSC navigation channels to a width of 700 ft
- Widen the HSC bay bends as proposed as Cutoff Bends with 1030 ft Apex
- Widen the BSC bay channel from the intersection with the HSC to the proposed RO/RO Turning Basin with a 4,000 ft radius flare on the south edge at the intersection of the HSC.
- Construct the proposed RO/RO Turning Basin on the BSC
- Widen the BSC land channel to 400 ft with a taper on the north side of the channel from the RO/RO Turning Basin to the Land Cut
- Flare the entrance to the BCC as proposed with the widener transitioning from the 700 ft HSC channel to the existing channel at Markers 83-84
- Widen the BCC to 455 ft
- Widen and deepen the HSC from Boggy Bayou to Greens Bayou as proposed to 530 ft and 46.5 ft below MLLW
- Enlarge the Brady Island Turning Basin as proposed.

Introduction

The ongoing feasibility study under the Houston Ship Channel Expansion Channel Improvement Project, Texas (HSC ECIP), has identified a need to conduct feasibility level ship maneuvering simulations in order to determine if the proposed channel design layout and dimensions for the projected design vessel classes are feasible and, where there is uncertainity about the required dimension, assist to identify the dimension needed. Of particular interest is the admission of Post- and Neo-Panamax container ships (now commonly referred to as Ultra Large Container Carriers or ULCC) that transit and, therefore, are limited to the maximum dimensions of the expanded Panama Canal. Since the terminals that would admit these vessels are both in the Galveston Bay below Morgans Point at the Bayport Ship Channel (BSC) and the Barbours Cut Channel (BCC), the design container test vessel (design containership) for Bay reaches and BSC and BCC have dimensions of an overall length of 1200 ft or less and a beam of 158 ft or less - and a Suezmax tanker with an overall length of 935 ft or less and a beam of 164 ft. The longer and wider containerships cannot meet any other vessels in the existing 530 ft HSC channel widths or the existing channel widths of the BSC and BCC; nor can they currently safely transit the existing unwidened bends of the HSC bay channels.

In addition, new and expanded turning basins are being considered with some of these requiring ship maneuvering simulation.

Finally, there is consideration of widening and deepening the HSC navigation channel between Boggy Bayou and Greens Bayou to accommodate developments along this reach of the HSC. Since the target design is to allow Aframax and Suezmax vessels to operate in this reach (this is not allowed under current pilot rules) and also a desire to determine the allowable limits for two-way traffic in this reach, simulations were recommended for this section of the HSC. An Aframax model was used for this purpose with the dimensions of LOA of 243.8m (799.9 ft), a beam of 42m (137.8 ft) and a draft of 12.2m (40.0 ft) even keel.

The navigation channel and turning basin designs to be tested were provided by the Project Delivery Team (PDT) consisting of members from the USACE and Port of Houston Authority (PHA). The ship maneuvering simulations study was conducted by the Waterway Simulation Technology, Inc. (WST) and Maritime Pilot Institute (MPI) with the Houston Pilots providing the piloting expertise.

It is understood that since these simulations were done as a part of a feasibility study, they were conducted as a limited set of tests, as quickly as possible and with minimum effort and cost, to refine feasible channel dimensions. Therefore, the testing program was designed to quickly assess a particular proposed design and to move to an alternate design based on the results of that test. The acceptability of the design was based on the participating Houston Pilot's opinions and the judgment of the team conducting the simulations using an accepted set of evaluation criteria.

Finally, the simulations were conducted at the SJCMTTC using their Kongsberg Polaris simulators. These simulators are similar to the simulator at the U.S. Army Engineering Research and Development Center (ERDC) at Vicksburg, MS.

Simulation matrices and scope were coordinated with ERDC in August and September and included fifty-five (55) simulation runs in the HSC, HSC/BCS, HSC/BCC, Boggy Bayou to Green's Bayou, and the Brady Island Turning Basin (this approved test matrix and the proposed scope of work are included as Appendix H). At the direction of the PDT, additional simulation of a Suezmax tanker was added to the simulations planned from Boggy to Greens and simulation of modifications to the Brady Island Turning Basin if time allowed.

Purpose

The primary purpose of this feasibility level simulation study was to determine the feasibility of the proposed channel improvements and to refine the proposed range of widening improvements in Galveston Bay. The Tentatively Selected Plan (TSP), provided a range of widening in the Galveston Bay sections of the HSC from the current 530-foot-wide channel to a 650 to 820 foot-wide channel. Due to the length of the transit in the Bay, the navigation channel in this reach is currently considered to allow two-way traffic. The existing channel widths and bend designs do not allow safe transits of the design containership, primarily due to the *length* and beam of these vessels. Therefore, two-way meeting simulations were required to refine the channel and bend width.

Since it is necessary for the new design containerships to enter and exit the channels leading to the container terminals from the HSC, simulations of the design containership maneuvering into and through the proposed navigation channels and turning basins for the BSC and BCC container terminals was required to determine if the proposed channel and turning basin designs are feasible.

Admission of Aframax and Suezmax vessels into the reaches above the East Sam Houston Tollway Bridge (Texas 8) from Boggy Bayou to Greens Bayou is being considered and transits of these vessels were simulated with the proposed channel width of 530 ft and deepening to -46.5 ft MLLW. Tests were conducted to determine the feasible limits of two-way traffic meetings of the design vessels in this improved reach.

Finally, an expansion of the Brady Island Turning Basin is being proposed in order to relieve an operational constraint prohibiting turning of Panamax vessels while other vessels are berthed at the Wharfs 26-28 docks and especially while bunkering operations are ongoing at these locations. Simulated turning operations of a Panamax ship (700 ft LOA by 104 ft beam) were performed with Panamax vessels at these docks with a bunkering barge alongside one of the vessels to confirm the turning basin design.

Approach

Ship Models

The Maritime Pilot's Institute (MPI) had a ship model of the *MAERSK EDINBURG* with a Length Over All (LOA) of 354m (1161.4 ft) and a beam of 48m (157.5 ft). Therefore, it was recommended that this model be modified to a length of 1200 ft and used as the representative design containership. MPI provided the maneuvering characteristics of this model based on observations of operating containerships. Houston Pilots vetted the model as described in a Memorandum for the Record[1] included in Appendix J.

A partially loaded Suezmax tanker model (*ORION VOYAGER*) that has been used extensively by the Houston Pilots on the San Jacinto simulator was used in these simulations. This tanker had dimensions

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[1] Memorandum for the Record, Subject Houston Ship Channel (HSC) 216 Ship Simulation Model Setup and Verification, Waterway Simulation Technology, Inc., October 20, 2017

of 274m (900.4 ft) LOA, 50.0m (164 ft) beam and a draft aft of 13.79m (45.2 ft) and draft forward of 11.22m (36.8 ft.). This model was used as the representative Suezmax design vessel.

The PDT requested that combinations of vessels meeting in the deepened and widened reach of the HSC from Boggy Bayou to Greens Bayou be included in the ship maneuvering tests. This reach was widened from 300 ft to 530 ft and deepened to a depth of 46.5 ft MLLW from 41.5 ft MLLW. The goal of the design change was to allow Aframax and Suezmax vessels to use this reach of the HSC, which is currently restricted for these vessels. In addition, the simulation was to determine what combination of these vessels could meet in this reach to provide for feasible two-way traffic conditions; thereby increasing efficiency. The models used included a Suezmax VLCC model (*ORION VOYAGER*) with an LOA of 902ft, a beam of 164ft, and a draft of 45ft; a Aframax tanker model (*EAGLE KANGAR*) with an LOA of 800ft, a beam of 138ft, and a draft of 40ft; and a Panamax bulk carrier (*M/S MAGITOGORSK*) with an LOA of 707ft, a beam of 104ft, and a draft of 38ft.

Additionally, the PDT requested that the proposed improvements to the Brady Island Turning Basin be tested if time allowed. For the turning basin tests at Brady Island, a typical Panamax vessel (*M/S MAGITOGORSK*) was used. The preferred LOA for such a vessel was 750 ft as this is the maximum length allowed in this reach of the HSC. However, the only acceptable model available was a Panamax bulk carrier with a LOA of 707 ft, a beam of 104 ft and a draft of 38 ft. This vessel was used with available tug support for the turning tests at Brady Island.

In summary, the ship class, model name, and dimensions used for each vessel are included in Table 1 below:

Table 1: Ship Models Used in the HSC Feasibility Ship Maneuvering Simulation Study

Model Name	Ships Name	Dead Weight	DRAFT		Displacement	Length Overall	Breath
		Tons	AFT (ft)	FWD (ft)	Tons	(ft)	(ft)
BULKC06L	*M/S Magnitogorsk*	22691	37.7	37.6	60920	706.5	104.3
TANK23L	*EAGLE KANGAR*	107481	40.0	40.0	99250	799.7	137.8
BULKC16	*FRAISER RIVER*	75000	41.0	41.0	85005	869.2	105.9
VLCC13X	*ORION VOYAGER*	156500	45.2	36.8	122400	900.4	164.0
MULCV14T	*MAERSK EDINBURGH*	133500	45.0	45.0	157281	1202.1	158.1

Pilot Cards for each of the vessel models used in these stimulations are presented in Appendix A.

Model Databases

A basic model of the HSC navigation channels was available on the San Jacinto simulator. Widening is proposed for the HSC Bay Channels above Bolivar Roads to Morgans Point to a width greater than the existing 530 ft. channel widths being considered for the simulation effort included 650 ft, 700 ft, and 750 ft. Bend wideners for each of four bends are also being considered for this channel segment of Galveston Bay. No deepening is being considered at this time. Therefore, modifications of these model databases (visual, radar and ECDIS, channel, currents) were required to account for the channel improvements being tested. WST assisted MPI in this development.

Currents were input as data. The currents for the HSC ECIP simulation were obtained from a 3D hydrodynamic model of the existing HSC developed at USACE Engineer Research and Development Center (ERDC). WST converted the three-dimensional data from this model to two-dimensional depth-averaged data for simulation model input. Maximum ebb and flood currents for the Redfish Bend and the Bayport Channel sections were independently extracted from the model data to provide a range of water flow conditions for the simulations. Current data were also extracted from the model for the Bayou section simulations; although, current magnitudes in this region were very low.

Since the emphasis of this study was to determine the feasible navigation channel width for the larger design vessels, it was recommended that the proposed alternative navigation channel width for the bay channels be input based on agreement with the USACE and the Houston Pilots. It was anticipated that the initial testing would begin with a 650 ft wide channel from Bouy 18 to Morgans Point and a cutoff bend easing of 980ft at each of the channel bends at HSC stations 138+369 (Buoy 18), 128+731, 78+844 (Redfish), and 28+605 (Beacons 75/76). Simulations with vessel meetings were developed for all three channel sections of Galveston Bay. Based on discussions with the Houston Pilots and with approval from the Corps representatives during the simulation validation, meetings of the design vessels in the improved bends were also included. Emphasis was placed on meeting before and after the bends at Redfish, at HSC Beacons 75 and 76 below the intersection with the Bayport Ship Channel and then up to (Beacons 81-82). Other channel widths were prepared at 700 ft and 750 ft in anticipation of the need to test such alternatives. These channel cross-sections were constructed to be representative of typical cross-sections observed in the existing ship channels and to be representative of the typical conditions the ships would experience in the future after the channel has been used and shaped by the ship traffic. An example of the type of cross-section to be used in building the widened channels is shown in Figure 2. It was anticipated that barge shelves would be included to represent the bank conditions with these present in any future project expansion. Consideration was given to including operating tows on the barge shelf to observe the effects of deep-draft ships transiting the deep navigation channel.

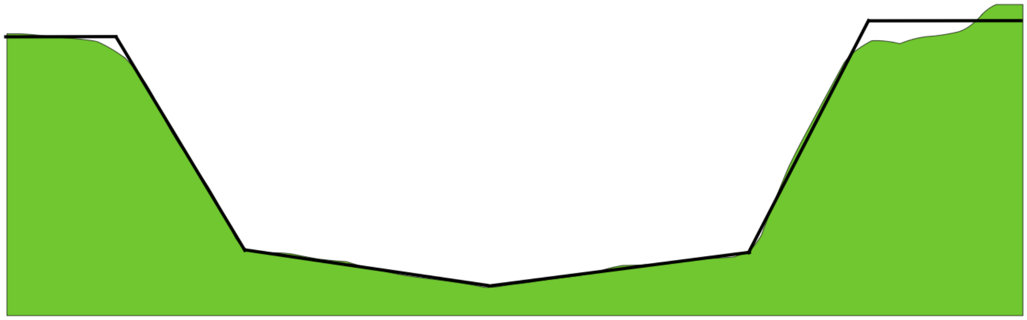


Figure 2. Typical Cross-section

Similarly, the proposed navigation channels in the HSC above the Texas 8 Bridge from Boggy Bayou to Greens Bayou were developed based on the existing hydrographic survey data modified to represent the proposed improvements to the channel with a nominal channel width of 530 ft and depth of 46.5 ft MLLW. Modifications to the channel were made based on the results of transits of the largest permitted vessels (LOA<= 750 ft) in this reach at the present time.

The Bayport Ship Channel was widened on the north side of the ship channel from a width of 400 ft to 455 ft from the entrance near the bend at channel markers 75-76. A turning basin, identified as the RO/RO Turning Basin, was included in the modified Bayport project. Beginning at this turning basin, the simulated channel was tapered to a 400 ft width near the entrance to the land cut through the remainder of the ship channel and the turning basin. The simulated channel was also developed with a 455 ft width through the entire channel including the turning basin; however, this was not tested. Both ship channels were also developed with a 4,000 ft and 5,735 ft radius flare on the south side of the

Bayport Ship Channel connecting with the apex of the bend near channel marker 75 for each of the HSC navigation channel model databases.

The Barbours Cut Channel was modified to include a widening of the ship channel from 300 ft to 455 ft with offsets from the container terminal to the north. Straight-line flare designs on the north and south sides of the entrance were provided by the PDT and included in the simulated test channels. A transition from the eastern side of the widened HSC channel starting at channel marker 90A to the existing channel near channel marker 94 were also included and tested for traffic transiting between points north of Morgans Point and Barbours Cut.

Finally, a simulation database was developed for the proposed enlarged Brady Island Turning Basin. This enlargement was to enable the maximum sized Panamax vessels allowed to operate in the upper reaches of the HSC above Boggy Bayou to turn in the turning basin while vessels are berthed at the docks at Wharfs 26-27; especially while receiving bunker fuel from barges alongside the vessels. Therefore, Panamax vessels with a length of 750 ft and a beam of 106 ft were berthed at Wharfs 6-8 such as to restrict the turning area to test the relaxation of the current operating restrictions for this turning basin and a bunkering barge with length of 195 ft by 35 ft was placed adjacent to the tanker berthed at Wharf 27.

Simulated Project Improvement Databases for the Houston Pilot Portable Pilot Units (Raven PPUs)

The Houston Pilots provided three computers used as Portable Pilot Units (PPUs) for use during these simulation tests and arranged for *myppu.com* to work with WST and MPI to develop databases of the proposed project improvements for use with the PPUs during the ship maneuvering simulation tests. The Houston Pilots regularly utilize PPUs to help them navigate vessel transits on the HSC system. Personnel from myppu.com were able to provide these databases with short lead times.

Ship and Waterway Model Validation and Adjustments

During the period from October 13-15, 2017, MPI, San Jacinto Maritime, Houston Pilots, and WST installed the simulation model databases for the reaches of the HSC, tested and adjusted the ship models until they were verified by the Houston Pilots, checked out the simulation databases, and discussed the project, feasibility study objectives, and testing program with the pilots, representatives from ERDC, the Galveston District, and Port of Houston Authority. A Memorandum for Record dated October 20, 2018 was prepared to document the results of this effort and is included in Appendix J.

Ship Maneuvering Simulation Tests

Ship maneuvering simulation tests were conducted at the San Jacinto Maritime Center Ship Simulator during the period November 13-17, 2017. The list of participants is provided in Appendix B. The simulations conducted as a part of this study and the conditions of each simulated transit are documented in Appendix C. The results of the simulations are presented below.

Results of the Ship Maneuvering Simulations

A brief description of each principal simulation test area is presented in this section of the report. In addition, the basic findings and recommendations derived from those test sections are presented. The entire set of track plots for all simulations conducted are included in Appendix K-P.

Galveston Bay Channel of the HSC

Figure 3 through Figure 5 show representative track plots of the HSC tested during the simulation study. The HSC bay channels tested stretched from Bolivar Roads to just below BCC and were considered to represent three segments. The entire set of track plots for all simulations conducted are included in Appendix L. The proposed 650-ft widening of the Houston Ship Channel in the Galveston Bay was tested extensively and found to be unacceptable for two-way traffic operations (see Figure 3). The 700-foot-wide channel was tested next. The design vessel for this study segment was a representative design containership with dimensions of 1,200ft x 158ft x 45ft. The primary design operation was a meeting maneuver of two of these vessels. Additionally, meeting and passing maneuvers were simulated between the design containership and a Suezmax-class tanker (900ft x 170.6ft x 45.3ft/36.8ft). A few simulations also included traffic tows transiting the HSC along the barge lanes during the meeting/passing operations. The proposed 700-ft widening was found to be acceptable (see Figure 4). Also, meetings of the design containership in bends, which were widened to an apex of 1,030 ft and with the 700-ft channel, were found to be acceptable (see Figure 5). Below are the findings for simulations in the bay section of the HSC.

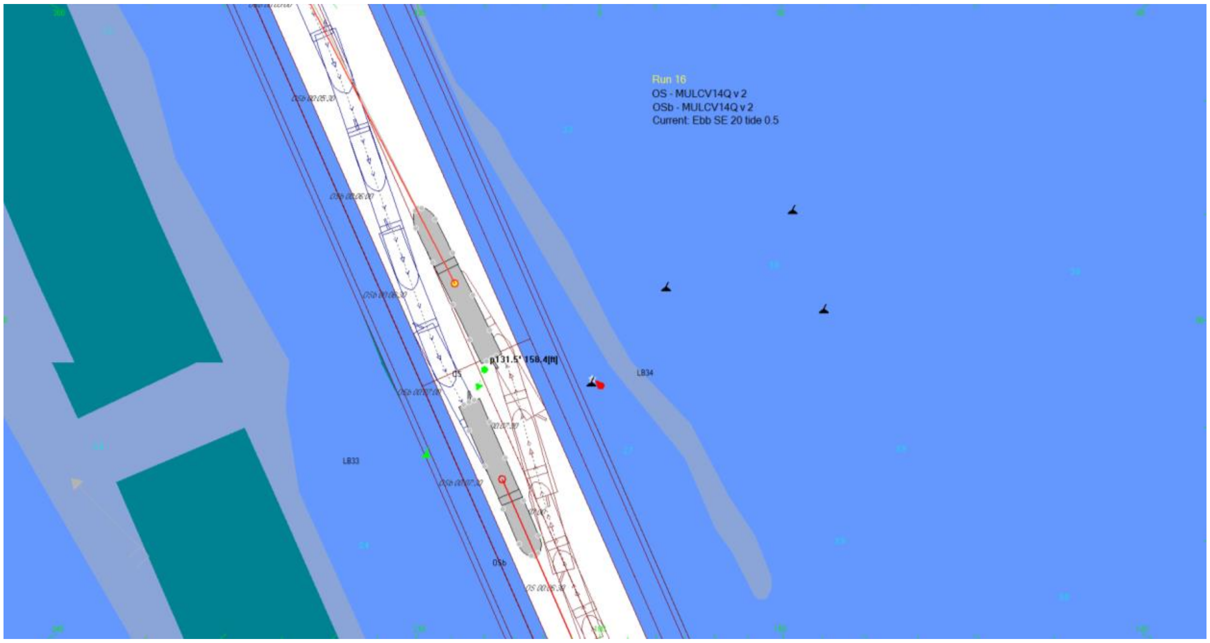


Figure 3. Two Design Containerships Meeting in the Proposed 650 ft Wide Houston Ship Channel

Figure 4. Two Design Containerships Meeting in the Proposed 700 ft Wide Houston Ship Channel

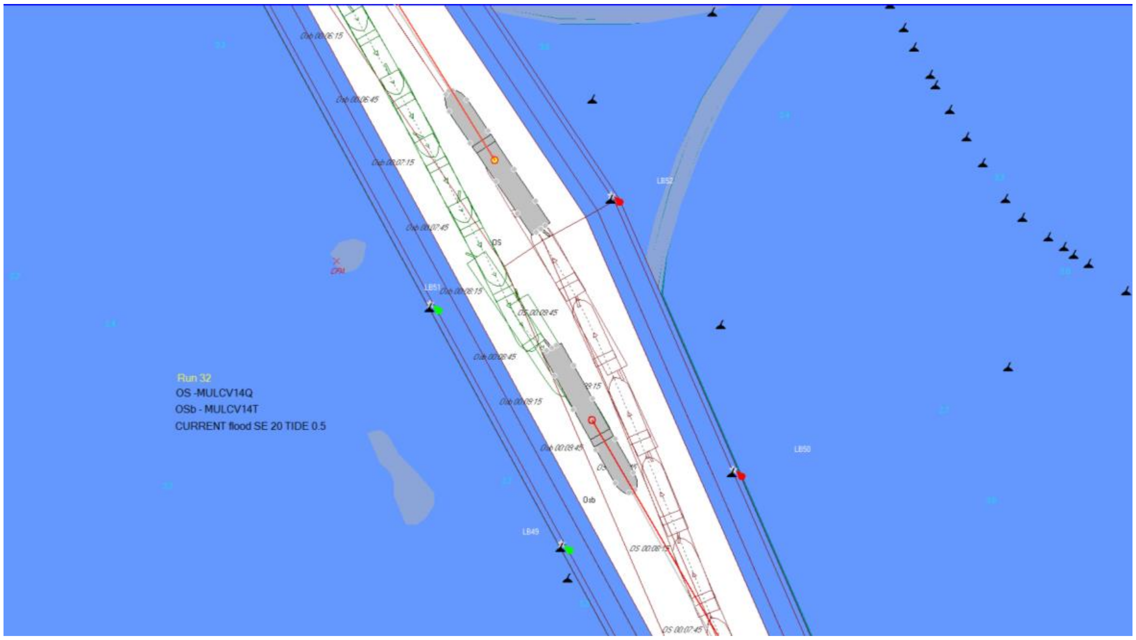


Figure 5. Two Design Containerships Meeting in Red Fish Bend

Findings for Bay Reach of the Houston Ship Channel

1. The design containership had better piloting success in the 700’ channel than the 650’ channel.
2. The design containership was able to meet another design containership in the 700’ test channel while maintaining adequate separation between each vessel and the test channel toe.
3. The design containership was able to safely meet Suezmax (secondary design test vessel with dimensions of 900ft x 164ft x 45ft) vessels in the 700’ channel of the HSC.
4. The design containership was able to meet another design containership and a Suezmax vessel in the widened design bends under current and wind conditions (20 knots SE) tested.

5. Tow vessels navigating in the deeper water alongside the channel toeline, on the margin of the barge lanes, *may* lose control of their vessel and/or tow units due to passing ship forces from the design containership. .
6. The channel widening provided in the 700’ channel is feasible for two-way traffic meetings of an inbound and outbound design containership, Suezmax vessels, and a design containership and a Suezmax vessel.

Recommendations for the Bay Reach of the Houston Ship Channel

1. Consideration could be given to evaluating a reduction of the proposed 1,030-foot apex bend widening such that safe meeting operations may be maintained and further evaluated in Project Engineering and Design (PED).
2. Further analysis of ship and tow interaction in the 700’ alternative is recommended to better understand the risk posed by the design containership as well as Suezmax vessels to tug and tow vessels transiting in the barge lanes alongside the 700’ channel.

Bayport Channel

The design containership was successfully piloted in simulations in and out of Bayport Channel. Figure 6 - Figure 8 show representative track plots of the Bayport Channel. The entire set of track plots for all simulations conducted are included in Appendix N. A modification to the existing BSC southern flare is underway that will create a 4,000 ft radius. ERDC previously evaluated a flare modification up to a 5,375 ft radius. Discussions with the Houston Pilots indicated that the 5,375 foot radius may not be necessary for the southern side of the channel at the intersection of the BSC and HSC at beacon 75/76 when the HSC is widened to 700 feet, therefore, only the 4,000 ft radius with an additional modification to tie it into the proposed 700 ft wide HSC was simulated. The channel design tested was 455 ft wide from the 4000 ft-radius flare intersection with the HSC, westward to the proposed RO/RO Turning Basin and, from thence, tapering to 400 ft wide at the beginning of the land cut and past the container docks to the existing turning basin. A proposed new turning basin (RO/RO) on the south side of the channel at the beginning of the land-cut was also included in the simulation tests (Figure 7). The following findings for the Bayport Channel simulation are presented.

Figure 6. Design Containership Inbound to Bayport Container Terminal at Channel Intersection with HSC

Figure 7. Design Containership Turning in the RO/RO Turning Basin and Backing to the Bayport Container Terminal

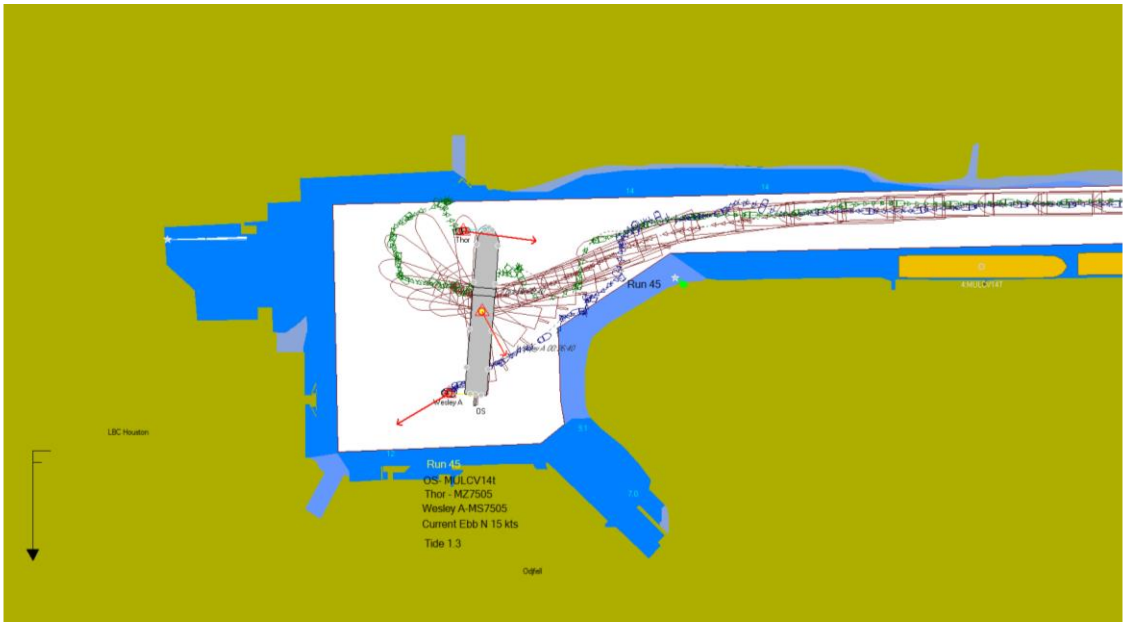


Figure 8. Design Containership Transiting the Bayport Container Terminal and Turning in the Existing Turning Basin which was Expanded by 400ft to the North

Bayport Ship Channel Findings

1. The design containership and ship assist tugs providing escort towing services to the design containership were able to maintain position in water considered safe by the pilots and tug masters during approaches and departures to Bayport container terminal using the additional space provided in the 700' HSC design, proposed bend wideners, 4000' flare at the entrance, and the widening of the Bayport Ship Channel to 455ft from the flare to the land cut.
2. The proposed widening of the Bayport Ship Channel open bay reach to 455', the approved and anticipated 4,000' radius flare at the entrance, and the proposed bend widener at the bend at Beacon 75/76 allowed successful entrance into and departure from the Bayport Ship Channel in accordance with the Houston Pilots Simulation-Based Evaluation Standards of Care even following the meeting with another vessel immediately below the bend at Beacons 75/76.
3. The Houston Pilots stated that the availability and use of the RO/RO Turning Basin would allow more efficient marine operations by allowing ships to move to the main turning basin followed by ships that would use the RO/RO Turning Basin; thus making effective use of 8 hours of daylight operations at the Bayport Terminals.
4. The proposed RO/RO Turning Basin near BSC Markers 6-7 allowed successful turning with the assistance of available escort tugs prior to entrance into the land cut of the BSC by backing to the eastern berths of the Bayport terminal in accordance with the Houston Pilots Simulation-Based Evaluation Standards of Care.
5. The proposed design of the Bayport Ship Channel widening to a 455 ft width tapers from the RO/RO Turning Basin to the entrance of the land cut at the eastern end of the container terminal to a 400 ft ship channel width along the terminal to the turning basin at the end of the channel. This increase in width from 350 ft provides for a successful transit of the design containership with available tug escort up to the wind limits of 15 knots.
6. The Houston Pilots stated that with the 400' land cut Bayport Ship Channel width would still require one-way traffic with the design containership and would limit bunkering operation in the channel and holding of barges along the channel.

7. The Houston Pilots stated that they believed this design would require three tugs to control the design containership with the upper wind limits of 15 knots.
8. The Houston Pilots prefer a width in the land cut of 455 ft.
9. The channel improvements proposed for the 455'/400' navigation channel for the approaches to the Bayport Terminals, inclusive of the 4,000 ft flare and channel improvements, are feasible for the successful transit of the design containership, assist tugs and normal HSC vessel traffic.

Recommendations for Bayport Ship Channel

1. The proposed RO/RO Turning Basin near the land cut in the Bayport Ship Channel is recommended by the Houston Pilots for consideration as this will provide for more efficient ship maneuvering operations to the eastern berths at the Bayport Container Terminal and allow optimal use of the channel during daylight restriction.

Barbours Cut Channel

Figure 9 through Figure 11 show representative track plots in the 455ft widened design channel for Barbours Cut Container Terminal near Morgans Point, Texas. In addition, design widenings and flares at the intersection of the Barbours Cut channel with the 700 ft design HSC are shown. The entire set of track plots for all simulations conducted are included in Appendix M. In order to successfully transition from the widened channel in Galveston Bay to the existing 530-wide channel above Morgans Point as well as the north bound turns out of BCC, slight widening and tapering of the channel transition was approximated. The following findings for the simulations of Barbours Cut Channel are presented.

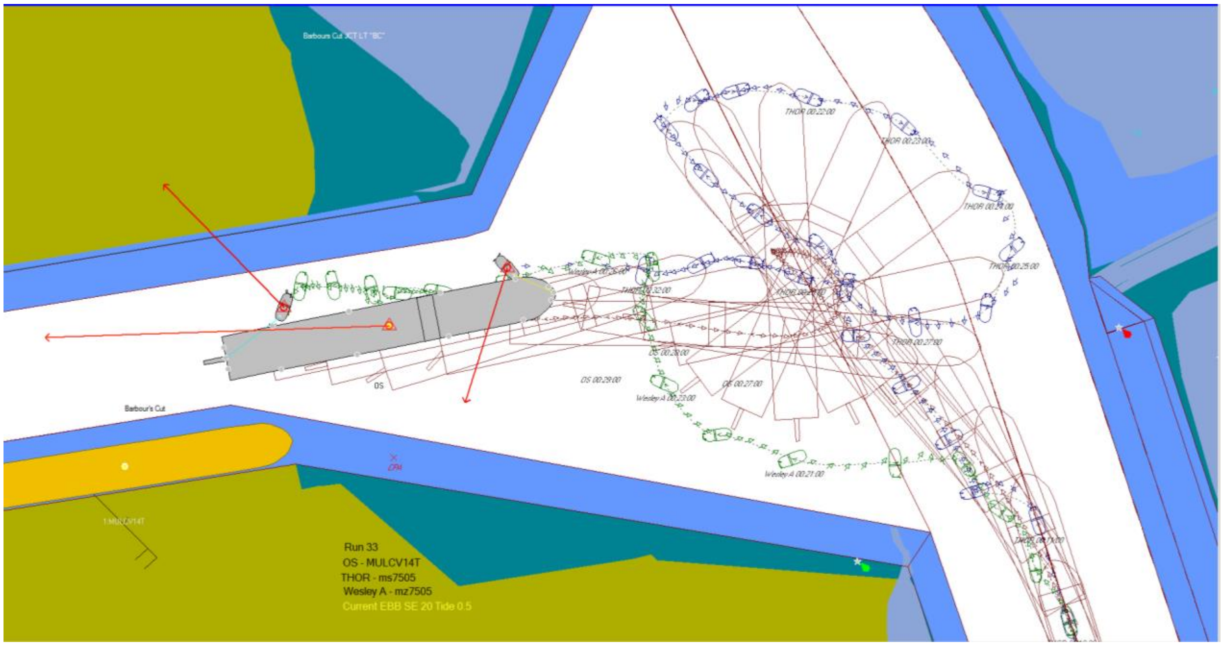


Figure 9. Design Containership Turning and Backing into Barbours Cut Container Terminal

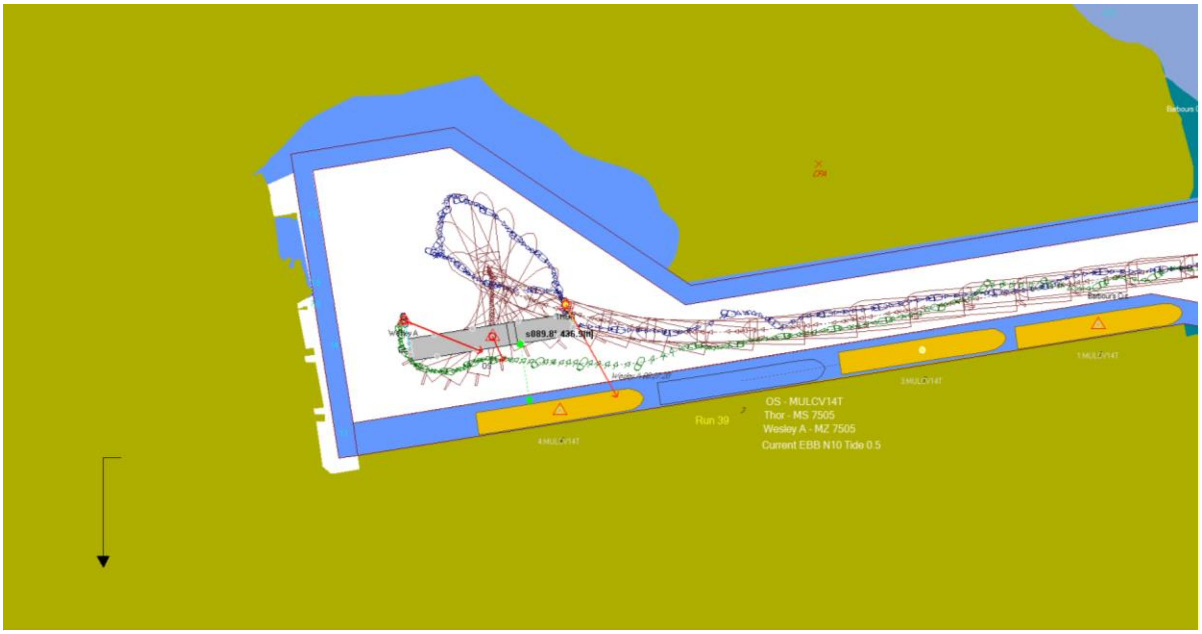


Figure 10. Design Containership Transiting the Widened 455ft Channel at Barbours Cut Container Terminal and Turning in the Existing Turning Basin

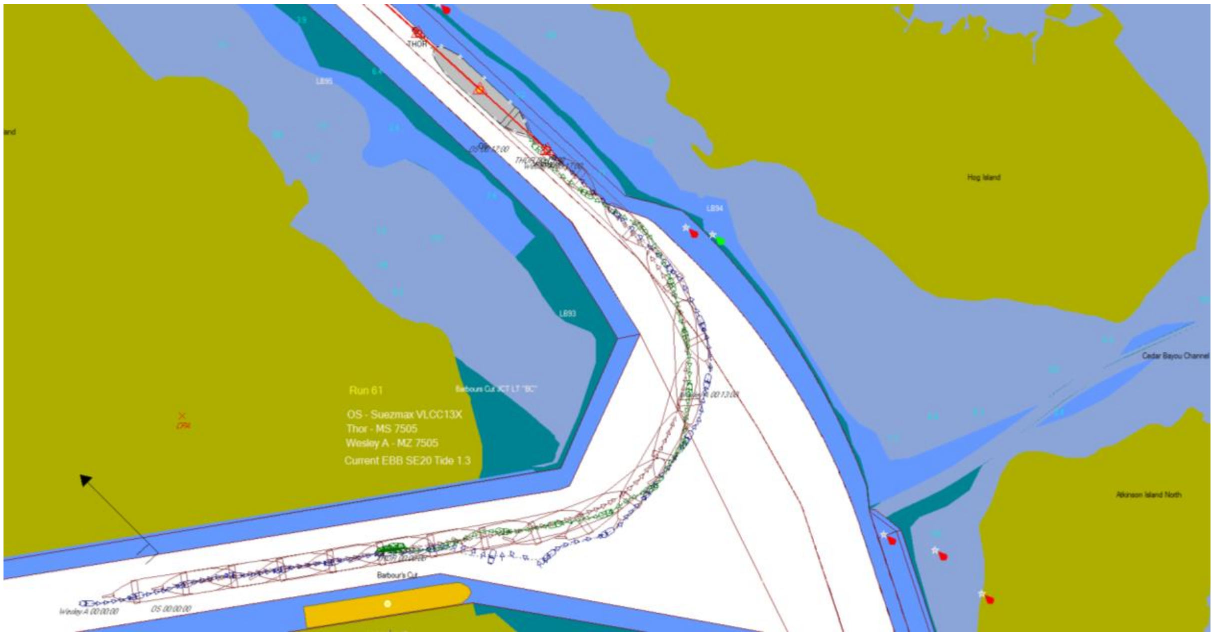


Figure 11. Suezmax Exiting the Barbours Cut Container Terminal Channel and Turning Up-channel Using the Widening Flare and East Houston Ship Channel Widener at Markers 83-84

Findings for Barbours Cut Channel

1. The widening of the BCC to 455' allowed the successful maneuvering of the design containership through the terminal past berthed design containerships at the terminal berths with tug support with both the ship and tugs maintaining Houston Pilots Simulation-Based Evaluation Standards of Care (see I).
2. The design containership was able to sucessfully turn and maintain Houston Pilots Simulation-Based Evaluation Standards of Care while turning in the BCC Turning Basin with assistance of the available tug escort and maneuvering assistance.

3. Transit of Suezmax-class vessels to and from the proposed BCC improvements into and from the proposed 700 ft HSC north of BCC was found to be successful with assistance of available tugs.
4. The channel improvements proposed for the 455’ channel for the approaches to BCC, inclusive of the flare and HSC channel improvements, are feasible for the navigation of the design containership, assist tugs and normal HSC vessel traffic.

Recommendations for Proposed Barbours Cut Channel

1. The channel improvements at the entrance of the BCC and the widening of the Houston Ship Channel between channel markers 91 to 93-94 provided successful maneuvering of Suezmax tankers transiting between terminals north of Morgans Point and Barbours Cut. However, this transition should be specifically evaluated further in PED.

HSC from Boggy Bayou to Greens Bayou

Figure 11 shows a representative track plot of the simulations between Boggy Bayou to Greens Bayou. The entire set of track plots for all simulations conducted are included in Appendix P. In the Bayou section of the HSC, the proposed design tested was widening the section from Boggy Bayou to Greens Bayou from a width of 300ft to 530ft and deepening to a depth of 46.5ft MLLW (Figure 12). Meetings of various combinations of Suezmax, Aframax, and Panamax vessels were simulated to evaluate the limits of vessel meetings that could feasibly be accomplished. Since these meetings were a completely new maneuver for the Houston Pilots, they were establishing the ship handling technique that was required to meet this size of vessel in this improved reach. Even though many of these meetings were close to the proposed channel toelines, the Houston Pilots stated that they consider these were safe meetings and within the pilots’ standard of care as there is deep water outside the proposed channel toelines, which they routinely use.

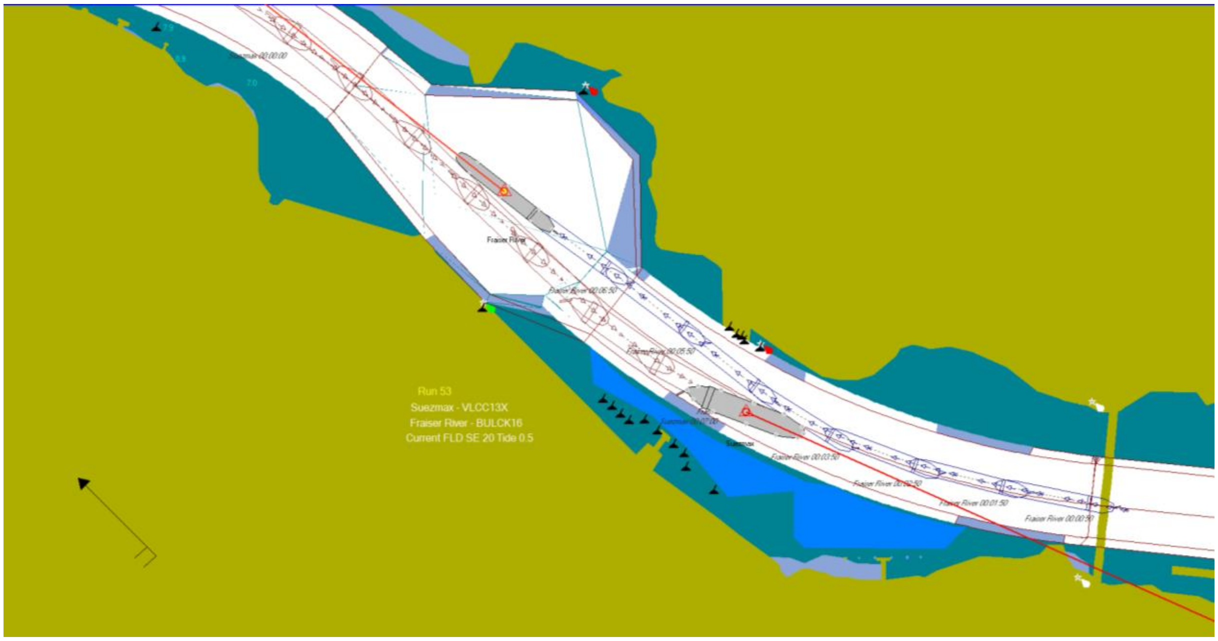


Figure 12. Meeting of Suezmax and Panamax Vessels in the Widened and Deepened Houston Ship Channel Between Boggy Bayou and Greens Bayou

Findings for the Houston Ship Channel from Boggy Bayou to Greens Bayou

1. The proposed widening and deepening of the HSC reach between Boggy Bayou and Greens Bayou was found to provide for successful operations of Aframax and Suezmax vessels, which increases the size of ships allowed to operate in this reach above the existing LOA of 750 ft and beam of 106 ft.
2. The proposed widening and deepening for this reach was found to allow successful implementation of two-way traffic of loaded vessels with a maximum combined ship beam of 246'.
3. The proposed widening and deepening allowed the meeting of loaded Aframax and Panamax ships in this improved reach of the HSC.
4. The meetings of loaded vessels of Suezmax size with loaded vessels of Panamax size were problematic during the simulation tests; however, there is a possibility with a more realistic database considering the channel conditions along the navigation channel and additional training, two-way operations between these vessels could be possible.
5. The channel improvements provided in the proposed 530' channel widening and deepening to 46.5 MLLW for the upper Houston Ship Channel between Boggy Bayou (Shell) to Greens Bayou the deepening area are feasible.

Recommendations for the Houston Ship Channel from Boggy Bayou to Greens Bayou

1. During PED, additional testing with a channel database representing the proposed design along with terminals that will be constructed to service these larger vessels may demonstrate the feasibility of relaxing the combined beam restriction cited in item 4 above.

Brady Island Turning Basin

The proposed enlargement of the Brady Island Turning Basin is shown in Figure 13. Simulations are shown of Panamax vessels turning in the enlarged Brady Island Turning Basin with Panamax vessels berthed at the docks at Wharfs 26-28 and a bunkering barge alongside the ship at Wharf 27. The entire set of track plots for all simulations conducted are included in Appendix O.

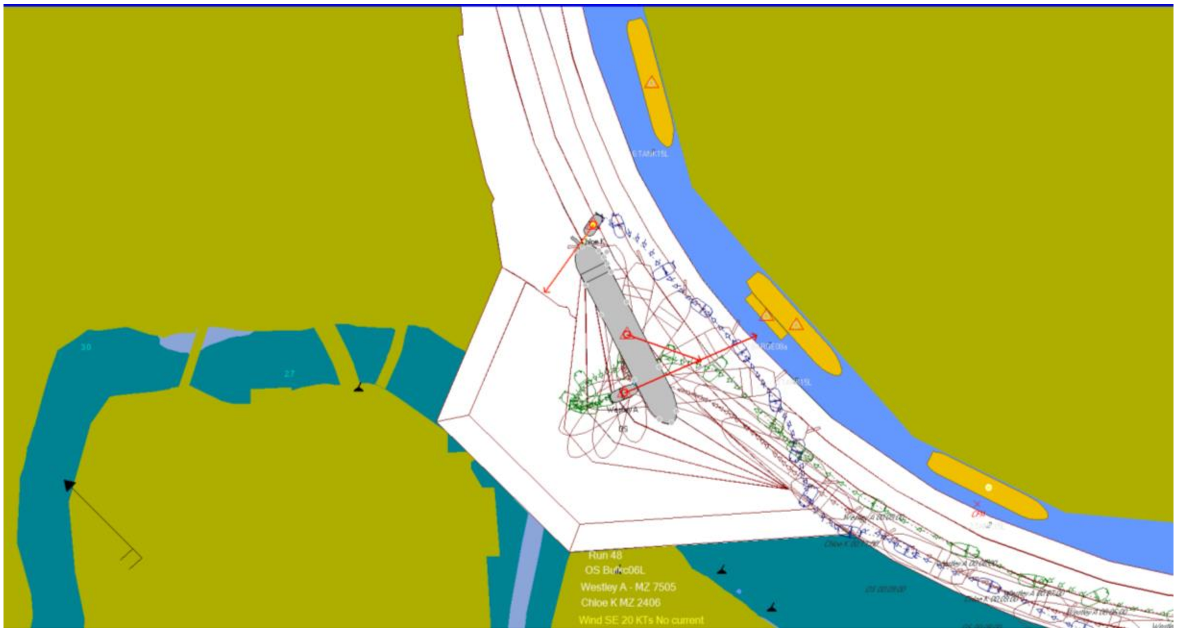


Figure 13. Panamax Turning in the Enlarged Brady Island Turning Basin

Findings for the Enlarged Brady Island Turning Basin

1. Successful turning maneuvers of the representative design test Panamax vessel with the assistance of available tugs in this enlarged turning basin with Panamax vessels at Wharfs 26, 27, and 28 and bunkering operations at these vessels can be accomplished in compliance with the Houston Pilots Simulation-Based Evaluation Standards of Care.

Appendix A: Pilot Cards for the Ship Models Used in the Simulations

PILOT CARD

MULCV14Q
Version 6

Ship's name MPI 14000 TEU ULCV **Date** ______

Call Sign MPI1 **Deadweight** 133500 tonnes **Year built** 2017

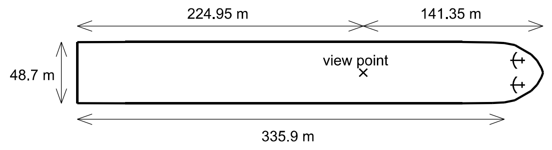
Draught aft 13.716 m / 45 ft 0 in **Forward** 13.716 m / 45 ft 0 in **Displacement** 157281 tonnes

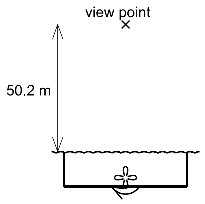
SHIP'S PARTICULARS

Length overall 365.7 m **Anchor chain:** **Port** 28.0 shackles **Starboard** 28.0 shackles

Breadth 48.7 m **Stern** ______ shackles

Bulbous bow Yes **(1 shackle = 27.432 m = 15 fathoms)**





PROPULSION PARTICULARS

Type of engine Diesel **Maximum power** 67699 kW (92045 hp)

Manoeuvring engine order		**RPM**	**Pitch**	**Speed (knots)**	
				Loaded	**Ballast**
Full sea speed	**1**	101.7			24.8
Full Ahead	**0.8**	89.8			22.4
Half Ahead	**0.5**	59.9			15.3
Slow Ahead	**0.25**	31.0			7.3
Dead Slow Ahead	**0.125**	20.0			4.9
Dead Slow Astern	**-0.125**	-20.0			
Slow Astern	**-0.25**	-31.0			
Half Astern	**-0.5**	-50.9			
Full Astern	**-1**	-66.9			

Time limit astern ______ min:sec

Full ahead to full astern ______ min:sec

Max. No. of consecutive starts ______

Minimum RPM ______ ______ knots

Astern power ______ % ahead

PILOT CARD

VLCC13X
Version 5

Ship's name Orion Voyager

Call Sign ____ **Deadweight** 156400 tonnes **Year built** ____

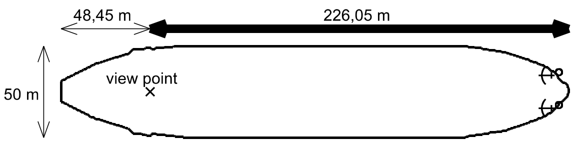
Draught aft 13.79 m / 45 ft 3 in **Forward** 11.22 m / 36 ft 10 in **Displacement** 122400 tonnes

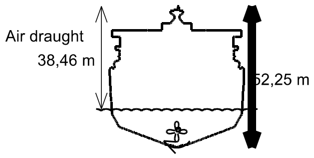
SHIP'S PARTICULARS

Length overall 274.5 m **Anchor chain:** **Port** 14.0 shackles **Starboard** 14.0 shackles

Breadth 50 m

Bulbous bow No **(1 shackle = 27,432 m = 15 fathoms)**





PROPULSION PARTICULARS

Type of engine Diesel **Maximum power** 14872 kW (20220 hp)

Manoeuvring engine order		**RPM**	**Pitch**	**Speed (knots)**	
				Loaded	**Ballast**
Full sea speed	**1**	91.0	N/A	N/A	16.4
Full Ahead	**0.8**	57.0	N/A	N/A	10.4
Half Ahead	**0.5**	46.0	N/A	N/A	8.4
Slow Ahead	**0.25**	35.0	N/A	N/A	6.4
Dead Slow Ahead	**0.125**	27.0	N/A	N/A	4.9
Dead Slow Astern	**-0.125**	-27.0	N/A		
Slow Astern	**-0.25**	-35.0	N/A		
Half Astern	**-0.5**	-46.0	N/A		
Full Astern	**-1**	-91.0	N/A		

PILOT CARD

TANK23L
Version 5

Ship's name Eagle Kangar

Call Sign 9V8472 **Deadweight** 107481 tonnes **Year built** 2010

Draught aft 12.2 m / 40 ft 0 in **Forward** 12.2 m / 40 ft 0 in **Displacement** 99250 tonnes

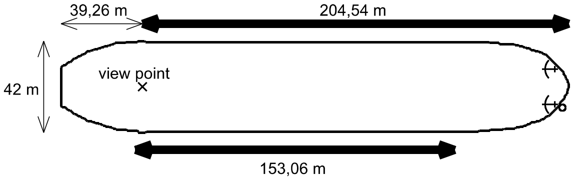
SHIP'S PARTICULARS

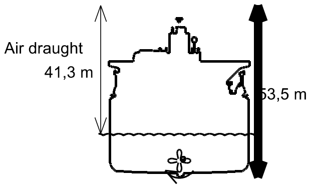
Length overall 243.8 m **Anchor chain:** **Port** 13.0 shackles **Starboard** 13.0 shackles

Breadth 42 m

Bulbous bow Yes

(1 shackle = 27,432 m = 15 fathoms)





PROPULSION PARTICULARS

Type of engine Diesel **Maximum power** 13557 kW (18432 hp)

Manoeuvring engine order		RPM	Pitch	Speed (knots)	
				Loaded	Ballast
Full sea speed	**1**	101.0	N/A	15.0	N/A
Full Ahead	**0.8**	75.0	N/A	11.2	N/A
Half Ahead	**0.5**	62.0	N/A	9.2	N/A
Slow Ahead	**0.25**	42.0	N/A	6.2	N/A
Dead Slow Ahead	**0.125**	35.0	N/A	5.1	N/A
Dead Slow Astern	**-0.125**	-35.0	N/A		
Slow Astern	**-0.25**	-42.0	N/A		
Half Astern	**-0.5**	-62.0	N/A		
Full Astern	**-1**	-75.0	N/A		

PILOT CARD

BULKC16
Version 1

Ship's name Fraiser River **Date**

Call Sign V7NS1 **Deadweight** 75000 tonnes **Year built** 1982

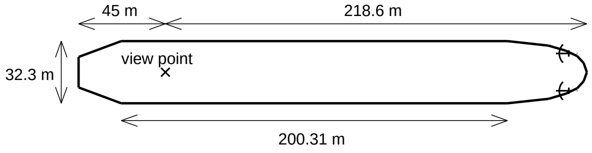
Draught aft 12.5 m / 41 ft 0 in **Forward** 12.5 m / 41 ft 0 in **Displacement** 85005 tonnes

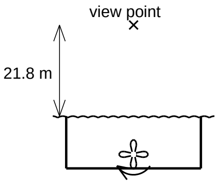
SHIP'S PARTICULARS

Length overall 265 m **Anchor chain:** **Port** 25.1 shackles **Starboard** 25.1 shackles

Breadth 32.3 m **Stern** shackles

Bulbous bow Yes **(1 shackle = 27.432 m = 15 fathoms)**





PROPULSION PARTICULARS

Type of engine Diesel **Maximum power** 10860 kW (14564 hp)

Manoeuvring engine order		**RPM**	**Pitch**	**Speed (knots)**	
				Loaded	**Ballast**
Full sea speed	**1**	94.0		14.5	
Full Ahead	**0.8**	81.0		12.6	
Half Ahead	**0.5**	60.0		9.3	
Slow Ahead	**0.25**	40.0		6.1	
Dead Slow Ahead	**0.125**	28.0		4.2	
Dead Slow Astern	**-0.125**	-28.0			
Slow Astern	**-0.25**	-40.0			
Half Astern	**-0.5**	-54.0			
Full Astern	**-1**	-81.0			

Time limit astern min:sec

Full ahead to full astern min:sec

Max. No. of consecutive starts

Minimum RPM knots

Astern power % ahead

PILOT CARD

BULKC06L
Version 15

Ship's name M/S Magnitogorsk

Call Sign A8IS3 **Deadweight** 22691 tonnes **Year built** 1976

Draught aft 11.5 m / 37 ft 9 in **Forward** 11.5 m / 37 ft 9 in **Displacement** 60920 tonnes

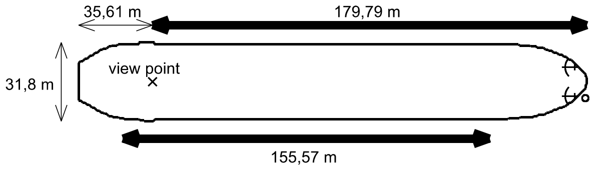
SHIP'S PARTICULARS

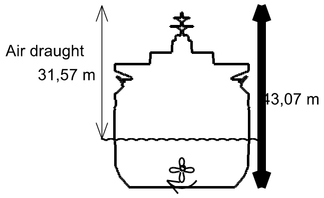
Length overall 215.4 m **Anchor chain: Port** 10.9 shackles **Starboard** 10.9 shackles

Breadth 31.8 m

Bulbous bow No

(1 shackle = 27,432 m = 15 fathoms)





PROPULSION PARTICULARS

Type of engine Diesel **Maximum power** 9180 kW (12481 hp)

Manoeuvring engine order		**RPM**	**Pitch**	**Speed (knots)**	
				Loaded	**Ballast**
Full sea speed	**1**	120.0	N/A	16.0	N/A
Full Ahead	**0.8**	108.6	N/A	14.4	N/A
Half Ahead	**0.5**	96.0	N/A	12.8	N/A
Slow Ahead	**0.25**	76.2	N/A	10.1	N/A
Dead Slow Ahead	**0.125**	45.0	N/A	6.0	N/A
Dead Slow Astern	**-0.125**	-45.0	N/A		
Slow Astern	**-0.25**	-70.2	N/A		
Half Astern	**-0.5**	-89.4	N/A		
Full Astern	**-1**	-96.0	N/A		

PILOT CARD

TUGBA21
Version 4

Ship's name MTY Tow 21

Call Sign ______ **Deadweight** 0 tonnes **Year built** 2002

Draught aft 2.28 m / 7 ft 6 in **Forward** 0.46 m / 1 ft 6 in **Displacement** 790 tonnes

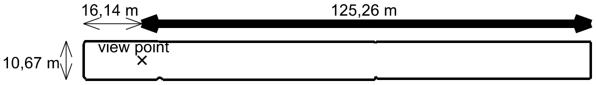
SHIP'S PARTICULARS

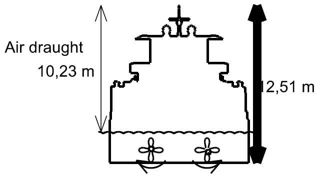
Length overall 141.4 m **Anchor chain:** **Port** ______ shackles **Starboard** ______ shackles

Breadth 10.67 m

Bulbous bow No

(1 shackle = 27,432 m = 15 fathoms)





PROPULSION PARTICULARS

Type of engine Diesel **Maximum power** 1177 kW (1600 hp)

Manoeuvring engine order		RPM	Pitch	Speed (knots)	
				Loaded	Ballast
Full sea speed	**1**	268.0	N/A	N/A	8.0
Full Ahead	**0.8**	237.8	N/A	N/A	7.3
Half Ahead	**0.5**	192.6	N/A	N/A	6.2
Slow Ahead	**0.25**	120.0	N/A	N/A	4.2
Dead Slow Ahead	**0.125**	32.0	N/A	N/A	1.1
Dead Slow Astern	**-0.125**	-32.0	N/A		
Slow Astern	**-0.25**	-120.0	N/A		
Half Astern	**-0.5**	-192.6	N/A		
Full Astern	**-1**	-268.0	N/A		

PILOT CARD

MS7505
Version 5

Ship's name THOR

Call Sign WDD8608 **Deadweight** 189 tonnes **Year built:** 2007

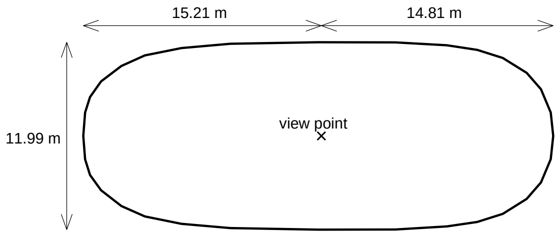
Draught aft 5.99 m / 19 ft 8 in **Forward** 5.85 m / 19 ft 2 in **Displacement** 733 tonnes

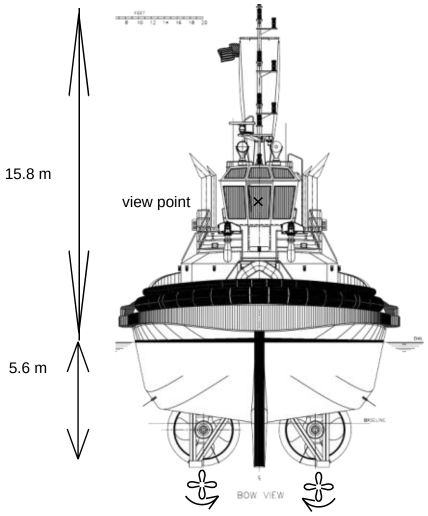
SHIP'S PARTICULARS

Length overall 30.02 m **Anchor chain:** **Port** ____ shackles **Starboard** ____ shackles

Breadth 11.99 m **Stern** ____ shackles

Bulbous bow No **(1 shackle = 27.432 m = 15 fathoms)**





PROPULSION PARTICULARS

Type of engine Diesel **Maximum power** 4633 kW (6299 hp)

Manoeuvring engine order		RPM Shaft	RPM Engine	Speed (knots)	
				Loaded	Ballast
Full speed	**1**	200.0	1800	12.2	
Ahead	**0.8**	168.0	1500	10.5	
Half Ahead	**0.5**	130.0	1200	8.7	
Quarter Ahead	**0.25**	100.0	950	6.5	
Slow Ahead	**0.125**	70.0	650	5.3	

Time limit astern ____ min:sec

Full ahead to full astern ____ min:sec

Max. No. of consecutive starts ____

Minimum RPM ____ ____ knots

Astern power ____ % ahead

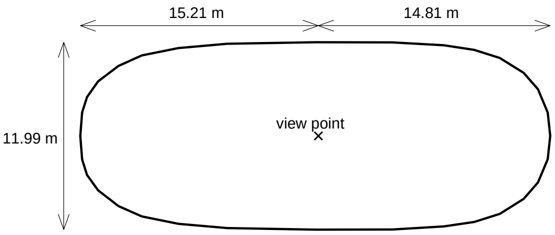
PILOT CARD

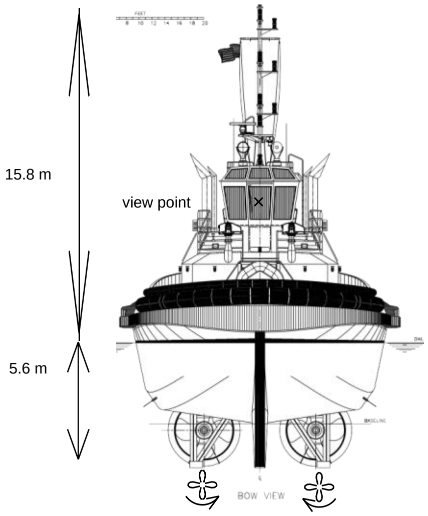
MZ7505
Version 5

Ship's name WESLEY A
Call Sign WDE 2433 **Deadweight** 189 tonnes **Year built:** 2007
Draught aft 5.99 m / 19 ft 8 in **Forward** 5.85 m / 19 ft 2 in **Displacement** 733 tonnes

SHIP'S PARTICULARS

Length overall 30.02 m **Anchor chain:** **Port** ____ shackles **Starboard** ____ shackles
Breadth 11.99 m **Stern** ____ shackles
Bulbous bow No
(1 shackle = 27.432 m = 15 fathoms)





PROPULSION PARTICULARS

Type of engine Diesel **Maximum power** 4633 kW (6299 hp)

Manoeuvring engine order		RPM Shaft	RPM Engine	Speed (knots)	
				Loaded	Ballast
Full speed	**1**	200.0	1800	12.2	
Ahead	**0.8**	168.0	1500	10.5	
Half Ahead	**0.5**	130.0	1200	8.7	
Quarter Ahead	**0.25**	100.0	950	6.5	
Slow Ahead	**0.125**	70.0	650	5.3	

Time limit astern ____ min:sec
Full ahead to full astern ____ min:sec
Max. No. of consecutive starts ____
Minimum RPM ____ ____ knots
Astern power ____ % ahead

Appendix B: Study Participants and Attendees

A partial list of participants of the ship maneuvering simulation study is provided below:

U.S. Army Corps of Engineers

- Dennis Webb
- Mario Sanchez
- Tim Shelton
- Tomas White

Gahagan & Bryant Associates, Inc.

- Dana Chaney
- Ashley Judith

Maritime Pilots Institute

- George Burkley
- Fernando Lagunes

Houston Pilots

- Capt. Tom Goodwin
- Capt. Gregg Brown
- Capt. John Bratcher
- Capt. Sean Arbogast
- Capt. Jason Briones
- Capt. Brandon Bass

San Jacinto Maritime Simulator

- Renee Hendrix
- John Gregg

G&H Towing

- Capt. Robin Sarvis
- Capt. Bobby Pytka
- Capt. Bobby Pytka

Waterway Simulation Technology

- Larry Daggett
- Chris Hewlett

Appendix C. Simulation Runs Performed in Support of the HSC 216 Study

Run No.	Channel Condition	Inbound Ship		Heading (deg) Initial Speed (knts)	Initial Position	Pilot	Outbound Ship		Heading (deg) Initial Speed (knts)	Initial Position	Pilot	Tide	Wind Direction/ Speed (knts)	Tugs	Notes	Run Comments
		Type	Draft (ft)				Type	Draft (ft)								
1 - Testing HSC Widened to 650 ft with Bend Wideners																
1a	650 ft	Container	45	10	18	B	Suezmax	45	10	57-58	A	Flood	SE/20	0	Meeting Below Red Fish	1st Run with environment - Familiarization - !st Meeting good; With only 2 pilots, the setup of the second run was problematic.
1b	650 ft	Container	45	10	Continue	B	Container	45	10	63-64	A	Flood	SE/20	0	Meeting Below Red Fish	2nd meeting very tight – outbound ship aground.
2	650 ft	Container	45	266/10	Bolivar Roads	B	Container	45	156/10	45-46	A	0.5/Fld	SE/20	0	Meeting Below Red Fish	Run to allow Pilot B to rerun previous run. Outbound ship over-steered in anticipation of bow wave - stern-to-stern collision.
3	650 ft	Container	45	336/10	31-32	B	Container	45	156/10	37-39	A	0	0	0	2 ship meeting in straight reach - no environmentals	B broke too soon and had too much drift angle..
4	650 ft	Container	45	336/10	31-32	B	Container	45	156/10	37-38	A	0	0	0	Trying a slower speed- limit break angle to 3 degrees. No enviornmentals	Large angle/LOA creates stern section & turn to port - recovery crosses C//L.
5	650 ft	Container	45	336/10	31-32	B	Tanker	45	156/10	37-38	A	0	0	0	Meeting with Suzmax/Neo-Panamax. No environmentals	Good Run
6	650 ft	Suezmax	45	336/10	31-32	B	Tanker	45	156/10	37-38	A	0.5/Ebb	SE/20	0	Add Environment	Suezmax Grounded
7	650 ft	Container	45	326/10	65-66	A	Tanker	45	146/10	73/74	B	0.5/Fld	SE/20	0	Move Up-bay	ULCV Grounded
8	650 ft	Container	45	326/10	65-66	A	Tanker	45	146/10	73-74	B	0.5/Fld	SE/20	0	Repeat run	Good run
9	650 ft	Container	45	326/10	65-66	A	Container	45	146/10	73-74	B	0.5/Fld	SE/20	0	Container to Container	Both vessels grounded
10	650 ft	Tanker	45	326/10	65-66	A	Tanker	45	146/10	73-74	B	0.5/Fld	SE/20	0	VLCC/VLCC	Good run
11	700 ft	Container	45	326/10	63-64	A	Container	45	146/10	71-72	B	0.5/Fld	SE/20	0	Check effects of a wider channel	Inbound vessel aground
12	700 ft	Container	45	326/10	63-64	A	Tanker	45	146/10	71-72	B	0.5/Fld	SE/20	0	Check effects of a wider channel - VLCC/VLCC	ULCV grounded
13	700 ft	Container	45	326/10	63-64	A	Container	45	146/10	71-72	B	0.5/Fld	SE/20	0	Reduce Containership (red) bank moment	Vessels passed, but very tight on channel toe
14	700 ft	Container	45	326/10	63-64	A	Container	45	146/10	71-72	B	0.5/Fld	SE/20	0	New vessel model with reduced bank moment & bow effect in ship/ship interaction	Good run. Pilots confirm Containership model is acceptable
15	650 ft	Container	45	326/10	63-64	A	Container	45	146/10	71-72	B	0.5/Fld	SE/20	0	Repeat #9	Good Run
16	650 ft	Container	45	336.5/10	29-30	B	Container	45	156/10	39-40	A	0.5/Ebb	SE/20	0	Clean Passing	Run with inbound @ 10 knts & outbound @ 14 knts
17	650 ft	Container	45	336.5/10	29-30	C	Tanker	45	156.3/10	39-40	D	0.5/Ebb	SE/20	0	2 new pilots - Start Suezmax meeting	Inbound ship grounded after meeting
18	650 ft	Container	45	336.5/10	29-30	C	Tanker	45	156.3/10	39-40	D	0.5/Ebb	SE/20	0	2 new pilots - Suezmax/Containership	Good meeting
19	650 ft	Container	45	336.5/10	29-30	D	Tanker	45	156.3/10	39-40	C	0.5/Ebb	SE/20	0	Switch Bridges	Containership close to bank
20	650 ft	Container	45	336.5/10	29-30	C	Container	45	156.3/10	37-38	D	0.5/Ebb	SE/20	0	2 Containerships meeting	Inbound container close to bank

Run No.	Channel Condition	Inbound Ship		Heading (deg) Initial Speed (knts)	Initial Position	Pilot	Outbound Ship		Heading (deg) Initial Speed (knts)	Initial Position	Pilot	Tide	Wind Direction/ Speed (knts)	Tugs	Notes	Run Comments
		Type	Draft (ft)				Type	Draft (ft)								
2 - Testing HSC Widened to 700 ft with Bend Wideners																
21	700 ft	Container	45	326.2/10	63-64	B	Container	45	146.5/10	71-72	C	0.5/Fld	SE/20	0	Wider channel - mid-bay reach	Successful Passing, but outbound ship rotated clockwise after passing
22	700 ft	Container	45	326.2/10	63-64	D	Container	45	146.5/10	71-72	A	0.5/Fld	SE/20	0	"	Good meeting
23	700 ft	Container	45	326.2/10	63-64	C	Container	45	146.5/10	71-72	B	0.5/Ebb	SE/20	0	Change currents	Good meeting
24	700 ft	Container	45	326.2/10	63-64	A	Container	45	146.5/10	71-72	D	0.5/Ebb	SE/20	0	Set up traffic meetings	Good meeting
							Tanker	45	161.8/10	81-82	B					Good meeting
25	700 ft	Container	45	326.2/10	65-66	B	Container	45	146.5/10	73-74	D	0.5/Fld	SE/20	0	Shorten Traffic separation	High speed 13.5 - Heeled & soft grounding
							Tanker	45	161.8/10	81-82	A					Stopped model - lost tanker model - no evaluation
26	700 ft	Container	45	326.2/10	65-66	B	Container	45	146.5/10	73-74	D	0.5/Fld	SE/20	0	Shorten Traffic separation	Rudder stuck at port after meeting on outbound ship; grounded on red side of channel
							Tanker	45	161.8/10	81-82	A					Meeting OK; passed grounded ship successfully
27	700 ft	Container	45	326.2/10	73-74	C	Container	45	161.8/10	81-82	D	0.5/Fld	SE/20	0	Meet in Red Fish Bend	Changed rudder to azipods on Bridges B & C
							Tanker	45	161.8/10	85-86	A				Meet above Bayport Ship Channel	
28	700 ft	Container	45	326.2/10	63-64	C	Container	45	146.5/10	73-74	D	1.3/Ebb	SE/20	0	Meeting with tow in barge channel - TUGBA21 conned by Pilot A	Inbound tow difficult to control during overtaking
29	700 ft	Container	45	326.2/10	65-66	A	Container	45	146.5/10	73-74	D	0.5/Ebb	SE/20	0	Repeat run 28 – Pilot E on Tow	Inbound tow difficult to control during overtaking
30	700 ft	Container	45	336.5/10	43-44	A	Container	45	146.5/10	53-54	D	0.5/Fld	SE/20	0	Meetings @ Red Fish	
							Tanker	45	146.5/10	57-58	E/D					
31	700 ft	Container	45	336.5/10	43-44	A	Tanker	45	146.5/10	55-56	D	0.5/Fld	SE/20	0	Meeting in Red Fish Bend	Inbound ship turned late; ended on red bank toeline
32	700 ft	Container	45	326.2/10	43-44	A	Container	45	146.5/10	55-56	D	0.5/Fld	SE/20	0	Meeting in Red Fish Bend / Change pilot visibility on Outbound ULCV	
3. Testing Widened HSC Channel (700 ft) - Entrance to Babours Cut Channel @ 455 ft Width																
33	700ft / 455 ft	Container	45	342/7	87-88	D						0.5/Ebb	SE/20	2	Tugs = Thor@C/L Aft-C; Wesley A@C/L Bow-I	Time clear of channel 29:20 into simulation
34	700ft / 455 ft	Container	45	342/7	87-88	I						0.5/Ebb	SE/20	2	Tugs = Thor@PB- H; Wesley A@C/L Aft- G	Time clear of channel 34 min. into simulation; Wesely went out of channel; Max wind limits for this ship are 15 knots; New pilot disregard run - No Evaluation
35	700ft / 455 ft	Container	45	342/3	89A-90A	C						0.5/Ebb	N/10	2	Tugs = Thor@PB- G; Wesley A@C/L Aft- H	Bow clear of channel @ 20 min., Tug clear @20:36
36	700ft / 455 ft						Container	45	080/0	Berth 2	A	0.5/Ebb	N/10	2	Tugs = Thor@C/L B- G; Wesley A@C/L Aft- H	Grounded on the Point/Turned too early
37	700ft / 455 ft						Container	45	080/0	Berth 2	A	0.5/Ebb	N/10	2	Tugs = Thor@C/L B- G; Wesley A@C/L Aft- H	Good

Run No.	Channel Condition	Inbound Ship		Heading (deg) Initial Speed (knts)	Initial Position	Pilot	Outbound Ship		Heading (deg) Initial Speed (knts)	Initial Position	Pilot	Tide	Wind Direction/ Speed (knts)	Tugs	Notes	Run Comments
		Type	Draft (ft)				Type	Draft (ft)								
38	700ft / 455 ft						Container	45	080/0	Berth 2	D	0.5/Ebb	SE/10	2	Tugs = Thor@C/L B- G; Wesley A@C/L Aft- H	Good
39	700ft / 455 ft	Container	45	342/3	89A-90A	C						0.5/Ebb	N/10	2	Tugs = Thor@C/L B- G; Wesley A@C/L Aft- H	Good
4. Testing Widened HSC Channel (700 ft) - Entrance to Bayport Ship Channel @ 455 ft Width																
40	700ft / 455-400ft	Container	45	328/8	73-74	A						0.5/Ebb	N/15	2	Tugs = Thor@C/L B- G; Wesley A@C/L Aft- H	Used RO/RO Turning Basin
41	700ft / 455-400ft	Container	45	328/8	73-74	C						0.5/Fld	SE/15	2	Tugs = Thor@C/L B- G; Wesley A@C/L Aft- H	Used RO/RO Turning Basin
42	700ft / 455-400ft						Container	45	089/4	Berth 2	D	0.5/Fld	SE/15	1	Tugs = Wesley A@C/L Aft- H	Simulation Stopped/Paused and restarted/finished OK
43	700ft / 455-400ft						Container	45	080/0	Berth 2	A	0.5/Ebb	N/15	0		
44	700ft / 455-400ft	Container	45	268/7	BSC 6-7	A					A	1.3/Ebb	N/15	2	Tugs = Thor@C/L B- G; Wesley A@C/L Aft- H; Transit through the terminal	Note: Channel ranges and C/L for 350' channel- visual and Raven; Drifted to South with wind forces
45	700ft / 455-400ft	Container	45	268/7	BSC 6-7	C						1.3/Ebb	N/15	2	Tugs = Thor@C/L B- G; Wesley A@C/L Aft- H; Transit through the terminal	Changed the tug use per tug mater's advice; used power indirect
5. Testing Enlarged Brady Island Turning Basin																
46	400ft x 41.5 ft	Bulker	37.7	250.5/4	Wharf 32	A						0/Ebb	N/15	2	Tugs= Wesley A@SS - H;Chloe K@C/L Aft- G	Panamax ships berthed at Wharfs 26-28 with bunker barge at Wharf 27
47	400ft x 41.5 ft	Bulker	37.7	250.5/4	Wharf 32	C						0/0	0	2	Tugs= Wesley A@SS - H;Chloe K@C/L Aft- G	Panamax ships berthed at Wharfs 26-28 with bunker barge at Wharf 27
48	400ft x 41.5 ft	Bulker	37.7	250.5/4	Wharf 32	A						0/0	SE/20	2	Tugs= Wesley A@SS - H;Chloe K@C/L Aft- G	Panamax ships berthed at Wharfs 26-28 with bunker barge at Wharf 27
6. Testing Widened and Deepened San Jacinto to Greens Bayou Channel (530 ft Wide x 46.5 ft Deep MLLW) (Texas 8 Bridge - to be replaced with a bridge spanning the navigation channel)																
49	530ft x 46.5 ft	Aframax	40	241.3/6.5	Shell	A	Suezmax	45	130.1/6.5	Greens Bayou	C	0.5/Ebb	SE20	0	Transit through Boggy Bayou - Greens Bayou	Grounded - do not meet 2 loaded ships in 530 ft channels with this combined beam
50	530ft x 46.5 ft	Aframax	40	241.3/6.5	Shell	A	Suezmax	45	130.1/6.5	Greens Bayou	C	0.5/Ebb	SE20	0	Transit through Boggy Bayou - Greens Bayou	Grounded
51	530ft x 46.5 ft	Aframax	28.2	241.3/6.5	Shell	A	Suezmax	45	095.6/5	Bridge	D	0.5/Fld	SE20	0	Transit through Boggy Bayou - Greens Bayou	Meet Light Aframax Tanker
52	530ft x 46.5 ft	Aframax	28.2	281.3/6	Bridge	A	Suezmax	45	126.9/5.5	Greens Bayou	C	0.5/Fld	SE20	0	Transit through Boggy Bayou - Greens Bayou	Meet Light Aframax Tanker
54	530ft x 46.5 ft	Suezmax	45	281.1/6.5	Bridge	C	Bulker	40	126.9/6	Greens Bayou	A	0.5/Fld	SE20	0	Transit through Boggy Bayou - Greens Bayou	

Run No.	Channel Condition	Inbound Ship		Heading (deg) Initial Speed (knts)	Initial Position	Pilot	Outbound Ship		Heading (deg) Initial Speed (knts)	Initial Position	Pilot	Tide	Wind Direction/ Speed (knts)	Tugs	Notes	Run Comments
		Type	Draft (ft)				Type	Draft (ft)								
55	530ft x 46.5 ft	Suezmax	45	242.4/5.5	Shell	C	Bulker	40	095.7/6	Bridge	A	0.5/Fld	SE20	0	Transit through Boggy Bayou - Greens Bayou	
56	530ft x 46.5 ft	Aframax	40	260/6	Shell	A	Bulker	37.7	107.1/6	Ammonia	D	1.3/Ebb	N20	0	Transit through Boggy Bayou - Greens Bayou	
57	530ft x 46.5 ft	Aframax	40	260/6	Shell	A	Bulker	37.7	107.1/6	Ammonia	K	1.3/Ebb	N20	0	Transit through Boggy Bayou - Greens Bayou	
58	530ft x 46.5 ft	Aframax	40	275/5.2	Kinder Morgan	A	Bulker	37.7	129.8/6	Greens Bayou	D	1.3/Ebb	N20	0	Transit through Boggy Bayou - Greens Bayou	
59	530ft x 46.5 ft	Bullker	37.7	275/6	Bridge	D	Aframax	40	131.4/6	Greens Bayou	A	1.3/Ebb	N20	0	Transit through Boggy Bayou - Greens Bayou	
60	530ft x 46.5 ft	Bullker	37.7	275/6	Bridge	K	Aframax	40	131.4/6	Greens Bayou	A	1.3/Ebb	SE20	0	Transit through Boggy Bayou - Greens Bayou	
63	530ft x 46.5 ft	Bullker	37.7	267.8/6	Shell	D	Suezmax	45	099.2/6	Bridge	A	1.3/Ebb	SE20	0	Transit through Boggy Bayou - Greens Bayou	
3. Testing Widened HSC Channel (700 ft) - Entrance to Barbours Cut Channel @ 455 ft Width																
61	700ft / 455 ft						Suezmax	45	081/3.5	Berth 2	A	1.3/Ebb	SE20	2	Tugs = Thor@C/L B- K; Wesley A@C/L Aft- D	Suezmax turn to North out of Barbours Cut; Two Houston Pilots handling the tugs
62	700ft / 455 ft						Suezmax	45	132.7/4.3	83-84	A	1.3/Ebb	SE20	2	Tugs = Thor@C/L B- K; Wesley A@C/L Aft- D	Suezmax inbound from the North to Barbours Cut; Two Houston Pilots handling the tugs

Ship Models Used in the HSC 216 Ship Maneuvering Simulation Study

					DRAFT					Length Overall		Breadth	
Model Name	Version	Ships Name	Dead Weight	Year Built	AFT M	A FT	FWD M	F FT	Displacement	Meters	Feet	Meters	Feet
BULKC06L	13	M/S Magnitogorsk	22691	1976	11.5	37.7	11.45	37.6	60920	215.4	706.5	31.8	104.3
TANK23L	5	EAGLE KANGAR	107481	2010	12.2	40.0	12.2	40.0	99250	244	799.7	42.0	137.8
BULKC16	1	FRAISER RIVER	75000	1982	12.5	41.0	12.5	41.0	85005	265	869.2	32.3	105.9
VLCC13X	5	ORION VOYAGER	156500	1994	13.8	45.2	11.2	36.8	122400	275	900.4	50.0	164.0
MULCV14T	2	MAERSK EDINBURGH	133500	2010	13.7	45.0	13.7	45.0	157281	367	1202.1	48.2	158.1

Pilot	Name	Tug Master	Name
A	**Capt. Tom Goodwin**	**F**	**Capt. Robin Sarvis**
B	**Capt. Gregg Brown**	**G**	**Capt. Bobby Pytka**
C	**Capt. John Bratcher**	**H**	**Capt. Shawn Elmore**
D	**Capt. Sean Arbogast**	**F**	**Capt. Robin Sarvis**
E	**Capt. George Burkley**	**G**	**Capt. Bobby Pytka**
I	**Capt. Jason Briones**	**H**	**Capt. Shawn Elmore**

Run No.	Channel Condition	Inbound Ship		Heading (deg) Initial Speed (knts)	Initial Position	Pilot	Outbound Ship		Heading (deg) Initial Speed (knts)	Initial Position	Pilot	Tide	Wind Direction/ Speed (knts)	Tugs	Notes	Run Comments
		Type	Draft (ft)				Type	Draft (ft)								
K	Capt. Brandon Bass															

Appendix D: A Sample Pilot Questionnaire

Run #:	**Date:**	**Simulator/Operator:**
Pilot:		**Ship's Initial Heading/Speed:**
Run Start Time:	**Run End Time:**	**HSC Bay Width:**
Start Location:		**End Location:**
Ship Model Used	**Container**	**Suezmax**
Travel Direction	**Inbound**	**Outbound**
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
Notes:		

1st Meeting (a)

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy Increasing Difficulty → Difficult
1 2 3 4 5 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe Increasing Safety → Safe
1 2 3 4 5 6 7 8 9 10

3 Comment(s)

2nd Meeting (b)

4 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy Increasing Difficulty → Difficult

1 2 3 4 5 6 7 8 9 10

5 Rate the overall safety of this run. Use “1” as unsafe and “5” as indicating average.

Unsafe Increasing Safety → Safe

1 2 3 4 5 6 7 8 9 10

6 Comment(s)

3rd Meeting (c)

7 Rate the difficulty of this run with the number “5” indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy Increasing Difficulty → Difficult

1 2 3 4 5 6 7 8 9 10

8 Rate the overall safety of this run. Use “1” as unsafe and “5” as indicating average.

Unsafe Increasing Safety → Safe

1 2 3 4 5 6 7 8 9 10

9 Comment(s)

Appendix E: Pilot Questionnaire Responses

The completed questionnaires by the conning pilot for each of the ship maneuvering simulated transits are provided in this appendix. The questionnaires included are the ones completed following runs after the final adjustments were made to the ship models. These questionnaires are published separately to conserve space in the main body of the report but are available on request.

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 14	**Date:** 11-13-17	**Simulator/Operator:**
Pilot: B		**Ship's Initial Heading/Speed:** 146/10
Run Start Time: 1641	**Run End Time:**	**HSC Bay Width:** 706
Start Location: 72-71		**End Location:**
Ship Model Used	[✓ **ULCV**]	**Suezmax**
Travel Direction	**Inbound**	[✓ **Outbound**]
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	SE/20	0.5/Fld
Notes: 14Q New Model red bank red bow moment		

Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy Increasing Difficulty → Difficult

1 2 3 4 5 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe Increasing Safety → Safe

1 2 3 4 5 6 7 8 9 10

3 Comment(s)

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 15

Date: 11-13-17

Simulator/Operator:

Pilot: B

Ship's Initial Heading/Speed: 146/10

Run Start Time: 1659

Run End Time:

HSC Bay Width: 650

Start Location: 73-74

End Location:

Ship Model Used	[✓ **ULCV**]	**Suezmax**
Travel Direction	**Inbound**	[✓ **Outbound**]
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	SE/20	0.5/ Fld

Notes: New Model 14Q
Red. bank effect
Red. Bow Effect Ship/Ship Interaction

Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 3 4 [✓ 5] 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 [✓ 4] 5 [✓ 6] 7 8 9 10

3 Comment(s)

More stable response of the meeting & rudder response much improved.

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 15

Date: 11-13-17

Simulator/Operator:

Pilot: A

Ship's Initial Heading/Speed: 326/10

Run Start Time: 1659

Run End Time:

HSC Bay Width: 650

Start Location: 65-66

End Location:

Ship Model Used	[✓ **ULCV**]	**Suezmax**
Travel Direction	[✓ **Inbound**]	**Outbound**
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	SE/20	0.5/Fld

Notes: New model 14Q
Red. bank effect
Red. Bow effect Ship/ship interaction

Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 [✓ 2] 3 4 5 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 5 6 7 8 [✓ 9] 10

3 Comment(s) REACTED NATURALLY AS TO REAL LIFE

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 16	**Date:** 11-14-17	**Simulator/Operator:** SIMC A/ Renee Hendrix
Pilot: B		**Ship's Initial Heading/Speed:** 336.5/10
Run Start Time: 0827	**Run End Time:**	**HSC Bay Width:** 650
Start Location: 29-30		**End Location:**
Ship Model Used	[✓ ULCV] QVZ	**Suezmax**
Travel Direction	[✓ Inbound]	**Outbound**
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	SE/20	0.5/Ebb
Notes: ULCV QVZ		

Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 3 4 5 [✓ 6] 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 [✓ 4] 5 6 7 8 9 10

3 Comment(s)

Sluggish Rudder response during meeting, bordering on Not being in absolute control.

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 16	**Date:** 11-14-17	**Simulator/Operator:** JJMC C/ Renee Hendrix	
Pilot: A		**Ship's Initial Heading/Speed:** 156.3/10	
Run Start Time: 0827	**Run End Time:**	**HSC Bay Width:** 650	
Start Location: 39-4		**End Location:**	
Ship Model Used	[✓ **ULCV**] Q UZ	**Suezmax**	
Travel Direction	**Inbound**	[✓ **Outbound**]	
Environmental Conditions	**Wind Dir. (from) / Speed** SE/20	**Tide/Flow** 0.5/Ebb	
Notes:			

Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 3 [✓ 4] 5 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 5 6 7 8 [✓ 9] 10

3 Comment(s) I FELT THE SPEED WAS UNREALISTIC IN PRACTICE BUT VESSEL PREFORMED AS EXPECTED

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 17	**Date:** 11-14-17	**Simulator/Operator:**	
Pilot: D		**Ship's Initial Heading/Speed:** 156.3/10	
Run Start Time: 0850	**Run End Time:**	**HSC Bay Width:** 650	
Start Location: 39-40		**End Location:**	
Ship Model Used	ULCV	[✓ Suezmax]	
Travel Direction	Inbound	[✓ Outbound]	
Environmental Conditions	Wind Dir. (from) / Speed	Tide/Flow	
	SE/10	0.5/Ebb	
Notes: First Run			

Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 3 [✓ 4] 5 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 5 6 7 [✓ 8] 9 10

3 Comment(s)

~~650~~ 325 500

Felt safe squat was significant but not realistic for our channel.

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 17

Date: 11-14-17

Simulator/Operator:

Pilot: C

Ship's Initial Heading/Speed: 336.5/10

Run Start Time: 0850

Run End Time:

HSC Bay Width: 650

Start Location: 29-30

End Location:

Ship Model Used	**ULCV**	[✓ **Suezmax**]
Travel Direction	[✓ **Inbound**]	**Outbound**
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	SE/20	0.5/Ebb

Notes:

Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 3 4 [✓ 5] 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 [✓ 5] 6 7 8 9 10

3 Comment(s)

MY SPEED WAS A LITTLE TOO FAST
OTHERWISE SEEMED FAIRLY "NORMAL"

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 18

Date: 11-14-17

Simulator/Operator:

Pilot: D

Ship's Initial Heading/Speed: 156.3/10

Run Start Time: 0918

Run End Time:

HSC Bay Width: 650

Start Location: 39-46

End Location:

Ship Model Used	ULCV	[✓ Suezmax]
Travel Direction	Inbound	[✓ Outbound]
Environmental Conditions	Wind Dir. (from) / Speed	Tide/Flow
	SE/20	0.5/Ebb

Notes: ~~Pilot stated he broke late~~ -

Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 [✓ 3] 4 5 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 5 6 7 [✓ 8] 9 10

3 Comment(s)

Very Comfortable

August 22, 2017

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 18	**Date:** 11-14-17	**Simulator/Operator:**
Pilot: C		**Ship's Initial Heading/Speed:** 336.5/10
Run Start Time: 0918	**Run End Time:**	**HSC Bay Width:** 650
Start Location: 29-30		**End Location:**

Ship Model Used	[✓ **ULCV**] QVZ	**Suezmax**
Travel Direction	[✓ **Inbound**]	**Outbound**
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	SE/20	0.5/Ebb

Notes:

Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 3 4 [✓ 5] 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 [✓ 5] 6 7 8 9 10

3 Comment(s)

FELT NORMAL
SPEED GOOD
GAVE A "KICK" TO MAINTAIN CONTROL COMING BACK
TO CENTER AFTER MTG

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 19	**Date:** 11-14-17	**Simulator/Operator:** A
Pilot: E D		**Ship's Initial Heading/Speed:** ~~156.3/10~~ 336.5/10
Run Start Time: 0935	**Run End Time:**	**HSC Bay Width:** 650
Start Location: ~~39-40~~ 29-30		**End Location:**

Ship Model Used	[✓ ULCV]	~~Suezmax~~
Travel Direction	[✓ Inbound]	~~Outbound~~
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	SE/20	0.5 / Ebb
Notes:		

Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 3 [✓ 4] 5 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 5 [✓ 6] 7 8 9 10

3 Comment(s)

still getting use to maneuvering characteristics of design vessel.

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 19	**Date:** 11-14-17	**Simulator/Operator:** C	
Pilot: ~~B~~ C		**Ship's Initial Heading/Speed:** ~~331.5/10~~ 156.3/10	
Run Start Time: 0935	**Run End Time:**	**HSC Bay Width:** 650	
Start Location: ~~29-30~~ 39-40		**End Location:**	
Ship Model Used	~~ULCV~~	[✓ Suezmax]	
Travel Direction	~~Inbound~~	[✓ Outbound]	
Environmental Conditions	Wind Dir. (from) / Speed	Tide/Flow	
	SE/20	0.5/Ebb	
Notes:			

Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 3 4 5 [✓ 6] 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 [✓] 5 6 7 8 9 10

3 Comment(s)

STEERING FAILURE CAUSED A HIGH LEVEL OF DISCOMFORT

SLIGHTLY SLUGGISH

SLOWER RUDDER

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 20	**Date:** 11-14-17	**Simulator/Operator:** A	
Pilot: C		**Ship's Initial Heading/Speed:** 156.3/10	
Run Start Time: 0955	**Run End Time:**	**HSC Bay Width:** 650	
Start Location: 39-40		**End Location:**	
Ship Model Used	[✓ ULCV] Q V2	Suezmax	
Travel Direction	Inbound	[✓ Outbound]	
Environmental Conditions	Wind Dir. (from) / Speed	Tide/Flow	
	SE/20	0.5/Ebb	
Notes:			

Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 3 4 5 6 7 [✓ 8] 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 [✓] 4 5 6 7 8 9 10

3 Comment(s)

NOT SURE OF THE REACISM OF THE RECOVERY/SWING/ANGLE
HAD A HARD SWING BACK TO PORT AFTER MEETING THEN
SHIP "SNAPPED" BACK TO STARBOARD - USED A LOT OF
HARD OVER COMMANDS TO CHECK SHIP
IF THIS IS ACURATE THEN WE'RE RUNNING AT THE

August 22, 2017

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 20	**Date:** 11-14-17	**Simulator/Operator:** C
Pilot: D		**Ship's Initial Heading/Speed:** 356.5/10
Run Start Time: 0955	**Run End Time:**	**HSC Bay Width:** 650
Start Location: 29-30		**End Location:**
Ship Model Used	[✓ **ULCV** QVZ]	**Suezmax**
Travel Direction	[✓ **Inbound**]	**Outbound**
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	SE/20	0.5/Ebb
Notes:		

Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 3 4 5 6 [✓ 7] 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 5 6 [✓ 7] 8 9 10

3 Comment(s)

Ship ran a little was worried about overcorrection and sterns colliding but recovered in significant time

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 21	**Date:** 11-14-17	**Simulator/Operator:**	
Pilot: C		**Ship's Initial Heading/Speed:** 146.5/10	
Run Start Time: 1031	**Run End Time:**	**HSC Bay Width:** 706	
Start Location: 71-72		**End Location:**	
Ship Model Used	[✓ **ULCV**]	**Suezmax**	
Travel Direction	**Inbound**	[✓ **Outbound**]	
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**	
	SE/20	0.5/Fld	
Notes:			

Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 3 4 5 6 [✓ 7] 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 [✓ 4] 5 6 7 8 9 10

3 Comment(s)

DECENT RUN
SPEED GOOD
QUESTIONABLE REACTION OF SHIP AFTER MEETING
SHIP COMES BACK TOWARD CENTER AFTER MEETING
AND THEN TAKES HARD RUN BACK TO PORT (UNREALISTIC)

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 21	**Date:** 11-14-17	**Simulator/Operator:** A	
Pilot: B		**Ship's Initial Heading/Speed:** 3263/10	
Run Start Time: 1031	**Run End Time:**	**HSC Bay Width:** 700	
Start Location: 63-64		**End Location:**	
Ship Model Used	[✓ ULCV]	Suezmax	
Travel Direction	[✓ Inbound]	Outbound	
Environmental Conditions	Wind Dir. (from) / Speed	Tide/Flow	
	SE/20	0.5/~~[illegible]~~Fld	
Notes:			

Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 3 4 5 [✓ 6] 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 [✓ 4] 5 6 7 8 9 10

3 Comment(s)

Vessel responded to Rudder
Very well, distance on stb qtr
close still. Rudder response

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 22	**Date:** 11-14-17	**Simulator/Operator:** C	
Pilot: A		**Ship's Initial Heading/Speed:** 146.5/10	
Run Start Time: 1053	**Run End Time:**	**HSC Bay Width:** 700	
Start Location: 71-72		**End Location:**	
Ship Model Used	[✓ ULCV] Q2	**Suezmax**	
Travel Direction	**Inbound**	[✓ **Outbound**]	
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**	
	55/20	0.5/Fld	
Notes:			

Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 [✓ 3] 4 5 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 5 6 7 [✓ 8] 9 10

3 Comment(s) VESSEL BEHAVED AS EXPECTED

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 22	**Date:** 11-14-17	**Simulator/Operator:** A
Pilot: D		**Ship's Initial Heading/Speed:** 326.2/10
Run Start Time: 1053	**Run End Time:**	**HSC Bay Width:** 700
Start Location: 63-64		**End Location:**
Ship Model Used	[✓ **ULCV**] Q2	**Suezmax**
Travel Direction	[✓ **Inbound**]	**Outbound**
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	SE/120	0.5/Fld
Notes:		

Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 3 4 5 [✓ 6] 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 5 6 [✓ 7] 8 9 10

3 Comment(s) still getting use to size of ship

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 23	**Date:** 11-14-17	**Simulator/Operator:** A
Pilot: C		**Ship's Initial Heading/Speed:** 326.2/10
Run Start Time: 1106	**Run End Time:**	**HSC Bay Width:** 700
Start Location: 63-64		**End Location:**
Ship Model Used	[✓ **ULCV** Q2]	**Suezmax**
Travel Direction	[✓ **Inbound**]	**Outbound**
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	SE/20	0.5/Ebb
Notes:		

Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 3 4 [✓ 5] 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 [✓ 5] 6 7 8 9 10

3 Comment(s)

SEEMED LIKE EVERYTHING SET UP WELL

GOOD SPD

GOOD DISTANCE

MUCH BETTER WITH WIDER CHANNEL

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 23	**Date:** 11-14-17	**Simulator/Operator:** B
Pilot: B		**Ship's Initial Heading/Speed:** 146.5/
Run Start Time: 1106	**Run End Time:**	**HSC Bay Width:** 706
Start Location: 71-72		**End Location:**

Ship Model Used	[✓ ULCVQ2]	Suezmax
Travel Direction	Inbound	[✓ Outbound]
Environmental Conditions	Wind Dir. (from) / Speed	Tide/Flow
	SE/20	0.5/Ebb
Notes:		

Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 3 4 [✓ 5] 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 5 [✓ 6] 7 8 9 10

3 Comment(s)

Meeting + Recovery went well. P>S
meeting was again somewhat unrealistic.

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 221	**Date:** 11-14-17	**Simulator/Operator:** A
Pilot: A		**Ship's Initial Heading/Speed:** 326.2 /10
Run Start Time: 1157	**Run End Time:**	**HSC Bay Width:** 700
Start Location: 63-64		**End Location:**
Ship Model Used	[✓ **ULCV**QZ]	**Suezmax**
Travel Direction	[✓ **Inbound**]	**Outbound**
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	SE/20	0.5/Ebb
Notes: Traffic Test		

1st Meeting (a)

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 [✓ 3] 4 5 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 5 6 7 [✓ 8] 9 10

3 Comment(s) As Expected

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

2nd Meeting (b)

10 Rate the difficulty of this run with the number “5” indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy Increasing Difficulty → Difficult

1 [✓ 2] 3 4 5 6 7 8 9 10

11 Rate the overall safety of this run. Use “1” as unsafe and “5” as indicating average.

Unsafe Increasing Safety → Safe

1 2 3 4 5 6 7 8 [✓ 9] 10

12 Comment(s) As EXPECTED

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 24a	**Date:** 11-14-17	**Simulator/Operator:**
Pilot: D		**Ship's Initial Heading/Speed:** 146.5/10
Run Start Time: 1157	**Run End Time:**	**HSC Bay Width:** 700
Start Location: 71-72		**End Location:**

Ship Model Used	[✓ **ULCV** Q2]	**Suezmax**
Travel Direction	**Inbound**	[✓ **Outbound**]
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	SE/20	0.5/Ebb

Notes:

Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy Increasing Difficulty → Difficult

1 2 [✓ 3] 4 5 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe Increasing Safety → Safe

1 2 3 4 5 6 7 [✓ 8] 9 10

3 Comment(s) Getting Use to Model

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 246	**Date:** 11-14-17	**Simulator/Operator:**	
Pilot: · B		**Ship's Initial Heading/Speed:** 161.8/10	
Run Start Time: 1157	**Run End Time:**	**HSC Bay Width:** 700	
Start Location: 81-82		**End Location:**	
Ship Model Used	**ULCV**	[✓ **Suezmax**]	
Travel Direction	**Inbound**	[✓ **Outbound**]	
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**	
	SE/20	0.5/Ebb	
Notes: Transit Bend then meet			

Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 3 [✓ 4] 5 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 5 6 [✓ 7] 8 9 10

3 Comment(s)

Good Run, Suez reacted very well on this simulation.

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 25	**Date:** 11-14-17	**Simulator/Operator:** A	
Pilot: B		**Ship's Initial Heading/Speed:** 326.2/10	
Run Start Time: ~~1250~~ 1306 restart	**Run End Time:**	**HSC Bay Width:** 700	
Start Location: 65-66		**End Location:**	
Ship Model Used	[✓ ULCV]	Suezmax	
Travel Direction	[✓ Inbound]	Outbound	
Environmental Conditions	Wind Dir. (from) / Speed	Tide/Flow	
	SE/20	0.5/Fld	
Notes:			

1st Meeting (a)

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 3 [✓ 4] 5 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 [✓ 5] 6 7 8 9 10

3 Comment(s)

Meeting went well, Rudder response better before & after meeting?

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

4th Meeting (4)

10 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 3 4 [✓ 5] 6 7 8 9 10

11 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 [✓ 5] 6 7 8 9 10

12 Comment(s)

Turn into Bayport at 11 kts slow ROT at start of turn but did achieve 24° ROT for successful turn – but grounding then occurred, unexplained!!

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 266	**Date:** 11-14-17	**Simulator/Operator:** B
Pilot: A		**Ship's Initial Heading/Speed:** 161.8/10
Run Start Time: 1306 restart ~~1250~~	**Run End Time:**	**HSC Bay Width:** 700
Start Location: 81-82		**End Location:**
Ship Model Used	**ULCV**	[✓ **Suezmax**]
Travel Direction	**Inbound**	[✓ **Outbound**]
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	SE/20	0.5/Fld
Notes:		

Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 [✓ 3] 4 5 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 5 6 7 [✓ 8] 9 10

3 Comment(s) As EXPECTED

August 22, 2017

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 25a	**Date:** 11-14-17	**Simulator/Operator:** C
Pilot: D		**Ship's Initial Heading/Speed:** 146.5/10
Run Start Time: 1306 ~~1259~~ ~~restart~~	**Run End Time:**	**HSC Bay Width:** 700
Start Location: 73-74		**End Location:**

Ship Model Used	[✓ ULCV] 22	Suezmax
Travel Direction	Inbound	[✓ Outbound]
Environmental Conditions	Wind Dir. (from) / Speed	Tide/Flow
	SE/10	0.5/Fld

Notes:

Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 3 [✓ 4] 5 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 [✓ 5] 6 7 8 9 10

3 Comment(s)

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 27	**Date:** 11-14-17	**Simulator/Operator:** A
Pilot: C		**Ship's Initial Heading/Speed:** 376.2/10
Run Start Time: 1417	**Run End Time:**	**HSC Bay Width:** 700
Start Location: 73-74		**End Location:**

Ship Model Used	[✓ **ULCV** Q2]	**Suezmax**
Travel Direction	[✓ **Inbound**]	**Outbound**
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	SE/20	1.3 ~~05~~/Ebb

Notes:

1st Meeting (a)

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 3 4 5 6 7 8 9 [✓ 10]

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 [✓ 3] 4 5 6 7 8 9 10

3 Comment(s)

FAIRLY UNREALISTIC IN TERMS OF DIST. BETWEEN
SHIPS - MADE IT WORK - TRIED TO KEEP SPD
DOWN - NOT SURE IN REAL LIFE IF I WOULD
HAVE BEEN ABLE TO KEEP SHIP ON BANK TO MEET
2ND SHIP

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

~~4th~~ 2nd Meeting (~~4~~ b)

10 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy Increasing Difficulty → Difficult

1 2 3 4 5 6 7 8 [✓ 9] 10

11 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe Increasing Safety → Safe

1 2 [✓ 3] 4 5 6 7 8 9 10

12 Comment(s)

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 27a	**Date:** 11-14-17	**Simulator/Operator:** C
Pilot: D		**Ship's Initial Heading/Speed:** 161.8/10
Run Start Time: 1417	**Run End Time:**	**HSC Bay Width:** 700
Start Location: 81-82		**End Location:**
Ship Model Used	[✓ ULCVQ2]	**Suezmax**
Travel Direction	**Inbound**	[✓ **Outbound**]
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	SE/20.	1.3 [illegible]/Ebb
Notes:		

Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 [✓ 3] 4 5 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 5 6 7 [✓ 8] 9 10

3 Comment(s)

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 27 b	**Date:** 11-14-17	**Simulator/Operator:** 1
Pilot: A		**Ship's Initial Heading/Speed:** 161.8/10
Run Start Time: 1417	**Run End Time:**	**HSC Bay Width:** 706
Start Location: 85-86		**End Location:**
Ship Model Used	ULCV	[✓ Suezmax]
Travel Direction	Inbound	[✓ Outbound]
Environmental Conditions	Wind Dir. (from) / Speed	~~Tide~~/Flow
	SE/140	1.3 ~~[illegible]~~/Ebb
Notes:		

Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 [✓ 3] 4 5 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 5 6 7 8 [✓ 9] 10

3 Comment(s) VESSEL HANDLED THE MANUVER AS EXPECTED

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 28	**Date:** 11-14-17	**Simulator/Operator:** A
Pilot: C		**Ship's Initial Heading/Speed:** 326.2/10
Run Start Time: 1453	**Run End Time:**	**HSC Bay Width:** 700
Start Location: 65-66		**End Location:**

Ship Model Used	[✓ **ULCV**Q2]	**Suezmax**
Travel Direction	[✓ **Inbound**]	**Outbound**
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	SE/20	1.3/Ebb

Notes: Mtg with Tows

Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 3 4 5 6 7 8 [✓ 9] 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 [✓ 3] 4 5 6 7 8 9 10

3 Comment(s)

I CALL THIS ONE A FAILURE DUE TO BANK TO BANK DRIVING

2. TOWS WERE NOT A CONCERN - THE CONCERN FOR ME WAS THE 'RUN' THE SHIP TOOK TO PORT

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 28	**Date:** 11-14-17	**Simulator/Operator:** C	
Pilot: D		**Ship's Initial Heading/Speed:** 146.5/10	
Run Start Time: 1453	**Run End Time:**	**HSC Bay Width:** 700	
Start Location: 73-74		**End Location:**	
Ship Model Used	[✓ ULCVQ2]	Suezmax	
Travel Direction	Inbound	[✓ Outbound]	
Environmental Conditions	Wind Dir. (from) / Speed	Tide/Flow	
	SE/20	1.3/Ebb	
Notes: Mtg with Tows			

Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 3 4 5 6 [✓ 7] 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 [✓ 3] ~~4~~ 5 6 7 8 9 10

3 Comment(s)

August 22, 2017

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 28	**Date:** 11-14-17	**Simulator/Operator:** B
Pilot: A		**Ship's Initial Heading/Speed:** 326.2/5
Run Start Time: 1453	**Run End Time:**	**HSC Bay Width:** 700
Start Location:		**End Location:**

Ship Model Used	~~ULCV~~ TugBAZ1	**Suezmax**
Travel Direction	[✓ **Inbound**]	**Outbound**
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	SE/20	1.3/Ebb

Notes:

Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 3 4 [✓ 5] 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 [✓ 5] 6 7 8 9 10

3 Comment(s) VESSEL INTERACTION WAS MUCH LIKE REAL LIFE

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 29

Date: 11-14-

Simulator/Operator: A

Pilot: A

Ship's Initial Heading/Speed: 326.2/10

Run Start Time: 1519

Run End Time:

HSC Bay Width: 700

Start Location: 63-64

End Location:

Ship Model Used	[✓ ULCV Q2]	Suezmax
Travel Direction	[✓ Inbound]	Outbound
Environmental Conditions	Wind Dir. (from) / Speed	Tide/Flow
	SE/20	0.5/Ebb

Notes:

Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 [✓ 3] 4 5 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 5 6 [✓ 7] 8 9 10

3 Comment(s) As EXPECTED

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 29

Date: 11-14-19

Simulator/Operator: C

Pilot: D

Ship's Initial Heading/Speed: 146.5/10

Run Start Time: 1519

Run End Time:

HSC Bay Width: 700

Start Location: 73-74

End Location:

Ship Model Used	[✓ **ULCV** Q2]	**Suezmax**
Travel Direction	**Inbound**	[✓ **Outbound**]
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	SE/20	0.5/Ebb

Notes:

Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 3 [✓ 4] 5 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 5 6 [✓ 7] 8 9 10

3 Comment(s)

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 29	**Date:** 11-14-17	**Simulator/Operator:** B
Pilot: E		**Ship's Initial Heading/Speed:** 326.2/5
Run Start Time:	**Run End Time:**	**HSC Bay Width:** 700
Start Location: 65-66		**End Location:**
Ship Model Used	**ULCV**	~~**Suezmax**~~ TugBA21
Travel Direction	[✓ **Inbound**]	**Outbound**
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	SE/20	0.5/Ebb
Notes:		

Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 3 4 5 6 7 8 9 [✓ 10]

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 [✓ 3] 4 5 6 7 8 9 10

3 Comment(s)

I DROVE THE TOWBOAT Along THE TOE of THE CHANNEL AT 5Kn AND THE HEAD of THE TOW WAS slightly To THE left AND INSIDE THE CHANNEL EDGE. THE OVERTAKING SHIP @ 9Kn Dragged THE HEAD of THE barge INTO THE CHANNEL. I Could NOT Control THE TOW.

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 30	**Date:** 11-14-17	**Simulator/Operator:** A
Pilot: A		**Ship's Initial Heading/Speed:** 336.5/10
Run Start Time: 1540	**Run End Time:**	**HSC Bay Width:** 700
Start Location: 43-44		**End Location:**
Ship Model Used	[✓ **ULCV**] Q2	**Suezmax**
Travel Direction	[✓ **Inbound**]	**Outbound**
Environmental Conditions	**Wind Dir. ~~(from)~~ / Speed**	**Tide/Flow**
	SE/140	0.5/Fld
Notes: Mtgs around Red Fish		

1st Meeting (a)

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 [✓ 3] 4 5 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 5 6 7 [✓ 8] 9 10

3 Comment(s) AS EXPECTED

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

~~4th~~ 2nd Meeting (~~d~~ b)

10 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 3 [✓ 4] 5 6 7 8 9 10

11 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 [✓ 5] 6 7 8 9 10

12 Comment(s) THE WIDENER MADE IT DIFFICULT TO ~~[illegible]~~ BE IN POSITION FOR THE MEETING

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 30
Date: 11-14-17
Simulator/Operator: C
Pilot: D
Ship's Initial Heading/Speed: 146.3/10
Run Start Time: 1540
Run End Time:
HSC Bay Width: 700
Start Location: 53-54
End Location:

Ship Model Used	[✓ **ULCVQ2**]	**Suezmax**
Travel Direction	**Inbound**	[✓ **Outbound**]
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	SE/20	0.5/Fld

Notes: Mtg below Red Fish

Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 3 4 [✓ 5] 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 5 6 [✓ 7] 8 9 10

3 Comment(s)

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 30	**Date:** 11-14-17	**Simulator/Operator:** B
Pilot: E/D		**Ship's Initial Heading/Speed:** 146.3/10
Run Start Time: 1540	**Run End Time:**	**HSC Bay Width:** 700
Start Location: 57-58		**End Location:**
Ship Model Used	**ULCV**	[✓ **Suezmax**]
Travel Direction	**Inbound**	[✓ **Outbound**]
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	SE/20	0.5/Fld
Notes: Mtg above Red Fish		

Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 [✓ 2] 3 4 5 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 5 6 7 [✓ 8] 9 10

3 Comment(s)

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 31	**Date:** 11-14-17	**Simulator/Operator:** A
Pilot: A		**Ship's Initial Heading/Speed:** 336.1/10
Run Start Time: 1604	**Run End Time:**	**HSC Bay Width:** 700
Start Location: 43-46		**End Location:**
Ship Model Used	[✓ ULCV G2]	Suezmax
Travel Direction	[✓ Inbound]	Outbound
Environmental Conditions	Wind Dir. (from) / Speed	Tide/Flow
	SE/20	0.5/Fld
Notes: Mtg in Red Fish		

Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

[✓ 1] 2 3 4 5 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 5 6 7 8 9 [✓ 10]

3 Comment(s) MEETING HAD NO ISSUES WIDENER IS ALITTLE EXCESSIVE IN MY OPINION

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 31	**Date:** 11-14-17	**Simulator/Operator:** C
Pilot: D		**Ship's Initial Heading/Speed:** 146.6/10
Run Start Time: 1604	**Run End Time:**	**HSC Bay Width:** 700
Start Location: 55-56		**End Location:**
Ship Model Used	**ULCV**	[✓ **Suezmax**]
Travel Direction	**Inbound**	[✓ **Outbound**]
Environmental Conditions	**Wind Dir. (from) / Speed**	**~~Tide~~/Flow**
	SE/20	0.5/Fld
Notes: Mtg in Red Fish		

Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 [✓ 2] 3 4 5 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 5 6 7 8 [✓ 9] 10

3 Comment(s)

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 32	**Date:** 11-14-17	**Simulator/Operator:** A
Pilot: A		**Ship's Initial Heading/Speed:** 336.1 /10
Run Start Time: 1621	**Run End Time:**	**HSC Bay Width:** 700
Start Location: 43-46		**End Location:**

Ship Model Used	[✓ **ULCV**Q2]	**Suezmax**
Travel Direction	[✓ **Inbound**]	**Outbound**
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	SE/20	0.5/Fld

Notes: Mtg in RedFish

Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 [✓ 2] 3 4 5 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 5 6 7 8 [✓ 9] 10

3 Comment(s) WIDENER DOES INCREASE MARGIN OF SAFETY, BUT MY OPINION STILL NOT NEEDED

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 32	**Date:** 11-14-17	**Simulator/Operator:** C
Pilot: D		**Ship's Initial Heading/Speed:** 146.6/110
Run Start Time: 1621	**Run End Time:**	**HSC Bay Width:** 700
Start Location: 55-56		**End Location:**

Ship Model Used	[✓ **ULCV** T2]	**Suezmax**
Travel Direction	**Inbound**	[✓ **Outbound**]
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	SE/20	0.5/Fld

Notes: Mtg in Red Fish

Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy Increasing Difficulty → Difficult

1 2 [✓ 3] 4 5 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe Increasing Safety → Safe

1 2 3 4 5 6 7 [✓ 8] 9 10

3 Comment(s)

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 33	**Date:** 11-15-17	**Simulator/Operator:** A	
Pilot: D		**Ship's Initial Heading/Speed:** 342 / 7	
Run Start Time: 0840	**Run End Time:**	**HSC Bay Width:** 700	**BCC Flare:**
Start Location: 87-8B		**End Location:** Berth 1	
Ship Model Used	[✓ ULCV]	Tug MS7505 - 2 ~~Suezmax~~	
Travel Direction	[✓ Inbound]	**Outbound**	
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**	
	SE/20	0.5/Ebb	

Notes: Tugs Thor - I stern & Wesely A - A bow ℄
Time Clear of Channel - 29:20 into Simulation

Entry at Flare

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult
1 2 [✓ 3] 4 5 6 7 8 9 10

Difficulty is the large ship, Getting it slowed + turned

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe
1 2 3 4 5 6 7 8 [✓ 9] 10

3 Comment(s)

August 22, 2017

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Transit Channel

4 Rate the difficulty of this run with the number “5” indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult
1 [✓ 2] 3 4 5 6 7 8 9 10

5 Rate the overall safety of this run. Use “1” as unsafe and “5” as indicating average.

Unsafe — Increasing Safety → — Safe
1 2 3 4 5 6 7 8 [✓ 9] 10

6 Comment(s)

Turn in _________ Turning ~~Basin~~ B-Cut FLARE

7 Rate the difficulty of this run with the number “5” indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult
1 [✓ 2] 3 4 5 6 7 8 9 10

8 Rate the overall safety of this run. Use “1” as unsafe and “5” as indicating average.

Unsafe — Increasing Safety → — Safe
1 2 3 4 5 6 7 8 [✓ 9] 10

9 Comment(s)

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Approach to Terminal

10 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy Increasing Difficulty → Difficult

1 [✓ 2] 3 4 5 6 7 8 9 10

11 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe Increasing Safety → Safe

1 2 3 4 5 6 7 8 [✓ 9] 10

12 Comment(s)

August 22, 2017

Run 33

Tom wench easy
Jason safe

@ 2kts Stem push to pull to all stop maintain defficult to control
backing could do better if on port bow

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 34	**Date:** 11-~~15~~-17	**Simulator/Operator:** A	
Pilot: I		**Ship's Initial Heading/Speed:** 342/7	
Run Start Time: 0928	**Run End Time:**	**HSC Bay Width:** 700	**BCC Flare:**
Start Location: 87-88		**End Location:**	

Ship Model Used	[✓ **ULCV**]	Tugs MS78 cs ~~**Suezmax**~~
Travel Direction	[✓ **Inbound**]	**Outbound**
Environmental Conditions	**Wind Dir. ~~(from)~~ / Speed**	**Tide/Flow**
	SE/20	0.5/Ebb

Notes: ~~Thor~~ Wesley A. stern ℄ - H ~~Bow~~ ~~Wesley~~ A-Port Bow - G
Thor to Port Shoulder
Time Clear of Channel 34 min Wesely - out of Channel
Wind above limit of of 15 knts
New Pilot - disregard - No Eval

Entry at Flare

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 3 4 5 6 7 8 [✓ 9] 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 [✓ 5] 6 7 8 9 10

3 Comment(s)

FIRST TIME IN SIMULATOR.
ISSUE WAS PILOT ERROR.

August 22, 2017

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

~~**Transit Channel**~~

~~4 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.~~

~~Easy Increasing Difficulty → Difficult~~

~~1 2 3 4 5 6 7 8 9 10~~

~~5 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.~~

~~Unsafe Increasing Safety → Safe~~

~~1 2 3 4 5 6 7 8 9 10~~

~~6 Comment(s)~~

Turn in __________ Turning Basin

7 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy Increasing Difficulty → Difficult

1 2 [✓ 3] 4 5 6 7 8 9 10

8 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe Increasing Safety → Safe

1 2 3 4 5 6 7 [✓ 8] 9 10

9 Comment(s)

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Approach to Terminal

10 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy Increasing Difficulty → Difficult

1 2 3 4 5 6 7 8 9 10

11 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe Increasing Safety → Safe

1 2 3 4 5 6 7 8 9 10

12 Comment(s)

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 35	**Date:** 11-15-17	**Simulator/Operator:** A	
Pilot: C		**Ship's Initial Heading/Speed:** 342/3	
Run Start Time: 1010	**Run End Time:**	**HSC Bay Width:** 700	**BCC Flare:**
Start Location: 89A-90A		**End Location:**	

Ship Model Used	[✓ ULCV 7Z]	Thor ℄B 7506 - G **Suezmax** Wesely A ℄A 7505 - H
Travel Direction	[✓ **Inbound**]	**Outbound**
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	N/10	0.5/Ebb

Notes: Bow clear of channel @ 20 min
Bow tug " " " @ 20:36 min

Entry at Flare

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 3 4 5 6 [✓ 7] 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 [✓ 5] 6 7 8 9 10

3 Comment(s)

GOOD DISTANCE TO ENTER FLARE

August 22, 2017

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Approach to Terminal

10 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy Increasing Difficulty → Difficult

1 2 3 4 5 6 [✓ 7] 8 9 10

11 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

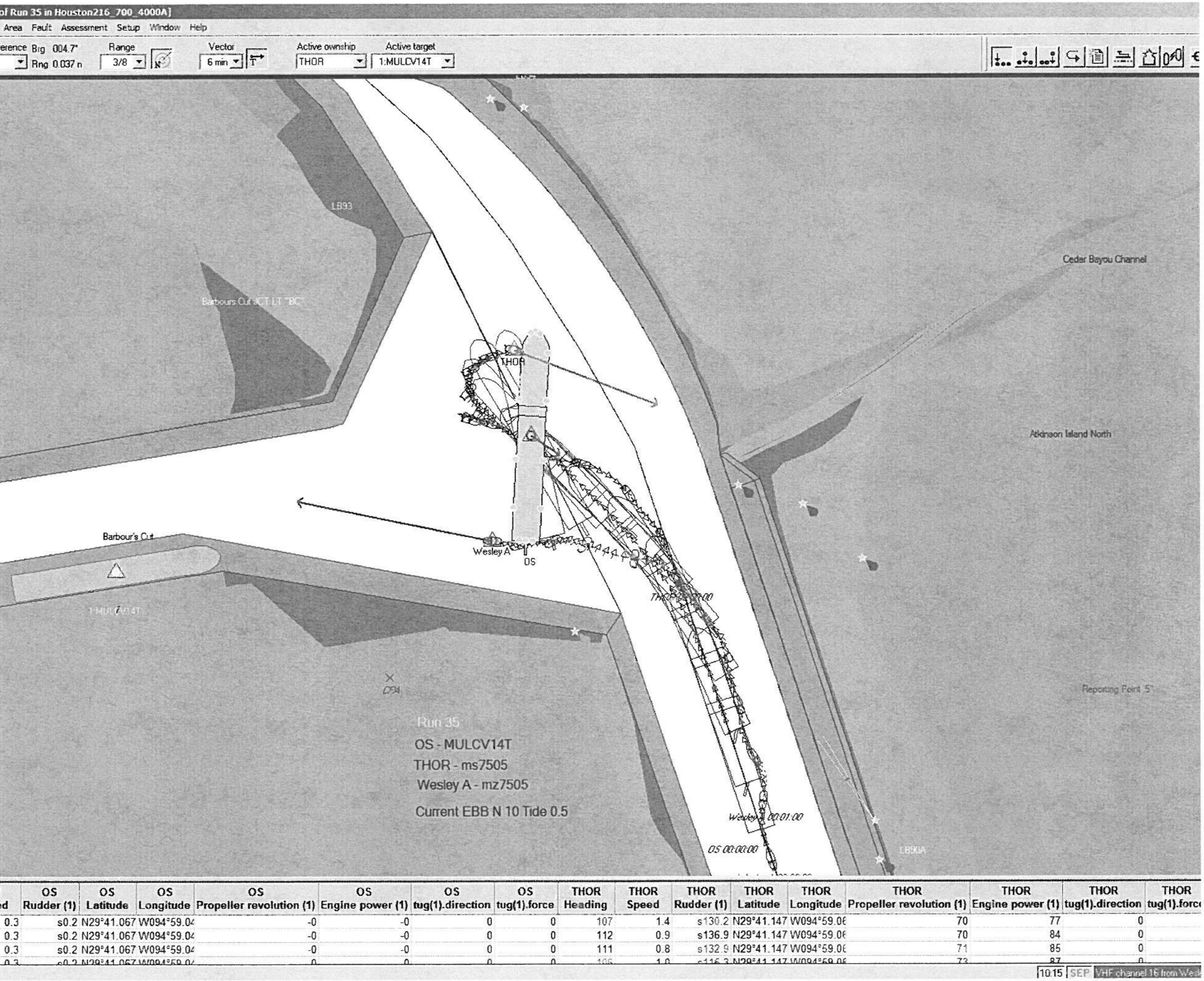
Unsafe Increasing Safety → Safe

1 2 3 4 5 6 7 8 9 10

12 Comment(s)

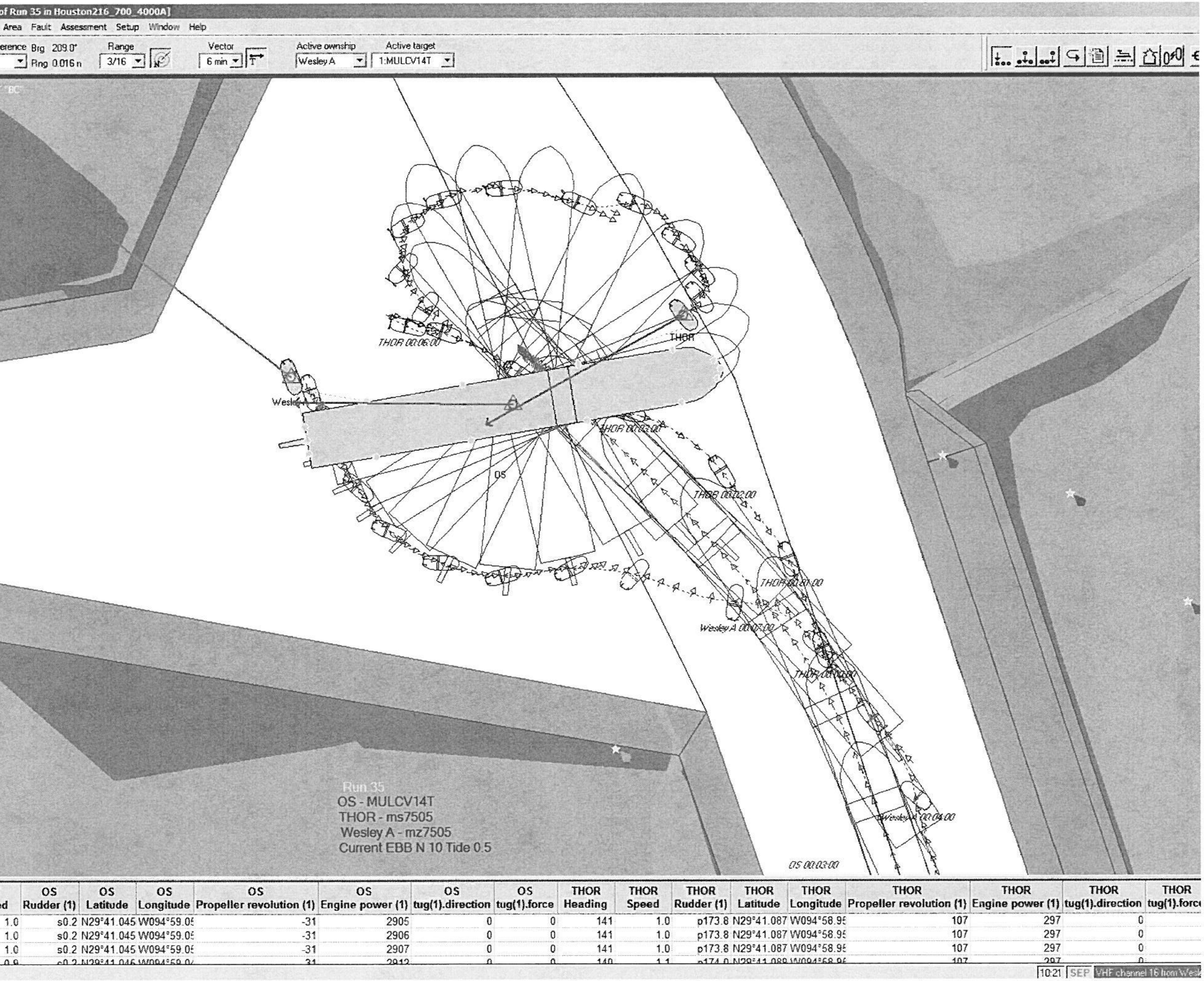
GOOD SPACING BETWEEN SHIP / DOCKS
AND NORTH SIDE
THIS DISTANCE IS GOOD AND SHOULD BE
THE MIN - SHOULD NOT LESSEN THE DISTANCE

August 22, 2017



Run 35
OS - MULCV14T
THOR - ms7505
Wesley A - mz7505
Current EBB N 10 Tide 0.5

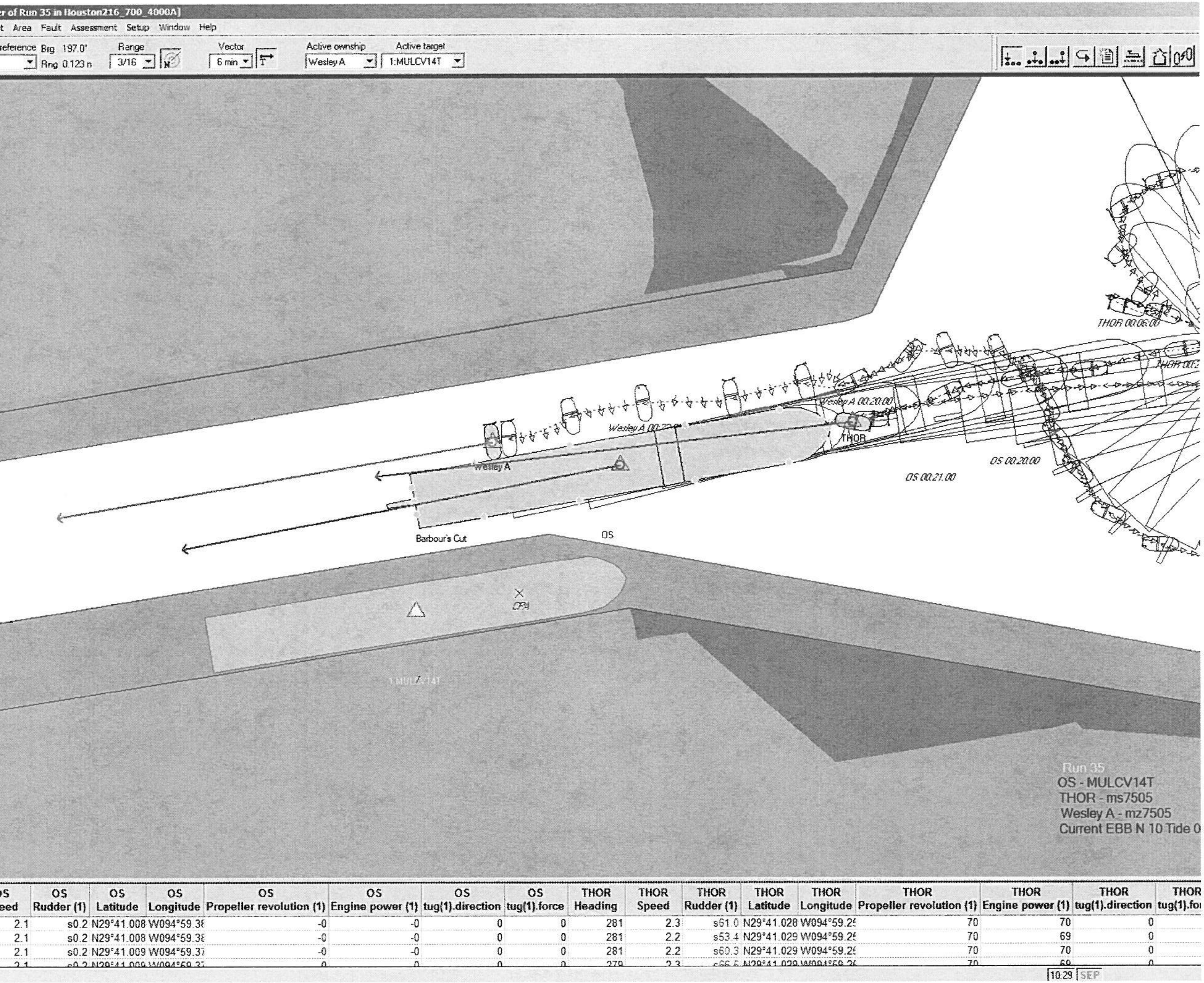
d	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).forc
0.3	s0.2	N29°41.067	W094°59.04	-0	-0	0	0	107	1.4	s130.2	N29°41.147	W094°59.06	70	77	0	
0.3	s0.2	N29°41.067	W094°59.04	-0	-0	0	0	112	0.9	s136.9	N29°41.147	W094°59.06	70	84	0	
0.3	s0.2	N29°41.067	W094°59.04	-0	-0	0	0	111	0.8	s132.9	N29°41.147	W094°59.06	71	85	0	



Run 35
OS - MULCV14T
THOR - ms7505
Wesley A - mz7505
Current EBB N 10 Tide 0.5

d	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).forc
1.0	s0.2	N29°41.045	W094°59.05	-31	2905	0	0	141	1.0	p173.8	N29°41.087	W094°58.95	107	297	0	
1.0	s0.2	N29°41.045	W094°59.05	-31	2906	0	0	141	1.0	p173.8	N29°41.087	W094°58.95	107	297	0	
1.0	s0.2	N29°41.045	W094°59.05	-31	2907	0	0	141	1.0	p173.8	N29°41.087	W094°58.95	107	297	0	
0.9	s0.2	N29°41.046	W094°59.0	-31	2912	0	0	140	1.1	p174.0	N29°41.089	W094°58.9	107	297	0	

August 22, 2017



Run 35
OS - MULCV14T
THOR - ms7505
Wesley A - mz7505
Current EBB N 10 Tide 0

OS eed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).fo
2.1	s0.2	N29°41.008	W094°59.38	-0	-0	0	0	281	2.3	s61.0	N29°41.028	W094°59.25	70	70	0	
2.1	s0.2	N29°41.008	W094°59.38	-0	-0	0	0	281	2.2	s53.4	N29°41.029	W094°59.25	70	69	0	
2.1	s0.2	N29°41.009	W094°59.37	-0	-0	0	0	281	2.2	s60.3	N29°41.029	W094°59.25	70	70	0	

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 36	**Date:** 11-15-17	**Simulator/Operator:** A	
Pilot: A		**Ship's Initial Heading/Speed:** 080/0	
Run Start Time: 1052	**Run End Time:**	**HSC Bay Width:** 700	**BCC Flare:**
Start Location: Berth 2		**End Location:**	
Ship Model Used	[✓ ULCVT2]	Tug Thor - CLB 7505 G ~~Suezmax~~ Wesley A-CLA 7505 F	
Travel Direction	Inbound	[✓ Outbound]	
Environmental Conditions	Wind Dir. (from) / Speed	Tide/Flow	
	N/10	0.5/Ebb	
Notes:			

Entry at Flare

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 3 4 [✓ 5] 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 [✓ 4] 5 6 7 8 9 10

3 Comment(s) UNDERESTIMATED THE ROT SPEED AT TURN

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Transit Channel

4 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy Increasing Difficulty → Difficult
1 2 3 4 5 6 7 8 9 10

5 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe Increasing Safety → Safe
1 2 3 4 5 6 7 8 9 10

6 Comment(s)

Turn in __________ Turning Basin

7 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy Increasing Difficulty → Difficult
1 2 3 4 5 6 7 8 9 10

8 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe Increasing Safety → Safe
1 2 3 4 5 6 7 8 9 10

9 Comment(s)

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 37	**Date:** 11-15-17	**Simulator/Operator:** A	
Pilot: A		**Ship's Initial Heading/Speed:** 080/0	
Run Start Time: 1110	**Run End Time:**	**HSC Bay Width:** 700	**BCC Flare:**
Start Location: Berth 2		**End Location:**	

Ship Model Used	[✓ **ULCVT2**]	**Suezmax**
Travel Direction	**Inbound**	[✓ **Outbound**]
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	N/10	0.5/Ebb

Notes:

Entry at Flare

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 [✓ 3] 4 5 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 5 6 [✓ 7] 8 9 10

3 Comment(s) WAS ABLE TO MAKE THE MANUVER WITH MINIMUM EXTERNAL FORCE

August 22, 2017

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Transit Channel

4 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy Increasing Difficulty → Difficult
1 2 3 4 5 6 7 8 9 10

5 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe Increasing Safety → Safe
1 2 3 4 5 6 7 8 9 10

6 Comment(s)

Turn in __________ Turning Basin

7 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy Increasing Difficulty → Difficult
1 2 3 4 5 6 7 8 9 10

8 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe Increasing Safety → Safe
1 2 3 4 5 6 7 8 9 10

9 Comment(s)

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Approach to Terminal

10 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy Increasing Difficulty → Difficult

1 2 3 4 5 6 7 8 9 10

11 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe Increasing Safety → Safe

1 2 3 4 5 6 7 8 9 10

12 Comment(s)

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 38	**Date:** 11-15-17	**Simulator/Operator:** A	
Pilot: C		**Ship's Initial Heading/Speed:** 080/0	
Run Start Time: 1211	**Run End Time:**	**HSC Bay Width:** 700	**BCC Flare:**
Start Location: Berth Z		**End Location:**	
Ship Model Used	[✓ ULCVT2]	Thor - ℄B G ~~Suezmax~~ 7505 Wesley - ℄A H 7505	
Travel Direction	Inbound	[✓ Outbound]	
Environmental Conditions	Wind Dir. (from) / Speed	Tide/Flow	
	SE/10	0.5/Fld	
Notes:			

Entry at Flare

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 [✓ 2] 3 4 5 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 5 6 7 [✓ 8] 9 10

3 Comment(s)

August 22, 2017

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Transit Channel

4 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy Increasing Difficulty → Difficult

1 [✓ 2] 3 4 5 6 7 8 9 10

5 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe Increasing Safety → Safe

1 2 3 4 5 6 7 [✓ 8] 9 10

6 Comment(s)

Turn in __________ Turning Basin

7 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy Increasing Difficulty → Difficult

1 2 3 4 5 6 7 8 9 10

8 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe Increasing Safety → Safe

1 2 3 4 5 6 7 8 9 10

9 Comment(s)

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Approach to Terminal

10 Rate the difficulty of this run with the number “5” indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy Increasing Difficulty → Difficult

1 [✓ 2] 3 4 5 6 7 8 9 10

11 Rate the overall safety of this run. Use “1” as unsafe and “5” as indicating average.

Unsafe Increasing Safety → Safe

1 2 3 4 5 6 7 8 [✓ 9] 10

12 Comment(s)

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 39	**Date:** 11-15-17	**Simulator/Operator:** A	
Pilot: C		**Ship's Initial Heading/Speed:** 342.1/3	
Run Start Time: 1138	**Run End Time:**	**HSC Bay Width:** 700	**BCC Flare:**
Start Location: 89A-90A		**End Location:**	
Ship Model Used	[✓ ULCV T2]	**Suezmax**	
Travel Direction	[✓ Inbound]	**Outbound**	
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**	
	N/10	0.5/Ebb	
Notes:			

Entry at Flare

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 3 4 [✓ 5] 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 [✓ 5] 6 7 8 9 10

3 Comment(s)

NICE SAFE TURN WITH WIDE FLARE

August 22, 2017

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
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Transit Channel

4 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy Increasing Difficulty → Difficult
1 2 [✓] 3 4 5 6 7 8 [✓] 9 10

5 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe Increasing Safety → Safe
1 2 [✓ 3] 4 5 6 7 8 9 10

6 Comment(s)

WITH ONLY 10KTS OF WIND - SHIP WANTED TO 'FALL' DOWN ON SHIPS - HAVE TO KEEP SPD DOWN SO WIND HAS GREATER EFFECT - I BELIEVE AT MAX LIMIT WITH WIND - OTHERWISE YOU HAVE TO CARRY MORE SPD

Turn in __________ Turning Basin

7 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy Increasing Difficulty → Difficult
1 2 3 [✓ 4] 5 [✓ 6] 7 8 9 10

8 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe Increasing Safety → Safe
1 2 3 [✓] 4 5 6 7 8 9 10

9 Comment(s)

HAVE TO MAKE SURE YOU USE THE WEST SIDE OF T.B. OTHERWISE YOU WILL RUN OUT OF ROOM ON BOW AS YOU TURN

WILL BE VERY TIGHT WITH NORTH WIND AND

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Approach to Terminal

10 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 3 [✓ 4] 5 [✓ 6] 7 8 9 10

11 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 [✓ 3] 4 5 6 7 8 9 10

12 Comment(s)

WILL BE TIGHT WITH NORTH WIND WITH SHIP AT 4 AND POINT AT ENTRY TO T.B.

August 22, 2017

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Pilot Evaluation of Simulation Run
November 2017

Run #: 40	**Date:** 11-15-17	**Simulator/Operator:** A	
Pilot: A		**Ship's Initial Heading/Speed:** 326/8	
Run Start Time: 1331	**Run End Time:**	**HSC Bay Width:** 700	**BSC Flare:**
Start Location: 73-74		**End Location:**	
Ship Model Used	[✓ ULCVT2]	Thor BL-G ~~Suezmax~~ 7566 Wesley LA-H 7505	
Travel Direction	[✓ Inbound]	**Outbound**	
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**	
	N/15	0.5/Ebb	
Notes:			

Entry at Flare

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 [✓ 2] 3 4 5 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 5 6 7 8 [✓ 9] 10

3 Comment(s) DESIGN OF FLARE IS A DESIRABLE LEVEL OF SAFETY

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Transit Channel

4 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 [✓ 2] 3 4 5 6 7 8 9 10

5 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 5 6 7 8 [✓ 9] 10

6 Comment(s) NO ISSUES

Turn in FWD BAYPORT BASIN Turning Basin

7 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 3 4 [✓ 5] 6 7 8 9 10

8 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 5 6 7 [✓ 8] 9 10

9 Comment(s) BASIN ~~WAS~~ SAFETY MARGINS WERE ACCEPTABLE

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Approach to Terminal

10 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 3 [✓ 4] 5 6 7 8 9 10

11 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 5 6 7 [✓ 8] 9 10

12 Comment(s) DOCKING EVOLUTION WAS UNDER CONTROL. MORE WATER COULD HAVE BEEN UTILIZED, TO CREATE MORE DISTANCE SKIN TO SKIN, BUT THE MANUVER WAS INDICITIVE OF MY NORMAL DOCKING APPROACH

August 22, 2017

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 41	**Date:** 11-15-17	**Simulator/Operator:** A	
Pilot: G		**Ship's Initial Heading/Speed:** 326.1 /8	
Run Start Time: 1436	**Run End Time:**	**HSC Bay Width:** 700	**BDC Flare:**
Start Location: 73-74		**End Location:**	
Ship Model Used	[✓ ULCVT2]	Thor ₵B -G ~~Suezmax~~ 7505 Wesley ₵A -H 7505	
Travel Direction	[✓ Inbound]	**Outbound**	
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**	
	SE/15	0.5/Fld	
Notes:			

Entry at Flare

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 3 4 [✓ 5] 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 [✓ 5] 6 7 8 9 10

3 Comment(s)

GOOD ROOM FOR A SAFE ENTRY INTO FLARE

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Transit Channel

4 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 3 4 [✓ 5] 6 7 8 9 10

5 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 [✓ 5] 6 7 8 9 10

6 Comment(s)

KEPT MY SPD A LITTLE FASTER THAN I NORMALLY WOULD BECAUSE OF STRONG WIND - ONLY PROBLEM WAS SHIP HAD A HARD TIME SLOWING DOWN AS WE WERE APPROACHING THE T.B.

Turn in __________ Turning Basin

7 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 3 4 5 6 7 [✓ 8] 9 10

8 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 [✓] 4 5 6 7 8 9 10

9 Comment(s)

LOTS OF ROOM BUT AGAIN - NEED TO MAKE SURE TO DRIVE FURTHER TO WEST INTO LARGER PORTION OF T.B.

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Approach to Terminal

10 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy Increasing Difficulty → Difficult
1 2 3 4 5 6 7 [✓ 8] 9 10

11 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe Increasing Safety → Safe
1 2 3 [✓ 4] 5 6 7 8 9 10

12 Comment(s)

A TIGHT BUT VERY DOABLE MANEUVER
THATS MORE DIFFICULT DUE TO THE WIND
I WAS USING THE TUGS UP TO THEIR LIMIT
TO MAKE SURE THE SHIP STAYED ON TRACK

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 42	**Date:** 11-15-17	**Simulator/Operator:** A	
Pilot: D		**Ship's Initial Heading/Speed:** 089/4	
Run Start Time: 1529	**Run End Time:**	**HSC Bay Width:**	**BSC Flare:**
Start Location: Berth 2		**End Location:**	

Ship Model Used	[✓ **ULCV**TZ]	Wesely A-H ~~**Suezmax**~~ 7505
Travel Direction	**Inbound**	[✓ **Outbound**]
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	SE/15	0.5/Ebb

Notes: Simulation stopped @ 12:40 - paused & restarted

Entry at Flare

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 [✓ 2] 3 4 5 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 5 6 7 8 9 [✓ 10]

3 Comment(s)

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Transit Channel

4 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy Increasing Difficulty → Difficult

1 [✓ 2] 3 4 5 6 7 8 9 10

5 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe Increasing Safety → Safe

1 2 3 4 5 6 7 8 [✓ 9] 10

6 Comment(s)

Turn in __________ Turning Basin

7 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy Increasing Difficulty → Difficult

1 2 3 4 5 6 7 8 9 10

8 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe Increasing Safety → Safe

1 2 3 4 5 6 7 8 [✓ 9] 10

9 Comment(s)

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HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Approach to Terminal

10 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy Increasing Difficulty → Difficult

1 2 3 4 5 6 7 8 9 10

11 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe Increasing Safety → Safe

1 2 3 4 5 6 7 8 [✓ 9] 10

12 Comment(s)

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 43	**Date:** 11-15-17	**Simulator/Operator:** A	
Pilot: A ~~B~~		**Ship's Initial Heading/Speed:** 089/4.5	
Run Start Time: 1601	**Run End Time:**	**HSC Bay Width:** 700	**BCC Flare:** 4000
Start Location: Bertha Z		**End Location:**	

Ship Model Used	[✓ ULCVTZ]	~~Worley A-H 7565~~ ~~Suezmax~~ O Tugs
Travel Direction	Inbound	[✓ Outbound]
Environmental Conditions	Wind Dir. (from) / Speed	Tide/Flow
	N/15	0.5/ Fld
Notes: ~~Sim Stopped 12:40 paused rebooted & restarted~~		

Entry at Flare

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 [✓ 2] 3 4 5 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 5 6 7 8 9 [✓ 10]

3 Comment(s) WORKED AS DESIGNED

August 22, 2017

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
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Transit Channel

4 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy Increasing Difficulty → Difficult

1 2 [✓ 3] 4 5 6 7 8 9 10

5 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe Increasing Safety → Safe

1 2 3 4 5 6 7 8 [✓ 9] 10

6 Comment(s) VESSEL PREFORMED AS EXPECTED

Turn in __________ Turning Basin

7 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy Increasing Difficulty → Difficult

1 2 3 4 5 6 7 8 9 10

N/A

8 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe Increasing Safety → Safe

1 2 3 4 5 6 7 8 9 10

9 Comment(s)

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Approach to Terminal

10 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 3 4 5 6 7 8 9 10

N/A

11 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 5 6 7 8 9 10

12 Comment(s)

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 44

Date: 11-16-17

Simulator/Operator: A

Pilot: A

Ship's Initial Heading/Speed: 268/7

Run Start Time: 0829

Run End Time:

HSC Bay Width: 700

BSC Flare: 4000

Start Location: 6-7

End Location:

Ship Model Used	[✓ ULCV-T2]	Thor B℄ - H ~~Suezmax~~ Wesely A℄ - G
Travel Direction	[✓ Inbound]	**Outbound**
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	N/15	1.3 / Ebb

Notes:

Transit Past Terminals
~~Entry at Flare~~

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 3 4 5 6 7 [✓ 8] 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 [✓ 4] 5 6 7 8 9 10

3 Comment(s) LACK OF NEEDED TUG HORSEPOWER

FELT THAT WIND EFFECT WAS UNREALISTIC

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: A15	**Date:** 11-16-17	**Simulator/Operator:** A	
Pilot: C		**Ship's Initial Heading/Speed:** 268/7	
Run Start Time:	**Run End Time:**	**HSC Bay Width:** 700	**HSC Flare:** 4000
Start Location: BSC 6-7		**End Location:**	
Ship Model Used	[✓ ULCV T2]	Suezmax	
Travel Direction	[✓ Inbound]	Outbound	
Environmental Conditions	Wind Dir. (from) / Speed	Tide/Flow	
	N/10	1.3/Ebb	
Notes:			

Transit thru terminal ~~Entry at Flare~~

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 3 4 5 6 7 [✓ 8] 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 [✓ 3-4] 5 6 7 8 9 10

3 Comment(s)

STRONG WIND - HAVE TO STAY ON NORTH SIDE OTHERWISE STERN WILL BE TOO CLOSE TO SHIPS ON DOCK

~~MAXED OUT ON~~

3-4 TUGS RECOMMENDED

August 22, 2017

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 45
Date: 11-16-17
Simulator/Operator: A

Pilot: C
Ship's Initial Heading/Speed: 268/7

Run Start Time:
Run End Time:
HSC Bay Width: 700
BSC Flare: 4000

Start Location: BSC 6-7
End Location:

Ship Model Used	[✓ **ULCV** T2]	Thor B¢ Worely A¢ ~~**Suezmax**~~
Travel Direction	[✓ **Inbound**]	**Outbound**
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	N/15	1.3/Ebb

Notes: Discussed how to work with Rawen image
>4 5K - Dead zone hard to do direct pull - do inline direct more eff.
& control speed.

Transit through terminal
~~**Entry at Flare**~~

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult
1 2 3 4 5 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe
1 2 3 4 5 6 7 8 9 10

3 Comment(s)

August 22, 2017

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 16	**Date:** 11-16-17	**Simulator/Operator:** A
Pilot: A		**Ship's Initial Heading/Speed:** 250.5 / 4
Run Start Time: 1043	**Run End Time:**	**Vessels at 26&27&28** 3 @ 750 x 106 Barge on 27
Start Location: Below Wharf 32		**End Location:**

Ship Model Used Wesely/	-55 -A Aframax 7605 Chloe K- A-G 2406	[✓ **Panamax Buiker** 06]
Travel Direction	[✓ **Inbound**]	**Outbound**
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	N/15	0.0/Ebb

Notes: Problems with simulator

Turn in Improved Turning Basin

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 [✓ 2] 3 4 5 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 5 6 7 8 [✓ 9] 10

3 Comment(s) TURNING ROOM WAS ADAQUATE FOR THE MANUVER

August 22, 2017

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 47	**Date:** 11-16-17	**Simulator/Operator:** A	
Pilot: [illegible] C		**Ship's Initial Heading/Speed:** 250.5/4	
Run Start Time: 1242	**Run End Time:**	**Vessels at 26&27&28** 3 @ ~~750x106~~ 473x 75.5 Barge on 27	
Start Location: ~~Below~~ Wharf 32		**End Location:**	
Ship Model Used Wesely	~~Zeus~~ -55-H-7505 ~~Aframax~~ Chloek-~~EA~~-G 2A06	[✓ **Panamax Buiker** 06]	
Travel Direction	[✓ **Inbound**]	**Outbound**	
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**	
	SE/20 ~~Φ~~	0.0/~~Ebb~~ Φ	
Notes:			

Turn in Improved Turning Basin

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 3 4 5 [✓ 6] 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 [✓ 4] 5 6 7 8 9 10

3 Comment(s)

ROOM FOR THIS SIZE SHIP IS GOOD

August 22, 2017

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 48

Date: 11-16-17

Simulator/Operator: A

Pilot: A

Ship's Initial Heading/Speed: 250.5 /4

Run Start Time: 1312

Run End Time:

Vessels at 26&27~~&~~28 3@ ~~760~~ 473 x 75.5
Barge @ 27

Start Location: Wharf32

End Location:

Ship Model Used	Wesely -SS- H 7505 ~~Aframax~~ Chole K-CA-G 2406	[✓ **Panamax Buiker** 06]
Travel Direction	[✓ **Inbound**]	**Outbound**
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	SE/20	0/0

Notes:

Turn in Improved Turning Basin

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 [✓ 2] 3 4 5 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 5 6 7 8 9 [✓ 10]

3 Comment(s) BASIN SIZE WORKED WELL

August 22, 2017

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 49

Date: 11-16-17

Simulator/Operator: A

Pilot: C

Ship's Initial Heading/Speed: 130.1/~~[illegible]~~6.5

Run Start Time: 16 16

Run End Time:

Bayou Channel Width: 530

Start Location: below Shell

End Location:

Ship Model Used	**Aframax**	Suez ~~**Panamax/Bulker**~~
Travel Direction	**Inbound**	[✓ **Outbound**]
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	SE/20	0.5/Fld

Notes:

Transit and Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 3 4 5 6 7 8 9 [✓ 10]

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

[✓ 1] 2 3 4 5 6 7 8 9 10

3 Comment(s)

TWO WIDE BEAM LOADED TANKERS MEETING THERE IS UNREALISTIC

THE ROOM APPEARS TO BE THERE BUT VERY LITTLE ROOM FOR ERROR

August 22, 2017

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 49	**Date:** 11-16-17	**Simulator/Operator:** C
Pilot: A		**Ship's Initial Heading/Speed:** 241.3/~~6.9~~6.5
Run Start Time: 1616	**Run End Time:**	**Bayou Channel Width:** 530
Start Location: Greens Bayou		**End Location:**

Ship Model Used	[✓ **Aframax**]	**Panamax Bulker**
Travel Direction	[✓ **Inbound**]	**Outbound**
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	5E/20	0.5/Fld

Notes:

Transit and Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy Increasing Difficulty → Difficult
1 2 3 4 [✓ 5] 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe Increasing Safety → Safe
1 2 3 4 [✓ 5] 6 7 8 9 10

3 Comment(s) VESSEL NEEDED TO HAVE ALL AVAILABLE WATER THAT IS USE IN REAL LIFE

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 50	**Date:** 11-16-17	**Simulator/Operator:** A
Pilot: D		**Ship's Initial Heading/Speed:** 130.1 / 6.5
Run Start Time:	**Run End Time:**	**Bayou Channel Width:** 530
Start Location: Greens Bayou		**End Location:**

Ship Model Used	**Aframax**	Suez ~~**Panamax Bulker**~~
Travel Direction	**Inbound**	[✓ **Outbound**]
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	SE 20	0.5/Fld

Notes:

Transit and Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 3 4 5 6 7 [✓ 8] 9 10

Under Bridge Badspot

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 [✓ 3] 4 5 6 7 8 9 10

3 Comment(s)

KMDN bad spot to meet.

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 50	**Date:** 11-16-17	**Simulator/Operator:** C	
Pilot: A		**Ship's Initial Heading/Speed:** 241.3/16.5	
Run Start Time:	**Run End Time:**	**Bayou Channel Width:** 530	
Start Location: Shell		**End Location:**	
Ship Model Used	[✓ **Aframax**]	**Panamax Bulker**	
Travel Direction	[✓ **Inbound**]	**Outbound**	
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**	
	5E/20	0.5/Fld	
Notes:			

Transit and Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 3 4 [✓ 5] 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 [✓ 5] 6 7 8 9 10

3 Comment(s) MEETING CAN BE DONE

August 22, 2017

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 51	**Date:** 11-16-17	**Simulator/Operator:** C	
Pilot: A		**Ship's Initial Heading/Speed:** 241.3/5	
Run Start Time: 1455	**Run End Time:**	**Bayou Channel Width:** 530	
Start Location: below Shell		**End Location:**	
Ship Model Used	[✓ **Aframax**]	**Panamax Buiker**	
Travel Direction	[✓ **Inbound**]	**Outbound**	
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**	
	SE/20	0.5/Fld	
Notes:			

Transit and Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 [✓ 3] 4 5 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 5 6 7 [✓ 8] 9 10

3 Comment(s) MEETING WENT WELL.

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 51	**Date:** 11-16-17	**Simulator/Operator:** A
Pilot: D		**Ship's Initial Heading/Speed:** 095.6/5
Run Start Time: 1455	**Run End Time:**	**Bayou Channel Width:** 530
Start Location: Bridge		**End Location:**

Ship Model Used	**Aframax**	~~**Panamax Bulker**~~ Suezmax
Travel Direction	**Inbound**	[✓ **Outbound**]
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	SE/20	0.5/Fld
Notes:		

Transit and Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 [✓ 3] 4 5 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 5 6 7 [✓ 8] 9 10

3 Comment(s)

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 53	**Date:** 11-16-17	**Simulator/Operator:** C
Pilot: A		**Ship's Initial Heading/Speed:** 281.3/6
Run Start Time: 1533	**Run End Time:**	**Bayou Channel Width:** 530
Start Location: TX8 Bridge		**End Location:**
Ship Model Used	Panamax Bulk ~~**Aframax**~~	**Panamax Buiker**
Travel Direction	[✓ **Inbound**]	**Outbound**
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	SE/20	0.5/Fld
Notes:		

Transit and Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 [✓ 2] 3 4 5 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 5 6 7 8 [✓ 9] 10

3 Comment(s) SAFE MANUVER !

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 53	**Date:** 11-16-17	**Simulator/Operator:** A
Pilot: C		**Ship's Initial Heading/Speed:** 126.9/5.5
Run Start Time: 1533	**Run End Time:**	**Bayou Channel Width:** 530
Start Location: Greens Bayou		**End Location:**
Ship Model Used	**Aframax**	~~**Panamax Bulker**~~ Suez Max
Travel Direction	**Inbound**	[✓ **Outbound**]
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	SE/20	0.5/Fld
Notes:		

Transit and Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 3 4 5 6 7 [✓ 8] 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 [✓ 3] 4 5 6 7 8 9 10

3 Comment(s)

GOOD MEETING
GOOD ROOM / POSITION
SHIP DID WANT TO 'RUN' TO PORT (TO LEFT)
AFTER MEETING SHIP BUT I WAS ABLE TO
CHECK SHIP

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 52	**Date:** 11-16-17	**Simulator/Operator:** C
Pilot: A		**Ship's Initial Heading/Speed:** 231.3/6
Run Start Time: 1516	**Run End Time:**	**Bayou Channel Width:** 530
Start Location: Bridge TX 8		**End Location:**
Ship Model Used	[✓ **Aframax**]	**Panamax Bulker**
Travel Direction	[✓ **Inbound**]	**Outbound**
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	5E/20	0.5/Fld
Notes:		

Transit and Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 [✓ 3] 4 5 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 5 6 7 [✓ 8] 9 10

3 Comment(s) NORMAL PRACTICE MEETING SUCESS

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 52	**Date:** 11-16-17	**Simulator/Operator:** A
Pilot: C		**Ship's Initial Heading/Speed:** 126.8 / 5.5
Run Start Time: 1516	**Run End Time:**	**Bayou Channel Width:** 530
Start Location: Greens Bayou		**End Location:**

Ship Model Used	**Aframax**	**~~Panamax Bulker~~** Suezmax
Travel Direction	**Inbound**	[✓ **Outbound**]
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	SE/20	0.5/Fld

Notes:

Transit and Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 3 4 5 6 7 8 [✓ 9] 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 [✓ 3] 4 5 6 7 8 9 10

3 Comment(s)

VERY GOOD MEETING

GOOD POSITION

MAIN CONCERN WAS INABILITY TO CHECK SHIP UP AFTER MEETING INBOUND SHIP

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 54	**Date:** 11-16-17	**Simulator/Operator:** C
Pilot: A		**Ship's Initial Heading/Speed:** 127 / 16
Run Start Time: 1545	**Run End Time:**	**Bayou Channel Width:** 530
Start Location: Greens Bayou		**End Location:** 3
Ship Model Used	**Aframax**	[✓ **Panamax Buiker**]
Travel Direction	**Inbound**	[✓ **Outbound**]
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	SE/20	0.5/ Fld
Notes:		

Transit and Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 [✓ 3] 4 5 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 5 6 7 [✓ 8] 9 10

3 Comment(s) SAFE AND CONTROLED

August 22, 2017

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 54	**Date:** 11-16-17	**Simulator/Operator:** A
Pilot: C		**Ship's Initial Heading/Speed:** 281. / 16.5
Run Start Time: 1545	**Run End Time:**	**Bayou Channel Width:** 530
Start Location: TX 8 Bridge		**End Location:**

Ship Model Used	[✓ Suez ~~Afra~~max]	S Panamax Buiker
Travel Direction	**Inbound**	**Outbound**
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	SE/20	0.5/Fld

Notes:

Transit and Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 3 4 5 6 7 [✓ 8] 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 [✓ 3] 4 5 6 7 8 9 10

3 Comment(s)

~~MEET~~ AT THE MOST NARROW PART OF CHANNEL.
MET

IT WORKED BUT WAS TIGHT.

THIS WOULD HAVE BEEN CONSIDERED
A SUCCESS IN MY BOOK ALTHOUGH I TRY NOT
TO MEET ANY SHIP AT THAT SPOT IN REAL LIFE

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 55	**Date:** 11-16-17	**Simulator/Operator:** C
Pilot: A		**Ship's Initial Heading/Speed:** 095.7/6
Run Start Time:	**Run End Time:**	**Bayou Channel Width:** 530
Start Location: TX8 Bridge		**End Location:**
Ship Model Used	**Aframax**	[✓ **Panamax Bulker**]
Travel Direction	**Inbound**	[✓ **Outbound**]
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	SE/20	0.5/Fld
Notes:		

Transit and Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 [✓ 2] 3 4 5 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 5 6 7 8 [✓ 9] 10

3 Comment(s)

August 22, 2017

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 55	**Date:** 11-16-17	**Simulator/Operator:** A	
Pilot: C		**Ship's Initial Heading/Speed:** 242.4/5.5	
Run Start Time:	**Run End Time:**	**Bayou Channel Width:** 530	
Start Location: Shell ~~TX 8 Bridge~~		**End Location:**	
Ship Model Used	[✓ Suez ~~Afra~~max]	**Panamax Buiker**	
Travel Direction	[✓ Inbound]	**Outbound**	
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**	
	SE/20	0.5/Fld	
Notes:			

Transit and Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 2 3 4 5 6 7 [✓ 8] 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 [✓ 4] 5 6 7 8 9 10

3 Comment(s)

GOOD MEETING
GOOD SPACE

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 56	**Date:** 11-17-17	**Simulator/Operator:** C
Pilot: D		**Ship's Initial Heading/Speed:** 107.1 / 6
Run Start Time: 0812	**Run End Time:**	**Bayou Channel Width:** 530
Start Location: Ammonia		**End Location:**

Ship Model Used	**Aframax**	[✓ **Panamax** ~~**Bulker**~~ Tank 10L]
Travel Direction	**Inbound**	[✓ **Outbound**]
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	N/20	1.3/Ebb

Notes:

Transit and Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

[✓ 1 2] 3 4 5 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 5 6 7 8 9 [✓ 10]

3 Comment(s)

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 56	**Date:** 11-17-17	**Simulator/Operator:** A	
Pilot: A		**Ship's Initial Heading/Speed:** 260/6	
Run Start Time: 0812	**Run End Time:**	**Bayou Channel Width:** 530	
Start Location: Shell		**End Location:**	
Ship Model Used	[✓ **Aframax**] 23L	**Panamax Buiker**	
Travel Direction	[✓ **Inbound**]	**Outbound**	
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**	
	N[illegible]/20	1.3/Ebb	
Notes:			

Transit and Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 [✓ 2] 3 4 5 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 5 6 7 8 [✓ 9] 10

3 Comment(s) MET WITH NO ISSUES

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 57	**Date:** 11-17-17	**Simulator/Operator:** C
Pilot: DK		**Ship's Initial Heading/Speed:** 107.1/6
Run Start Time: 0856	**Run End Time:**	**Bayou Channel Width:** 530
Start Location: Ammonia		**End Location:**

Ship Model Used	**Aframax**	[✓ **Panamax ~~Bulker~~** Tank 10L]
Travel Direction	**Inbound**	[✓ **Outbound**]
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	N/20	1.3/Ebb

Notes:

Transit and Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 [✓ 2] 3 4 5 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 5 6 7 [✓ 8] 9 10

3 Comment(s)

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 57	**Date:** 11-17-17	**Simulator/Operator:** A
Pilot: A		**Ship's Initial Heading/Speed:** 260/6
Run Start Time: 0836	**Run End Time:**	**Bayou Channel Width:**
Start Location: Shell		**End Location:**
Ship Model Used	[✓ **Aframax** 23L]	**Panamax Bulker**
Travel Direction	[✓ **Inbound**]	**Outbound**
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	N/20	1.3/Ebb
Notes:		

Transit and Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 [✓ 2] 3 4 5 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 5 6 7 [✓ 8] 9 10

3 Comment(s)

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 5B	**Date:** 11-17-17	**Simulator/Operator:** C
Pilot: [redacted] D		**Ship's Initial Heading/Speed:** 129.8/16
Run Start Time: 0902 [redacted]	**Run End Time:**	**Bayou Channel Width:** 530
Start Location: Green Bayou		**End Location:**

Ship Model Used	**Aframax**	[✓ **Panamax Bulker**] CW6L
Travel Direction	**Inbound**	[✓ **Outbound**]
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	N/20	1.3/Ebb

Notes:

Transit and Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

[✓ 1] 2 3 4 5 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 5 6 7 8 9 [✓ 10]

3 Comment(s)

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 58	**Date:** 11-17-17	**Simulator/Operator:** A
Pilot: A		**Ship's Initial Heading/Speed:** 275/5.2
Run Start Time: 0902 ~~0824~~	**Run End Time:**	**Bayou Channel Width:** 530
Start Location: Below TX 8 Bridge		**End Location:**

Ship Model Used	[✓ **Aframax** 23L]	**Panamax Bulker**
Travel Direction	[✓ **Inbound**]	**Outbound**
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	N/20	1.3/Ebb
Notes:		

Transit and Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 [✓ 2] 3 4 5 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 5 6 7 [✓ 8] 9 10

3 Comment(s) SUCCESSFUL!!!

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 59	**Date:** 11-17-17	**Simulator/Operator:** A
Pilot: A		**Ship's Initial Heading/Speed:** 137.4/6
Run Start Time: 0918	**Run End Time:**	**Bayou Channel Width:** 530
Start Location: Greens Bayou		**End Location:**

Ship Model Used	[✓ **Aframax**] L	**Panamax Bulker**
Travel Direction	**Inbound**	[✓ **Outbound**]
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	N/20	1.3/Ebb
Notes:		

Transit and Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy Increasing Difficulty → Difficult

[✓ 1] 2 3 4 5 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe Increasing Safety → Safe

1 2 3 4 5 6 7 8 9 [✓ 10]

3 Comment(s) GREAT RUN!

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 59	**Date:** 11-17-17	**Simulator/Operator:** C
Pilot: D		**Ship's Initial Heading/Speed:** 275.7/6
Run Start Time: 0918	**Run End Time:**	**Bayou Channel Width:**
Start Location: Below TX 8 Bridge		**End Location:**

Ship Model Used	**Aframax**	[✓ **Panamax Bulker** CD6L]
Travel Direction	[✓ **Inbound**]	**Outbound**
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	N/20	1.3/Ebb

Notes:

Transit and Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

[✓ 1] 2 3 4 5 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 5 6 7 8 9 [✓ 10]

3 Comment(s)

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 60	**Date:** 11-17-17	**Simulator/Operator:** C
Pilot: K		**Ship's Initial Heading/Speed:** 275.7/6
Run Start Time: 0931	**Run End Time:**	**Bayou Channel Width:** 530
Start Location: Below TX 8		**End Location:**

Ship Model Used	**Aframax**	[✓ **Panamax Buiker**] CO6L
Travel Direction	[✓ **Inbound**]	**Outbound**
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	SE/20	1.3/Ebb

Notes:

Transit and Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 [✓ 2] 3 4 5 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 5 6 7 8 [✓ 9] 10

3 Comment(s)

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 60	**Date:** 11-17-17	**Simulator/Operator:** A	
Pilot: A		**Ship's Initial Heading/Speed:** 131.4/6	
Run Start Time: 0931	**Run End Time:**	**Bayou Channel Width:** 530	
Start Location: Greens Bayou		**End Location:**	
Ship Model Used	[✓ **Aframax**]		~~**Panamax Bulker**~~
Travel Direction	~~**Inbound**~~		[✓ **Outbound**]
Environmental Conditions	**Wind Dir. (from) / Speed**		**Tide/Flow**
	SE/20		1.3 /Ebb
Notes:			

Transit and Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty ⟶ — Difficult

1 [✓ 2] 3 4 5 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety ⟶ — Safe

1 2 3 4 5 6 7 8 [✓ 9] 10

3 Comment(s)

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 61	**Date:** 11-17-17	**Simulator/Operator:** A	
Pilot: A		**Ship's Initial Heading/Speed:** 081/3.5	
Run Start Time: 0954	**Run End Time:**	**HSC Bay Width:** 700	**BCC Flare:**
Start Location: Berth 2		**End Location:**	

Ship Model Used	Tugs Thor & B – K – B Wesley K & ~~ULCV~~ D – C	[✓ **Suezmax**]
Travel Direction	**Inbound**	[✓ **Outbound**]
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	SE/20	1.3/Ebb

Notes: Turn to North from Barbours Cut

Entry at Flare

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

[✓ 1] 2 3 4 5 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 5 6 7 8 9 [✓ 10]

3 Comment(s) MOST OF TURN DONE WITH RUDDER ONLY/

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 6R	**Date:** 11-17-17	**Simulator/Operator:** A	
Pilot: A		**Ship's Initial Heading/Speed:** 132.7/4.3	
Run Start Time:	**Run End Time:**	**HSC Bay Width:** 700	**BCC Flare:**
Start Location: 83-84		**End Location:**	
Ship Model Used	Thor ℄B – D – ~~ULCV~~ B Wesely ℄A – K – C	[✓ Suezmax]	
Travel Direction	[✓ Inbound]	Outbound	
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**	
	SE/20	1.3/Ebb	
Notes:			

Entry at Flare

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 [✓ 2] 3 4 5 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 5 6 7 8 [✓ 9] 10

3 Comment(s) ADEQUATE ROOM FOR MANUVER

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 63

Date: 11-17-17

Simulator/Operator: A

Pilot: A

Ship's Initial Heading/Speed: 099.2/6

Run Start Time: 1049

Run End Time:

Bayou Channel Width: 530

Start Location: Above Bridge

End Location:

Ship Model Used	Suezmax ~~**Aframax**~~	**Panamax Buiker**
Travel Direction	**Inbound**	[✓ **Outbound**]
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	SE/20	1,3/Ebb

Notes:

Transit and Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

1 [✓ 2] 3 4 5 6 7 8 9 10

2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

1 2 3 4 5 6 7 8 [✓ 9] 10

3 Comment(s) PERFECT

HSC 216 Feasibility Simulation Study
Pilot Evaluation of Simulation Run
November 2017

Run #: 63	**Date:**	**Simulator/Operator:** C
Pilot: D		**Ship's Initial Heading/Speed:** 267.8/6
Run Start Time: 1049	**Run End Time:**	**Bayou Channel Width:** 530
Start Location: Shell		**End Location:**

Ship Model Used	**Aframax**	[✓ **Panamax Bulker** 006L]
Travel Direction	[✓ **Inbound**]	**Outbound**
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
	SE/20	1.3/Ebb

Notes:

Transit and Meeting

1 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy — Increasing Difficulty → — Difficult

[✓ 1] 2 3 4 5 6 7 8 9 10

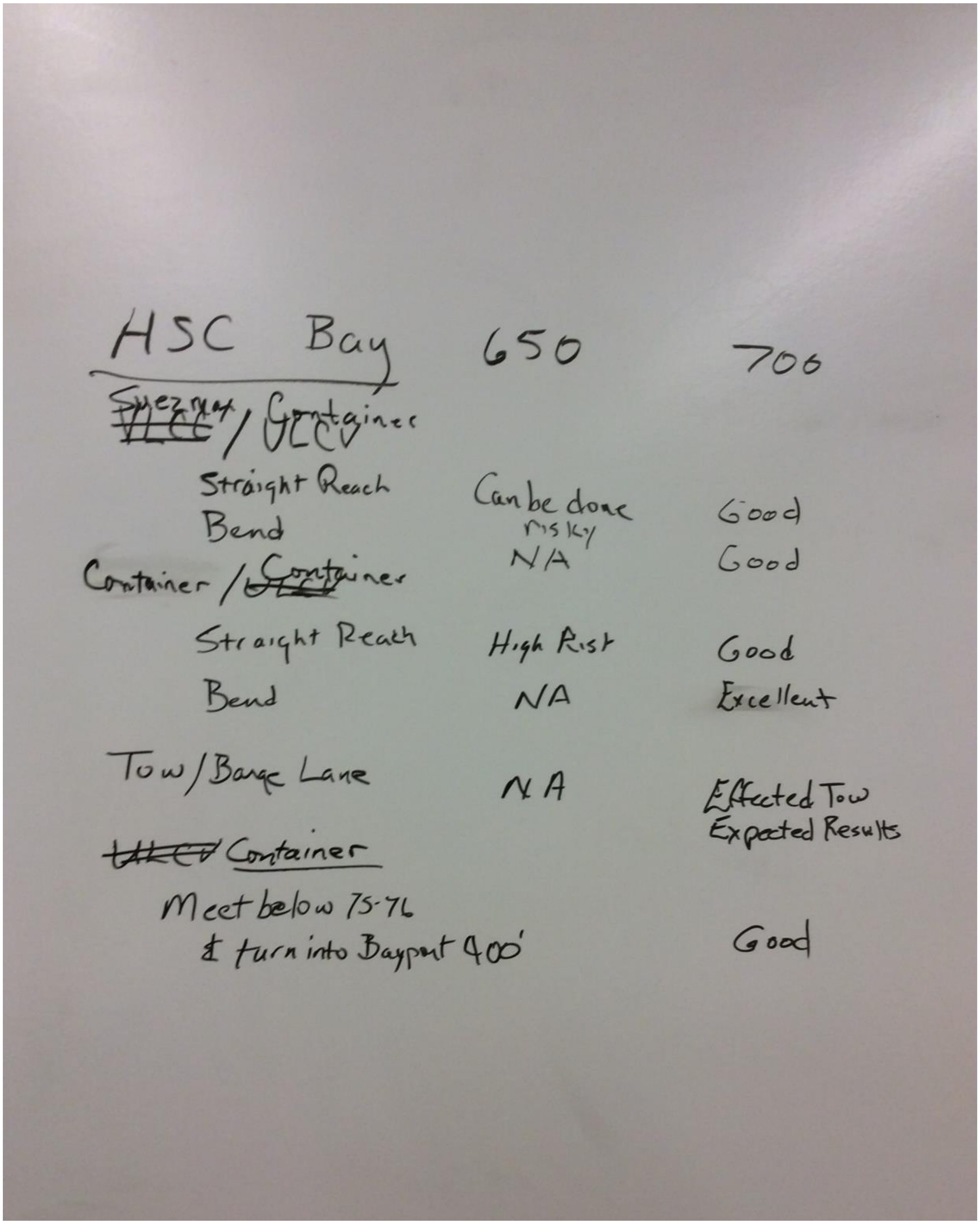
2 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe — Increasing Safety → — Safe

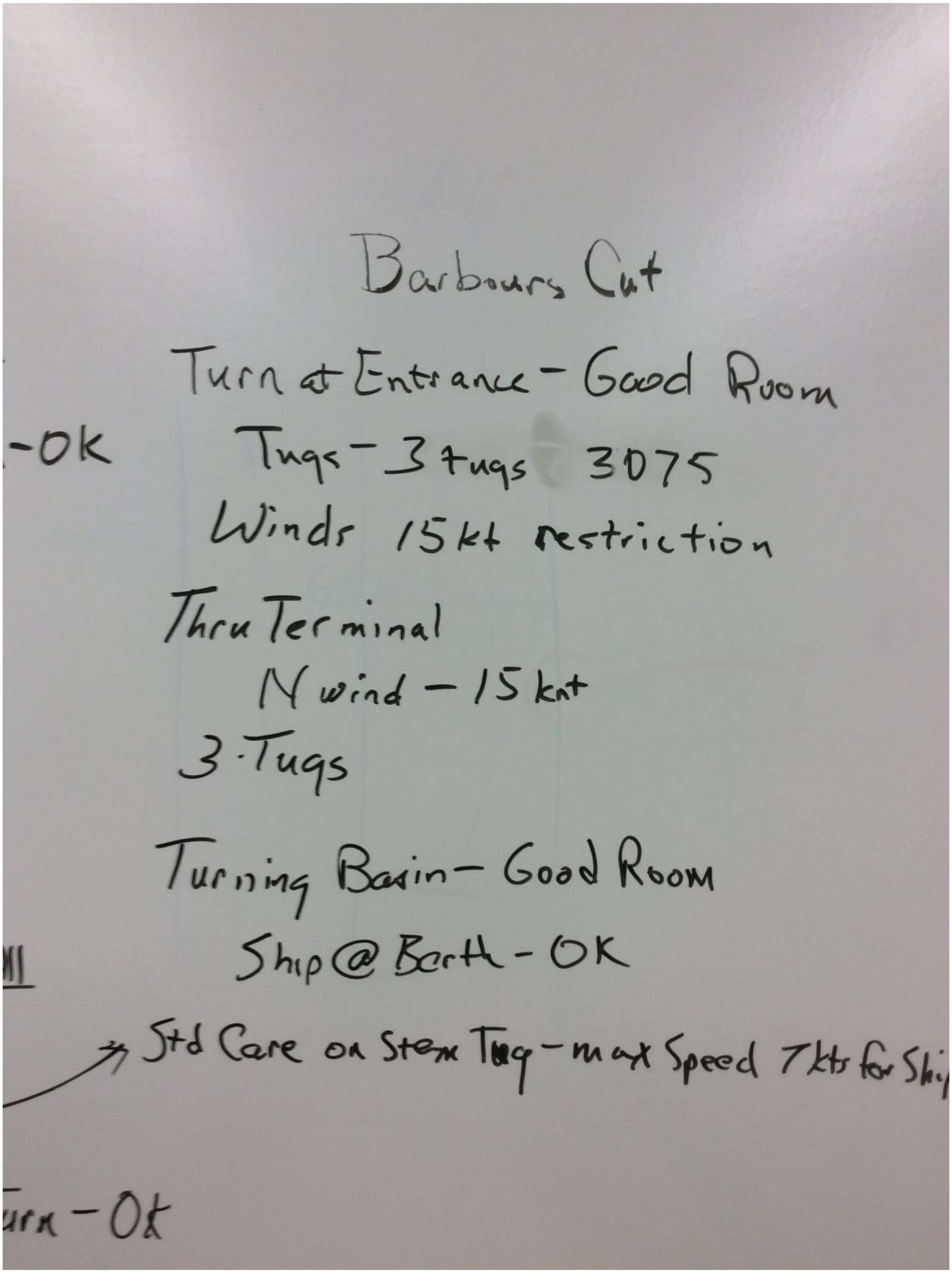
1 2 3 4 5 6 7 8 9 [✓ 10]

3 Comment(s)

Appendix F: Final Debriefing Agreements Based on the Completed Ship Maneuvering Simulation Tests



HSC Bay	650	700
Suezmax ~~VLCC~~ / Container ULCV		
Straight Reach	Can be done risky	Good
Bend	N/A	Good
Container / ~~ULCV~~ Container		
Straight Reach	High Rist	Good
Bend	N/A	Excellent
Tow/Barge Lane	N A	Effected Tow Expected Results
~~ULCV~~ Container		
Meet below 75-76 & turn into Bayport 400'		Good



Barbours Cut

Turn at Entrance - Good Room

-OK

Tugs - 3 tugs 3075

Winds 15kt restriction

Thru Terminal

N wind - 15 knt

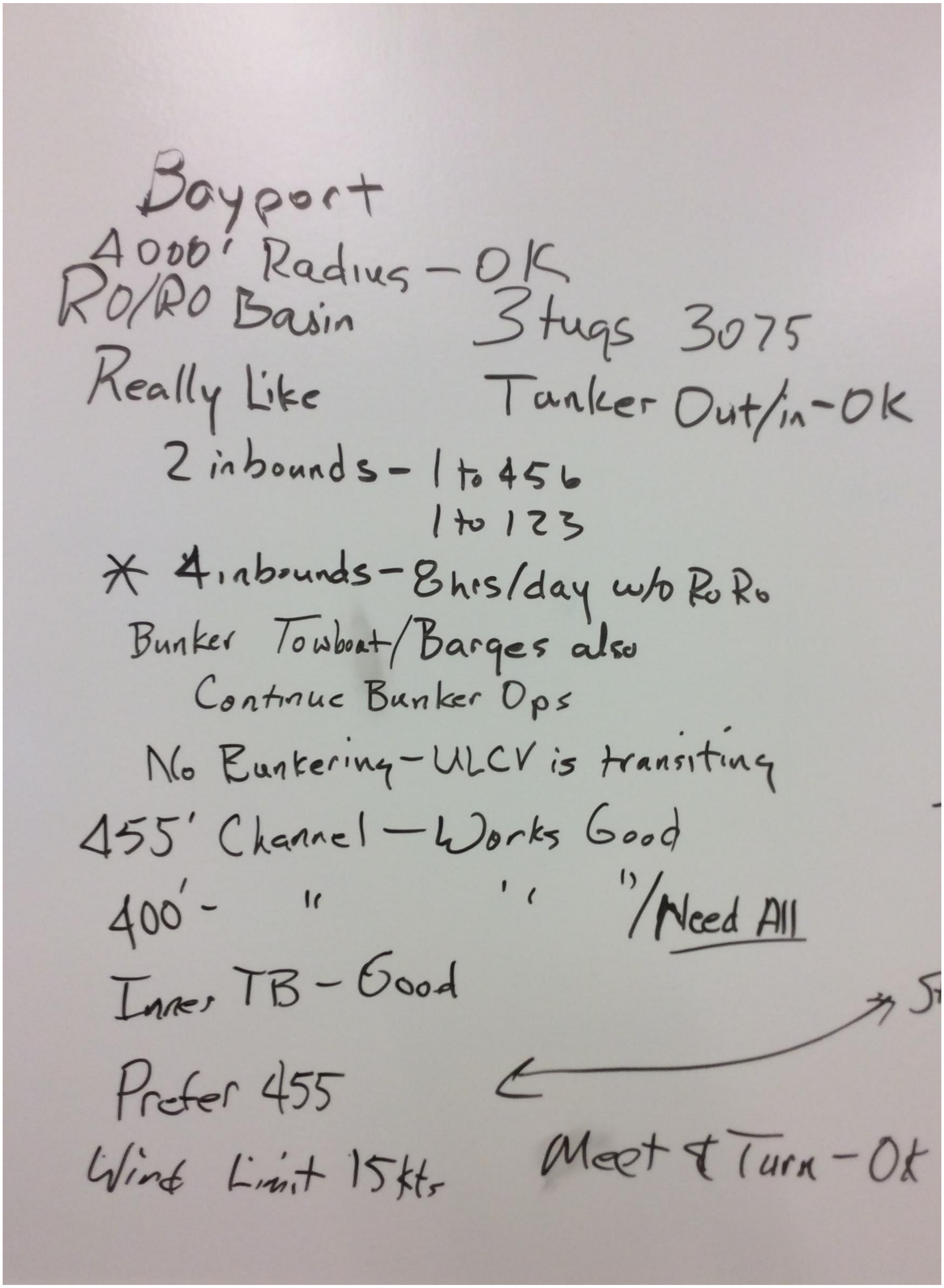
3 Tugs

Turning Basin - Good Room

Ship @ Berth - OK

Std Care on Stern Tug - max Speed 7 kts for Shi

urn - Ok



Bayport

4000' Radius – OK

RO/RO Basin

3 tugs 3075

Really Like

Tanker Out/in – Ok

2 inbounds – 1 to 456
1 to 123

* 4 inbounds – 8 hrs/day w/o Ro Ro

Bunker Towboat/Barges also
Continue Bunker Ops

No Bunkering – ULCV is transiting

455' Channel – Works Good

400' – " " "/<u>Need All</u>

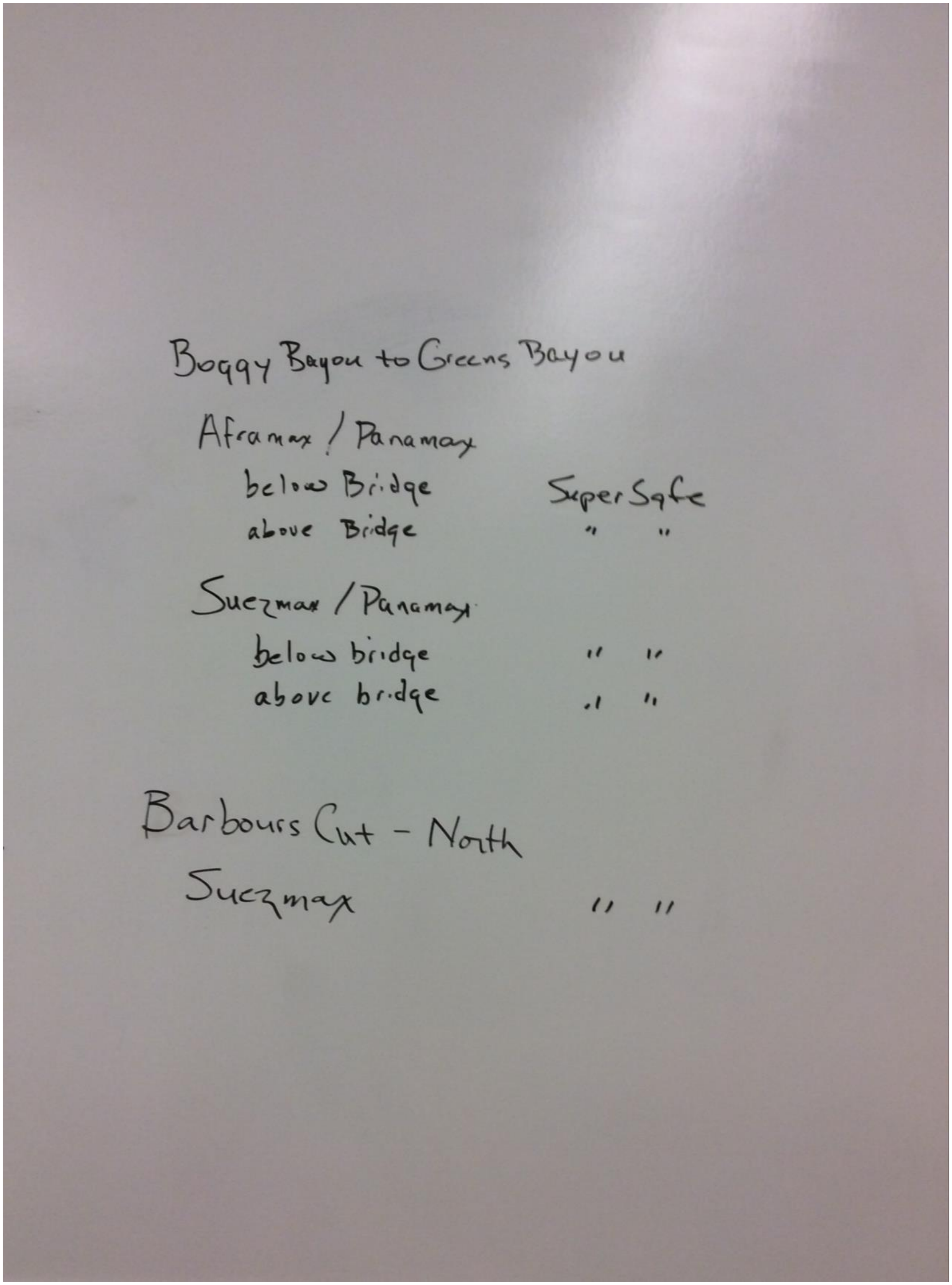
Inner TB – Good

Prefer 455

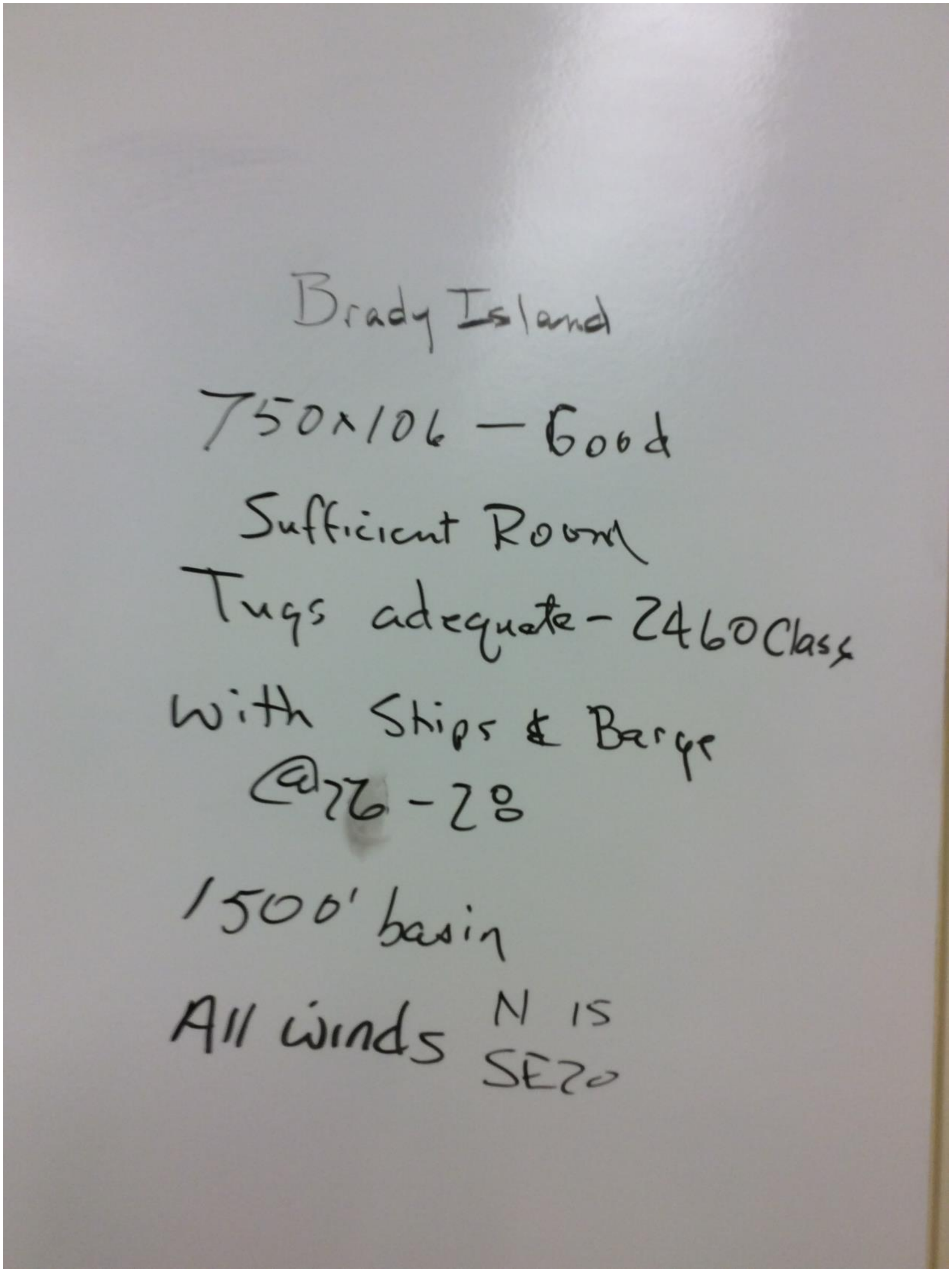
S

Wind Limit 15kts

Meet & Turn – Ok



Boggy Bayou to Greens Bayou	
Aframax / Panamax	
below Bridge	SuperSafe
above Bridge	" "
Suezmax / Panamax	
below bridge	" "
above bridge	" "
Barbours Cut - North	
Suezmax	" "



Brady Island

750x106 — Good

Sufficient Room

Tugs adequate - 2460 Class

with Ships & Barge

@26 - 28

1500' basin

All winds N 15
SE 20

Appendix G: Description of San Jacinto College Maritime Technology and Training Center Ship and Tug Simulators

A preview of the San Jacinto College Maritime Technology and Training Center

03.03.2014 | By Jeannie Peng-Armao

Capt. John Kessler, maritime instructor, demonstrates how mariners train using the bridge simulators at the San Jacinto College maritime program. *Photo credit: Jeannie Peng-Armao, San Jacinto College marketing, public relations, and government affairs department.*

As San Jacinto College prepares to break ground to build the region's newest maritime training facility, some of the industry's most sought after training technology has arrived and is awaiting its new home.

The College recently received three interactive, full-mission, ship bridge simulators, thanks to a collaborative agreement with the Houston Pilots. They will be moved to the College's 45,000-square-foot Maritime Technology and Training Center once it opens, projected for mid 2015.

“For our new, waterfront maritime campus, we did our homework and traveled across the country to research exactly what we needed to provide in our new facility in order to be certain that we are offering today's maritime professionals the best training available anywhere in the country” said Capt. Mitch Schacter, director of the San Jacinto College maritime program.

The simulators are room-sized replicas of ship control bridges, each with a 270-degree view and life-like graphics displayed on fourteen 65-inch monitors. They are equipped with the newest versions Kongsberg’s Polaris 7.2 ship simulation software. They allow trainees to experience different sea conditions from flat calm water to 30-foot high waves, from zero wind to hurricane winds, from clear blue skies to rain, snow, sleet, fog, and sand storms, and include day and night operations.

"This technology allows trainees from almost any type of vessel to experience wind, current and wave action from any direction and at any level of magnitude as well as close quarters interaction with other vessels operating in the same scenario, without ever putting anyone’s life or property in peril," said Bryan Elliot, maritime instructor and simulator operator. "It provides a very safe and very realistic experience."

The three simulators are currently operating at the San Jacinto College maritime training center off Highway 225 in Pasadena. Once the new Maritime Technology and Training Center is built along the Port of Houston, the simulators will become a part of a 3,748 square-foot simulation suite with instructor stations, debrief classrooms, and development stations.

In addition, the new facility will house engineering simulators to train maritime engineers for hydraulic, electric, pump control, motor control, heating and air conditioning, and refrigeration. Also planned is a full-mission engine room simulator, which will be interactive and interconnected with the bridge simulators to allow vessel management exercises to accommodate deck and engineering officers and crew at the same time, in the same scenario.

Other features will include a 2,000 square-foot multipurpose space for industry conferences and corporate partner meetings along with a fully equipped commercial kitchen to support those functions. The entire building will sit 14 feet above ground and will house 15 classrooms, and administrative support offices. The ground level will showcase a training dock with lifeboats, davits, and fast rescue craft, and a separate industry dock for crew changes. It will also allow vessel specific training for local maritime companies and have an aquatic training facility for sea survival and life raft training, complete with men’s and women’s locker rooms.

“The Center will serve as the premier training facility for regional industry and new maritime technology associate degree program," said Schacter. "It will house the very latest technology and U.S. Coast Guard-approved curriculum to allow us to continue and to offer much training for captains, mates, deckhands, tankermen and engineers in a safe, professional and productive training environment."

For more information about the San Jacinto College maritime program, visit http://www.sjcd.edu/continuing-professional-development/corporate-and-workforce/maritime.

About San Jacinto College

Surrounded by monuments of history, industries and maritime enterprises of today, and the space age of tomorrow, San Jacinto College has been serving the citizens of East Harris County, Texas, for more than 50 years. The Achieving the Dream Leader College is committed to the goals and aspirations of a diverse population of 30,000 students in more than 200 degree and certificate options, including university transfer and career preparation. Students also benefit from the College’s job training programs, renowned for meeting the needs of growing industries in the region. San Jacinto College graduates contribute nearly $630 million each year to the Texas workforce. San Jacinto College. Your Goals. Your College.

For more information about San Jacinto College, please call 281-998-6150, visit www.sanjac.edu, or follow us on Facebook at www.facebook.com/SanJacintoCollege.

Appendix H: Approved Study Scope and Test Matrix

August 22, 2017

Waterway Simulation Technology, Inc.

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MEMO FOR RECORD

Subject: Proposal to Conduct Ship Simulations for the Houston Ship Channel, Texas, Expansion Feasibility Study – Section 216 of the Flood Control Act of 1970, as Amended.

Introduction

The ongoing feasibility study of potential needs for improvement and possible expansion of the Houston Ship Channel (HSC), Texas, has identified a need to conduct feasibility level ship maneuvering simulations in order to refine safe and efficient channel dimension assumptions for the design vessel classes. This MFR presents a proposal for addressing the identified navigation issues.

Assumptions

One issue that has been identified is to define the required deep-water navigation channel width to provide safe and efficient transits of the design ships. It is understood that the primary area of concern is the existing 530 ft wide x 46.5 (MLLW) ft deep Bay Reaches; especially with the growing demand for admitting Post- and Neo-Panamax container ships, i.e. ULCVs. Of particular interest is admitting those ULCVs that transit and, therefore, are limited to the maximum dimensions of the expanded Panama Canal. Since the terminals that would be considered to admit these vessels are both in the Galveston Bay below Morgan Point (Bayport and Barbours Cut), the design ships for Bay reaches should be a ULCV with overall length of 1200 ft or less and a beam of 160 ft or less and a Suezmax tanker. ULVCs are being considered as possible vessels requesting admittance and request are expected to grow in the future.

Due to the length of the transit in the Bay, the width of the navigation channel in these reaches must consider two-way traffic. It is not recommended to evaluate passing lanes since it is so difficult to ensure that a meeting between two design ships will occur in the passing lane; this requires extremely accurate traffic control and could cause at least one of the meeting ships to slow to a dangerous speed. Therefore, two-way meeting simulations will be required to define the channel width.

In addition to the channel widths in the straight reaches of the Bay, simulation testing of potential bend widening should be examined. The length of the design vessels will most likely require extra widening in the four bends in the Bay from Buoy 18 to Morgans Point.
Finally, for the Bay channels, it will be advised to conduct simulations of the design container ships maneuvering into and through the navigation channels and turning basins to the Bayport and Barbers Cut container terminals. These simulations may require testing of specific designs being considered for these terminals; e.g., a docking facility may be used near the entrance of the Barbours Cut terminal.

It is understood that no simulations are being considered for the Bayou Sections of the 46.5 foot remainder of HSC. Therefore, this section of the HSC is not discussed in this MFR.

Consideration of admitting Aframax tankers and bulk carriers into the reaches above the East Sam Houston Tollway Bridge (Texas 8) has been discussed. Simulation tests of this channel should be considered to define the required channel widths, particularly in the bends of this reach and to provide guidance on the ship speeds and safe clearances of berths along this channel. Many of the bends in the lower reaches of this section of the HSC are relatively gentle; however, the bends above HSC Light 162 or Buffalo Bayou may require study.

It is understood that since these simulations are being done a part of a feasibility study, they are to be conducted as a limited set of tests to, as quickly as possible and with minimum effort and cost, to refine the acceptable channel dimensions. Therefore, the testing program should be designed to quickly assess a particular proposed design and move to an alternate design based on the results of that test. The acceptability of the design will be based on the participating Houston Pilot's opinions and the judgment of the team conducting the simulations using a accepted set of evaluation criteria.

Finally, it is understood that a requirement for the conduct of the simulations is the use of the local-area ship simulator, owned by the Houston Pilots, managed by the Maritime Pilot's Institute, and located at the San Jacinto Maritime Technology and Training Center. This is a Kongsberg simulator, similar to the simulator at the U.S. Army Engineering Research and Development Center (ERDC) at Vicksburg, MS.

Approach

Ship Models

The first requirement for conduct of the ship maneuvering simulations is to define the design ships and identify models for the HSC test reaches.

Previous simulation studies of admitting ULCVs to the Bayport Container terminal tested A-class Maersk containerships and a Neo-Panamax containerships at Maritime Institute of Technology and Graduate Studies (MITAGS) simulator facility. These ship models included 9,000 TEU, 14,000 TEU, and 15,000 TEU ULCVs. The 14,000 TEU ULCV was a model of the MSC Beatrice with a length overall (LOA) of 366m (1,200 ft) and a beam of 50.9m (166.7 ft) with a draft of 13.4m (44 ft). These ship models have been well vetted.

While this beam is larger than the suggested beam for transit through the third set of Panama Canal locks, i.e. beam of 160 ft, it is anticipated that this beam width will eventually be permitted as usage of the locks grows in a similar manner in which pressure from shipping companies narrowed the free space in the older locks. The width of the third lock chambers is 180 ft.

Later tests were conducted at MITAGS in January 2014 sponsored by the Maersk shipping company using a model of an A-Class containership. Maersk requested these simulations because they were requesting the pilots to agree to admit these ships into the HSC. Dimensions of this ship model are 352.2m (1,155.2 ft) LOA, 42.8m (140.4 ft) beam, and a loaded draft of 12.2m (40.0 ft).

An analysis of the largest 110 containerships in the world fleet shows that 88 of these ships, or 80%, would fit into the third set of Panama Canal locks, see Table 1.

The Maritime Pilot's Institute has a ship model of the MAERSK EDINBURG with an LOA of 354m (1161.4 ft) and a beam of 48m (157.5 ft). Therefore, it is recommended that this model be used as the design containership. MPI will be working on improving the maneuvering characteristics of this model based on observations of operating containerships. Maneuvering characteristics of the above mentioned ship models used in previous studies and vetted by pilots are also available to guide this model adjustment.

A loaded Suezmax tanker model was used in the MITAGS simulation tests of Bayport. This tanker had dimensions of 280m (918.6 ft) LOA, 49.9m (163.7 ft) beam and 12.2m (40.0 ft) draft. It is recommended that a ship model of this or similar size be used as the other design vessel for the Bay channel simulations. Again, if a vetted and acceptable model is not available on the San Jacinto simulator, then acceptable models from either Kongsberg or ERDC should be considered for use and should be vetted by the Houston Pilots.

An Aframax tanker was developed and vetted by the Houston Pilots for tests of a proposed terminal immediately above the Texas 8 bridge. This tanker was used in loaded and ballast conditions to test the approach, turning, and movement to the terminal and did not transit through the navigation channels. However, these tests were conducted on the San Jacinto simulator and the model developed could be used to conduct simulation runs through the HSC channels from Boggy Bayou to the upper turning basin. There should be a recheck of the model to assure that the model is still considered appropriate for these specific tests.

Model Databases

A basic model of the HSC navigation channels is available on the San Jacinto simulator. However, modifications of these model databases (visual, radar and ECDIS, channel, currents) will be required to account for the channel improvements being tested. WST will assist in this development.

Currents can be input as data. The best procedure is to use currents computed with numerical hydrodynamic models of the alternative channel dimensions during a spring tide. Generally it is best to test with maximum flood and ebb currents. It is understood that ERDC is computing the hydrodynamic currents for alternative channel widths in the Bay. However, if these are not available, WST can compute the currents. In this proposal it is assumed that ERDC will furnish the currents and an estimate of this work is not included in WST's estimate.

The existing Bay channels can be constructed based on the most recent hydrographic survey data recorded by the Galveston District Corps of Engineers. However, since the emphasis of this study is to define the navigation channel width that will provide safe and efficient transits, it is recommended that the proposed alternative navigation channel width be input based on agreement with the Corps of Engineers and the Houston Pilots. At this point it is anticipated that the initial testing would begin with a 650 ft wide channel with widening at the Redfish bend and the bend at HSC Lights 75 and 76 below the intersection with the Bayport Ship Channel. Other channel widths may be prepared at 600 ft, 700 ft ,and 750 ft in anticipation of the need to test such alternatives. These channel cross-sections will be constructed to be representative of typical cross-sections observed in the existing ship channels to be representative of the typical conditions the ships would experience in the future after the channel has been used and shaped by the ship traffic. It is anticipated that barge shelves would be included to represent the bank conditions with these present in any future project expansion. Consideration will be given to including operating tows on the barge shelf to observe the effects of deep-draft ships operating in the deep navigation channel.

Similarly, the navigation channels in the HSC above the Texas 8 Bridge would be developed based on the existing hydrographic survey data modified to represent the proposed improvements to the channel with a nominal channel width of 530 ft and depth of 45 ft. Modifications to the channel would be made based on the results of the Aframax tanker transits.

Simulations

It is proposed that each test run in the Bay navigation channels accomplish multiple purposes. Simulation runs should be conducted with Houston Pilots conning the deep-draft vessels and G&H tug masters handling the tug simulators. Tug models to be used will be based on the advice of the pilots and G&H.

For example, inbound simulation runs in the Bay could begin HSC Lights 41-42 and proceed to HSC Lights 85-86; a distance of 13.5 nm. During that run a meeting situation could be introduced below the bend at Redfish, transit through the bend widener at Redfish, another meeting between HSC Lights 51-52 and HSC Lights 75-76, transit through the bend widener at HSC Lights 75-76 below the Bayport Ship Channel, and then a final meeting above Bayport Ship Channel. If the inbound ship transits at approximately 10 knots, that transit would take approximately an hour and 20 minutes. But there would be three meetings and each bend would be evaluated. Outbound runs would be similar.

A draft proposed test matrix is provided in Table 2.

Special runs would be conducted to evaluate the turns from the widened HSC navigation channel into both the Bayport Ship Channel and the Barbours Cut Terminal. The Bayport transits would be conducted from HSC Light 65-66 into the Bayport Turning Basin. This would be a distance of approximately 6.8 nm and would require a transit time of less than one hour. It would be a test of traffic to include an outbound tanker to meet the inbound container ship just below the bend at HSC Lights 75-76 prior to making the turn into the Bayport Ship Channel. Similarly, runs can be conducted from HSC Lights 85-86 into the Barbers Cut Terminal to the berth prepared for the ULCVs; from previous inquiries it is understood that consideration has been given to assigning the first berth from the HSC to the ULCVs, thus, avoiding a full transit through the Barbours Cut Ship Channel and use of the turning basin at the end of that channel.

At this point it is recommended that transits with the Aframax through the navigation channels above the Texas 8 Bridge be initially conducted with the proposed channel width up to 530 ft and depth of 45 ft. Conducting several inbound and outbound transits would identify any issues with the bends and terminals along the channel. If problems are identified, then modifications to the simulated navigation channels could be made and retested.

The proposed simulation approaches are recommendations and are subject to approval and modification based on discussions with the Corps of Engineers, Port of Houston Authority, and Houston Pilots.

Larry L Daggett

Larry L. Daggett, Engineer

Table 2. List of 110 Largest Containerships in the World Fleet

Built	Name	Length overall (m)	Length overall (ft)	Beam (m)	Beam (ft)	Maximum TEU	Owner	gt (tn)
2017	OOCL Hong Kong[1]	399.87	1,311.90	58.8	193	21413	OOCL (Hong Kong)	210,890
2017	OOCL Germany	399.87	1,311.90	58.8	193	21413	OOCL (Hong Kong)	210,890
2017	Madrid Maersk[2]	399	1,309	58.6	192	20568	Maersk Line	214,286
2017	Munich Maersk	399	1,309	58.6	192	20568	Maersk Line	214,286[3]
2017	Moscow Maersk	399	1,309	58.6	192	20568	Maersk Line	214,286[4]
2017	MOL Triumph[5]	400	1,312.30	58.8	193	20170	Mitsui O.S.K. Lines	199,000
2017	MOL Trust	400	1,312.30	58.8	193	20170	Mitsui O.S.K. Lines	199,000
2017	MOL Tribute	400	1,312.30	58.8	193	20170	Mitsui O.S.K. Lines	199,000
2016	MSC Jade[6]	398.45	1,307.30	59.07	193.8	19224	Mediterranean Shipping Company	194,308
2016	MSC Ditte[7]	398.43	1,307.20	59.08	193.8	19224	Mediterranean Shipping Company	194,308
2016	MSC Reef	398.43	1,307.20	59.08	193.8	19224	Mediterranean Shipping Company	194,308
2016	MSC Mirja	398.43	1,307.20	59.08	193.8	19224	Mediterranean Shipping Company	194,308
2016	MSC Erica	398.43	1,307.20	59.08	193.8	19224	Mediterranean Shipping Company	194,308
2017	MSC Tina	398.43	1,307.20	59.08	193.8	19224	Mediterranean Shipping Company	194,308
2016	MSC Diana[8]	399.994	1,312.32	58.839	193.04	19224	Mediterranean Shipping Company	193,489
2016	MSC Ingy	399.994	1,312.32	58.839	193.04	19224	Mediterranean Shipping Company	193,489
2016	MSC Eloane	399.994	1,312.32	58.839	193.04	19224	Mediterranean Shipping Company	193,489
2016	MSC Mirjan	399.994	1,312.32	58.839	193.04	19224	Mediterranean Shipping Company	193,489
2017	MSC Rifaya	399.994	1,312.32	58.839	193.04	19224	Mediterranean Shipping Company	193,489
2017	MSC Leanne	399.994	1,312.32	58.839	193.04	19224	Mediterranean Shipping Company	193,489
2015	MSC Oscar[9]	395.4	1,297	59	194	19224	MSC (Switzerland)	192,237
2015	MSC Oliver[10]	395.4	1,297	59	194	19224	MSC (Switzerland)	192,237
2015	MSC Zoe[11]	395.4	1,297	59	194	19224	MSC (Switzerland)	192,237

Built	Name	Length overall (m)	Length overall (ft)	Beam (m)	Beam (ft)	Maximum TEU	Owner	gt (tn)
2015	MSC Maya[12]	395.4	1,297	59	194	19224	MSC (Switzerland)	192,237
2014	CSCL Globe[13]	399.67	1,311.30	58.6	192	19100	CSCL (China)	187,541
2014	CSCL Pacific Ocean[14]	399.67	1,311.30	58.6	192	19100	CSCL (China)	187,541
2015	CSCL Indian Ocean[15]	399.67	1,311.30	58.6	192	19100	CSCL (China)	187,541
2015	CSCL Atlantic Ocean[16]	399.67	1,311.30	58.6	192	19100	CSCL (China)	187,541
2015	CSCL Arctic Ocean[17]	399.67	1,311.30	58.6	192	19100	CSCL (China)	187,541
2015	Barzan[18]	400	1,312.30	58.6	192	18800	UASC (Kuwait)	195,636
2013	*Magleby Maersk*[19]	400	1,312.30	59	194	18270	Maersk (Denmark)	194,849
2014	MSC New York[20]	399	1,309	54	177	18270	MSC (Switzerland)	176,490
2013	*Madison Maersk*[21]	400	1,312.30	59	194	18270	Maersk (Denmark)	194,849
2013	*Mærsk Mc-Kinney Møller*[22]	400	1,312.30	59	194	18270	Maersk (Denmark)	194,849
2013	*Majestic Mærsk*[23]	400	1,312.30	59	194	18270	Maersk (Denmark)	194,849
2013	*Mary Mærsk*[24]	400	1,312.30	59	194	18270	Maersk (Denmark)	194,849
2013	*Marie Mærsk*[25]	400	1,312.30	59	194	18270	Maersk (Denmark)	194,849
2015	CMA CGM Georg Forster[26]	398	1,306	54	177	18000	CMA CGM (France)	175,688
2015	CMA CGM Bougainville	398	1,306	54	177	17722	CMA CGM (France)	175,688
2015	*CMA CGM Kerguelen*[27]	398	1,306	54	177	17722	CMA CGM (British)	175,688
2015	CMA CGM Vasco de Gama	399	1,309	54	177	17859	CMA CGM (France)	178,228
2015	CMA CGM Zheng He	399	1,309	54	177	17859	CMA CGM (France)	178,228
2015	*CMA CGM Benjamin Franklin*[28]	399	1,309	54	177	17859	CMA CGM (France)	178,228
2012	*CMA CGM Marco Polo*[29]	396	1,299	54	177	16020	CMA CGM (France)	175,343
2013	*CMA CGM Alexander von Humboldt*[30]	396	1,299	54	177	16020	CMA CGM (France)	175,343
2013	*CMA CGM Jules Verne*[31]	396	1,299	54	177	16020	CMA CGM (France)	175,368
2006	*Emma Mærsk*[32]	397.7	1,305	56.4	185	15500	Maersk (Denmark)	170,794

August 22, 2017

Built	**Name**	Length overall (m)	Length overall (ft)	Beam (m)	Beam (ft)	**Maximum TEU**	**Owner**	gt (tn)
2006	*Estelle Mærsk*[33]	397.7	1,305	56.4	185	15500	Maersk (Denmark)	170,794
2007	*Eleonora Mærsk*[34]	397.7	1,305	56.4	185	15500	Maersk (Denmark)	170,794
2007	*Evelyn Mærsk*[35]	397.7	1,305	56.4	185	15500	Maersk (Denmark)	170,794
2007	*Ebba Mærsk*[36]	397.7	1,305	56.4	185	15500	Maersk (Denmark)	170,794
2007	*Elly Mærsk*[37]	397.7	1,305	56.4	185	15500	Maersk (Denmark)	170,794
2007	*Edith Mærsk*[38]	397.7	1,305	56.4	185	15500	Maersk (Denmark)	170,794
2008	*Eugen Mærsk*[39]	397.7	1,305	56.4	185	15500	Maersk (Denmark)	170,794
2010	CSCL Star[40]	366	1,201	52	171	14074	CSCL (China)	150,853
2011	CSCL Saturn[41]	366	1,201	52	171	14074	CSCL (China)	150,853
2011	CSCL Mercury[42]	366	1,201	52	171	14074	CSCL (China)	150,853
2011	CSCL Mars[43]	366	1,201	51.2	168	14074	CSCL (China)	150,853
2012	CSCL Uranus[44]	366	1,201	52	171	14074	CSCL (China)	150,853
2012	CSCL Neptune[45]	366	1,201	52	171	14074	CSCL (China)	150,853
2011	CSCL Jupiter[46]	365.5	1,199	52	171	14074	CSCL (China)	150,853
2013	MOL Quest[47]	368	1,207	51	167	14000	Mitsui (Japan)	151,963
2013	APL Temasek[48]	368	1,207	51	167	14000	APL (Singapore)	151,963
2010	MSC Savona[49]	366	1,201	51	167	14000	MSC (Switzerland)	153,115
2010	MSC Genova[50]	366	1,201	51	167	14000	MSC (Switzerland)	153,115
2012	MSC Deila[51]	366	1,201	51	167	14000	MSC (Switzerland)	153,115
2012	MSC Valeria[52]	366	1,201	51	167	14000	MSC (Switzerland)	153,115
2011	MSC Fillippa[53]	366	1,201	48	157	14000	MSC (Switzerland)	140,259
2009	*MSC Danit*[54]	366	1,201	51	167	14000	MSC (Switzerland)	153,092
2009	*MSC Camille*[55]	366	1,201	51	167	14000	MSC (Switzerland)	153,092
2010	*MSC Melatilde*[56]	366	1,201	51	167	14000	MSC (Switzerland)	151,559
2010	*MSC Paloma*[57]	366	1,201	51	167	14000	MSC (Switzerland)	153,092

Built	Name	Length overall (m)	Length overall (ft)	Beam (m)	Beam (ft)	Maximum TEU	Owner	gt (tn)
2011	MSC Ravenna[58]	366	1,201	51	167	14000	MSC (Switzerland)	153,115
2011	CSCL Venus[59]	365.5	1,199	51.2	168	14000	CSCL (China)	150,853
2010	MSC Alexandra[60]	365.5	1,199	52	171	14000	MSC (Switzerland)	153,115
2010	MSC Rosa M[61]	365.5	1,199	51	167	14000	MSC (Switzerland)	153,115
2010	MSC La Spezia[62]	365.5	1,199	51	167	14000	MSC (Switzerland)	153,115
2011	MSC Taranto[63]	365.5	1,199	51	167	14000	MSC (Switzerland)	153,115
2013	*APL Raffles*[64]	368.5	1,209	51	167	13900	APL (Singapore)	151,963
2015	Manchester Bridge[65]	366	1,201	51	167	13870	K Line (Japan)	150,709
2009	*CMA CGM Laperouse*[66]	366	1,201	52	171	13830	CMA CGM (France)	150,269
2010	*CMA CGM Corte Real*[67]	366	1,201	52	171	13830	CMA CGM (France)	150,269
2010	*CMA CGM Amerigo Vespucci*[68]	366	1,201	52	171	13800	CMA CGM (France)	152,991
2010	*CMA CGM Christophe Colomb*[69]	365	1,198	52	171	13800	CMA CGM (France)	153,022
2008	*MSC Daniela*[70]	366	1,201	45.6	150	13798	MSC (Switzerland)	151,559
2009	*MSC Kalina*[71]	366	1,201	51	167	13798	MSC (Switzerland)	151,559
2009	*MSC Bettina*[72]	366	1,201	51	167	13798	MSC (Switzerland)	151,559
2009	*MSC Irene*[73]	366	1,201	51	167	13798	MSC (Switzerland)	151,559
2009	*MSC Emanuela*[74]	366	1,201	51	167	13798	MSC (Switzerland)	151,559
2009	*MSC Eva*[75]	366	1,201	51	167	13798	MSC (Switzerland)	151,559
2010	*MSC Beatrice*[76]	366	1,201	51	167	13798	MSC (Switzerland)	151,559
2010	MSC Sonia[77]	365.5	1,199	51	167	13798	MSC (Switzerland)	153,092
2010	MSC Livorno[78]	365.5	1,199	51	167	13798	MSC (Switzerland)	153,115
2009	*MSC Gaia*[79]	365.5	1,199	45.6	150	13798	MSC (Switzerland)	151,559
2010	*UMM Salal*[80]	365.5	1,199	48	157	13500	UASC (Kuwait)	141,077
2012	Ain Snan[81]	365.5	1,199	48	157	13500	UASC (Kuwait)	141,077

Built	Name	Length overall (m)	Length overall (ft)	Beam (m)	Beam (ft)	Maximum TEU	Owner	gt (tn)
2012	Unayzah[82]	365.5	1,199	48	157	13500	UASC (Kuwait)	141,077
2012	Alula[83]	365.5	1,199	48	157	13500	UASC (Kuwait)	141,077
2012	Tayma[84]	365.5	1,199	48	157	13500	UASC (Kuwait)	141,077
2012	Malik Al Ashtar[85]	365.5	1,199	48	157	13500	UASC (Kuwait)	141,077
2012	Al Riffa[86]	365.5	1,199	48	157	13500	UASC (Kuwait)	141,077
2012	Al Qibla[87]	365.5	1,199	48	157	13500	UASC (Kuwait)	141,077
2012	Jebel Ali[88]	365.5	1,199	48	157	13500	UASC (Kuwait)	141,077
2013	COSCO France[89]	366	1,201	52	171	13386	COSCO (China)	153,666
2013	COSCO Belgium[90]	366	1,201	51	167	13386	COSCO (China)	153,666
2010	*CMA CGM Magellan*[91]	365.5	1,199	51.2	168	13830	CMA CGM (France)	150,269
2013	OOCL Brussels[92]	366.5	1,202	48.2	158	13208	OOCL (Hong Kong)	141,003
2013	OOCL Berlin[93]	366.5	1,202	48.2	158	13208	OOCL (Hong Kong)	141,003
2013	OOCL Chongqing[94]	366.5	1,202	48.2	158	13208	OOCL (Hong Kong)	141,003
2013	NYK Helios[95]	365.5	1,199	48.4	159	13208	NYK (Japan)	141,003
2013	NYK Hercules[96]	365.5	1,199	48.4	159	13208	NYK (Japan)	141,003
2012	Hamburg Express[97]	366	1,201	48.2	158	13169	Hapag Lloyd (Germany)	142,295
2012	New York Express[98]	366	1,201	48.2	158	13169	Hapag Lloyd (Germany)	142,295
2012	Basle Express[99]	366	1,201	48.2	158	13169	Hapag Lloyd (Germany)	142,295
2013	*Hong Kong Express*[100]	366	1,201	48.2	158	13169	Hapag Lloyd (Germany)	142,295
2013	Shanghai Express[101]	366	1,201	48.2	158	13169	Hapag Lloyd (Germany)	142,295
2013	Essen Express[102]	366	1,201	48.2	158	13169	Hapag Lloyd (Germany)	142,295
2011	*COSCO Glory*[103]	366.45	1,202.30	48.2	158	13114	Seaspan Corp. (HK)	141,823
2011	*COSCO Development*[104]	366.45	1,202.30	48.2	158	13114	Seaspan Corp. (HK)	141,823
2011	*COSCO Pride*[105]	366.45	1,202.30	48.2	158	13114	Seaspan Corp. (HK)	141,823
2011	*COSCO Harmony*[106]	366.45	1,202.30	48.2	158	13114	Seaspan Corp. (HK)	141,823

Built	Name	Length overall (m)	Length overall (ft)	Beam (m)	Beam (ft)	Maximum TEU	Owner	gt (tn)
2012	*COSCO Faith*[107]	366.45	1,202.30	48.2	158	13114	Seaspan Corp. (HK)	141,823
2012	*COSCO Hope*[108]	366.45	1,202.30	48.2	158	13114	Seaspan Corp. (HK)	141,823
2012	*COSCO Excellence*[109]	366.45	1,202.30	48.2	158	13114	Seaspan Corp. (HK)	141,823
2012	Hanjin Sooho[110]	366	1,201	48	157	13102	Hanjin (South Korea)	141,754
2012	Hanjin Europe[111]	366	1,201	48	157	13102	Hanjin (South Korea)	141,754
2012	Hanjin Africa[112]	366	1,201	48	157	13102	Hanjin (South Korea)	141,754
2012	Hanjin America[113]	366	1,201	48	157	13102	Hanjin (South Korea)	141,754
2013	Hanjin Harmony[114]	366	1,201	48	157	13102	Hanjin (South Korea)	141,754
2013	Hanjin Gold[115]	366	1,201	48	157	13102	Hanjin (South Korea)	141,754
2013	Hanjin Green Earth[116]	366	1,201	48	157	13102	Hanjin (South Korea)	141,754
2011	MSC Cristina[117]	366	1,201	48	157	13102	MSC (Switzerland)	141,635
2012	MSC Altair[118]	366	1,201	48	157	13102	MSC (Switzerland)	141,635
2012	Hanjin Asia[119]	366	1,201	48	157	13102	Hanjin (South Korea)	141,754
2012	Hyundai Together[120]	366	1,201	48.2	158	13100	Danaos (Greece)	141,770
2012	Hyundai Tenacity[121]	366	1,201	48.2	158	13100	Danaos (Greece)	141,770
2012	Hyundai Smart[122]	366	1,201	48.2	158	13100	Danaos (Greece)	141,770
2012	Hyundai Speed[123]	366	1,201	48.2	158	13100	Danaos (Greece)	141,770
2012	Hyundai Ambition[124]	366	1,201	48.2	158	13100	Danaos (Greece)	141,770
2011	Maersk Evora[125]	366.47	1,202.30	48.2	158	13092	Maersk (Denmark)	141,716
2011	CMA CGM Alaska[126]	366	1,201	48	157	13092	CMA CGM (France)	140,259
2011	CMA CGM Nevada[127]	366	1,201	48	157	13092	CMA CGM (France)	140,259

Table 3. Proposed Test Matrix for Sec 216 Houston Ship Channel Expansion Ship Simulation

		Inbound Ship				Outbound Ship										
Run No.	**Channel Condition**	**Type**	**Draft (ft/m)**	**Initial Speed (knts)**	**Initial Position**	**Pilot**	**Type**	**Draft (ft/m)**	**Initial Speed (knts)**	**Initial Position**	**Pilot**	**Tide/ Current Speed**	**Wind Direction / Speed**	**Tugs**	**Estimated Transit Time (min)**	**Notes**
1 - Testing HSC Widened to 650 ft with Bend Wideners																
1a	650 ft	Container	44/13.4	12	41-42		Suezmax	44/13.4	10	53-54		Flood	SE/20	0		Meeting Below Red Fish
1b	650 ft	Container	44/13.4	12	Continue							Flood	SE/20	0		Navigating Bend
1c	650 ft	Container	44/13.4	12	Continue		Suezmax	44/13.4	10	81-82		Flood	SE/20	0		Meeting near 65-66
1d	650 ft	Container	44/13.4	12	Continue							Flood	SE/20	0		Navigating Bend
1e	650 ft	Container	44/13.4	12	Continue		Suezmax	44/13.4	10	85-86		Flood	SE/20	0	90	Meeting Near 81-82
2a	650 ft	Container	44/13.4	12	41-42		Suezmax	44/13.4	10	53-54		Ebb	SE/20	0		Meeting Below Red Fish
2b	650 ft	Container	44/13.4	12	Continue							Ebb	SE/20	0		Navigating Bend
2c	650 ft	Container	44/13.4	12	Continue		Suezmax	44/13.4	10	81-82		Ebb	SE/20	0		Meeting near 65-66
2d	650 ft	Container	44/13.4	12	Continue							Ebb	SE/20	0		Navigating Bend
2e	650 ft	Container	44/13.4	12	Continue		Suezmax	44/13.4	10	85-86		Ebb	SE/20	0	90	Meeting Near 81-82
3a	650 ft	Suezmax	44/13.4	10	71-72		Container	44/13.4	12	85+86		Flood	SE/20	0		Meeting Below Red Fish
3b	650 ft						Container	44/13.4	12	Continue		Flood	SE/20	0		Navigating Bend
3c	650 ft	Suezmax	44/13.4	10	45-46		Container	44/13.4	12	Continue		Flood	SE/20	0		Meeting near 65-66
3d	650 ft						Container	44/13.4	12	Continue		Flood	SE/20	0		Navigating Bend
3e	650 ft	Suezmax	44/13.4	10	41-42		Container	44/13.4	12	Continue		Flood	SE/20	0	90	Meeting Below Red Fish
4a	650 ft	Suezmax	44/13.4	10	71-72		Container	44/13.4	12	85+86		Ebb	SE/20	0		Meeting Below Red Fish
4b	650 ft						Container	44/13.4	12	Continue		Ebb	SE/20	0		Navigating Bend
4c	650 ft	Suezmax	44/13.4	10	45-46		Container	44/13.4	12	Continue		Ebb	SE/20	0		Meeting near 65-66
4d	650 ft						Container	44/13.4	12	Continue		Ebb	SE/20	0		Navigating Bend
4e	650 ft	Suezmax	44/13.4	10	41-42		Container	44/13.4	12	Continue		Ebb	SE/20	0	90	Meeting Below Red Fish

		Inbound Ship				**Outbound Ship**										
Run No.	**Channel Condition**	**Type**	**Draft (ft/m)**	**Initial Speed (knts)**	**Initial Position**	**Pilot**	**Type**	**Draft (ft/m)**	**Initial Speed (knts)**	**Initial Position**	**Pilot**	**Tide/ Current Speed**	**Wind Direction / Speed**	**Tugs**	**Estimated Transit Time (min)**	**Notes**
Total Time														**min**	**360**	
														hrs	**6**	
2 - Testing HSC Widened to xxx ft with Bend Wideners - Width Depending on Results of Previous Set of Tests																
1a	ft	Container	44/13.4	12	41-42		Suezmax	44/13.4	10	53-54		Flood	SE/20	0		Meeting Below Red Fish
1b	ft	Container	44/13.4	12	Continue							Flood	SE/20	0		Navigating Bend
1c	ft	Container	44/13.4	12	Continue		Suezmax	44/13.4	10	81-82		Flood	SE/20	0		Meeting near 65-66
1d	ft	Container	44/13.4	12	Continue							Flood	SE/20	0		Navigating Bend
1e	ft	Container	44/13.4	12	Continue		Suezmax	44/13.4	10	85-86		Flood	SE/20	0	90	Meeting Near 81-82
2a	ft	Container	44/13.4	12	41-42		Suezmax	44/13.4	10	53-54		Ebb	SE/20	0		Meeting Below Red Fish
2b	ft	Container	44/13.4	12	Continue							Ebb	SE/20	0		Navigating Bend
2c	ft	Container	44/13.4	12	Continue		Suezmax	44/13.4	10	81-82		Ebb	SE/20	0		Meeting near 65-66
2d	ft	Container	44/13.4	12	Continue							Ebb	SE/20	0		Navigating Bend
2e	ft	Container	44/13.4	12	Continue		Suezmax	44/13.4	10	85-86		Ebb	SE/20	0	90	Meeting Near 81-82
3a	ft	Suezmax	44/13.4	10	71-72		Container	44/13.4	12	85+86		Flood	SE/20	0		Meeting Below Red Fish
3b	ft						Container	44/13.4	12	Continue		Flood	SE/20	0		Navigating Bend
3c	ft	Suezmax	44/13.4	10	45-46		Container	44/13.4	12	Continue		Flood	SE/20	0		Meeting near 65-66
3d	ft						Container	44/13.4	12	Continue		Flood	SE/20	0		Navigating Bend
3e	ft	Suezmax	44/13.4	10	41-42		Container	44/13.4	12	Continue		Flood	SE/20	0	90	Meeting Below Red Fish
4a	ft	Suezmax	44/13.4	10	71-72		Container	44/13.4	12	85+86		Ebb	SE/20	0		Meeting Below Red Fish
4b	ft						Container	44/13.4	12	Continue		Ebb	SE/20	0		Navigating Bend
4c	ft	Suezmax	44/13.4	10	45-46		Container	44/13.4	12	Continue		Ebb	SE/20	0		Meeting near 65-66

		Inbound Ship				Outbound Ship										
Run No.	**Channel Condition**	**Type**	**Draft (ft/m)**	**Initial Speed (knts)**	**Initial Position**	**Pilot**	**Type**	**Draft (ft/m)**	**Initial Speed (knts)**	**Initial Position**	**Pilot**	**Tide/ Current Speed**	**Wind Direction / Speed**	**Tugs**	**Estimated Transit Time (min)**	**Notes**
4d	ft						Container	44/13.4	12	Continue		Ebb	SE/20	0		Navigating Bend
4e	ft	Suezmax	44/13.4	10	41-42		Container	44/13.4	12	Continue		Ebb	SE/20	0	90	Meeting Below Red Fish
Total Time														**min**	**360**	
														hrs	**6**	
3. Testing Widened HSC Channel (xxx ft) - Entrance to Barbours Cut (width depending on results of Runs 1-4)																
5	ft	Container	44/13.4	12	85-86		Suezmax	44/13.4	10	53-54		Flood	SE/20	2	45	Meeting Approaching Barbours Cut and Berthing in Barbours Cut
6	ft	Container	44/13.4	12	85-86		Suezmax	44/13.4	10	53-54		Ebb	SE/20	2	45	Meeting Approaching Barbours Cut and Berthing in Barbours Cut
7	ft	Suezmax	44/13.4	10	85-86		Container	44/13.4	12	Berth		Flood	SE/20	2	45	Departing Barbours Cut and Meeting below Barbours Cut
8	ft	Suezmax	44/13.4	10	85-86		Container	44/13.4	12	Berth		Ebb	SE/20	2	45	Departing Barbours Cut and Meeting below Barbours Cut
9	ft	Container	44/13.4	12	71-72		Suezmax	44/13.4	10	83-84		Flood	SE/20	2	60	Meeting Approaching Bayport and Enter Bayport
10	ft	Container	44/13.4	12	71-72		Suezmax	44/13.4	10	83-84		Ebb	SE/20	2	60	Meeting Approaching Bayport and Enter Bayport
11	ft	Suezmax	44/13.4	10	71-72		Container	44/13.4	0	Berth		Flood	SE/20	2	45	Departing Bayport and Meeting below 75-76
12	ft	Suezmax	44/13.4	10	71-72		Container	44/13.4	0	Berth		Ebb	SE/20	2	45	Departing Bayport and Meeting below 75-76

		Inbound Ship					**Outbound Ship**									
Run No.	**Channel Condition**	**Type**	**Draft (ft/m)**	**Initial Speed (knts)**	**Initial Position**	**Pilot**	**Type**	**Draft (ft/m)**	**Initial Speed (knts)**	**Initial Position**	**Pilot**	**Tide/ Current Speed**	**Wind Direction / Speed**	**Tugs**	**Estimated Transit Time (min)**	**Notes**
Total Time														**min**	**390**	
														hrs	**6.5**	
4. Testing Widened Upper HSC Channel (Above Texas 8 Bridge - to be replaced with a bridge spanning the navigation channel)																
13	400 (?) ft x 45 (?) ft	Aframax	44/13.4	6	160							0	SE20	2	30	Transit through Boggy Bayou - Greens Bayou
14	400 (?) ft x 45 (?) ft	Aframax	44/13.4	6	160							0	SE20	2	30	Transit through Boggy Bayou - Greens Bayou
15	400 (?) ft x 45 (?) ft						Aframax	44/13.4	0	Berth		0	SE20	2	30	Transit through Boggy Bayou - Greens Bayou
16	400 (?) ft x 45 (?) ft						Aframax	44/13.4	0	Berth		0	SE20	2	30	Transit through Boggy Bayou - Greens Bayou
13	400 (?) ft x 45 (?) ft	Aframax	44/13.4	6	160							0	N20	2	30	Transit through Boggy Bayou - Greens Bayou
14	400 (?) ft x 45 (?) ft	Aframax	44/13.4	6	160							0	N20	2	30	Transit through Boggy Bayou - Greens Bayou
15	400 (?) ft x 45 (?) ft						Aframax	44/13.4	0	Berth		0	N20	2	30	Transit through Boggy Bayou - Greens Bayou
16	400 (?) ft x 45 (?) ft						Aframax	44/13.4	0	Berth		0	N20	2	30	Transit through Boggy Bayou - Greens Bayou
Total Time														**min**	**240**	
														hrs	**4**	

Appendix I: Houston Pilots Association Simulation-Based Evaluation Standards of Care

Houston Pilots Association

Simulation-Based Evaluation Standards of Care

Date: Thursday, 24 July, 2017
Document Version: 4

Pilot in Charge: Capt. Sean Arbogast, HPA Pilots

Edited by: George B. Burkley, LOCUS LLC, Maritime Pilots Institute

Disclaimer
The standards and methods documented herein are intended only for use in simulation-based research. These standards are designed to inform a research process and in no way apply to actual piloting or relate to the piloting operations of the Houston Ship Pilots Association or their members.

Contents

Update Log

Change Date	Change Made	By
19 JAN 2016	Document initiation	George Burkley
27 JAN 2016	Editorial revisions from initial safety committee review of document, added values to measurement metrics	George Burkley
20 APR 2016	Editorial edits to ship model evaluation, upgraded run evaluation form to include quantitative grading criteria	George Burkley
24 July 2017	Edited Pilot Eval Form to improve grading criteria logic. Added unsafe tug maneuver " no running in front of a ship while tethered at speeds above 8kn)	George Burkley

Simulation-Based Evaluation Standards of Care

Description:
The HPA simulation-based Evaluation Standards of Care are a set of standards developed by the Houston Pilots designed to guide pilots and researchers during evaluations when using a ship simulator. The standards are set out in three parts:

1. Standards for simulation databases and ship models
2. Standards for the conduct of simulation-based evaluation
3. Standards for documentation and reporting

Standards for simulation databases and ship models

- a) Simulation databases
  - i) Simulation databases used for test and evaluation shall be vetted and approved for use by the HPA Pilots prior to use of the simulation for testing using the **HPA Simulation Vetting Form**.
  - ii) The following items will be vetted
    - (1) Distances and measurements: If special docks or new structures are provided in the simulation the structures and their setbacks must be measured and validated against the agreed design measurements.
    - (2) Shore and cultural features necessary for navigation and piloting landmarks.
    - (3) Depths vetted either to the hydrographic chart in use or to custom data as per the direction of the HPA Pilot in Charge. The process is to move a ship through the areas to be used in the testing at piloting speeds and to ensure that no unusual grounding occurs. Occasionally, a random polygon can appear in a database that will cause a grounding in a testing area.
    - (4) Currents vetted and tested
      - (a) Current drift test: Place a large ship dead in the water in an area of constant, even current, and observe the motion of the vessel. Allow the vessel to reach maximum drift velocity due to the current. Then oppose the drift forces using two tugs in opposition to the forces. Note the required power needed by the tugs to oppose the forces. The Pilot in Charge should observe these forces and concur that the vessel drifts at current speed and the tug arrest forces seems reasonable for the conditions and under keel clearance provided.
    - (5) Wind vetting: Wind shadowing should be provided by landmass and structures. Test this by partially hiding the ship behind an object then slowly move the vessel into the wind field and observe the wind force acting on the model as it projects into the wind area.
      - (a) Wind can be either steady force wind or provided by a variance model which will surge the wind speeds and direction based on a simulation formula.
    - (6) Fendering: Check the fendering at the docks, if used, to ensure the vessel will moor correctly in the fendering. Ensure the fendering effect is coincident with the provided visual image of the dock.
    - (7) Lights and shapes: Ensure that navigation lights and their corresponding ATON shapes, especially ranges and range lights are clearly visible to the pilot.

Ship Model Standards and Evaluation Methods

General Standards

1) Ships used in simulation modelling will be six-degree of freedom, high fidelity ownships modeled using data from actual vessels.
2) Models will be provided with Pilot Card, Maneuvering Card and full IMO recognized sea trial data, with the trials conducted in simulation, deep water and zero environmental conditions. Sea trial data will be assumed as a baseline for the behavior of the vessel in deep water.
3) Shallow water testing: All ship models used in testing will be evaluated for shallow water effects prior to simulation using the **HPA Simulation Ship Model Evaluation Form.** This form is designed to test the behavior of the vessel in the Houston ship channel, with particular interest in the vessels squat, bank effect, suction, stern suction, bow cushion and ship to ship interaction.

Standards for the Conduct of Simulation-based Evaluation

Simulation Run Standards

1. All simulation-based testing will be conducted with vetted databases, vetted shipmodels with vetted tug effects.
2. Simulation runs will be run according to the following pattern:
    a. Run prebrief:
        i. Testing objective
        ii. Hypothesis of what the test pilot thinks will be the likely outcome
        iii. Double check of simulation setup, model, environmental conditions and tug setup
        iv. Communication with the operator of the intended tug use and maneuvers
    b. Runtime
        i. Data will be kept in a spreadsheet record of the simulation runs, typically be a researcher in the control room area.
        ii. Screenshots of the run will be taken a various intervals to support the spreadsheet data
        iii. A record file of the run will be maintained so that the run can be replayed on the simulator.
        iv. The Pilot in Charge or their designate has full control over the simulation start, stop, pause and conduct of the system.
    c. Debrief
        i. Pilots conducting tests will fill out a survey form (see **HPA Pilot Simulation Run Evaluation Form**) after every run to document their opinions and findings from the simulation.

Vessel Maneuvering Standards

3. Standards for vessel maneuvers
    a. Vessels will be maneuvered and piloted with good seamanship in a conservative fashion to a typical standard of care with the aim of success following the axiom **“ The proposed or tested maneuver can be reliably completed by an average pilot on an average day achieving consistent above-average results”**
    b. Simulation maneuvers that are reckless, lucky or otherwise non-professional will not be considered valid for testing. If there is question about whether a maneuver is valid, it will be decided by the Pilot in Charge with appeal to the HPA Safety Committee.
    c. All standards and requirements documented and used in these standards are intended only for use in simulation-based research purposes. The standards use herein are designed to inform a research process and in no way apply to actual piloting or relate to piloting operations in the Houston Ship Channel.

Vessel Load and Trim Conditions

4. Standards for vessel load and trim conditions
    a. Vessels used in simulation evaluation will normally be in even-keel configuration or in drag condition whereby the stern of the vessel is lower in the water than the bow.
    b. Vessels that are down-by-the-head, whereby the bow is lower in the water than the stern, will be considered a special-condition vessel, with known unusual maneuvering behaviors, and will not be used as a general comparator to normal load condition vessels.

Meeting and Overtaking

5. Standards for clearances when meeting, overtaking
    a. The main Houston Ship Channel will be assumed to be 530’ wide with two barge lanes on either side of the main channel measuring 235’ wide each. The toe of the main channel extends at a 3:1 slope towards the barge lane.
    b. Ownship will maintain **90 feet** of lateral distance between two ships during meeting and overtaking maneuvers in the ship channel.

  c. Ownship will maintain **100' feet** of lateral distance between tows with barges during meeting and overtaking maneuvers in the ship channel.

Passing Moored Vessels

6. Standards for clearances and speeds when passing moored vessels
    a. Ownship shall maintain **119** feet of distance to other ships when passing a vessel that is berthed.
    b. Unless otherwise informed of by approved surge analysis study results, ownship shall not exceed **4.5** knots through the water speed when passing another berthed vessel when that vessel is within **119 feet** of distance from ownship.

Turning Basins and Confined Channels

7. Standards for maneuvering in turning basins and confined channels
    a. Ownship hull perimeter or outermost structure shall maintain **50 feet** of distance, and attached tugs shall maintain **25 feet** from fixed objects or moored vessels while maneuvering in turning basins.
    b. Ownship wash must be minimized when maneuvering in turning basins. Maneuvering bells of greater than half ahead or half astern will be considered non-standard emergency actions.

Drafts and Air-drafts

8. Standards for clearances with overhead and bottom structure
    a. Ownship shall maintain **2 feet** of distance between the uppermost part of the ship and any overhead structure (ex. bridge, crane)
    b. In a static condition, ownship shall maintain **1 foot** of distance between the bottom-most part of the ship and the project depth of the waterway.
    c. In a dynamic (moving) condition, ownship shall maintain **½ foot (.5')** of distance between the bottom-most part of the ship and the project depth waterway.
        i. This safety clearance accounts for vessel "squat" effects of a moving vessel in a waterway.
        ii. It is understood that vessels navigating in confined muddy waterways with an indeterminate bottom composition have varying behavior to squat conditions.
        iii. It is agreed that all vessels navigating in near-bottom conditions, typically at speeds **above 5 knots**, will suffer a loss of speed and display an impairment in maneuvering, to include piloting requirements for greater rudder inputs to maintain courses and track stability of the vessel.

Assist Tugs

9. Tug clearances when engaged in ship assist maneuvers while at a dock or slip
    a. Assist tugs engaged in ship assistance at a dock or slip, whether attached or alongside, shall maintain **25 feet** of clearance from the extreme end of the tug and any man-made structure.
10. Tug clearance in the main channel
    a. Assist tugs engaged in ship assistance, whether attached or alongside, shall not allow the center-point of the tug's wheelhouse to cross the 25 foot channel contour (outer toe of the ship channel)
11. Tug clearance when passing other ships in the channel
    a. Assist tugs engaged in ship assistance with a vessel underway in the HSC, whether attached or alongside, shall maintain **25 feet** of distance from any other vessel in the channel.
12. Tug clearance when passing moored vessels
    a. Assist tugs engaged in ship assistance, whether attached or alongside, shall not allow the perimeter fendering of the tug to come closer than **25 feet** to manmade structure or other vessels. (source, G&H Towing)
13. Tug reposition times
    a. Unless otherwise agreed to by the Pilot in Charge, the following re-position times will be used for assist tugs during simulation.

Tug Maneuver	Reposition Time
Running free alongside to "Put a line up and make fast"	2 minutes
Tied-up alongside - to shift one chock to another chock on the same side of the vessel	3 minutes
Tied-up alongside - to shift to a chock on the other side and tie up.	4 minutes
From center-lead aft - to drop line and shift to any chock forward of amidships	3 minutes
From center-lead aft – to keep line up and get into push-pull position on the quarter	1 minute

14. Tug bollard pull
    a. Unless otherwise agreed to by the Pilot in Charge, or accurate data is provided for actual tugs in the working area, the following tug bollard pull assumptions will be used for Azimuth Stern Drive (ASD) Tractor Tugs.
    b. Note: 1 long ton = 2240 pounds, 1 short ton = 2000 pounds, 1 metric ton = 2204.62 pounds
    c. Assist Tug Assumed Bollard Pull Table

Tug Type	Horsepower	Ahead Long Tons	Ahead Short Tons	Astern Long Tons	Astern Short Tons
ASD	6000	74	82.8	67	75
ASD	5000	56	62.7	52	58.2
ASD	4000	48	53.6	44	49.2
Twin Screw	3900	56	62.7	43	48.2

15. Tug polars for direct pull maneuvers
    a. Unless otherwise agreed to by the Pilot in Charge, the following direct pull tug polars will be used in simulation evaluation maneuvering

Direct Pull Table (Assumed)

Ship speed through the water (knots)	Tug angle to the ship (degrees)	Effective power (%)
0-2	Any	100% (full power)
2-4	0-90	50%
4+	0-90	0

16. Tug polars for powered indirect maneuvers
    a. Unless otherwise agreed to by the Pilot in Charge, the following powered-indirect pull tug polars will be used in simulation evaluation maneuvering

Powered Indirect Table

Ship speed through the water (knots)	Tug angle to the ship (degrees)	Effective power multiplier over direct pull power (%)
0-5	Any	none
5-8	90	125%

17. Tug polars for indirect pull maneuvers
    a. Unless otherwise agreed to by the Pilot in Charge, the following indirect pull tug polars will be used in simulation evaluation maneuvering

Indirect Pull Table

Ship speed through the water (knots)	Tug angle to the ships' stern (degrees)	Effective power multiplier (%)
0-7	Any	None
7-9	Inline (0) to 30 degrees	150%
7 - 10	Greater than 30 degrees	None (not possible)

Transverse Arrest Maneuver

18. For the purposes of simulation it will be assumed that transverse arrest maneuvers are emergency maneuvers only.
    a. The validity of the effective bollard pull multiplier for this maneuver is not validated. For the purposes of simulation, and until better data is available, it will be assumed that transverse arrest maneuvers are no more effective than an inline direct pull maneuver.
    b. The transverse arrest maneuver is also known to be unacceptably rough on tug equipment due to excess vibration, and is thus not considered a normal practice.

19. Unsafe tug maneuvers
    b. The following tug maneuvers will be considered unsafe
        i. Running ahead of a ship while tethered at speeds above 8kn.

Standards for Documentation and Reporting

The following standards will be followed for documentation and reporting

Privacy of Information

1. Participating pilots and researchers will document their work in the simulations using forms, notes, and recordings, both written and electronic. This information will be shared with persons designated by the Pilot in Charge.
    a. Participating pilots and researchers agree that no information will be shared with any other party regarding the conduct or outcomes of simulation research.

Documentation

2. The Pilot in Charge will approve the documentation protocol to be used for the evaluation and will be responsible for the safe keeping of such information.
3. Any changes to information contained in evaluation reports will be with the notice and consent of the Pilot in Charge and will be clearly noted in change logs in the preface of all reports.

HPA Simulation Database Vetting Form

HPA Vetting Pilot:___________________________ Database accepted: _______
Date:_____________ Database not accepted:______
Simulation Database Name/ Build Date:

#	Vetting Item	Accepted	Unacceptable
1.	**Distances and measurements**: If docks or new structures are provided in the simulation the structures and their setbacks to shallow water must be measured and validated against the agreed design measurements.		
2.	**Shore and cultural features** necessary for navigation and piloting landmarks		
3.	**Depths** vetted either to the hydrographic chart in use or to custom data as per the direction of the HPA Pilot in Charge. Process is to move a ship through the areas to be used in the testing at piloting speeds and to ensure that no unusual grounding occurs.		
4.	**Current drift test**: Place a large ship DIW in an area of constant, even current. Note that the vessel drifts at current speed and motion seem reasonable for the conditions/UKC. For eddy currents, place ship in current eddy and observe correct behavior		
5.	**Wind vetting:** Wind shadowing should be provided by landmass and structures.		
6.	**Fendering:** Check the fendering at the docks to ensure the vessel will moor correctly in the fendering. Ensure the fendering effect is coincident with the provided visual image of the dock.		
7.	**Lights and shapes:** lights, ATON shapes, are clearly visible		
8.	**Any other items noted by vetting pilot:**		

Signed: ______________________________

**Note: Attach screenshots of simulation instructor chart view of an unacceptable condition and other special findings from the vetting tests.*

HPA Simulation Ship Model Evaluation Form

HPA Vetting Pilot:__________________________ Model accepted: _______
Date:_____________ Model not accepted: _______

Simulation Model Name/Description:
Length: **Beam:** **Draft:** **Load Condition:**

Please attach pilot card and screenshots of maneuver to this form as a record of the testing
The intention of these test are to validate shallow water behavior of the model in the Houston Ship Channel. Model tests must be conducted in a validated and approved simulation model of the Houston Ship Channel. This form is documents the behavior of the vessel in the Houston ship channel for vessel squat, bank effect, suction, stern suction, bow cushion and ship to ship interaction. Feel free to make special notes and attach them to this record.

#	Vetting Item	Accepted	Unacceptable
1.	**Deep water sea trial** documentation, Pilot card and maneuvering poster are provided		
2.	**Squat behavior:** Model starts from DIW in the channel and accelerates to maximum transit speed consistent with future testing needs. Note the speed incident with onset of squat effects. Document if the vessel grounds due to squat in the speed range of future intended tests. Ensure the simulator is using the charted depth database and not a fictitious arbitrary depth “hard bottom”.		
3.	**Bank effect, neutral steering line:** Start model at a slow maneuvering speed in the center of the channel and accelerates to normal transit speeds. Document if the vessel will achieve a balanced position in the channel between the two opposing bank forces, ie: the “neutral steering line”. Document this effect.		
4.	**Bank effect, interaction:** While in the neutral steering line, pilot the vessel out of the “neutral steering line” and towards the starboard bank in easy increments until the model begins to interact with the bank. Note the speed and general angle and if it feels correct to your experience. If vessel consistently grounds and will not interact with the bank this is unacceptable.		
5.	**Bank effect departure:** Slowly move the vessel farther towards the bank observing greater need for counter-rudder. Achieve “departure” whereby the ship shears away from the bank with full counter-rudder. If departure is unattainable this unacceptable. Determine at which speed and angle this departure behavior will occur. If grounding occurs, document the situation referencing the grounding speeds and angle to the bank and if it is stern or bow grounding		
6.	**Ship to ship interaction test setup** (tests 6-12): 1. Tests will be run in a vetted and approved straight section of the HSC. 2. Bank effect testing must be completed first prior to validating ship to ship interactions. 3. Recommend a mid-bay location. 4. Vessels in the test should be of the exact same model type 5. Setup is, break at .6nm and 4 degrees (this setup is at the discretion of the test pilot)		
6.	**Ship to ship interaction, meeting conditions, onset behavior:** Document and evaluate if the bow surge effect is consistent with		

#	Vetting Item	Accepted	Unacceptable
	your experience. No effect noticed is grounds for an unacceptable rating.		
7.	**Ship to ship interaction, meeting conditions, alongside behavior**: Document and evaluate if the alongside effect and counter-rudder needed is consistent with your experience. No effect noticed is grounds for an unacceptable rating.		
8.	**Ship to ship interaction, meeting conditions, recovery behavior**: Document and evaluate if the recovery behavior is consistent with your experience. The vessel should turn in to the wake of the other ship and require piloting inputs to maintain safe clearance and control in the channel. No effect noticed is grounds for an unacceptable rating.		
9.	**Ship to ship interaction, overtaking conditions, onset behavior:** Note distance and effect of bow when approaching the stern of the other ship. Typically, this will be a weak effect in a ship simulator.		
10.	**Ship to ship interaction, overtaking conditions, alongside behavior:** Note the counter-rudder needed to maintain safe clearances while alongside the other vessel. This is a strong effect in ship simulators, if no effect is noted this is unacceptable.		
11.	**Ship to ship interaction, overtaking conditions, recovery behavior:** Note recovery effects as stern passes the other vessels bow, if any. (rare to feel in a ship simulator)		
12.	**Any other items noted by vetting pilot:**		

Signed: ______________________________

**Note: Attach screenshots of simulation instructor chart view of an unacceptable condition and other special findings from the vetting tests.*

Pilot Simulation Run Evaluation Form

Pilot Name:_______________________
Date:_______________________
Run #: _______________________

Overall Assessment: Satisfactory ____ Marginal ____ Unsatisfactory____

Run Objective: ____

Special Conditions (tugs, traffic, wind, current, setup, etc.):______________________________

Pilot Opinion of Simulation Outcome: ____

Quantitative Grading Criteria:
For marks above a level 4 please provide comment

	Safe				***Unsafe***					
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Safety										

Comment:

	Easy				***Challenging***					
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Degree of Difficulty										

Comment:

	High Degree of Reserve Power				***Reduced Reserve Tug Power***					
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Reserve Tug Power										

Comment:

Please use reverse for additional comments

Appendix J: Documentation of the HSC EPIFS Simulation Database Validation

June 26, 2019

Waterway Simulation Technology, Inc.

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Attn: Larry L. Daggett

MEMO FOR RECORD

Subject: Houston Ship Channel (HSC) 216 Ship Simulation Model Setup and Verification

Introduction

During the period from October 13-15, 2017, MPI, San Jacinto Maritime, Houston Pilots, and WST installed the simulation model databases for the reaches of the HSC, tested and adjusted the ship models until they were verified by the Houston Pilots, checked out the simulation databases, and discussed the project, feasibility study objectives, and testing program with the pilots, representatives from ERDC, the Galveston District, and Port of Houston Authority. This MFR has been prepared to document the results of this effort. Those in attendance during this period were:

- Marcus Maher, Tom Goodwin – Houston Pilots
- George Berkley, Fernando Lagunes – MPI
- Keith Martin, Dennis Webb – ERDC
- Larry Daggett, Chris Hewlett – WST
- Dana Chaney – Gahagan Bryant
- Richard Ruchhoeft – Port of Houston Authority
- Tomas White – Galveston District, Corps of Engineers

Ship model adjustment/verification

The ship model checkout and verification concentrated on the modified design ship, the Ultra Large Container Vessel (ULCV) (MV EDINBURG). This model was modified to make the ship more responsive to rudder commands in line with measurement that MPI made while observing a similar containership maneuvering in Norfolk Harbor. Maneuvers in deep unrestricted water and in the 650’ widened HSC channel were conducted by the Houston Pilots. Maneuvers were focused on responsiveness of the containership’s rudders to commands, the ship’s response to the rudder positions, and the response of the containership to the shallow water and banks in the channel. The pilots were satisfied with the ship’s performance in these circumstances.

Following the acceptance of the containership model, the verification focused on the modeling of ship/ship interactions within a shallow water restricted channel. This involved two Houston Pilots performing their normal meeting maneuvers with the design ULVC and Suezmax ship models in the shallow restricted proposed navigation channel (650ft x 46.5ft). Adjustments were made to the channel modeling resolution to enhance the bank effects and to the ship/ship interaction function of the ULCV in order to achieve ship model pilot acceptance.

Initial plans for modeling two-way traffic in the upper HSC were to involve an Aframax meeting a Panamax vessel. Discussions with the Houston Pilots noted that gas ships (LPG Carriers) involved vessels with a wider beam (120ft vs 106ft). Therefore, meeting situations with an LPGC model from the SJC library were performed which proved to be unsatisfactory. Further testing showed that the LPGC model had little, if any, bank effects response and was very sluggish in response to rudder commands. Therefore, the inclusion of the LPGC in the upper HSC tests was dropped. Testing of the performance of the design Aframax tanker meeting the design Panamax bulk carrier proved to be acceptable to the Houston Pilots. Although the bulk carrier has a smaller beam than the LPGC (106ft vs 120ft), the length of the Panamax bulk carrier was longer than the LPGC by 128ft. This will prove to be significant in maneuvers in the curved channel in the upper HSC.

Following the meeting tests, which were done without wind and/or currents, drift tests were performed on these ship models to demonstrated that the effects of wind and currents impacted the ship models in a realistic way.

Therefore, all ship models were accepted by the Houston Pilots and are ready for use in testing the channel design widths. The approval forms for the ULCV and Suezmax are attached as Enclosure 1. The selected ship principal characteristics are attached as Enclosure 2.

Test Procedures

The original development of the model of the Boggy to Greens Bayou widening was going to modify the Texas Beltway 8 bridge was going to be done by moving the piers of the bridge to the bank since the bridge replacement plans were not available. MPI was made aware that the proposed bridge would be of the cable stay design similar to the bridge at Baytown. Therefore, the modeled bridge was modified to have a similar design.

There was confusion on the proposed authorized channel depth to be used in the lower HSC and the Boggy Bayou to Greens Bayou. It was agreed that the design-authorized depth should be 46.5 MLLW. Therefore, all channels up to Greens Bayou were modified to that depth.

The proposed approach involved modeling meetings of Suezmax and ULCV in the bay channels with each vessel type transiting the bends in one-way mode. The Houston Pilots expressed concern that, as much as they would try to prevent meetings in the bends, such meetings were unavoidable. They strongly encouraged performing meetings in the bends.

In addition to meetings in the bends, the Houston Pilots noted that when one ULCV is approaching the container terminals another one would normally be departing. Therefore, they were concerned that the meetings should also include meetings of two ULCVs. It was agreed that such meetings would be included in the testing program.

The Houston Pilots noted that they do not presently allow the meeting of two Aframax vessels above Morgans Point, e.g. above the straight bay reaches. Therefore, it was recommended and agreed that the tests in the upper HSC widened and deepened reaches between Boggy Bayou and Greens Bayou would only involve two-way traffic of a Panamax and an Aframax vessel.

There was a discussion about which radius flare should be included in the testing program. There was a concern that the 5375ft radius that was presently programmed into the model databases would result in excessive dredging and maintenance volumes and mitigation costs. There was a discussion about whether the 4000ft radius would be adequate. The training that the pilots have been doing has been with the 4000ft radius flare; however, this may have been with a smaller ULCV. Results of the tests to determine the widening requirement for the Bayport Ship Channel were reviewed and found that transits were being made with the 4000ft radius. With the increased HSC width and the bend flare, it was agreed that the 4000ft radius should be included in the testing program. Concern was expressed over the extension of the channel toeline on the southwest end of the flare when the HSC was widened; thus making a point that had to be navigated around rather than a smooth curve transition to the apex of the west point of the Five-mile Cutoff Bend (markers 75-76). It was agreed that the simulation databases would be modified to include both the 4000ft radius and 5375ft radius flare into the Bayport Ship Channel for both the 650ft and 750ft HSC channel widths with testing of the 4000ft radius flare initially.

The Houston Pilots expressed a desire to conduct the turning operation in the Bayport Ship Channel in the proposed RO/RO turning basin. This would allow them to turn prior to entering the land portion of the channel and back into the terminals under tug control. They would prefer this operation instead of proceeding down the entire terminal channel between berthed containerships and the land and back again after turning in the turning basin at the end of the channel.

A draft pilot questionnaire was developed by WST and presented to ERDC for approval. That approval was received. The questionnaire is attached as Enclosure 3. This questionnaire was based on the initially presented test matrix.

Finally, the initial positions of the ships for each of the proposed test matrix were discussed using the NOAA navigation charts. The proposed test matrix for the Bay channels included long transits of the ULCV with multiple meetings of a Suezmax tanker in each of the straight reaches with no meetings in the bends. With the addition of meetings in the bends and meetings of the both the Suezmax and ULCV, this test matrix had to be revised. The Houston Pilots recommended a separation distance of 2 miles between ships in convoy. It was recommended that consideration be given to having the ship bridge be the long transiting ULCV and the two tug bridges be the meeting vessels. The simulation would be started at the lower end of the reach between Red Fish and Bolivar Roads with the ships beginning their transit below or above a bend so that the pilots could get a feel for the ship responses to the maneuvering commands.

Following the meetings of the two ships, the simulation could be paused and the tug bridges be reassigned or moved to a new location in the channel and the simulation restarted.

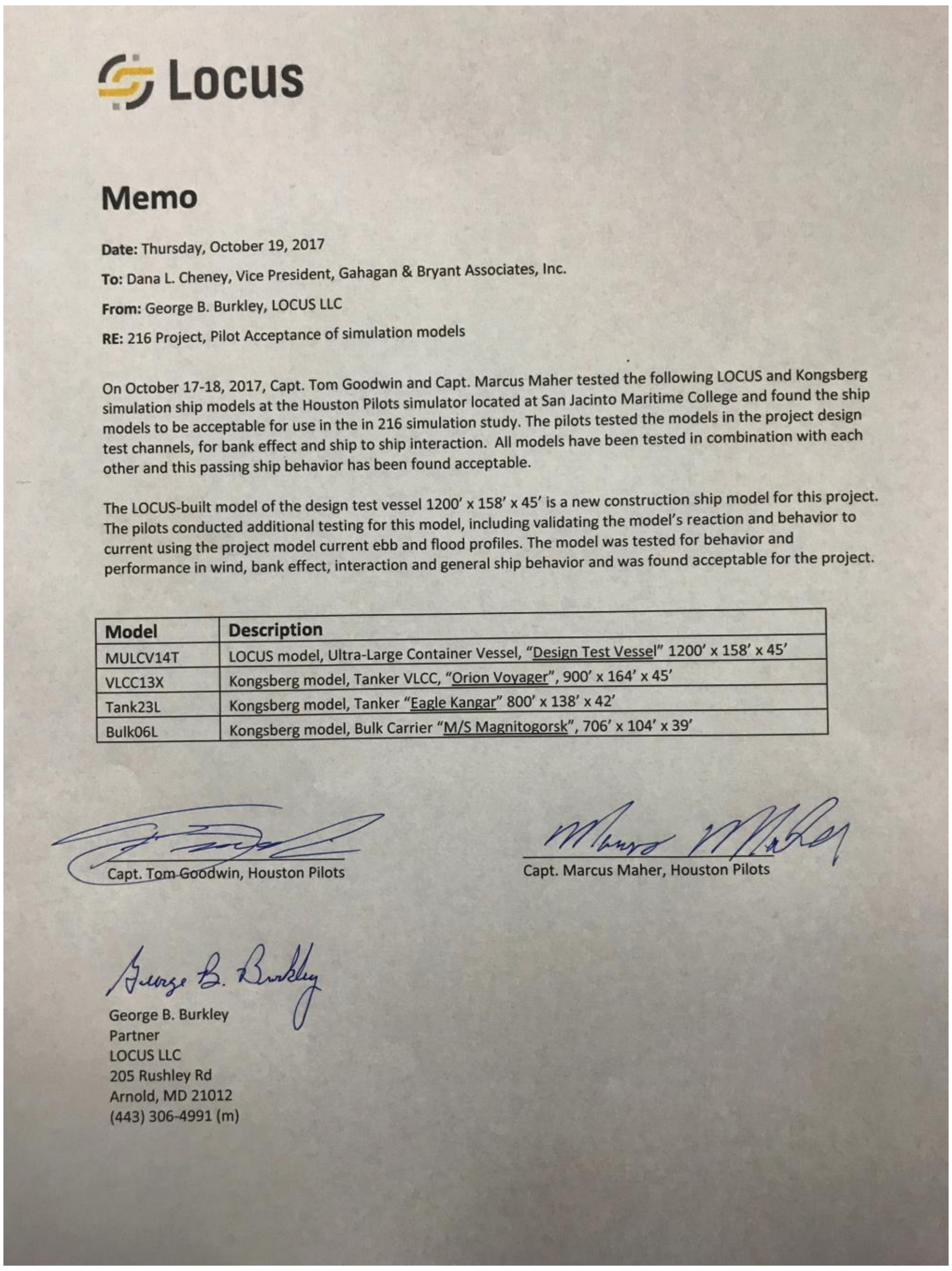
Based on these discussions, the test matrix was revised and is attached as Enclosure 4. The test program was modified to reduce the total time for the Bay channel runs. This test matrix is submitted for review and comments/suggestions.

Conclusions

The simulation modeling components were reviewed, evaluated and approved as modified. Changes were suggested that benefited the program and will make it more fully meet the objectives of the simulations. The benefit of having all parties involved participating, especially obtaining the input of the pilots to bring reality to the program, was especially beneficial.

Larry L Daggett

Larry L. Daggett, Engineer



LOCUS

Memo

Date: Thursday, October 19, 2017

To: Dana L. Cheney, Vice President, Gahagan & Bryant Associates, Inc.

From: George B. Burkley, LOCUS LLC

RE: 216 Project, Pilot Acceptance of simulation models

On October 17-18, 2017, Capt. Tom Goodwin and Capt. Marcus Maher tested the following LOCUS and Kongsberg simulation ship models at the Houston Pilots simulator located at San Jacinto Maritime College and found the ship models to be acceptable for use in the in 216 simulation study. The pilots tested the models in the project design test channels, for bank effect and ship to ship interaction. All models have been tested in combination with each other and this passing ship behavior has been found acceptable.

The LOCUS-built model of the design test vessel 1200' x 158' x 45' is a new construction ship model for this project. The pilots conducted additional testing for this model, including validating the model's reaction and behavior to current using the project model current ebb and flood profiles. The model was tested for behavior and performance in wind, bank effect, interaction and general ship behavior and was found acceptable for the project.

Model	**Description**
MULCV14T	LOCUS model, Ultra-Large Container Vessel, "Design Test Vessel" 1200' x 158' x 45'
VLCC13X	Kongsberg model, Tanker VLCC, "Orion Voyager", 900' x 164' x 45'
Tank23L	Kongsberg model, Tanker "Eagle Kangar" 800' x 138' x 42'
Bulk06L	Kongsberg model, Bulk Carrier "M/S Magnitogorsk", 706' x 104' x 39'

Capt. Tom Goodwin, Houston Pilots

Marcus Maher

Capt. Marcus Maher, Houston Pilots

George B. Burkley

George B. Burkley
Partner
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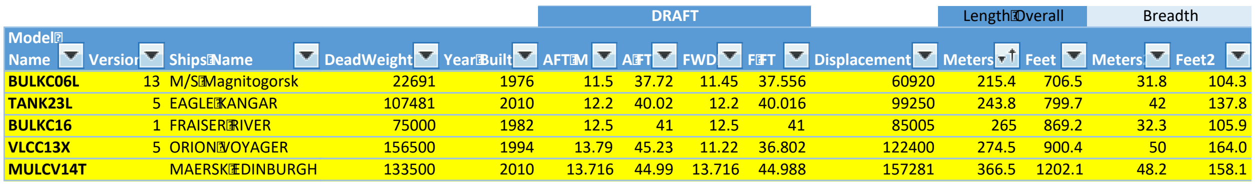
Enclosure 1



					DRAFT					Length Overall		Breadth	
Model Name	Version	Ships Name	DeadWeight	Year Built	AFT M	A FT	FWD	F FT	Displacement	Meters	Feet	Meters	Feet2
BULKC06L	13	M/S Magnitogorsk	22691	1976	11.5	37.72	11.45	37.556	60920	215.4	706.5	31.8	104.3
TANK23L	5	EAGLE KANGAR	107481	2010	12.2	40.02	12.2	40.016	99250	243.8	799.7	42	137.8
BULKC16	1	FRAISER RIVER	75000	1982	12.5	41	12.5	41	85005	265	869.2	32.3	105.9
VLCC13X	5	ORION VOYAGER	156500	1994	13.79	45.23	11.22	36.802	122400	274.5	900.4	50	164.0
MULCV14T		MAERSK EDINBURGH	133500	2010	13.716	44.99	13.716	44.988	157281	366.5	1202.1	48.2	158.1

Enclosure 2

Run #:	**Date:**	**Simulator/Operator:**
Pilot:		**Ship's Initial Heading/Speed:**
Run Start Time:	**Run End Time:**	
Start Location:		**End Location:**
Ship Model Used	**ULCV**	**Suezmax**
Travel Direction	**Inbound**	**Outbound**
Environmental Conditions	**Wind Dir. (from) / Speed**	**Tide/Flow**
Notes:		

Reach 1 Meeting (27-28 to 47-48)

10 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy Increasing Difficulty → Difficult

1 2 3 4 5 6 7 8 9 10

11 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe Increasing Safety → Safe

1 2 3 4 5 6 7 8 9 10

12 Comment(s)

Red Fish Bend (47-48 to 53-54)

13 Rate the difficulty of this run with the number "5" indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy Increasing Difficulty → Difficult

1 2 3 4 5 6 7 8 9 10

14 Rate the overall safety of this run. Use "1" as unsafe and "5" as indicating average.

Unsafe Increasing Safety → Safe

1 2 3 4 5 6 7 8 9 10

15 Comment(s)

Reach 2 Meeting (53-54 to 73-74)

16 Rate the difficulty of this run with the number “5” indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy Increasing Difficulty ⟶ Difficult

1 2 3 4 5 6 7 8 9 10

17 Rate the overall safety of this run. Use “1” as unsafe and “5” as indicating average.

Unsafe Increasing Safety ⟶ Safe

1 2 3 4 5 6 7 8 9 10

18 Comment(s)

Bayport Bend (73-74 to B-78)

19 Rate the difficulty of this run with the number “5” indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy Increasing Difficulty ⟶ Difficult

1 2 3 4 5 6 7 8 9 10

20 Rate the overall safety of this run. Use “1” as unsafe and “5” as indicating average.

Unsafe Increasing Safety ⟶ Safe

1 2 3 4 5 6 7 8 9 10

21 Comment(s)

Reach 3 Meeting (B-78 to 89A-90A)

22 Rate the difficulty of this run with the number “5” indicating the difficulty level of an average transit in real-world pilotage conditions.

Easy Increasing Difficulty ⟶ Difficult

1 2 3 4 5 6 7 8 9 10

23 Rate the overall safety of this run. Use “1” as unsafe and “5” as indicating average.

Unsafe Increasing Safety → Safe
1 2 3 4 5 6 7 8 9 10

24 Comment(s)

Run No.	Channel Condition	Inbound Ship					Outbound Ship					Tide	Wind Direction/ Speed (knts)	Tugs	Estimated Transit Time	Notes
		Type	Draft (ft/m)	Initial Speed (knts)	Initial Position	Pilot	Type	Draft (ft/m)	Initial Speed (knts)	Initial Position	Pilot					
1 - Testing HSC Widened to 650 ft with Bend Wideners																
1a	650 ft	Container	44/13.4	10	18		Suezmax	44/13.4	10	57-58		Flood	SE/20	0		Meeting Below Red Fish
1b	650 ft	Container	44/13.4	10	Continue		Container	44/13.4	10	63-64		Flood	SE/20	0	45	Meeting Below Red Fish
2a	650 ft	Suezmax	44/13.4	10	29-30		Container	44/13.4	10	57-58		Ebb	SE/20	0		Meeting Below Red Fish
2b	650 ft	Container	44/13.4	10	18		Container	44/13.4	10	Continue		Ebb	SE/20	0	45	Meeting Below Red Fish
3a	650 ft	Container	44/13.4	10	43-44		Suezmax	44/13.4	10	59-60		Flood	SE/20	0		Meeting Red Fish Bend
3b	650 ft	Container	44/13.4	10	Continue		Container	44/13.4	10	75-76		Flood	SE/20	0		Meeting near 65-66
3c	650 ft	Container	44/13.4	10	Continue		Suezmax	44/13.4	10	B-92		Flood	SE/20	0		Meeting at 5-Mile Bend
3d	650 ft	Container	44/13.4	10	Continue		Container	44/13.4	10	B-92		Flood	SE/20	0	75	Meeting near 83-84
4a	650 ft	Container	44/13.4	10	43-44		Container	44/13.4	10	59-60		Ebb	SE/20	0		Meeting Red Fish Bend
4b	650 ft	Container	44/13.4	10	Continue		Suezmax	44/13.4	10	75-76		Ebb	SE/20	0		Meeting near 65-66
4c	650 ft	Container	44/13.4	10	Continue		Container	44/13.4	10	B-92		Ebb	SE/20	0		Meeting at 5-Mile Bend

Run No.	Channel Condition	Inbound Ship					Outbound Ship					Tide	Wind Direction/ Speed (knts)	Tugs	Estimated Transit Time	Notes
		Type	Draft (ft/m)	Initial Speed (knts)	Initial Position	Pilot	Type	Draft (ft/m)	Initial Speed (knts)	Initial Position	Pilot					
4d	650 ft	Container	44/13.4	10	Continue		Suezmax	44/13.4	10	B-92		Ebb	SE/20	0	75	Meeting near 83-84
5a	650 ft	Container	44/13.4	10	73-74		Container	44/13.4	10	B-92		Flood	SE/20	0		Meet near 83-84
5b	650 ft	Suezmax	44/13.4	10	65-66		Container	44/13.4	10	Continue		Flood	SE/20	0		Meeting in 5-mile Bend
5c	650 ft	Container	44/13.4	10	53-54		Container	44/13.4	10	Continue		Flood	SE/20	0		Meeting near 66-68
5d	650 ft	Suezmax	44/13.4	10	29-30		Container	44/13.4	10	Continue		Flood	SE/20	0	75	Meet in Red Fish Bend
6a	650 ft	Suezmax	44/13.4	10	73-74		Container	44/13.4	10	B-92		Ebb	SE/20	0		Meet near 83-84
6b	650 ft	Container	44/13.4	10	65-66		Container	44/13.4	10	Continue		Ebb	SE/20	0		Meeting in 5-mile Bend
6c	650 ft	Suezmax	44/13.4	10	53-54		Container	44/13.4	10	Continue		Ebb	SE/20	0		Meeting near 66-68
6d	650 ft	Container	44/13.4	10	29-30		Container	44/13.4	10	Continue		Ebb	SE/20	0	75	Meet in Red Fish Bend
Total Time														**minutes**	**390**	
														hours	**6.5**	
2 - Testing HSC Widened to xxx ft with Bend Wideners - Width Depending on Results of Previous Set of Tests																
7a	750 ft	Container	44/13.4	10	18		Suezmax	44/13.4	10	57-58		Flood	SE/20	0		Meeting Below Red Fish

Run No.	Channel Condition	Inbound Ship					Outbound Ship					Tide	Wind Direction/ Speed (knts)	Tugs	Estimated Transit Time	Notes
		Type	Draft (ft/m)	Initial Speed (knts)	Initial Position	Pilot	Type	Draft (ft/m)	Initial Speed (knts)	Initial Position	Pilot					
7b	750 ft	Container	44/13.4	10	Continue		Container	44/13.4	10	63-64		Flood	SE/20	0	45	Meeting Below Red Fish
8a	750 ft	Suezmax	44/13.4	10	29-30		Container	44/13.4	10	57-58		Ebb	SE/20	0		Meeting Below Red Fish
8b	750 ft	Container	44/13.4	10	18		Container	44/13.4	10	Continue		Ebb	SE/20	0	45	Meeting Below Red Fish
9a	750 ft	Container	44/13.4	10	43-44		Suezmax	44/13.4	10	59-60		Flood	SE/20	0		Meeting Red Fish Bend
9b	750 ft	Container	44/13.4	10	Continue		Container	44/13.4	10	75-76		Flood	SE/20	0		Meeting near 65-66
9c	750 ft	Container	44/13.4	10	Continue		Suezmax	44/13.4	10	B-92		Flood	SE/20	0		Meeting at 5-Mile Bend
9d	750 ft	Container	44/13.4	10	Continue		Container	44/13.4	10	B-92		Flood	SE/20	0	75	Meeting near 83-84
10a	750 ft	Container	44/13.4	10	43-44		Container	44/13.4	10	59-60		Ebb	SE/20	0		Meeting Red Fish Bend
10b	750 ft	Container	44/13.4	10	Continue		Suezmax	44/13.4	10	75-76		Ebb	SE/20	0		Meeting near 65-66
10c	750 ft	Container	44/13.4	10	Continue		Container	44/13.4	10	B-92		Ebb	SE/20	0		Meeting at 5-Mile Bend
10d	750 ft	Container	44/13.4	10	Continue		Suezmax	44/13.4	10	B-92		Ebb	SE/20	0	75	Meeting near 83-84

Run No.	Channel Condition	Inbound Ship					Outbound Ship					Tide	Wind Direction/ Speed (knts)	Tugs	Estimated Transit Time	Notes
		Type	Draft (ft/m)	Initial Speed (knts)	Initial Position	Pilot	Type	Draft (ft/m)	Initial Speed (knts)	Initial Position	Pilot					
11a	750 ft	Container	44/13.4	10	73-74		Container	44/13.4	10	B-92		Flood	SE/20	0		Meet near 83-84
11b	750 ft	Suezmax	44/13.4	10	65-66		Container	44/13.4	10	Continue		Flood	SE/20	0		Meeting in 5-mile Bend
11c	750 ft	Container	44/13.4	10	53-54		Container	44/13.4	10	Continue		Flood	SE/20	0		Meeting near 66-68
11d	750 ft	Suezmax	44/13.4	10	29-30		Container	44/13.4	10	Continue		Flood	SE/20	0	75	Meet in Red Fish Bend
12a	750 ft	Suezmax	44/13.4	10	73-74		Container	44/13.4	10	B-92		Ebb	SE/20	0		Meet near 83-84
12b	750 ft	Container	44/13.4	10	65-66		Container	44/13.4	10	Continue		Ebb	SE/20	0		Meeting in 5-mile Bend
12c	650 ft	Suezmax	44/13.4	10	53-54		Container	44/13.4	10	Continue		Ebb	SE/20	0		Meeting near 66-68
12d	650 ft	Container	44/13.4	10	29-30		Container	44/13.4	10	Continue		Ebb	SE/20	0	75	Meet in Red Fish Bend
Total Time														**minutes**	**390**	
														hours	**6.5**	
3. Testing Widened HSC Channel (xxx ft) - Entrance to Barbours Cut (width depending on results of Runs 1-4)																
13	xxx ft	Container	44/13.4	5	87-88							Flood	SE/20	2	45	Enter Barbpurs Cut and Turn in Turning Basin
14	xxx ft	Container	44/13.4	5	867-88							Ebb	N/20	2	45	Enter Barbpurs Cut and Turn in Turning Basin

Run No.	Channel Condition	Inbound Ship					Outbound Ship					Tide	Wind Direction/ Speed (knts)	Tugs	Estimated Transit Time	Notes
		Type	Draft (ft/m)	Initial Speed (knts)	Initial Position	Pilot	Type	Draft (ft/m)	Initial Speed (knts)	Initial Position	Pilot					
15	xxx ft						Container	44/13.4	0	Berth		Flood	SE/20	2	30	Departing Barbours Cut
16	xxx ft						Container	44/13.4	0	Berth		Ebb	N/20	2	30	Departing Barbours Cut
17	xxx ft / 4000 ft Flare	Container	44/13.4	8	71-72							Flood	SE/20	2	60	Enter Bayport and Turn in Turning Basin
18	xxx ft / 4000 ft Flare	Container	44/13.4	8	71-72							Ebb	N/20	2	60	Enter Bayport and Turn in Turning Basin
19	xxx ft / 4000 ft Flare						Container	44/13.4	0	Berth		Flood	SE/20	2	45	Departing Bayport
20	xxx ft / 4000 ft Flare						Container	44/13.4	0	Berth		Ebb	N/20	2	45	Departing Bayport
Total Time														**minutes**	**360**	
														hours	**6**	
4. Testing Widened Upper HSC Channel (Above Texas 8 Bridge - to be replaced with a bridge spanning the navigation channel)																
21	530ft x 46.5 ft	Aframax	44/13.4	5	Oil Tanking		Bulker	37.7	5	Greens Bayou		Ebb	SE20	0	30	Transit through Boggy Bayou - Greens Bayou

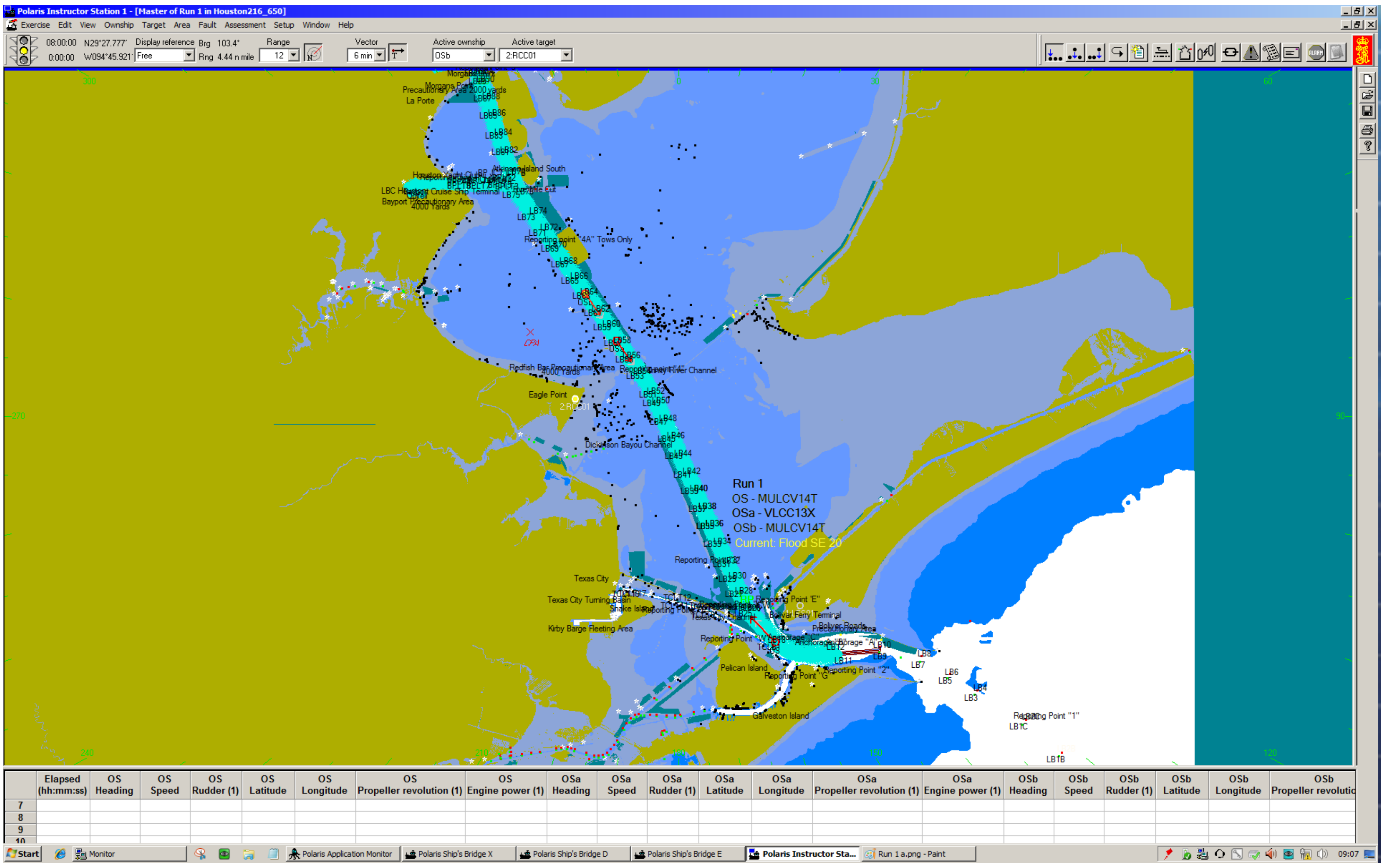
Run No.	Channel Condition	Inbound Ship					Outbound Ship					Tide	Wind Direction/ Speed (knts)	Tugs	Estimated Transit Time	Notes
		Type	Draft (ft/m)	Initial Speed (knts)	Initial Position	Pilot	Type	Draft (ft/m)	Initial Speed (knts)	Initial Position	Pilot					
22	530ft x 46.5 ft	Aframax	44/13.4	5	Oil Tanking		Bulker	37.7	5	Greens Bayou		Ebb	SE20	0	30	Transit through Boggy Bayou - Greens Bayou
23	530ft x 46.5 ft	Bulker	37.7	5	Greens Bayou		Aframax	44/13.4	0	Oil Tanking		Ebb	SE20	0	30	Transit through Boggy Bayou - Greens Bayou
24	530ft x 46.5 ft	Bulker	37.7	5	Greens Bayou		Aframax	44/13.4	0	Oil Tanking		Ebb	SE20	0	30	Transit through Boggy Bayou - Greens Bayou
25	530ft x 46.5 ft	Aframax	44/13.4	5	Oil Tanking		Bulker	37.7	5	Greens Bayou		Ebb	N20	0	30	Transit through Boggy Bayou - Greens Bayou
26	530ft x 46.5 ft	Aframax	44/13.4	5	Oil Tanking		Bulker	37.7	5	Greens Bayou		Ebb	N20	0	30	Transit through Boggy Bayou - Greens Bayou
27	530ft x 46.5 ft	Bulker	37.7	5	Greens Bayou		Aframax	44/13.4	0	Oil Tanking		Ebb	N20	0	30	Transit through Boggy Bayou - Greens Bayou
28	530ft x 46.5 ft	Bulker	37.7	5	Greens Bayou		Aframax	44/13.4	0	Oil Tanking		Ebb	N20	0	30	Transit through Boggy Bayou - Greens Bayou
Total Time														**minutes**	**240**	
														hours	**4**	
5. Brady Island Tests																

Run No.	Channel Condition	Inbound Ship					Outbound Ship					Tide	Wind Direction/ Speed (knts)	Tugs	Estimated Transit Time	Notes
		Type	Draft (ft/m)	Initial Speed (knts)	Initial Position	Pilot	Type	Draft (ft/m)	Initial Speed (knts)	Initial Position	Pilot					
29	400'x41.5'	Bulkc06L	37.7	5	CG							Ebb	SE/20	2	45	Turn In Brady Island TB
30	400'x41.5'	Bulkc06L	37.7	5	CG							Ebb	N/20	2	45	Turn In Brady Island TB
Total Time														**minutes**	**90**	
														hours	**1.5**	
Total Hours															**24.5**	
Total Days															**4**	

Appendix K: Validation Simulation Tests

June 26, 2019

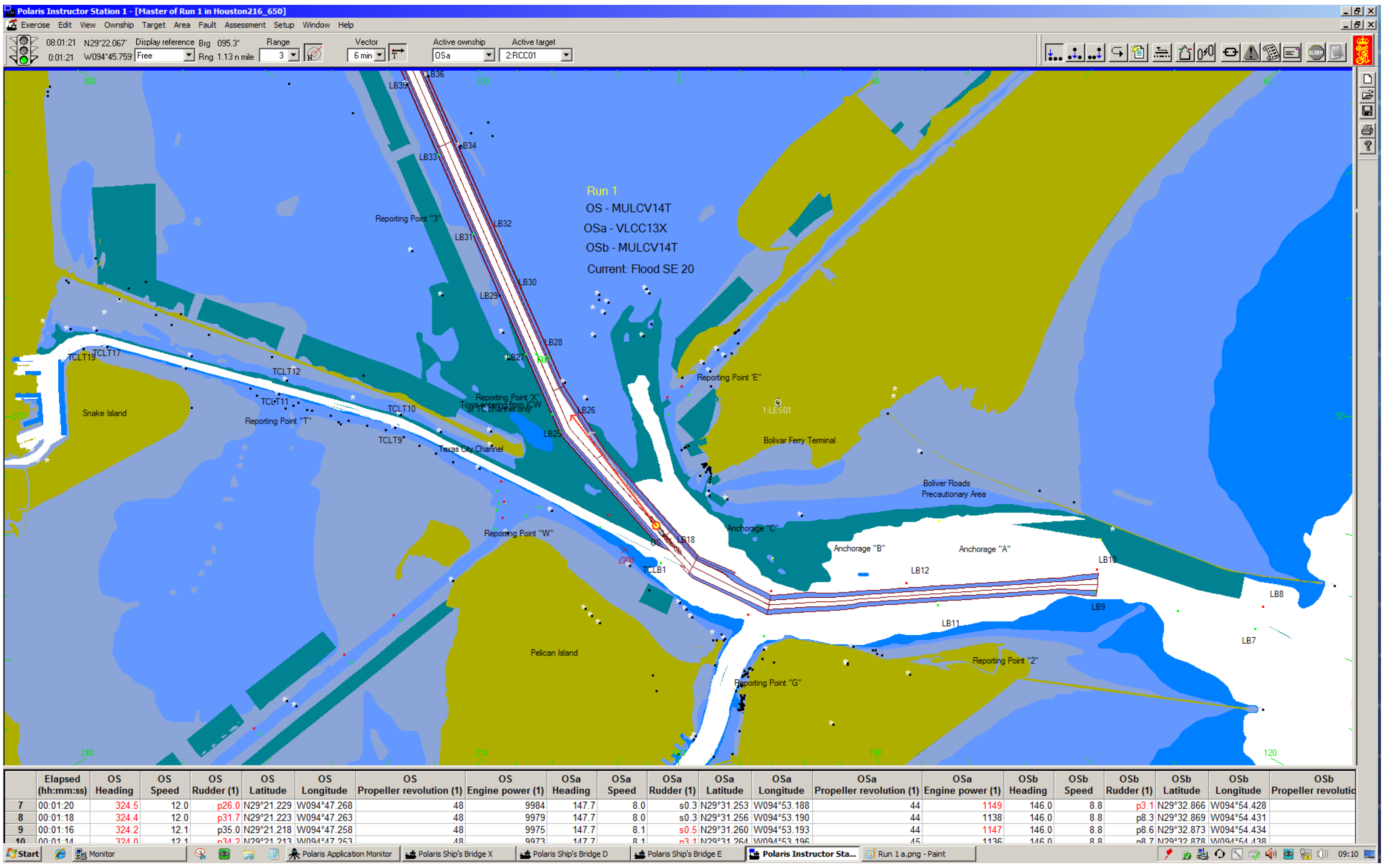
Run 1



08:00:00 N29°27.777' Display reference Brg 103.4° Range 12 Vector 6 min Active ownship OSb Active target 2:RCC01
0:00:00 W094°45.921' Free Rng 4.44 n mile

Run 1
OS - MULCV14T
OSa - VLCC13X
OSb - MULCV14T
Current: Flood SE 20

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolutio
7																					
8																					
9																					
10																					



08:01:21 N29°22.067' Display reference Brg 095.3° Range 3 Vector 6 min Active ownship OSa Active target 2:RCC01
0:01:21 W094°45.759' Free Rng 1.13 n mile

Run 1
OS - MULCV14T
OSa - VLCC13X
OSb - MULCV14T
Current: Flood SE 20

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolutio
7	00:01:20	324.5	12.0	p26.0	N29°21.229	W094°47.268	48	9984	147.7	8.0	s0.3	N29°31.253	W094°53.188	44	1149	146.0	8.8	p3.1	N29°32.866	W094°54.428	
8	00:01:18	324.4	12.0	p31.7	N29°21.223	W094°47.263	48	9979	147.7	8.0	s0.3	N29°31.256	W094°53.190	44	1138	146.0	8.8	p8.3	N29°32.869	W094°54.431	
9	00:01:16	324.2	12.1	p35.0	N29°21.218	W094°47.258	48	9975	147.7	8.1	s0.5	N29°31.260	W094°53.193	44	1147	146.0	8.8	p8.6	N29°32.873	W094°54.434	
10	00:01:14	324.0	12.1	p34.2	N29°21.213	W094°47.253	48	9973	147.7	8.1	p3.1	N29°31.264	W094°53.196	45	1136	146.0	8.8	p8.7	N29°32.878	W094°54.438	

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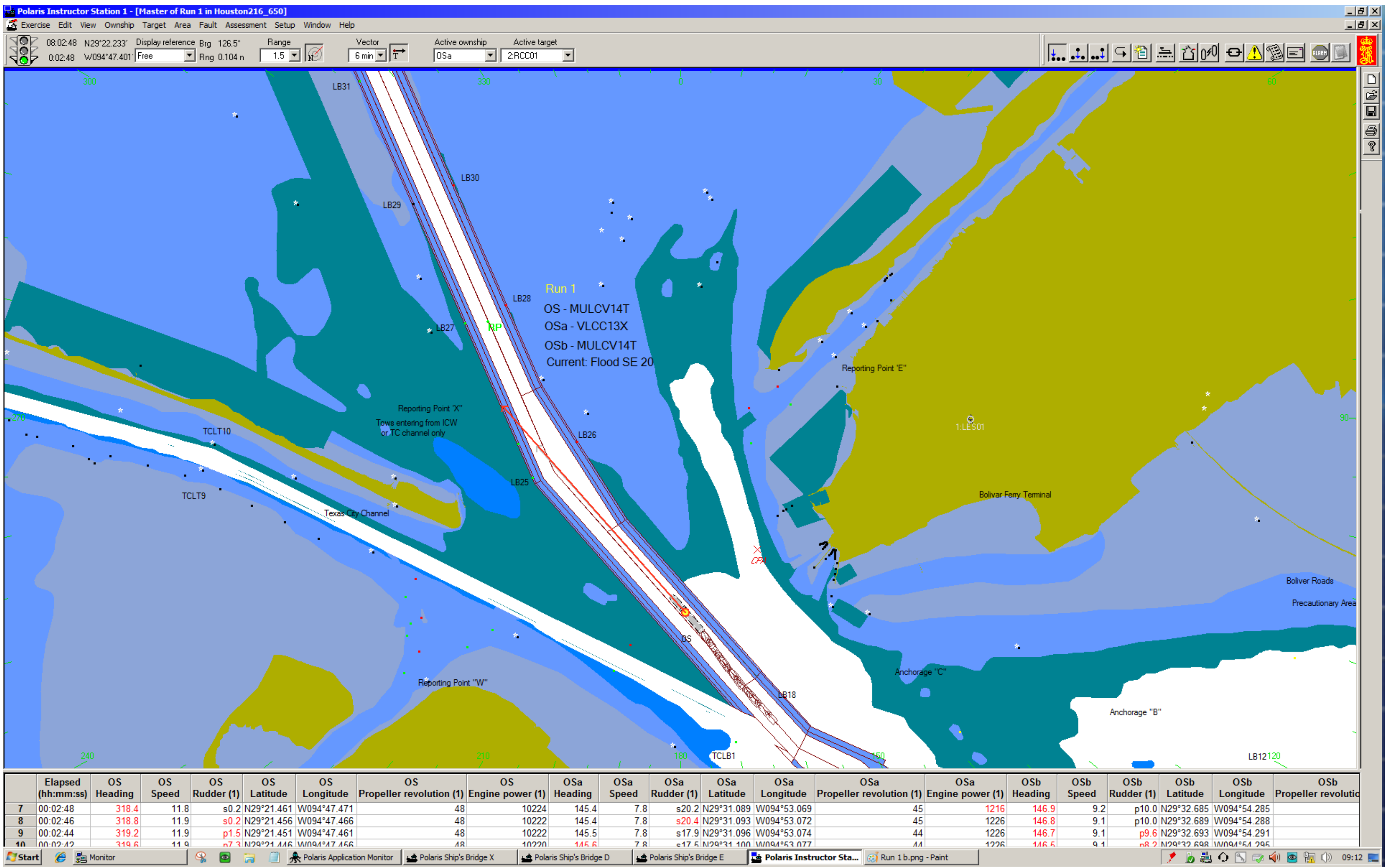
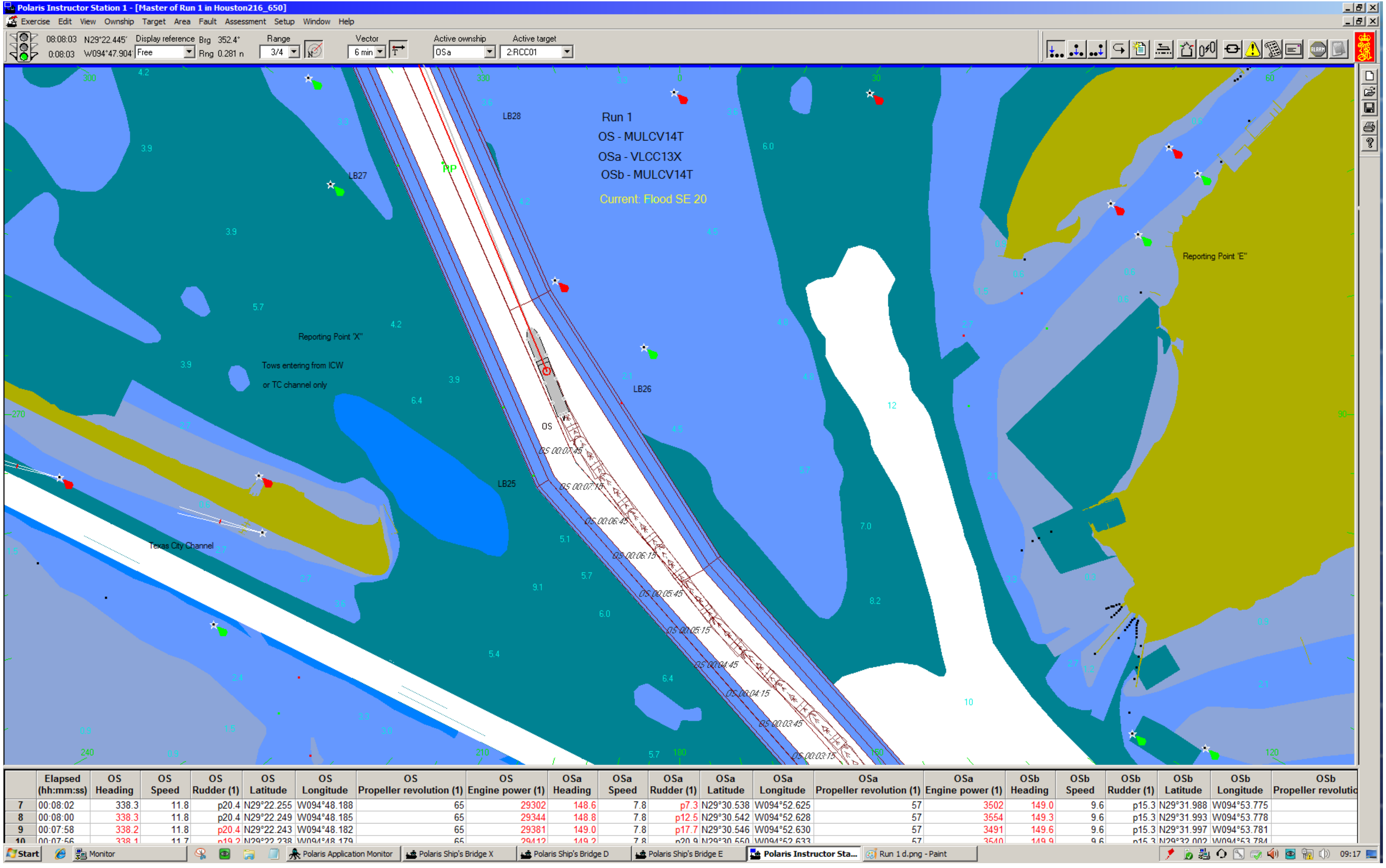


08:02:48 N29°22.233' Display reference Free Brg 126.5°
0:02:48 W094°47.401' Rng 0.104 n
Range 1.5
Vector 6 min
Active ownship OSa
Active target 2:RCC01

Run 1
OS - MULCV14T
OSa - VLCC13X
OSb - MULCV14T
Current: Flood SE 20

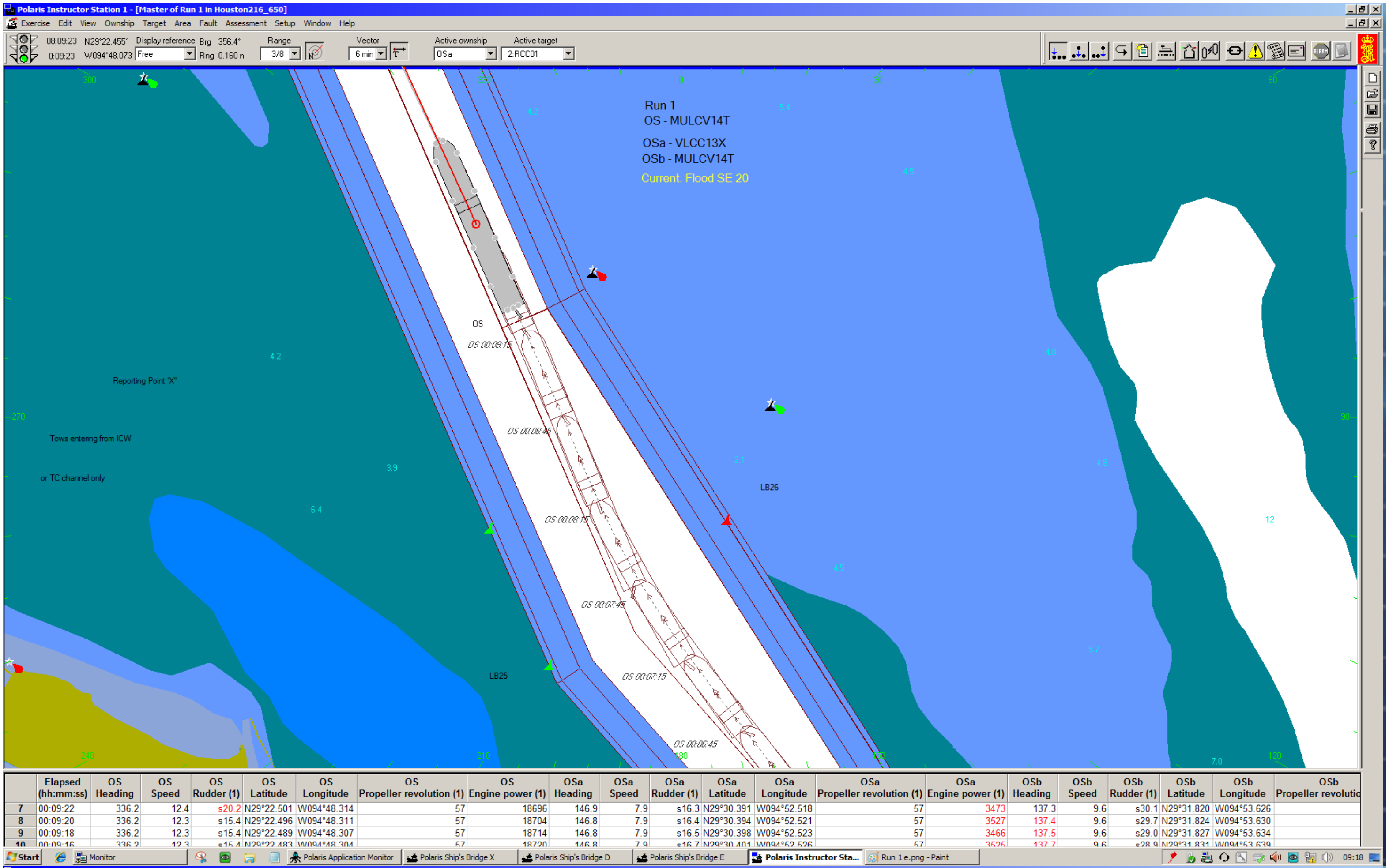
	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolutio
7	00:02:48	318.4	11.8	s0.2	N29°21.461	W094°47.471	48	10224	145.4	7.8	s20.2	N29°31.089	W094°53.069	45	1216	146.9	9.2	p10.0	N29°32.685	W094°54.285	
8	00:02:46	318.8	11.9	s0.2	N29°21.456	W094°47.466	48	10222	145.4	7.8	s20.4	N29°31.093	W094°53.072	45	1226	146.8	9.1	p10.0	N29°32.689	W094°54.288	
9	00:02:44	319.2	11.9	p1.5	N29°21.451	W094°47.461	48	10222	145.5	7.8	s17.9	N29°31.096	W094°53.074	44	1226	146.7	9.1	p9.6	N29°32.693	W094°54.291	
10	00:02:42	319.6	11.9	p7.3	N29°21.446	W094°47.456	48	10220	145.6	7.8	s17.5	N29°31.100	W094°53.077	44	1226	146.5	9.1	p8.2	N29°32.698	W094°54.295	



08:08:03 N29°22.445' Display reference Free Brg 352.4°
0:08:03 W094°47.904' Rng 0.281 n
Range 3/4
Vector 6 min
Active ownship OSa
Active target 2:RCC01

Run 1
OS - MULCV14T
OSa - VLCC13X
OSb - MULCV14T
Current: Flood SE 20

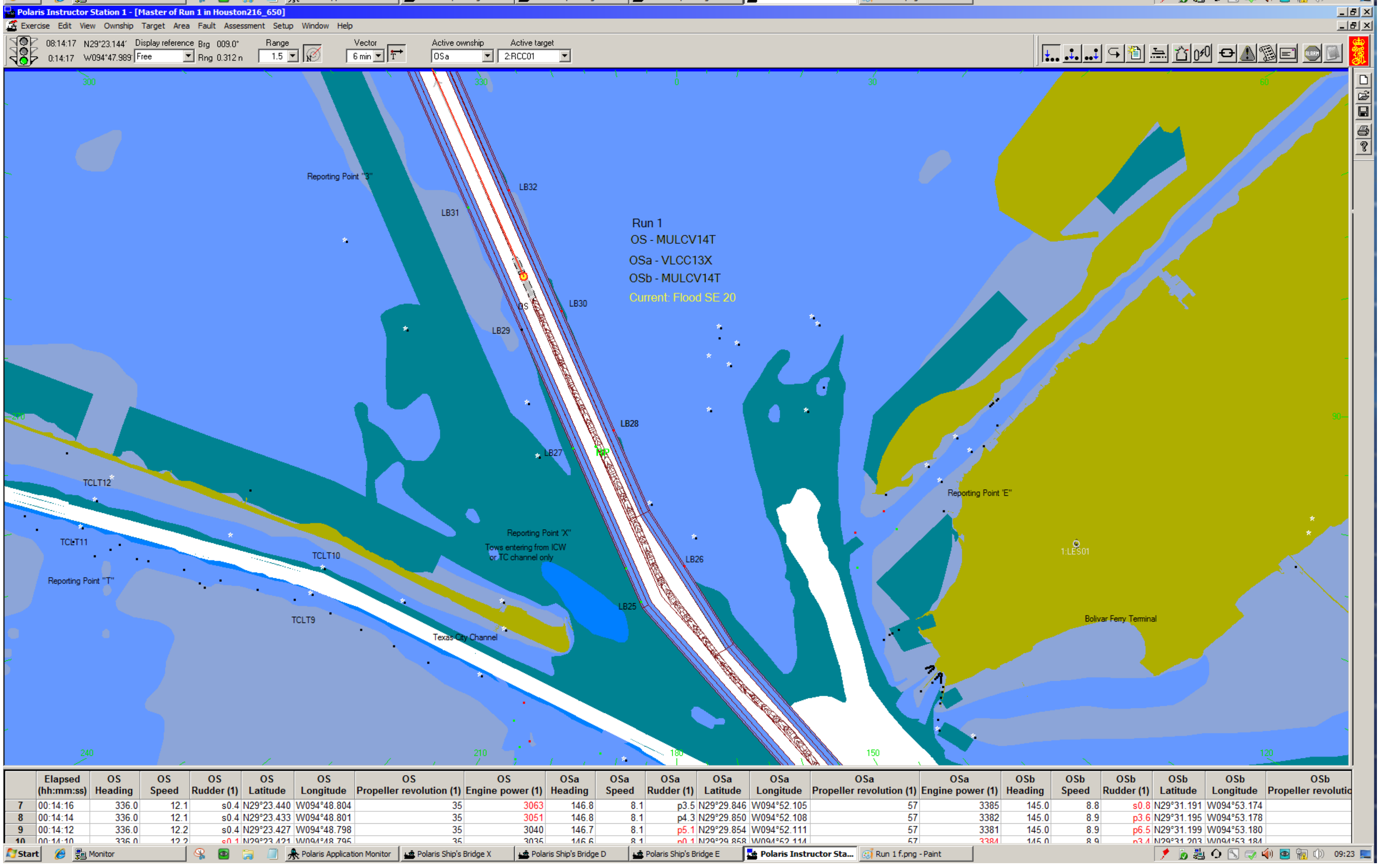
	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolutio
7	00:08:02	338.3	11.8	p20.4	N29°22.255	W094°48.188	65	29302	148.6	7.8	p7.3	N29°30.538	W094°52.625	57	3502	149.0	9.6	p15.3	N29°31.988	W094°53.775	
8	00:08:00	338.3	11.8	p20.4	N29°22.249	W094°48.185	65	29344	148.8	7.8	p12.5	N29°30.542	W094°52.628	57	3554	149.3	9.6	p15.3	N29°31.993	W094°53.778	
9	00:07:58	338.2	11.8	p20.4	N29°22.243	W094°48.182	65	29381	149.0	7.8	p17.7	N29°30.546	W094°52.630	57	3491	149.6	9.6	p15.3	N29°31.997	W094°53.781	
10	00:07:56	338.1	11.7	p19.2	N29°22.238	W094°48.179	65	29412	149.2	7.8	p20.9	N29°30.550	W094°52.633	57	3540	149.9	9.6	p15.3	N29°32.002	W094°53.784	



Polaris Instructor Station 1 - [Master of Run 1 in Houston216_650]

08:09:23 N29°22.455′ 0:09:23 W094°48.073′ Display reference Free Brg 356.4° Rng 0.160 n Range 3/8 Vector 6 min Active ownship OSa Active target 2:RCC01

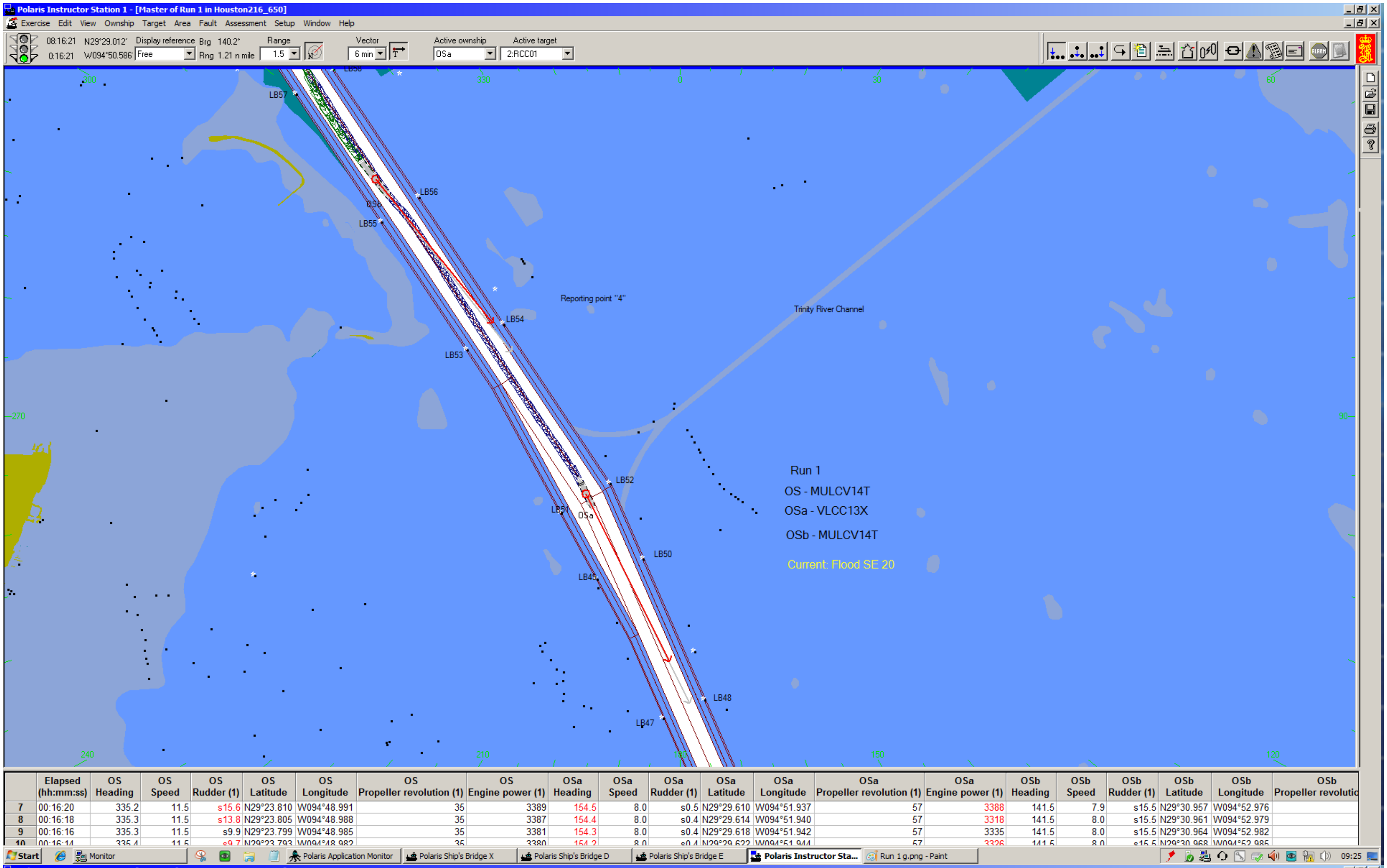
	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolutic
7	00:09:22	336.2	12.4	s20.2	N29°22.501	W094°48.314	57	18696	146.9	7.9	s16.3	N29°30.391	W094°52.518	57	3473	137.3	9.6	s30.1	N29°31.820	W094°53.626	
8	00:09:20	336.2	12.3	s15.4	N29°22.496	W094°48.311	57	18704	146.8	7.9	s16.4	N29°30.394	W094°52.521	57	3527	137.4	9.6	s29.7	N29°31.824	W094°53.630	
9	00:09:18	336.2	12.3	s15.4	N29°22.489	W094°48.307	57	18714	146.8	7.9	s16.5	N29°30.398	W094°52.523	57	3466	137.5	9.6	s29.0	N29°31.827	W094°53.634	
10	00:09:16	336.2	12.3	s15.4	N29°22.483	W094°48.304	57	18720	146.8	7.9	s16.7	N29°30.401	W094°52.526	57	3525	137.7	9.6	s28.9	N29°31.831	W094°53.639	



Polaris Instructor Station 1 - [Master of Run 1 in Houston216_650]

08:14:17 N29°23.144′ 0:14:17 W094°47.989′ Display reference Free Brg 009.0° Rng 0.312 n Range 1.5 Vector 6 min Active ownship OSa Active target 2:RCC01

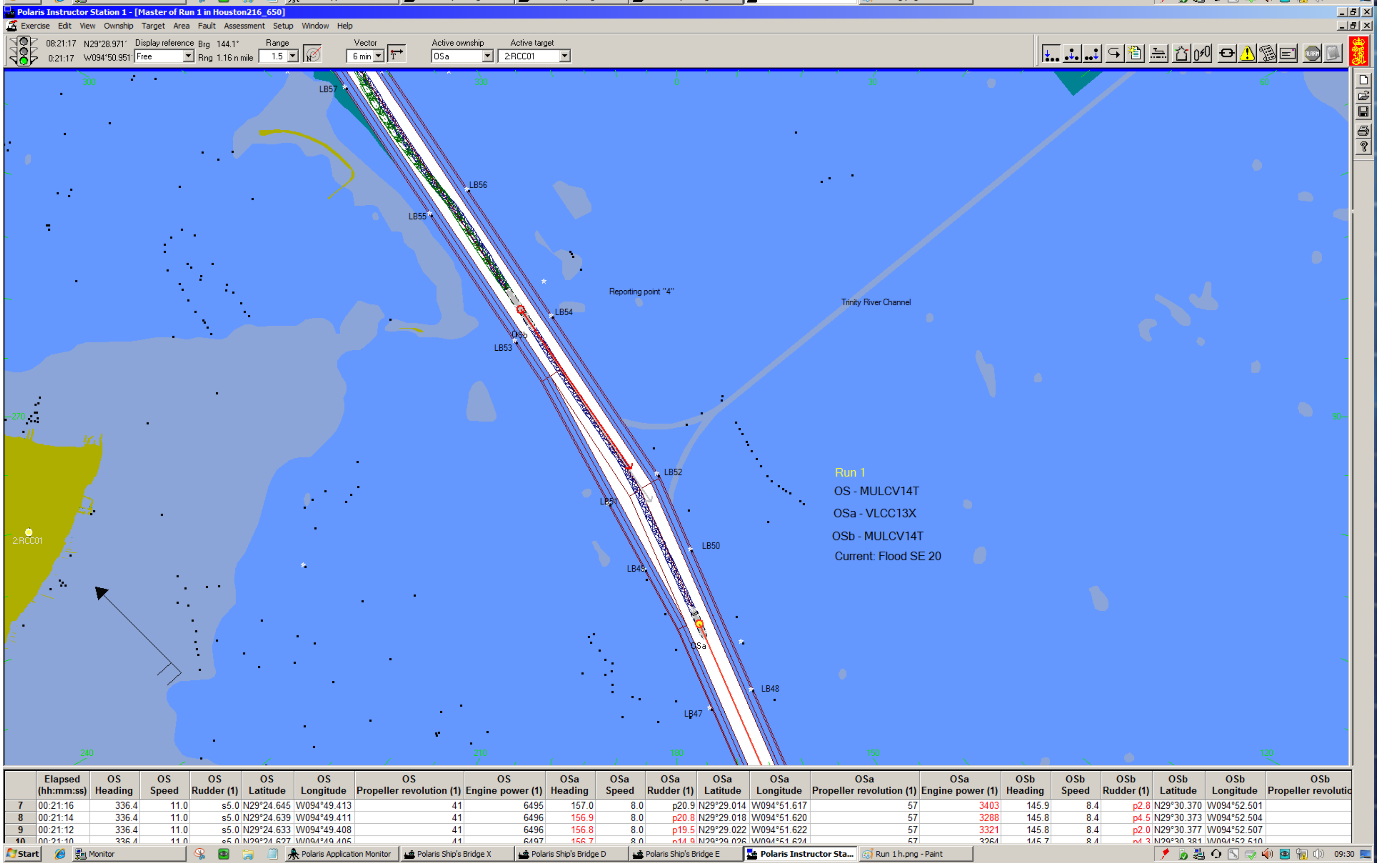
	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolutic
7	00:14:16	336.0	12.1	s0.4	N29°23.440	W094°48.804	35	3063	146.8	8.1	p3.5	N29°29.846	W094°52.105	57	3385	145.0	8.8	s0.8	N29°31.191	W094°53.174	
8	00:14:14	336.0	12.1	s0.4	N29°23.433	W094°48.801	35	3051	146.8	8.1	p4.3	N29°29.850	W094°52.108	57	3382	145.0	8.9	p3.6	N29°31.195	W094°53.178	
9	00:14:12	336.0	12.2	s0.4	N29°23.427	W094°48.798	35	3040	146.7	8.1	p5.1	N29°29.854	W094°52.111	57	3381	145.0	8.9	p6.5	N29°31.199	W094°53.180	
10	00:14:10	336.0	12.2	s0.1	N29°23.421	W094°48.795	35	3035	146.6	8.1	p0.1	N29°29.858	W094°52.114	57	3384	145.0	8.9	p3.4	N29°31.203	W094°53.184	



08:16:21 N29°29.012' Display reference: Free Brg 140.2° Range 1.5 Vector 6 min Active ownship OSa Active target 2:RCC01
0:16:21 W094°50.586' Rng 1.21 n mile

Run 1
OS - MULCV14T
OSa - VLCC13X
OSb - MULCV14T
Current: Flood SE 20

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolutio
7	00:16:20	335.2	11.5	s15.6	N29°23.810	W094°48.991	35	3389	154.5	8.0	s0.5	N29°29.610	W094°51.937	57	3388	141.5	7.9	s15.5	N29°30.957	W094°52.976	
8	00:16:18	335.3	11.5	s13.8	N29°23.805	W094°48.988	35	3387	154.4	8.0	s0.4	N29°29.614	W094°51.940	57	3318	141.5	8.0	s15.5	N29°30.961	W094°52.979	
9	00:16:16	335.3	11.5	s9.9	N29°23.799	W094°48.985	35	3381	154.3	8.0	s0.4	N29°29.618	W094°51.942	57	3335	141.5	8.0	s15.5	N29°30.964	W094°52.982	
10	00:16:14	335.4	11.5	s9.7	N29°23.793	W094°48.982	35	3380	154.2	8.0	s0.4	N29°29.622	W094°51.944	57	3326	141.5	8.0	s15.5	N29°30.968	W094°52.985	



08:21:17 N29°28.971' Display reference: Free Brg 144.1° Range 1.5 Vector 6 min Active ownship OSa Active target 2:RCC01
0:21:17 W094°50.951' Rng 1.16 n mile

Run 1
OS - MULCV14T
OSa - VLCC13X
OSb - MULCV14T
Current: Flood SE 20

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolutio
7	00:21:16	336.4	11.0	s5.0	N29°24.645	W094°49.413	41	6495	157.0	8.0	p20.9	N29°29.014	W094°51.617	57	3403	145.9	8.4	p2.8	N29°30.370	W094°52.501	
8	00:21:14	336.4	11.0	s5.0	N29°24.639	W094°49.411	41	6496	156.9	8.0	p20.8	N29°29.018	W094°51.620	57	3288	145.8	8.4	p4.5	N29°30.373	W094°52.504	
9	00:21:12	336.4	11.0	s5.0	N29°24.633	W094°49.408	41	6496	156.8	8.0	p19.5	N29°29.022	W094°51.622	57	3321	145.8	8.4	p2.0	N29°30.377	W094°52.507	
10	00:21:10	336.4	11.0	s5.0	N29°24.627	W094°49.405	41	6497	156.7	8.0	p14.9	N29°29.026	W094°51.624	57	3264	145.7	8.4	p4.3	N29°30.381	W094°52.510	

Polaris Instructor Station 1 - [Master of Run 1 in Houston216_650]

08:25:51 N29°29.663' Display reference: Free Brg 079.4°
0:25:51 W094°51.550' Rng 0.287 n
Range: 3/4
Vector: 6 min
Active ownship: OSa
Active target: 2:RCC01

Run 1

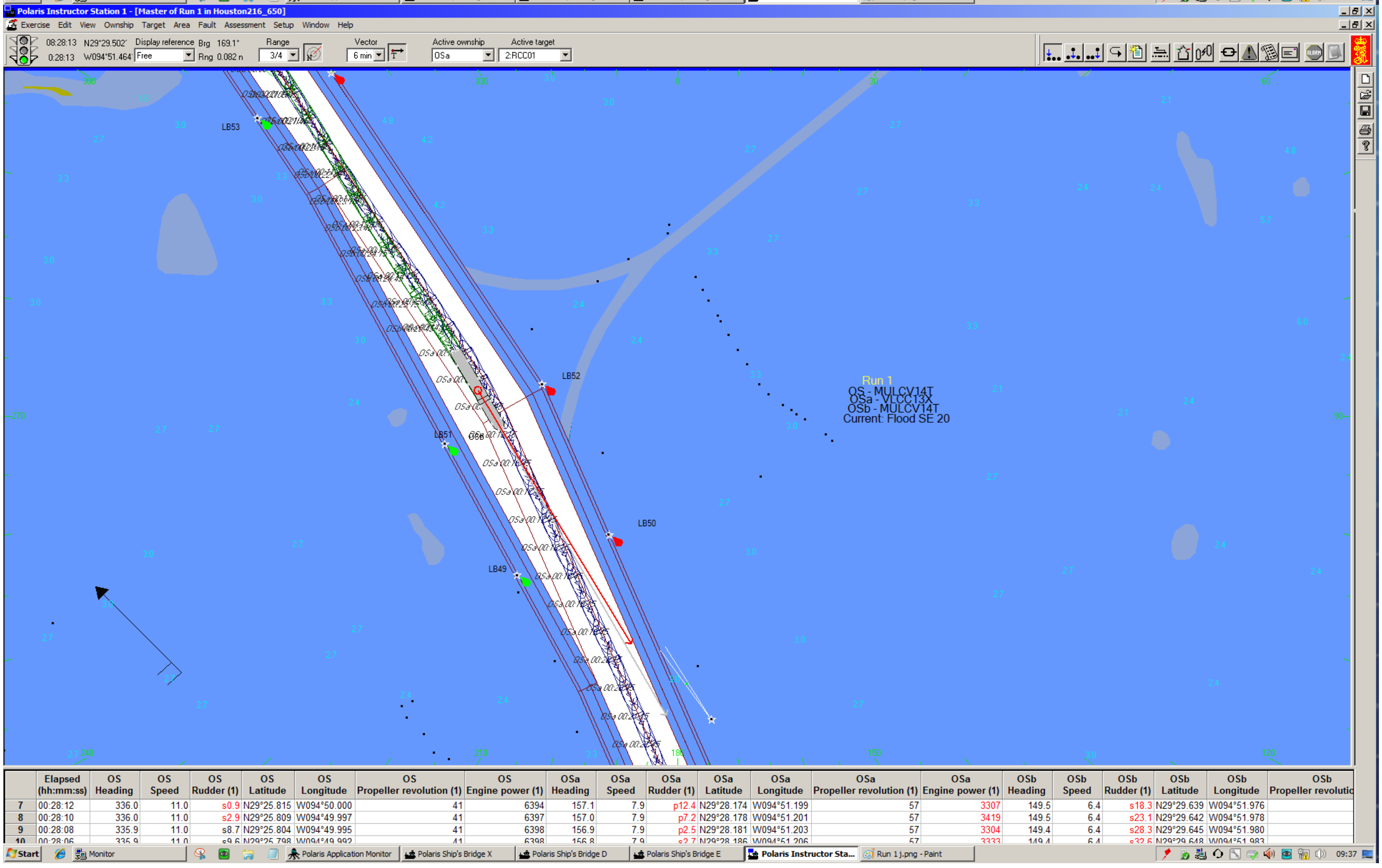
OS - MULCV14T

OSa - VLCC13X

OSb - MULCV14T

Current: Flood SE 20

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolutic
7	00:25:50	336.3	11.1	s0.2	N29°25.415	W094°49.802	41	6397	156.7	7.9	s12.2	N29°28.460	W094°51.342	57	3300	147.4	7.2	s0.4	N29°29.860	W094°52.139	
8	00:25:48	336.3	11.1	s0.2	N29°25.410	W094°49.799	41	6398	156.7	7.9	s17.4	N29°28.464	W094°51.344	57	3285	147.4	7.2	s0.5	N29°29.864	W094°52.141	
9	00:25:46	336.2	11.1	s0.2	N29°25.404	W094°49.796	41	6399	156.6	7.9	s21.3	N29°28.468	W094°51.347	57	3281	147.4	7.2	s0.5	N29°29.867	W094°52.143	
10	00:25:44	336.2	11.1	s0.2	N29°25.398	W094°49.793	41	6397	156.6	7.9	s18.8	N29°28.472	W094°51.349	57	3398	147.5	7.3	s0.5	N29°29.870	W094°52.146	



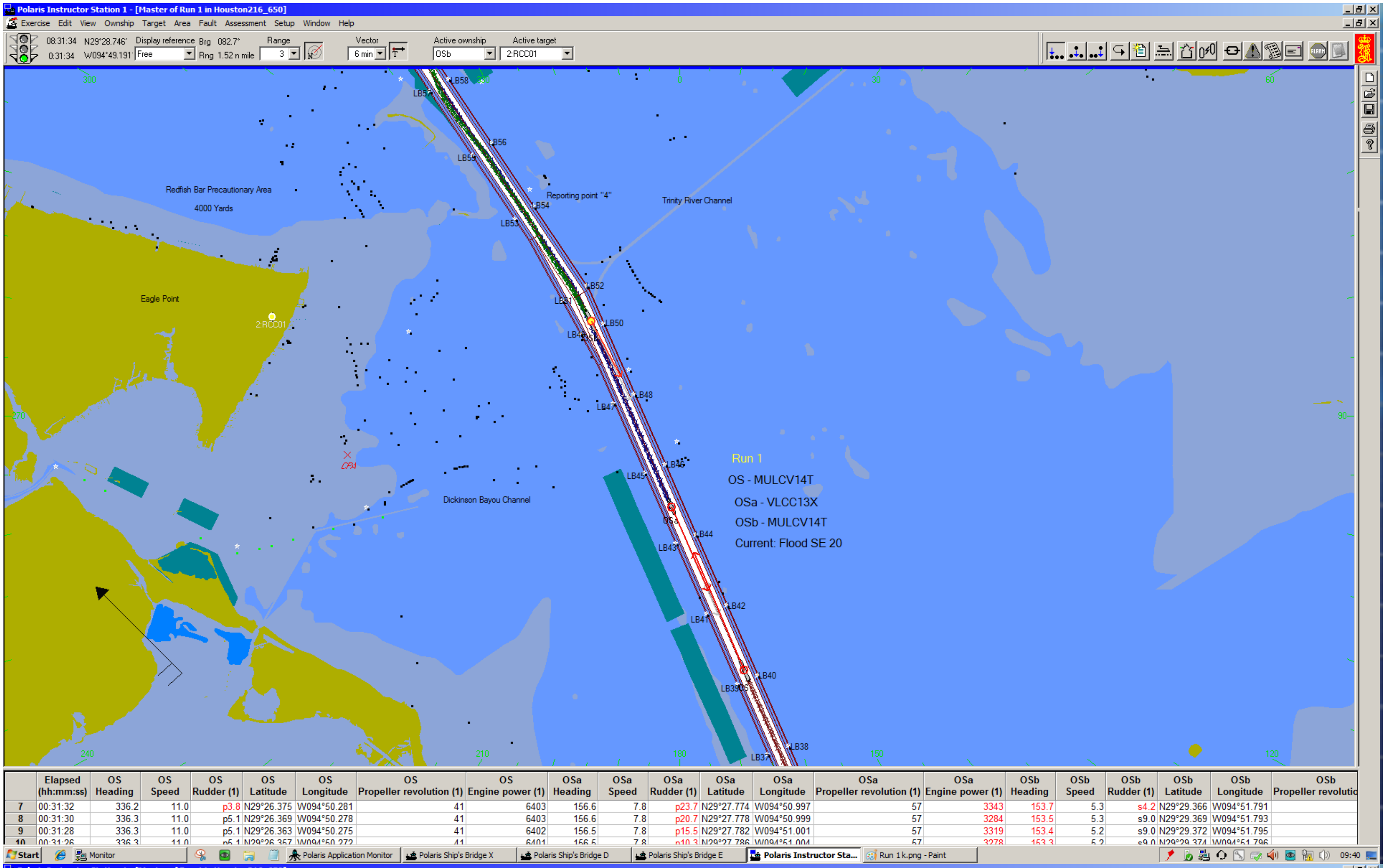
Polaris Instructor Station 1 - [Master of Run 1 in Houston216_650]

08:28:13 N29°29.502' Display reference: Free Brg 169.1°
0:28:13 W094°51.464' Rng 0.082 n
Range: 3/4
Vector: 6 min
Active ownship: OSa
Active target: 2:RCC01

Run 1
OS - MULCV14T
OSa - VLCC13X
OSb - MULCV14T
Current: Flood SE 20

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolutic
7	00:28:12	336.0	11.0	s0.9	N29°25.815	W094°50.000	41	6394	157.1	7.9	p12.4	N29°28.174	W094°51.199	57	3307	149.5	6.4	s18.3	N29°29.639	W094°51.976	
8	00:28:10	336.0	11.0	s2.9	N29°25.809	W094°49.997	41	6397	157.0	7.9	p7.2	N29°28.178	W094°51.201	57	3419	149.5	6.4	s23.1	N29°29.642	W094°51.978	
9	00:28:08	335.9	11.0	s8.7	N29°25.804	W094°49.995	41	6398	156.9	7.9	p2.5	N29°28.181	W094°51.203	57	3304	149.4	6.4	s28.3	N29°29.645	W094°51.980	
10	00:28:06	335.9	11.0	s9.6	N29°25.798	W094°49.992	41	6398	156.8	7.9	s2.7	N29°28.186	W094°51.206	57	3333	149.4	6.4	s32.6	N29°29.648	W094°51.983	

June 26, 2019



Polaris Instructor Station 1 - [Master of Run 1 in Houston216_650]

08:31:34 N29°28.746′ Display reference: Free Brg 082.7° Range: 3
0:31:34 W094°49.191′ Rng 1.52 n mile

Vector: 6 min
Active ownship: OSb
Active target: 2:RCC01

Run 1

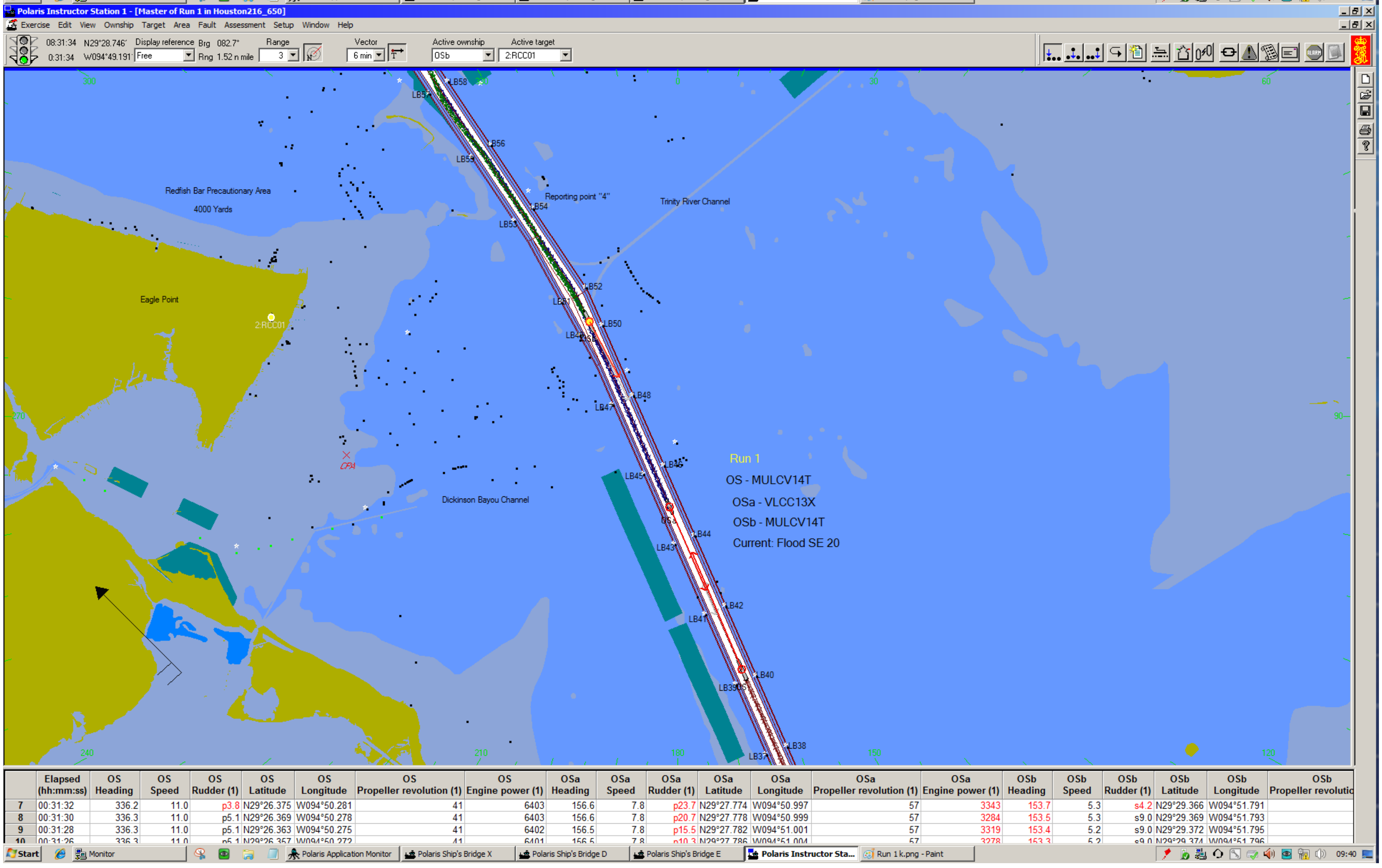
OS - MULCV14T

OSa - VLCC13X

OSb - MULCV14T

Current: Flood SE 20

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolutio
7	00:31:32	336.2	11.0	p3.8	N29°26.375	W094°50.281	41	6403	156.6	7.8	p23.7	N29°27.774	W094°50.997	57	3343	153.7	5.3	s4.2	N29°29.366	W094°51.791	
8	00:31:30	336.3	11.0	p5.1	N29°26.369	W094°50.278	41	6403	156.6	7.8	p20.7	N29°27.778	W094°50.999	57	3284	153.5	5.3	s9.0	N29°29.369	W094°51.793	
9	00:31:28	336.3	11.0	p5.1	N29°26.363	W094°50.275	41	6402	156.5	7.8	p15.5	N29°27.782	W094°51.001	57	3319	153.4	5.2	s9.0	N29°29.372	W094°51.795	
10	00:31:26	336.3	11.0	p5.1	N29°26.357	W094°50.272	41	6401	156.5	7.8	p10.3	N29°27.786	W094°51.004	57	3278	153.3	5.2	s9.0	N29°29.374	W094°51.796	



Polaris Instructor Station 1 - [Master of Run 1 in Houston216_650]

08:31:34 N29°28.746′ Display reference: Free Brg 082.7° Range: 3
0:31:34 W094°49.191′ Rng 1.52 n mile

Vector: 6 min
Active ownship: OSb
Active target: 2:RCC01

Run 1

OS - MULCV14T

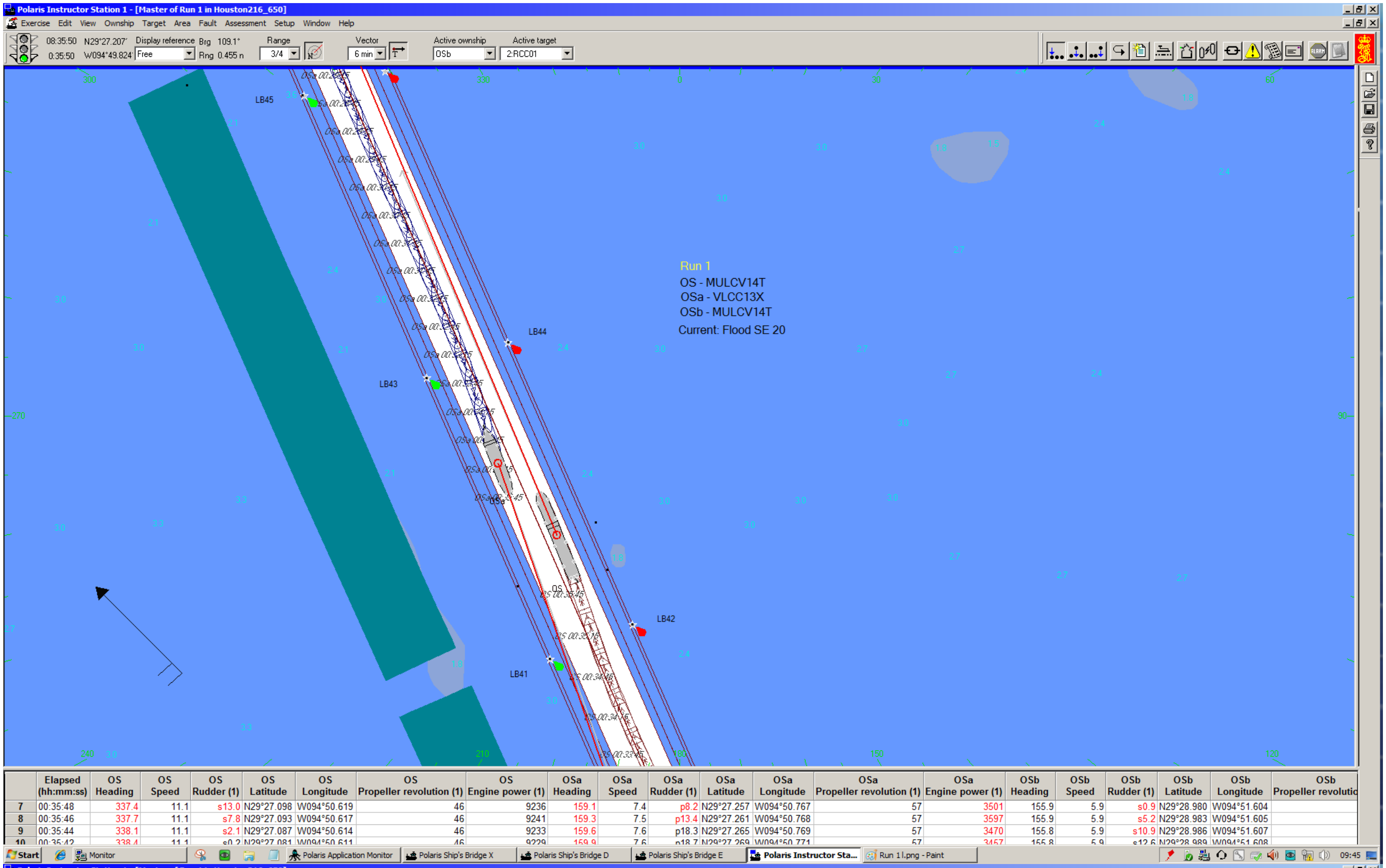
OSa - VLCC13X

OSb - MULCV14T

Current: Flood SE 20

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolutio
7	00:31:32	336.2	11.0	p3.8	N29°26.375	W094°50.281	41	6403	156.6	7.8	p23.7	N29°27.774	W094°50.997	57	3343	153.7	5.3	s4.2	N29°29.366	W094°51.791	
8	00:31:30	336.3	11.0	p5.1	N29°26.369	W094°50.278	41	6403	156.6	7.8	p20.7	N29°27.778	W094°50.999	57	3284	153.5	5.3	s9.0	N29°29.369	W094°51.793	
9	00:31:28	336.3	11.0	p5.1	N29°26.363	W094°50.275	41	6402	156.5	7.8	p15.5	N29°27.782	W094°51.001	57	3319	153.4	5.2	s9.0	N29°29.372	W094°51.795	
10	00:31:26	336.3	11.0	p5.1	N29°26.357	W094°50.272	41	6401	156.5	7.8	p10.3	N29°27.786	W094°51.004	57	3278	153.3	5.2	s9.0	N29°29.374	W094°51.796	

June 26, 2019



Run 1

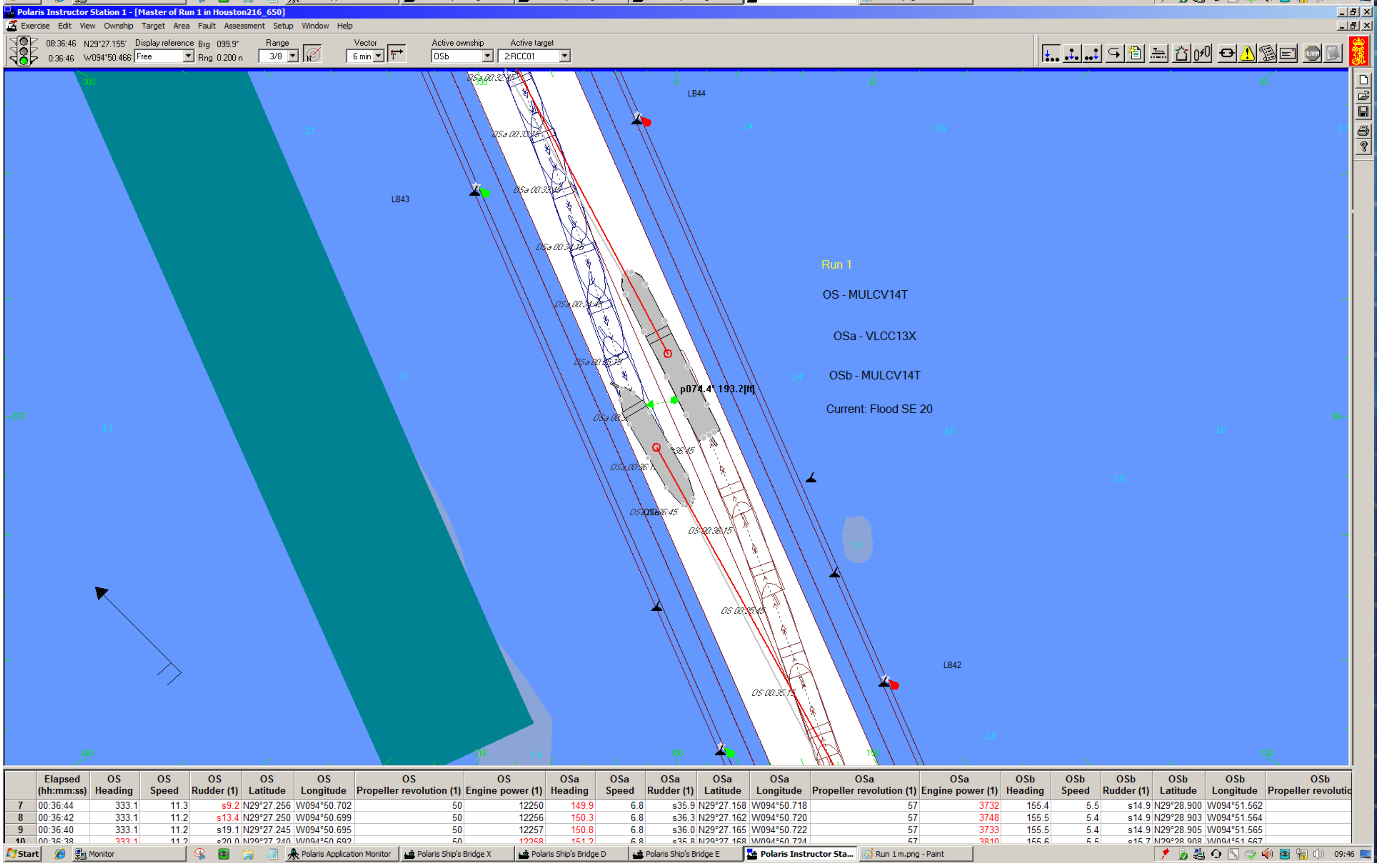
OS - MULCV14T

OSa - VLCC13X

OSb - MULCV14T

Current: Flood SE 20

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolutio
7	00:35:48	337.4	11.1	s13.0	N29°27.098	W094°50.619	46	9236	159.1	7.4	p8.2	N29°27.257	W094°50.767	57	3501	155.9	5.9	s0.9	N29°28.980	W094°51.604	
8	00:35:46	337.7	11.1	s7.8	N29°27.093	W094°50.617	46	9241	159.3	7.5	p13.4	N29°27.261	W094°50.768	57	3597	155.9	5.9	s5.2	N29°28.983	W094°51.605	
9	00:35:44	338.1	11.1	s2.1	N29°27.087	W094°50.614	46	9233	159.6	7.6	p18.3	N29°27.265	W094°50.769	57	3470	155.8	5.9	s10.9	N29°28.986	W094°51.607	



Run 1

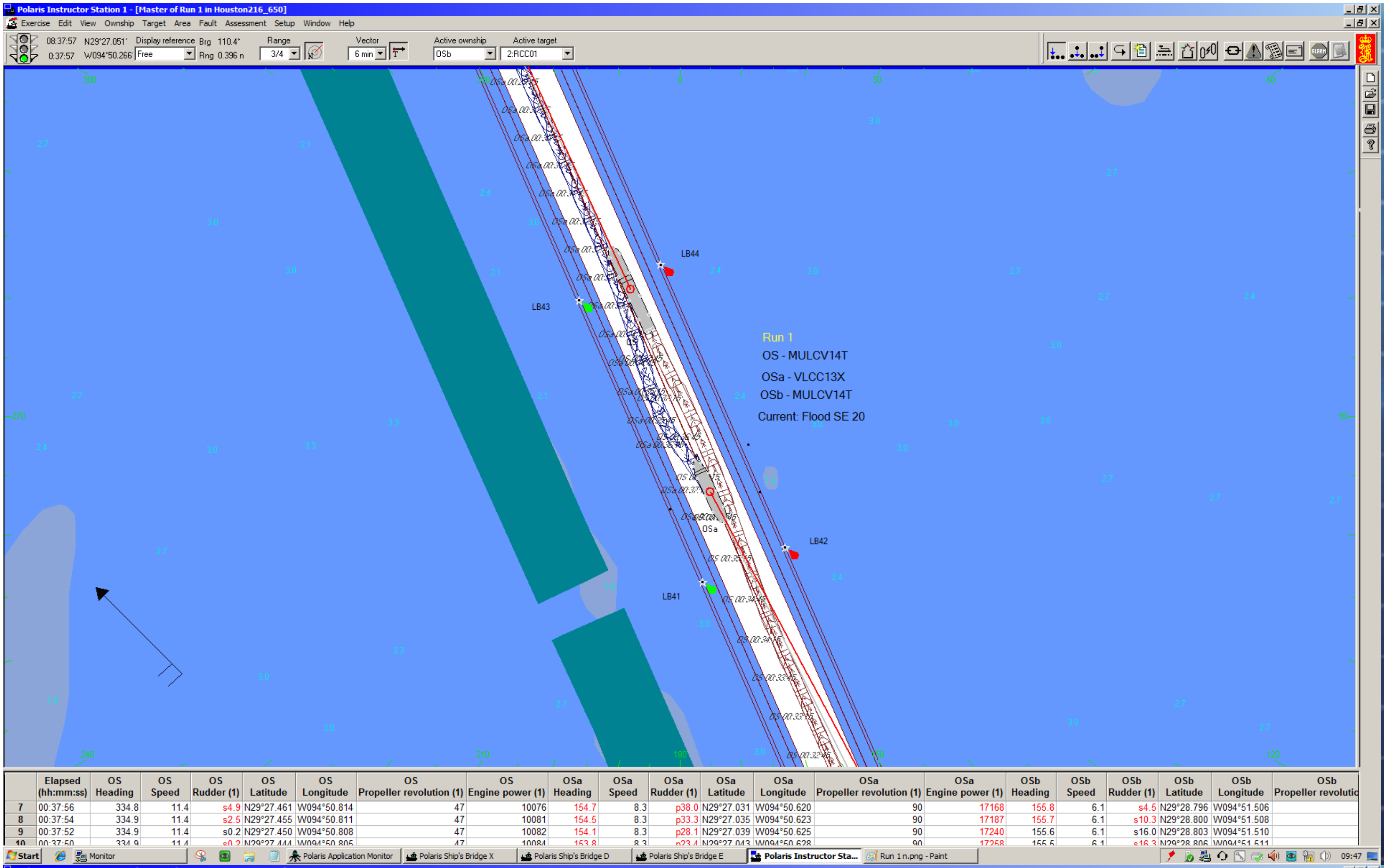
OS - MULCV14T

OSa - VLCC13X

OSb - MULCV14T

Current: Flood SE 20

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolutio
7	00:36:44	333.1	11.3	s9.2	N29°27.256	W094°50.702	50	12250	149.9	6.8	s35.9	N29°27.158	W094°50.718	57	3732	155.4	5.5	s14.9	N29°28.900	W094°51.562	
8	00:36:42	333.1	11.2	s13.4	N29°27.250	W094°50.699	50	12256	150.3	6.8	s36.3	N29°27.162	W094°50.720	57	3748	155.5	5.4	s14.9	N29°28.903	W094°51.564	
9	00:36:40	333.1	11.2	s19.1	N29°27.245	W094°50.695	50	12257	150.8	6.8	s36.0	N29°27.165	W094°50.722	57	3733	155.5	5.4	s14.9	N29°28.905	W094°51.565	

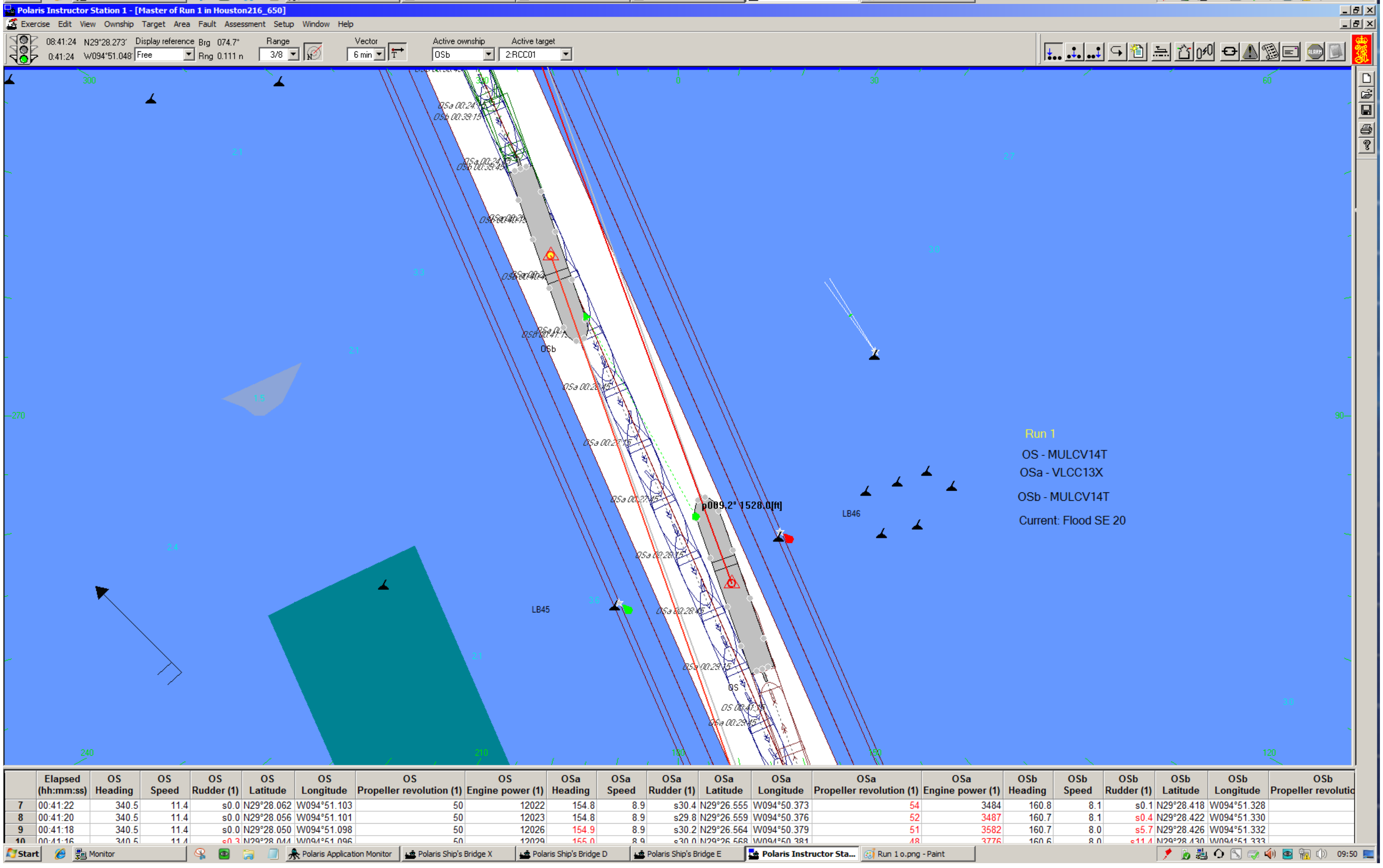


Polaris Instructor Station 1 - [Master of Run 1 in Houston216_650]

08:37:57 N29°27.051' Display reference Free Brg 110.4° Rng 0.396 n Range 3/4 Vector 6 min Active ownship OSb Active target 2:RCC01

0:37:57 W094°50.266'

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolutio
7	00:37:56	334.8	11.4	s4.9	N29°27.461	W094°50.814	47	10076	154.7	8.3	p38.0	N29°27.031	W094°50.620	90	17168	155.8	6.1	s4.5	N29°28.796	W094°51.506	
8	00:37:54	334.9	11.4	s2.5	N29°27.455	W094°50.811	47	10081	154.5	8.3	p33.3	N29°27.035	W094°50.623	90	17187	155.7	6.1	s10.3	N29°28.800	W094°51.508	
9	00:37:52	334.9	11.4	s0.2	N29°27.450	W094°50.808	47	10082	154.1	8.3	p28.1	N29°27.039	W094°50.625	90	17240	155.6	6.1	s16.0	N29°28.803	W094°51.510	
10	00:37:50	334.9	11.4	s0.2	N29°27.444	W094°50.805	47	10084	153.8	8.3	p23.4	N29°27.043	W094°50.628	90	17258	155.5	6.1	s16.3	N29°28.806	W094°51.511	

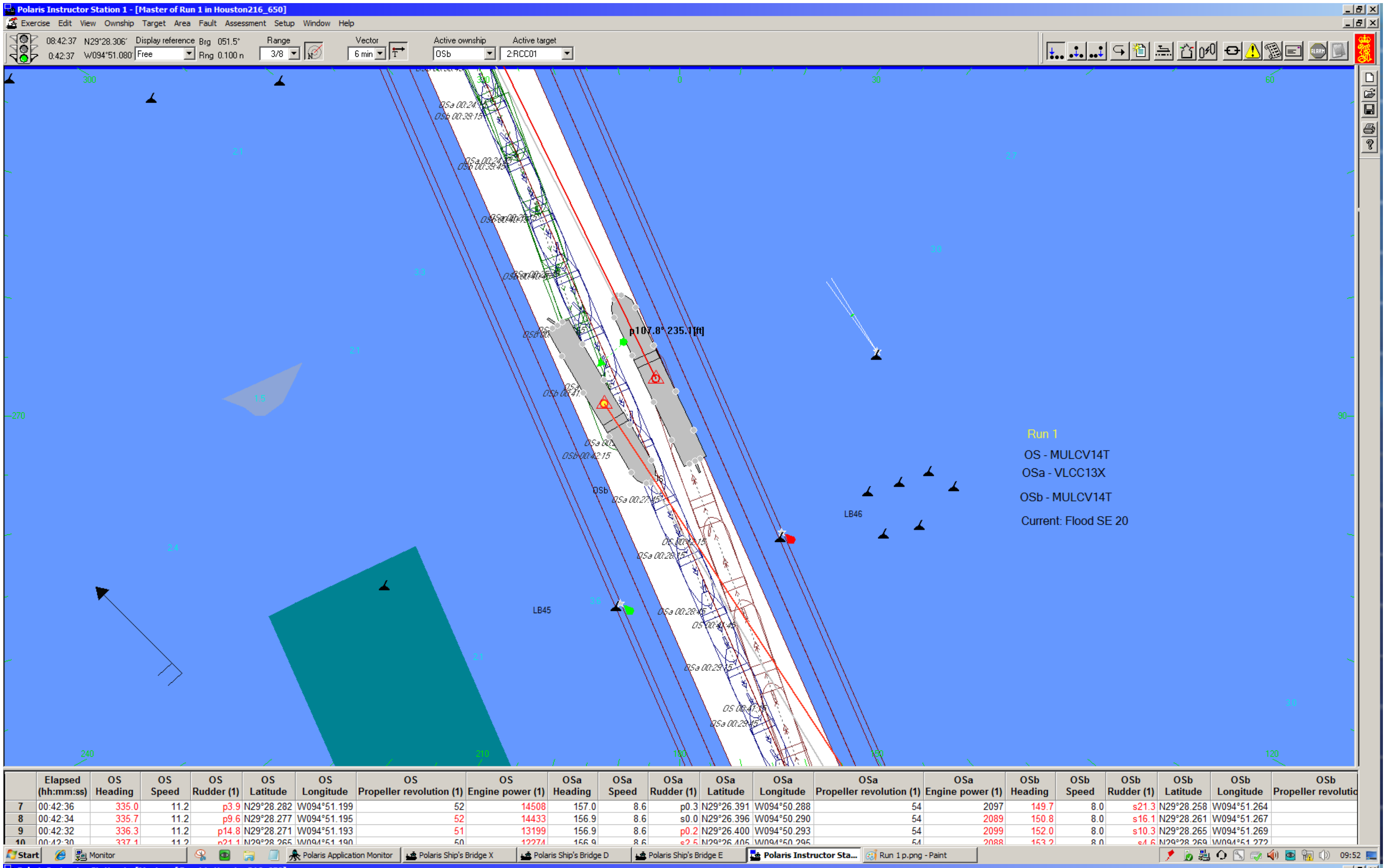


Polaris Instructor Station 1 - [Master of Run 1 in Houston216_650]

08:41:24 N29°28.273' Display reference Free Brg 074.7° Rng 0.111 n Range 3/8 Vector 6 min Active ownship OSb Active target 2:RCC01

0:41:24 W094°51.048'

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolutio
7	00:41:22	340.5	11.4	s0.0	N29°28.062	W094°51.103	50	12022	154.8	8.9	s30.4	N29°26.555	W094°50.373	54	3484	160.8	8.1	s0.1	N29°28.418	W094°51.328	
8	00:41:20	340.5	11.4	s0.0	N29°28.056	W094°51.101	50	12023	154.8	8.9	s29.8	N29°26.559	W094°50.376	52	3487	160.7	8.1	s0.4	N29°28.422	W094°51.330	
9	00:41:18	340.5	11.4	s0.0	N29°28.050	W094°51.098	50	12026	154.9	8.9	s30.2	N29°26.564	W094°50.379	51	3582	160.7	8.0	s5.7	N29°28.426	W094°51.332	
10	00:41:16	340.5	11.4	s0.3	N29°28.044	W094°51.096	50	12029	155.0	8.9	s30.0	N29°26.568	W094°50.381	48	3776	160.6	8.0	s11.4	N29°28.430	W094°51.333	



Polaris Instructor Station 1 - [Master of Run 1 in Houston216_650]

08:42:37 N29°28.306′ Display reference Free Brg 051.5° Rng 0.100 n
0:42:37 W094°51.080′

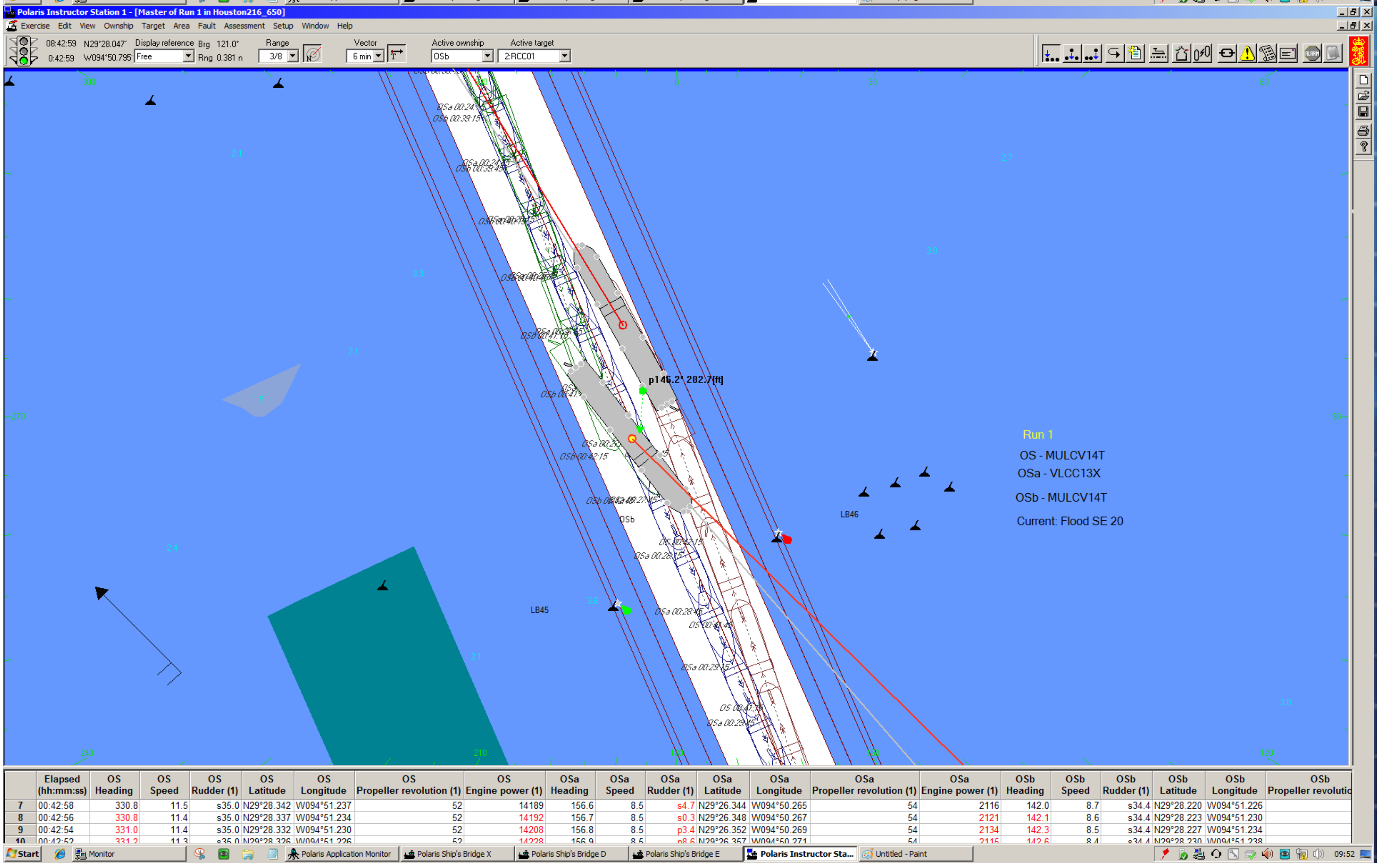
Range 3/8

Vector 6 min

Active ownship OSb

Active target 2:RCC01

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolutio
7	00:42:36	335.0	11.2	p3.9	N29°28.282	W094°51.199	52	14508	157.0	8.6	p0.3	N29°26.391	W094°50.288	54	2097	149.7	8.0	s21.3	N29°28.258	W094°51.264	
8	00:42:34	335.7	11.2	p9.6	N29°28.277	W094°51.195	52	14433	156.9	8.6	s0.0	N29°26.396	W094°50.290	54	2089	150.8	8.0	s16.1	N29°28.261	W094°51.267	
9	00:42:32	336.3	11.2	p14.8	N29°28.271	W094°51.193	51	13199	156.9	8.6	p0.2	N29°26.400	W094°50.293	54	2099	152.0	8.0	s10.3	N29°28.265	W094°51.269	
10	00:42:30	337.1	11.2	p21.1	N29°28.265	W094°51.190	50	12274	156.9	8.6	s2.5	N29°26.405	W094°50.295	54	2088	153.2	8.0	s4.6	N29°28.269	W094°51.272	



Polaris Instructor Station 1 - [Master of Run 1 in Houston216_650]

08:42:59 N29°28.047′ Display reference Free Brg 121.0° Rng 0.381 n
0:42:59 W094°50.795′

Range 3/8

Vector 6 min

Active ownship OSb

Active target 2:RCC01

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolutio
7	00:42:58	330.8	11.5	s35.0	N29°28.342	W094°51.237	52	14189	156.6	8.5	s4.7	N29°26.344	W094°50.265	54	2116	142.0	8.7	s34.4	N29°28.220	W094°51.226	
8	00:42:56	330.8	11.4	s35.0	N29°28.337	W094°51.234	52	14192	156.7	8.5	s0.3	N29°26.348	W094°50.267	54	2121	142.1	8.6	s34.4	N29°28.223	W094°51.230	
9	00:42:54	331.0	11.4	s35.0	N29°28.332	W094°51.230	52	14208	156.8	8.5	p3.4	N29°26.352	W094°50.269	54	2134	142.3	8.5	s34.4	N29°28.227	W094°51.234	
10	00:42:52	331.2	11.3	s35.0	N29°28.326	W094°51.226	52	14228	156.9	8.5	p8.6	N29°26.357	W094°50.271	54	2115	142.6	8.4	s34.4	N29°28.230	W094°51.238	

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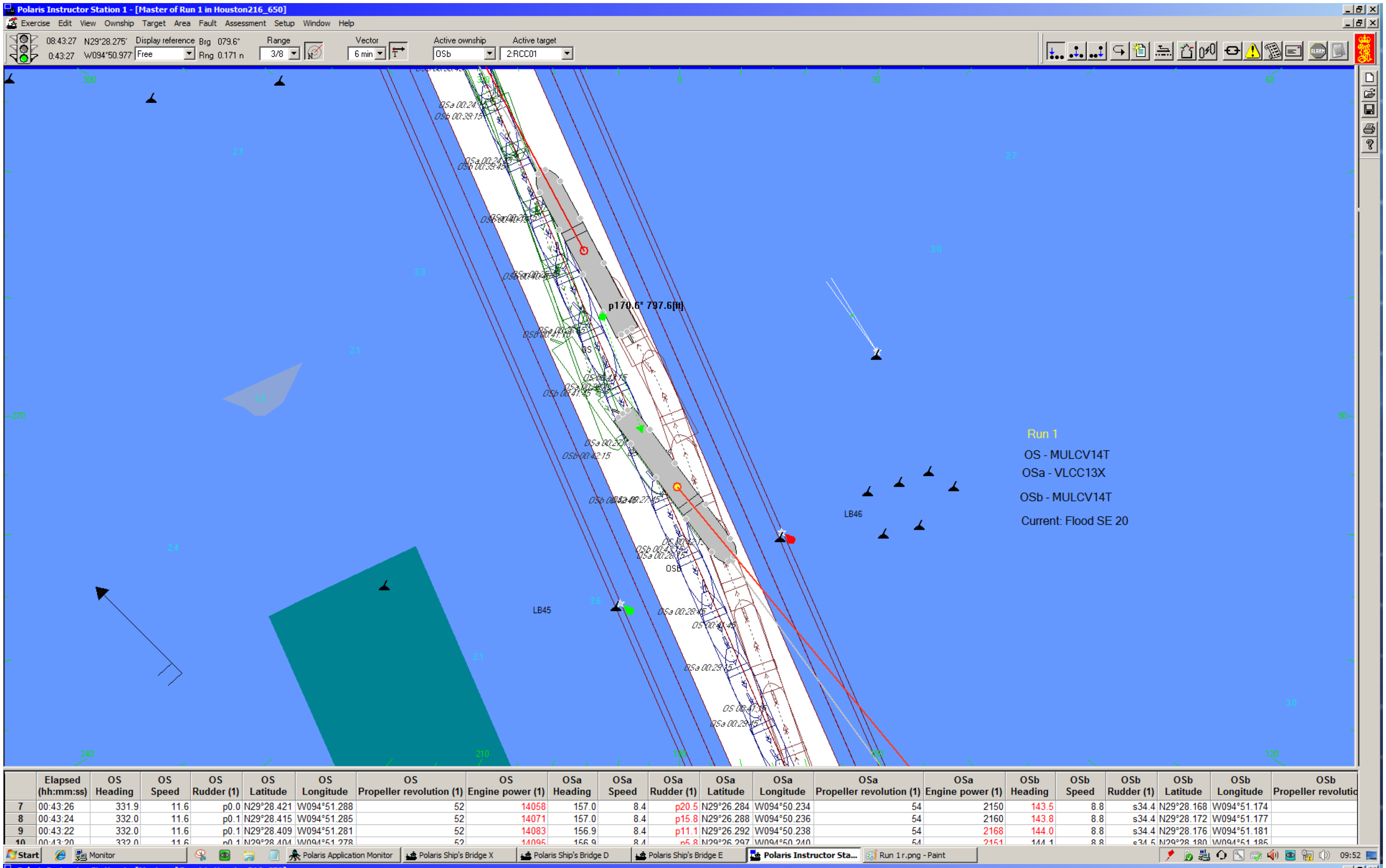


Polaris Instructor Station 1 - [Master of Run 1 in Houston216_650]

08:43:27 N29°28.275′ Display reference Free Brg 079.6° Rng 0.171 n Range 3/8 Vector 6 min Active ownship OSb Active target 2:RCC01

0:43:27 W094°50.977′

Run 1

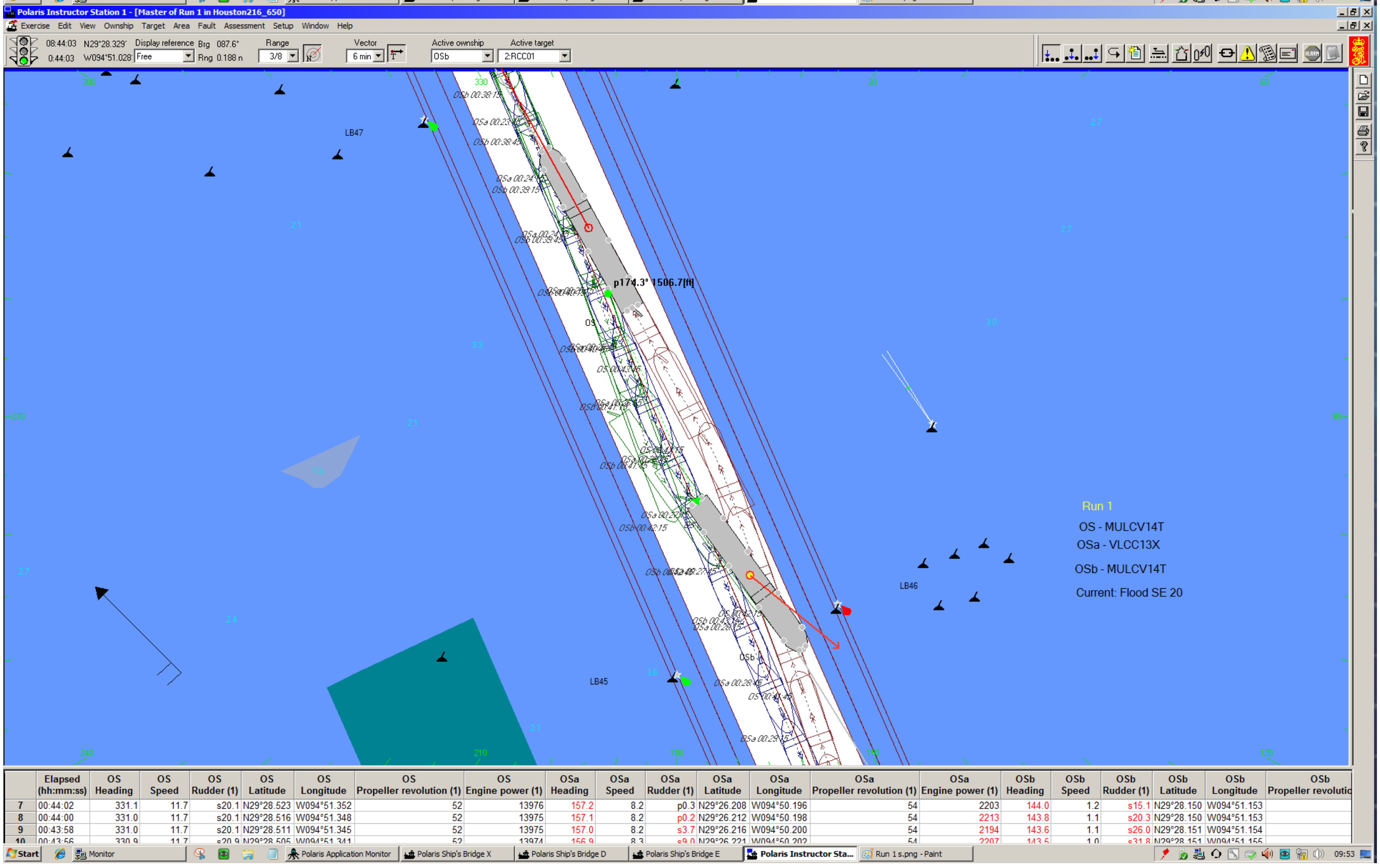
OS - MULCV14T

OSa - VLCC13X

OSb - MULCV14T

Current: Flood SE 20

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolutic
7	00:43:26	331.9	11.6	p0.0	N29°28.421	W094°51.288	52	14058	157.0	8.4	p20.5	N29°26.284	W094°50.234	54	2150	143.5	8.8	s34.4	N29°28.168	W094°51.174	
8	00:43:24	332.0	11.6	p0.1	N29°28.415	W094°51.285	52	14071	157.0	8.4	p15.8	N29°26.288	W094°50.236	54	2160	143.8	8.8	s34.4	N29°28.172	W094°51.177	
9	00:43:22	332.0	11.6	p0.1	N29°28.409	W094°51.281	52	14083	156.9	8.4	p11.1	N29°26.292	W094°50.238	54	2168	144.0	8.8	s34.4	N29°28.176	W094°51.181	
10	00:43:20	332.0	11.6	p0.1	N29°28.404	W094°51.278	52	14095	156.9	8.4	p5.8	N29°26.297	W094°50.240	54	2151	144.1	8.8	s34.5	N29°28.180	W094°51.185	



Polaris Instructor Station 1 - [Master of Run 1 in Houston216_650]

08:44:03 N29°28.329′ Display reference Free Brg 087.6° Rng 0.188 n Range 3/8 Vector 6 min Active ownship OSb Active target 2:RCC01

0:44:03 W094°51.028′

Run 1

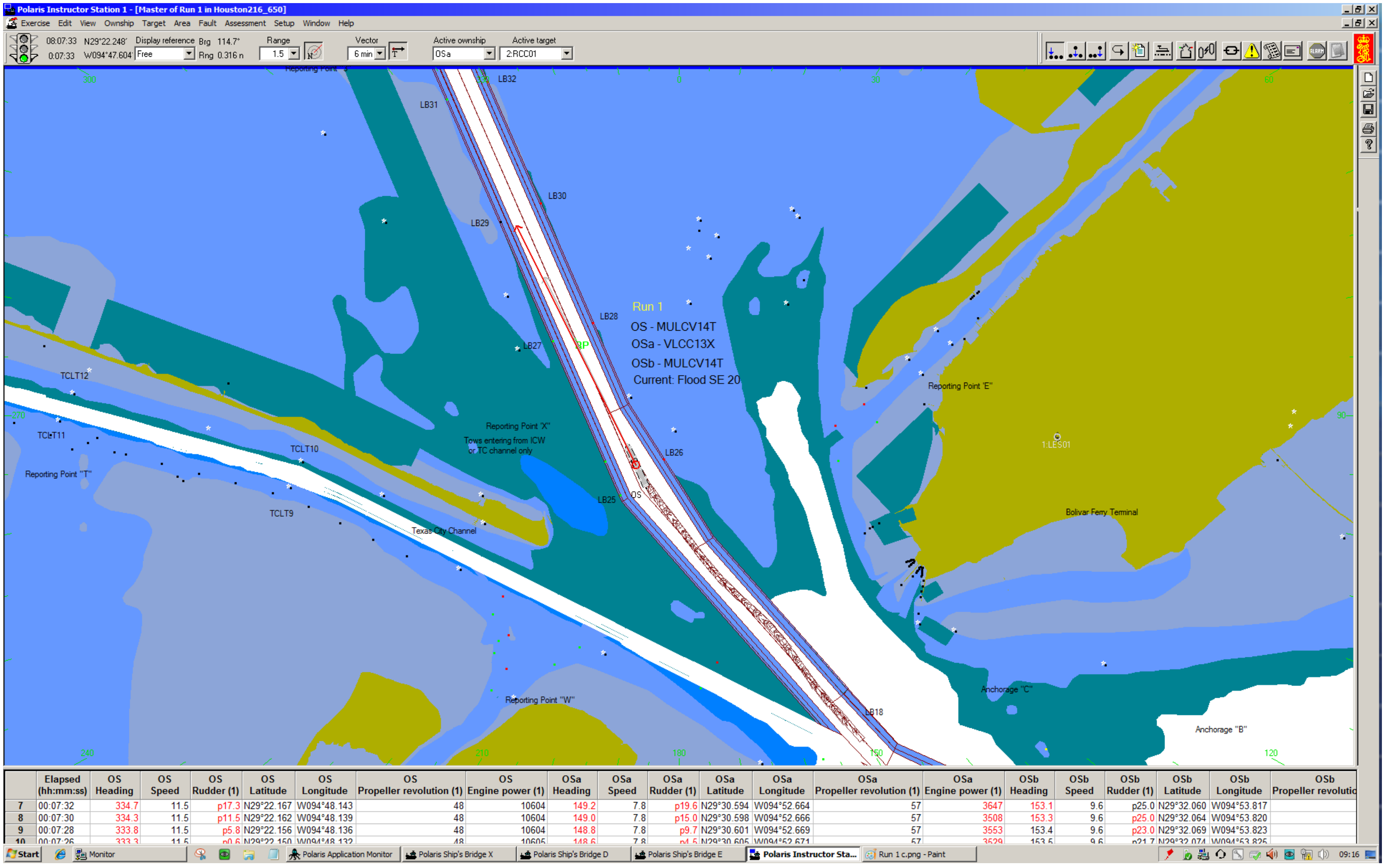
OS - MULCV14T

OSa - VLCC13X

OSb - MULCV14T

Current: Flood SE 20

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolutic
7	00:44:02	331.1	11.7	s20.1	N29°28.523	W094°51.352	52	13976	157.2	8.2	p0.3	N29°26.208	W094°50.196	54	2203	144.0	1.2	s15.1	N29°28.150	W094°51.153	
8	00:44:00	331.0	11.7	s20.1	N29°28.516	W094°51.348	52	13975	157.1	8.2	p0.2	N29°26.212	W094°50.198	54	2213	143.8	1.1	s20.3	N29°28.150	W094°51.153	
9	00:43:58	331.0	11.7	s20.1	N29°28.511	W094°51.345	52	13975	157.0	8.2	s3.7	N29°26.216	W094°50.200	54	2194	143.6	1.1	s26.0	N29°28.151	W094°51.154	
10	00:43:56	330.9	11.7	s20.9	N29°28.505	W094°51.341	52	13974	156.9	8.3	s9.0	N29°26.221	W094°50.202	54	2207	143.5	1.0	s31.8	N29°28.151	W094°51.155	



08:07:33 N29°22.248' Display reference: Free Brg 114.7°
0:07:33 W094°47.604' Rng 0.316 n
Range: 1.5
Vector: 6 min
Active ownship: OSa
Active target: 2:RCC01

Run 1

OS - MULCV14T

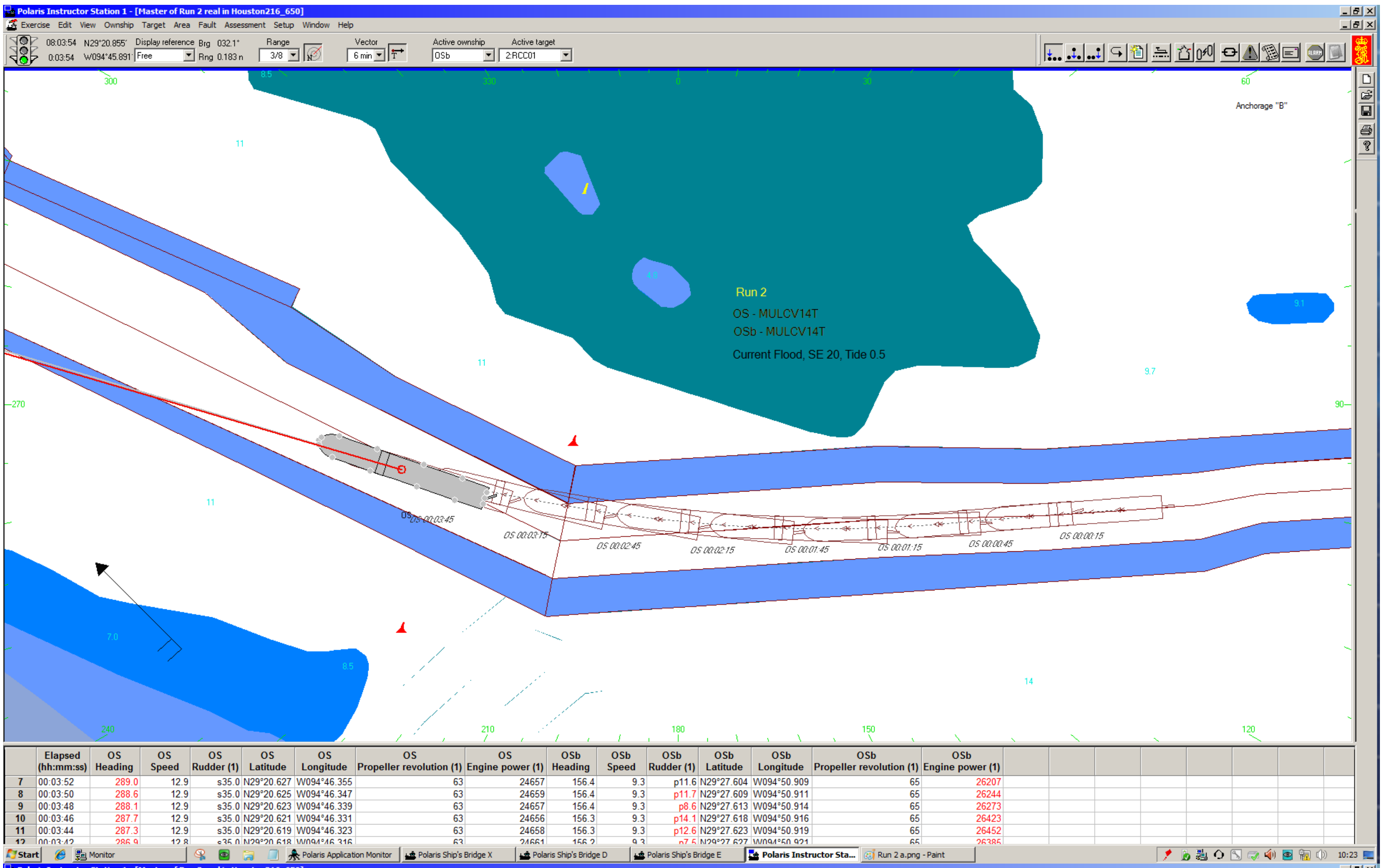
OSa - VLCC13X

OSb - MULCV14T

Current: Flood SE 20

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolutio
7	00:07:32	334.7	11.5	p17.3	N29°22.167	W094°48.143	48	10604	149.2	7.8	p19.6	N29°30.594	W094°52.664	57	3647	153.1	9.6	p25.0	N29°32.060	W094°53.817	
8	00:07:30	334.3	11.5	p11.5	N29°22.162	W094°48.139	48	10604	149.0	7.8	p15.0	N29°30.598	W094°52.666	57	3508	153.3	9.6	p25.0	N29°32.064	W094°53.820	
9	00:07:28	333.8	11.5	p5.8	N29°22.156	W094°48.136	48	10604	148.8	7.8	p9.7	N29°30.601	W094°52.669	57	3553	153.4	9.6	p23.0	N29°32.069	W094°53.823	
10	00:07:26	333.3	11.5	p0.6	N29°22.150	W094°48.132	48	10605	148.6	7.8	p4.5	N29°30.605	W094°52.671	57	3529	153.5	9.6	p21.7	N29°32.074	W094°53.825	

Run 2



08:03:54 N29°20.855′ Display reference: Free Brg 032.1° Rng 0.183 n
0:03:54 W094°45.891′
Range: 3/8
Vector: 6 min
Active ownship: OSb
Active target: 2:RCC01

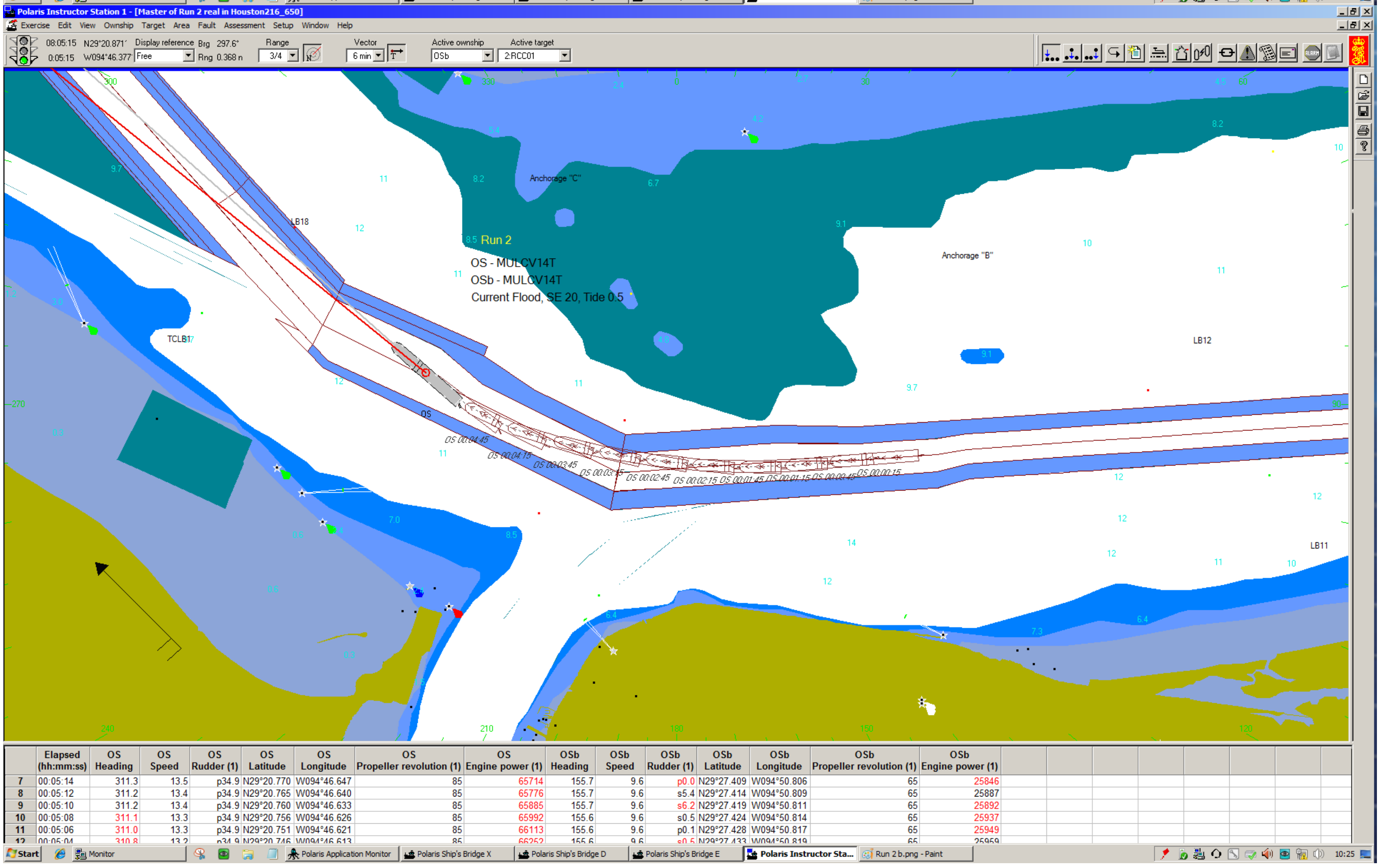
Run 2

OS - MULCV14T

OSb - MULCV14T

Current Flood, SE 20, Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:03:52	289.0	12.9	s35.0	N29°20.627	W094°46.355	63	24657	156.4	9.3	p11.6	N29°27.604	W094°50.909	65	26207
8	00:03:50	288.6	12.9	s35.0	N29°20.625	W094°46.347	63	24659	156.4	9.3	p11.7	N29°27.609	W094°50.911	65	26244
9	00:03:48	288.1	12.9	s35.0	N29°20.623	W094°46.339	63	24657	156.4	9.3	p8.6	N29°27.613	W094°50.914	65	26273
10	00:03:46	287.7	12.9	s35.0	N29°20.621	W094°46.331	63	24656	156.3	9.3	p14.1	N29°27.618	W094°50.916	65	26423
11	00:03:44	287.3	12.9	s35.0	N29°20.619	W094°46.323	63	24658	156.3	9.3	p12.6	N29°27.623	W094°50.919	65	26452
12	00:03:42	286.9	12.8	s35.0	N29°20.618	W094°46.316	63	24661	156.2	9.3	p7.5	N29°27.627	W094°50.921	65	26385



08:05:15 N29°20.871′ Display reference: Free Brg 297.6° Rng 0.368 n
0:05:15 W094°46.377′
Range: 3/4
Vector: 6 min
Active ownship: OSb
Active target: 2:RCC01

Run 2

OS - MULCV14T

OSb - MULCV14T

Current Flood, SE 20, Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:05:14	311.3	13.5	p34.9	N29°20.770	W094°46.647	85	65714	155.7	9.6	p0.0	N29°27.409	W094°50.806	65	25846
8	00:05:12	311.2	13.4	p34.9	N29°20.765	W094°46.640	85	65776	155.7	9.6	s5.4	N29°27.414	W094°50.809	65	25887
9	00:05:10	311.2	13.4	p34.9	N29°20.760	W094°46.633	85	65885	155.7	9.6	s6.2	N29°27.419	W094°50.811	65	25892
10	00:05:08	311.1	13.3	p34.9	N29°20.756	W094°46.626	85	65992	155.6	9.6	s0.5	N29°27.424	W094°50.814	65	25937
11	00:05:06	311.0	13.3	p34.9	N29°20.751	W094°46.621	85	66113	155.6	9.6	p0.1	N29°27.428	W094°50.817	65	25949
12	00:05:04	310.8	13.2	p34.9	N29°20.746	W094°46.613	85	66252	155.6	9.6	s0.5	N29°27.433	W094°50.819	65	25959

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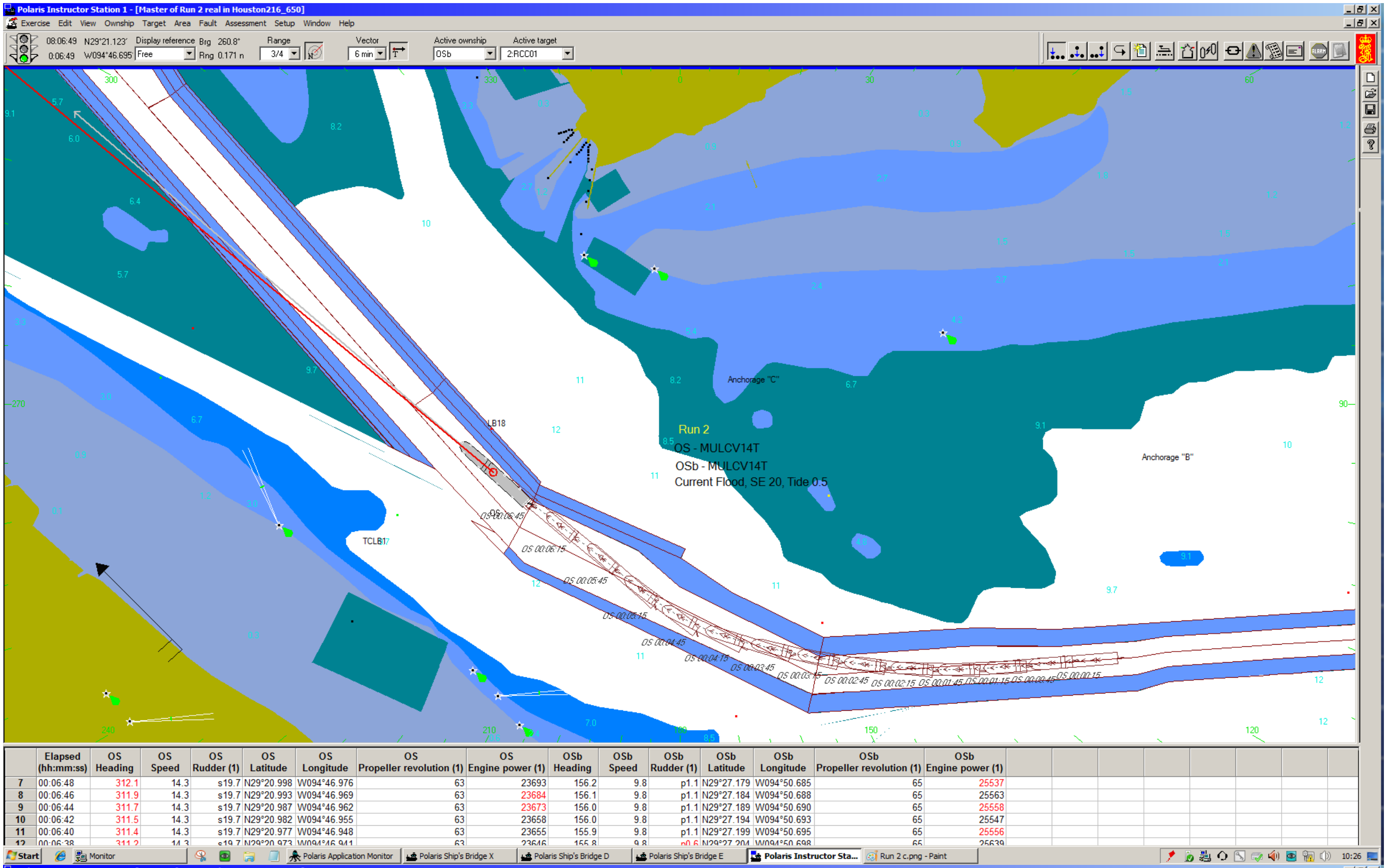
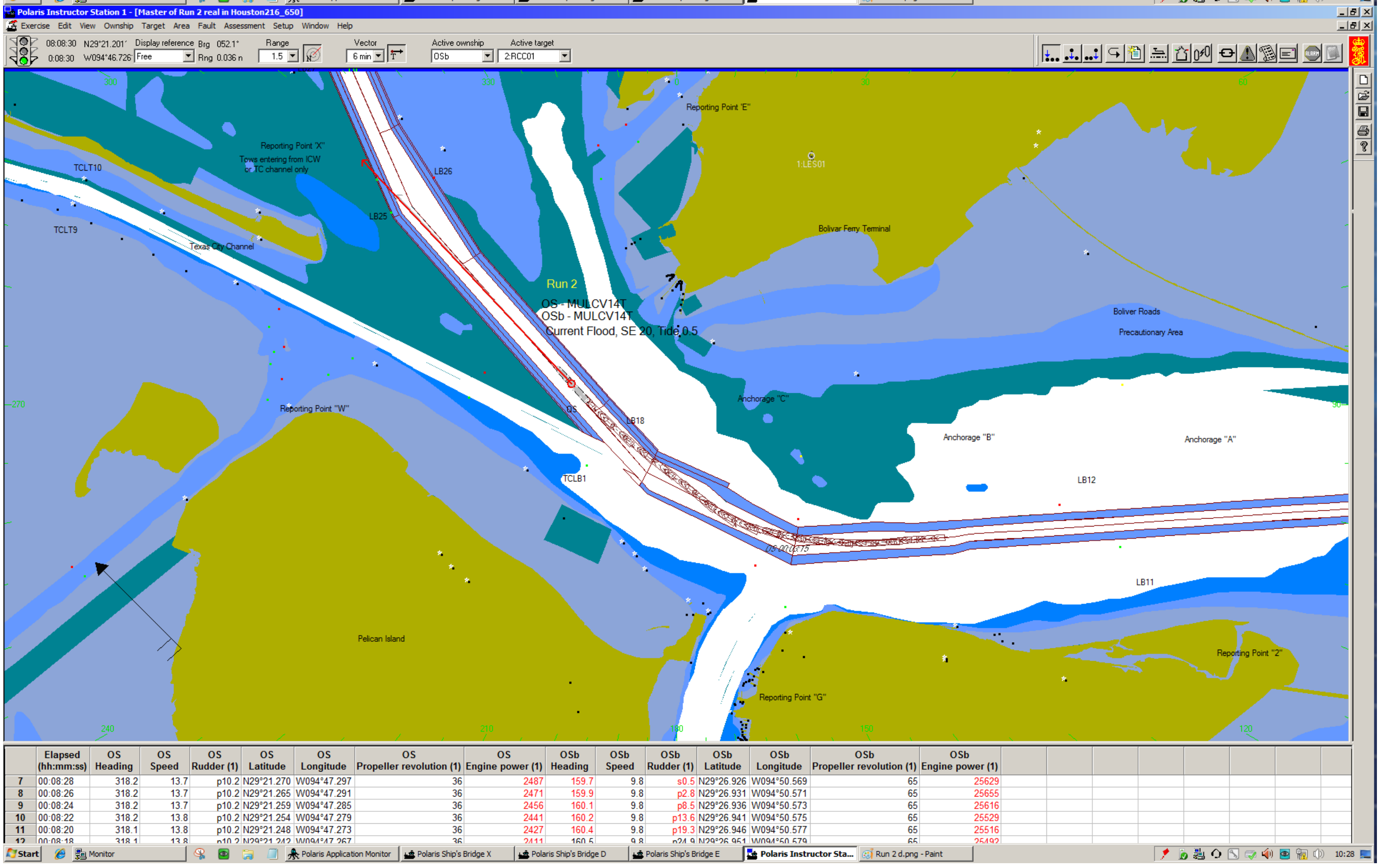


Run 2
OS - MULCV14T
OSb - MULCV14T
Current Flood, SE 20, Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:06:48	312.1	14.3	s19.7	N29°20.998	W094°46.976	63	23693	156.2	9.8	p1.1	N29°27.179	W094°50.685	65	25537
8	00:06:46	311.9	14.3	s19.7	N29°20.993	W094°46.969	63	23684	156.1	9.8	p1.1	N29°27.184	W094°50.688	65	25563
9	00:06:44	311.7	14.3	s19.7	N29°20.987	W094°46.962	63	23673	156.0	9.8	p1.1	N29°27.189	W094°50.690	65	25558
10	00:06:42	311.5	14.3	s19.7	N29°20.982	W094°46.955	63	23658	156.0	9.8	p1.1	N29°27.194	W094°50.693	65	25547
11	00:06:40	311.4	14.3	s19.7	N29°20.977	W094°46.948	63	23655	155.9	9.8	p1.1	N29°27.199	W094°50.695	65	25556
12	00:06:38	311.2	14.3	s19.7	N29°20.973	W094°46.941	63	23646	155.8	9.8	p0.6	N29°27.204	W094°50.698	65	25639



Run 2
OS - MULCV14T
OSb - MULCV14T
Current Flood, SE 20, Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:08:28	318.2	13.7	p10.2	N29°21.270	W094°47.297	36	2487	159.7	9.8	s0.5	N29°26.926	W094°50.569	65	25629
8	00:08:26	318.2	13.7	p10.2	N29°21.265	W094°47.291	36	2471	159.9	9.8	p2.8	N29°26.931	W094°50.571	65	25655
9	00:08:24	318.2	13.7	p10.2	N29°21.259	W094°47.285	36	2456	160.1	9.8	p8.5	N29°26.936	W094°50.573	65	25616
10	00:08:22	318.2	13.8	p10.2	N29°21.254	W094°47.279	36	2441	160.2	9.8	p13.6	N29°26.941	W094°50.575	65	25529
11	00:08:20	318.1	13.8	p10.2	N29°21.248	W094°47.273	36	2427	160.4	9.8	p19.3	N29°26.946	W094°50.577	65	25516
12	00:08:18	318.1	13.8	p10.2	N29°21.242	W094°47.267	36	2411	160.5	9.8	p24.9	N29°26.951	W094°50.579	65	25492

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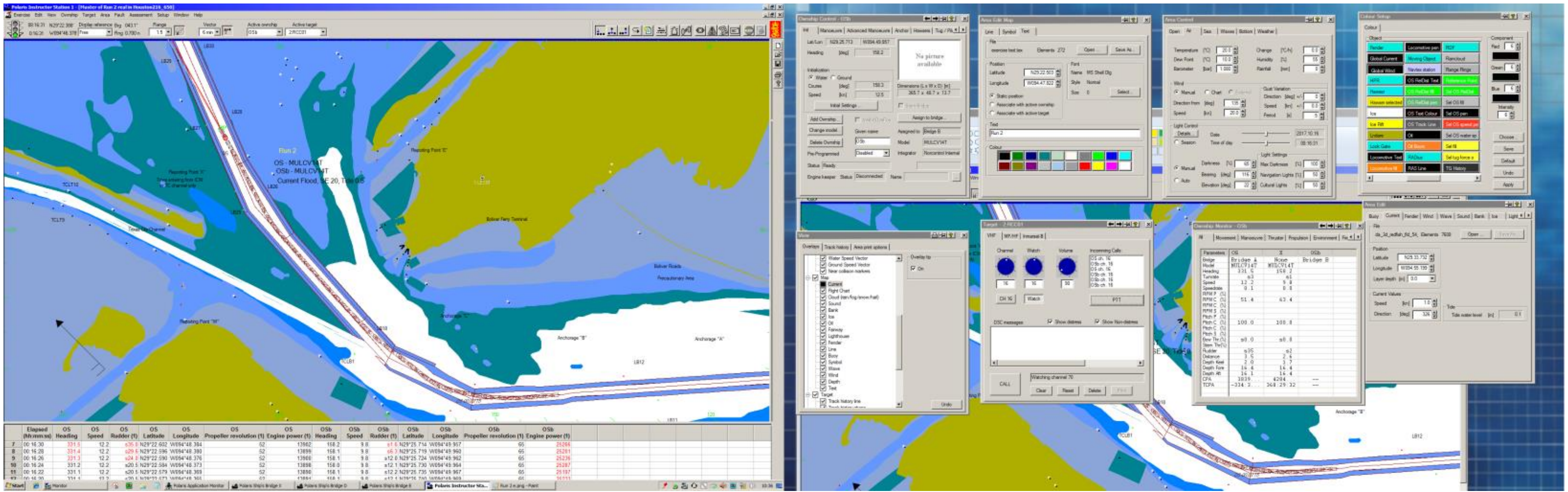
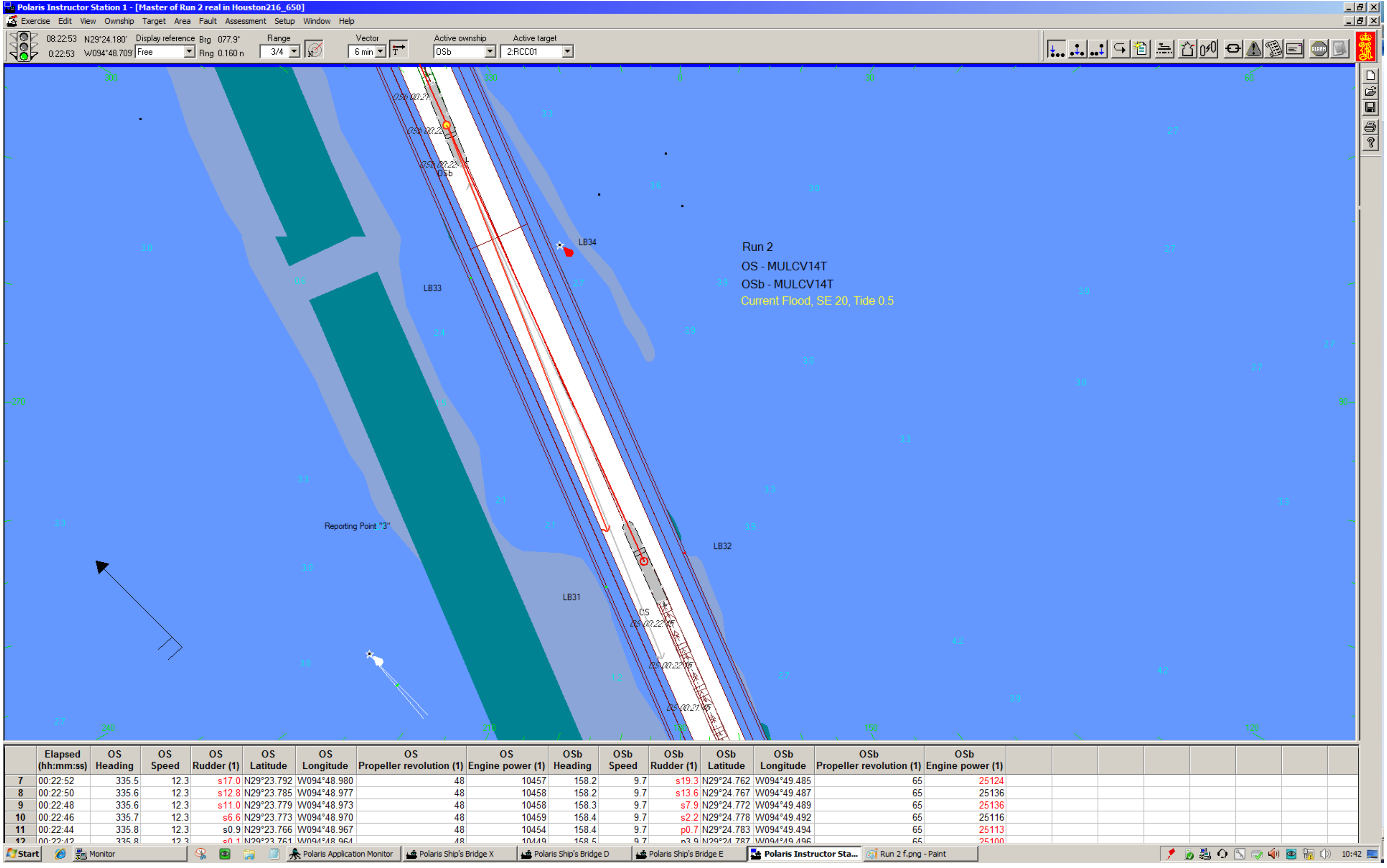
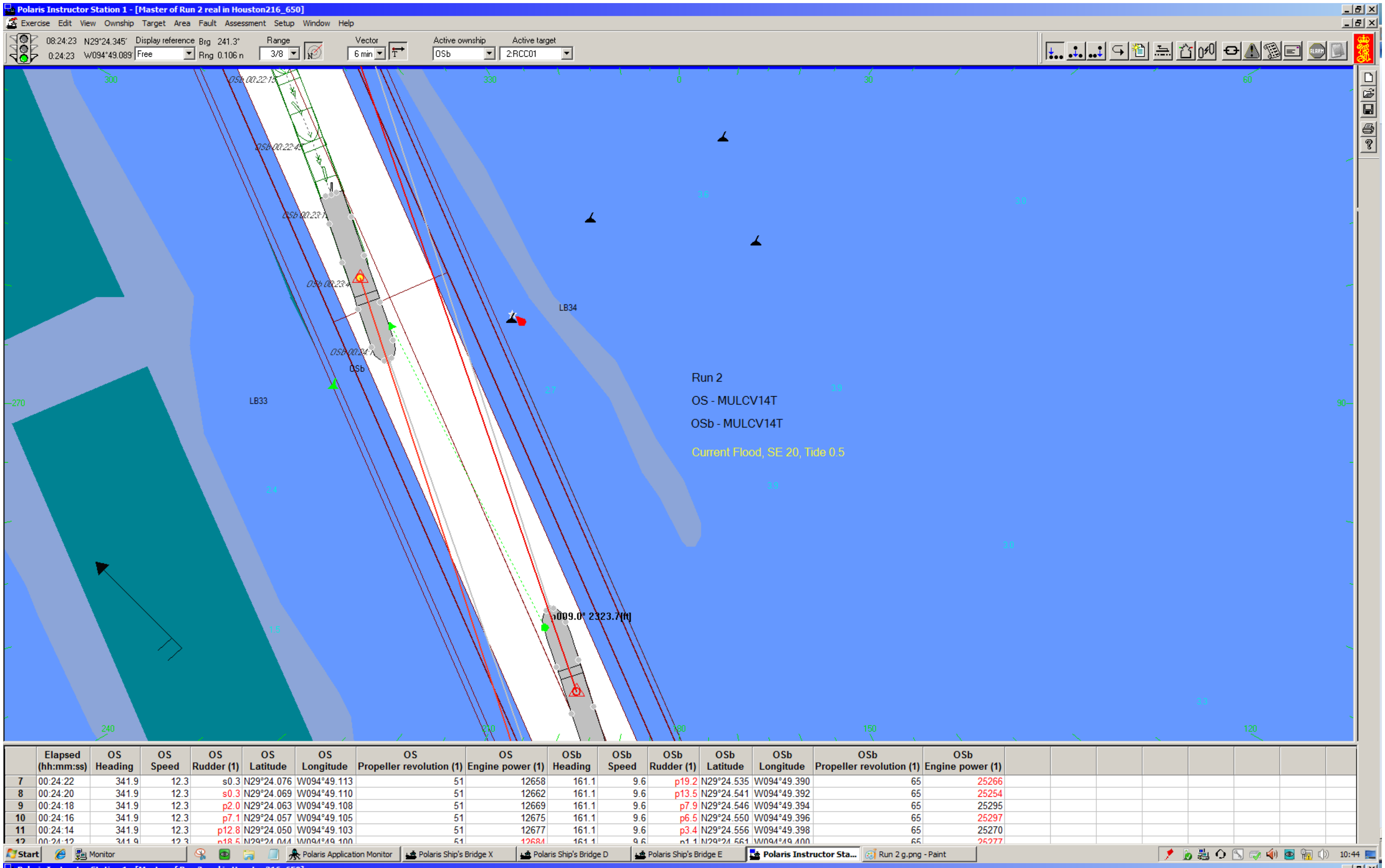



Polaris Instructor Station 1 - [Master of Run 2 real in Houston216_650]

08:22:53 N29°24.180′
0:22:53 W094°48.709′
Display reference: Free
Brg 077.9°
Rng 0.160 n
Range: 3/4
Vector: 6 min
Active ownship: OSb
Active target: 2:RCC01

Run 2
OS - MULCV14T
OSb - MULCV14T
Current Flood, SE 20, Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:22:52	335.5	12.3	s17.0	N29°23.792	W094°48.980	48	10457	158.2	9.7	s19.3	N29°24.762	W094°49.485	65	25124
8	00:22:50	335.6	12.3	s12.8	N29°23.785	W094°48.977	48	10458	158.2	9.7	s13.6	N29°24.767	W094°49.487	65	25136
9	00:22:48	335.6	12.3	s11.0	N29°23.779	W094°48.973	48	10458	158.3	9.7	s7.9	N29°24.772	W094°49.489	65	25136
10	00:22:46	335.7	12.3	s6.6	N29°23.773	W094°48.970	48	10459	158.4	9.7	s2.2	N29°24.778	W094°49.492	65	25116
11	00:22:44	335.8	12.3	s0.9	N29°23.766	W094°48.967	48	10454	158.4	9.7	p0.7	N29°24.783	W094°49.494	65	25113
12	00:22:42	335.8	12.3	s0.1	N29°23.761	W094°48.964	48	10449	158.5	9.7	p3.9	N29°24.787	W094°49.496	65	25100



Polaris Instructor Station 1 - [Master of Run 2 real in Houston216_650]

08:24:23 N29°24.345' Display reference Brg 241.3°
0:24:23 W094°49.089' Free Rng 0.106 n

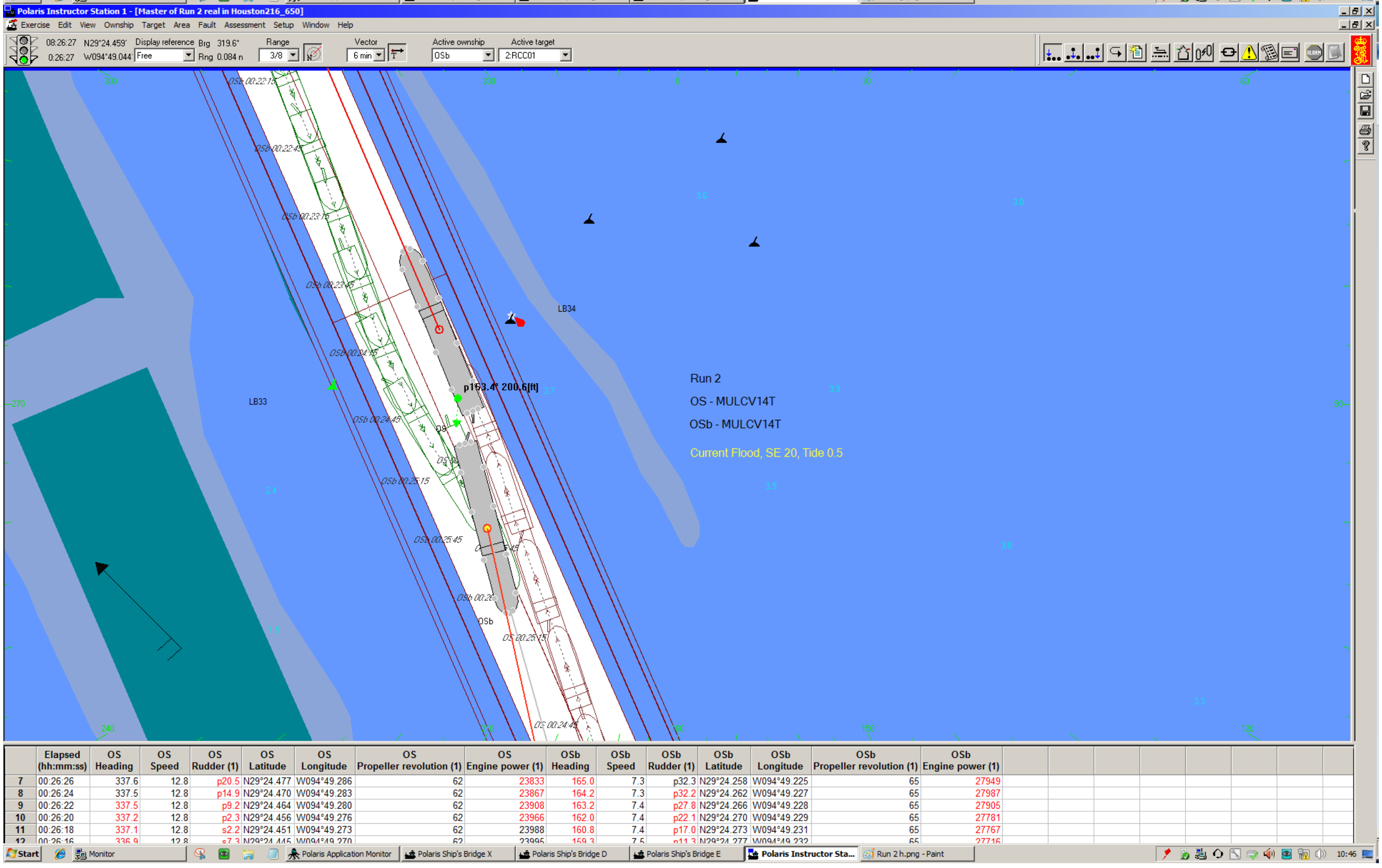
Range 3/8

Vector 6 min

Active ownship OSb

Active target 2:RCC01

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:24:22	341.9	12.3	s0.3	N29°24.076	W094°49.113	51	12658	161.1	9.6	p19.2	N29°24.535	W094°49.390	65	25266
8	00:24:20	341.9	12.3	s0.3	N29°24.069	W094°49.110	51	12662	161.1	9.6	p13.5	N29°24.541	W094°49.392	65	25254
9	00:24:18	341.9	12.3	p2.0	N29°24.063	W094°49.108	51	12669	161.1	9.6	p7.9	N29°24.546	W094°49.394	65	25295
10	00:24:16	341.9	12.3	p7.1	N29°24.057	W094°49.105	51	12675	161.1	9.6	p6.5	N29°24.550	W094°49.396	65	25297
11	00:24:14	341.9	12.3	p12.8	N29°24.050	W094°49.103	51	12677	161.1	9.6	p3.4	N29°24.556	W094°49.398	65	25270
12	00:24:12	341.9	12.3	p18.5	N29°24.044	W094°49.100	51	12684	161.1	9.6	p1.1	N29°24.561	W094°49.400	65	25277



Polaris Instructor Station 1 - [Master of Run 2 real in Houston216_650]

08:26:27 N29°24.459' Display reference Brg 319.6°
0:26:27 W094°49.044' Free Rng 0.084 n

Range 3/8

Vector 6 min

Active ownship OSb

Active target 2:RCC01

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:26:26	337.6	12.8	p20.5	N29°24.477	W094°49.286	62	23833	165.0	7.3	p32.3	N29°24.258	W094°49.225	65	27949
8	00:26:24	337.5	12.8	p14.9	N29°24.470	W094°49.283	62	23867	164.2	7.3	p32.2	N29°24.262	W094°49.227	65	27987
9	00:26:22	337.5	12.8	p9.2	N29°24.464	W094°49.280	62	23908	163.2	7.4	p27.8	N29°24.266	W094°49.228	65	27905
10	00:26:20	337.2	12.8	p2.3	N29°24.456	W094°49.276	62	23966	162.0	7.4	p22.1	N29°24.270	W094°49.229	65	27781
11	00:26:18	337.1	12.8	s2.2	N29°24.451	W094°49.273	62	23988	160.8	7.4	p17.0	N29°24.273	W094°49.231	65	27767
12	00:26:16	336.9	12.8	s7.3	N29°24.445	W094°49.270	62	23995	159.3	7.5	p11.3	N29°24.277	W094°49.232	65	27716

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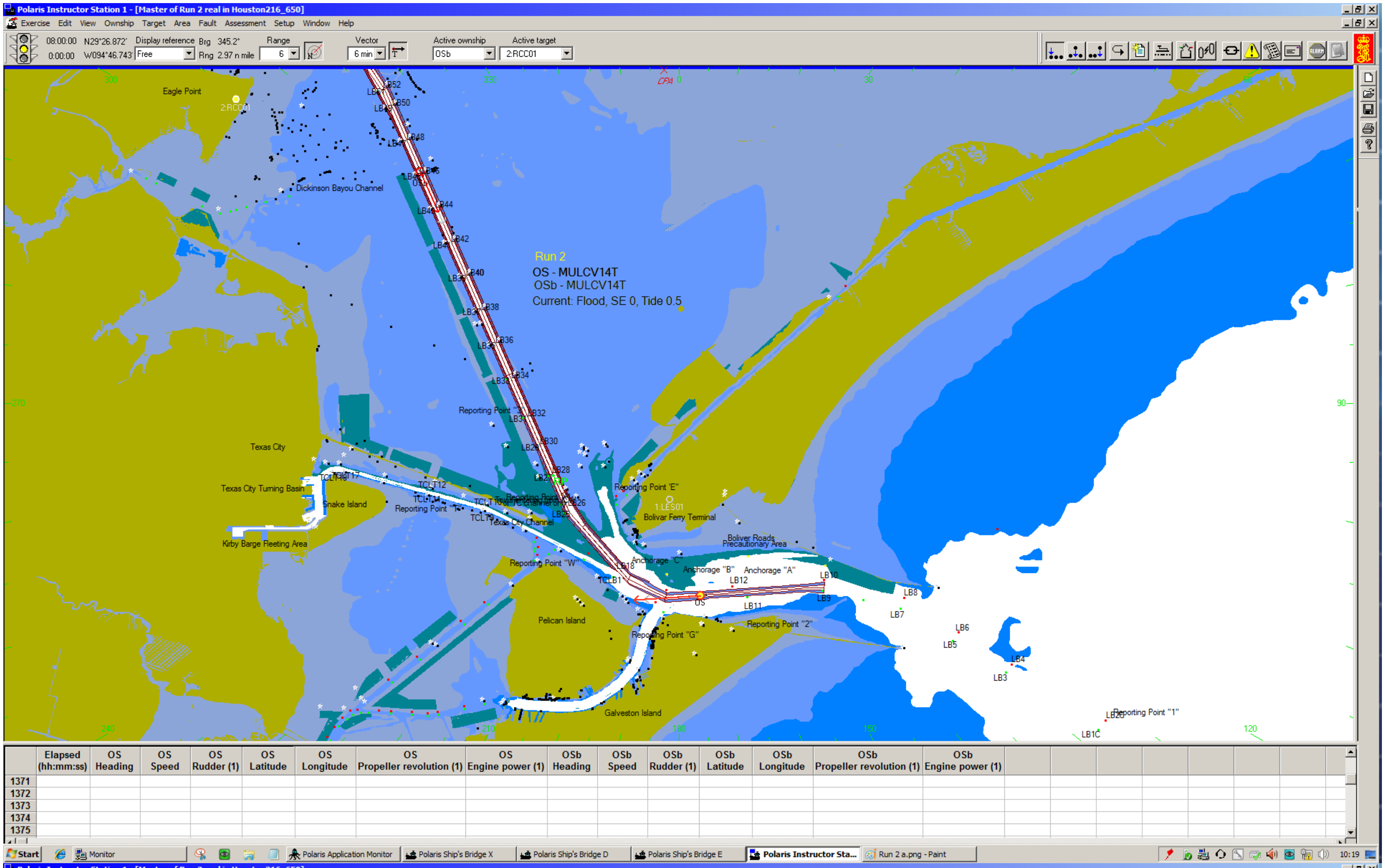
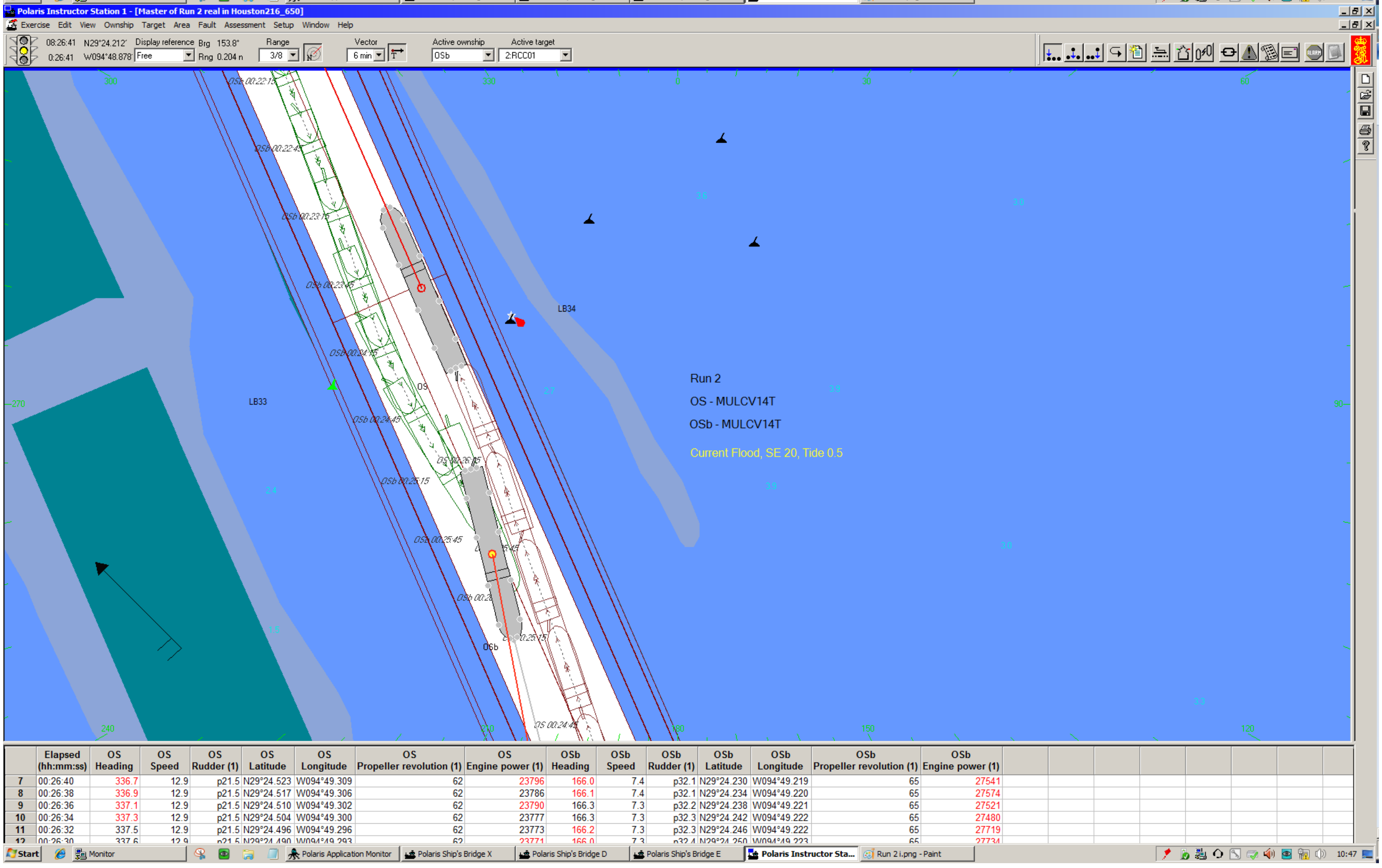


Polaris Instructor Station 1 - [Master of Run 2 real in Houston216_650]

08:00:00 N29°26.872' Display reference: Free Brg 345.2° Rng 2.97 n mile
0:00:00 W094°46.743'
Range: 6
Vector: 6 min
Active ownship: OSb
Active target: 2:RCC01

Run 2
OS - MULCV14T
OSb - MULCV14T
Current: Flood, SE 0, Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
1371															
1372															
1373															
1374															
1375															



Polaris Instructor Station 1 - [Master of Run 2 real in Houston216_650]

08:26:41 N29°24.212' Display reference: Free Brg 153.8° Rng 0.204 n
0:26:41 W094°48.878'
Range: 3/8
Vector: 6 min
Active ownship: OSb
Active target: 2:RCC01

Run 2
OS - MULCV14T
OSb - MULCV14T
Current Flood, SE 20, Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:26:40	336.7	12.9	p21.5	N29°24.523	W094°49.309	62	23796	166.0	7.4	p32.1	N29°24.230	W094°49.219	65	27541
8	00:26:38	336.9	12.9	p21.5	N29°24.517	W094°49.306	62	23786	166.1	7.4	p32.1	N29°24.234	W094°49.220	65	27574
9	00:26:36	337.1	12.9	p21.5	N29°24.510	W094°49.302	62	23790	166.3	7.3	p32.2	N29°24.238	W094°49.221	65	27521
10	00:26:34	337.3	12.9	p21.5	N29°24.504	W094°49.300	62	23777	166.3	7.3	p32.3	N29°24.242	W094°49.222	65	27480
11	00:26:32	337.5	12.9	p21.5	N29°24.496	W094°49.296	62	23773	166.2	7.3	p32.3	N29°24.246	W094°49.222	65	27719
12	00:26:30	337.6	12.9	p21.5	N29°24.490	W094°49.293	62	23771	166.0	7.3	p32.4	N29°24.250	W094°49.223	65	27734

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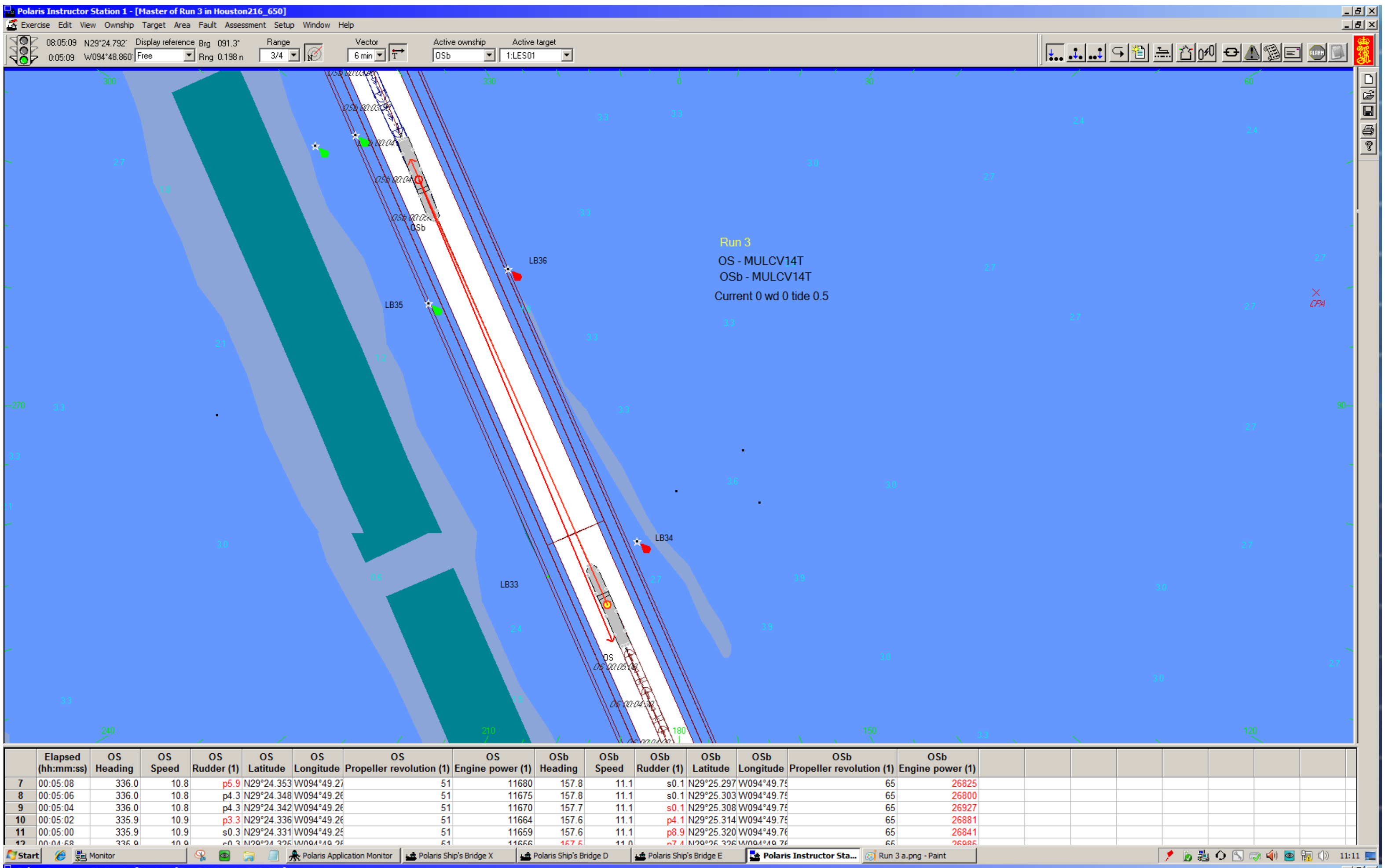
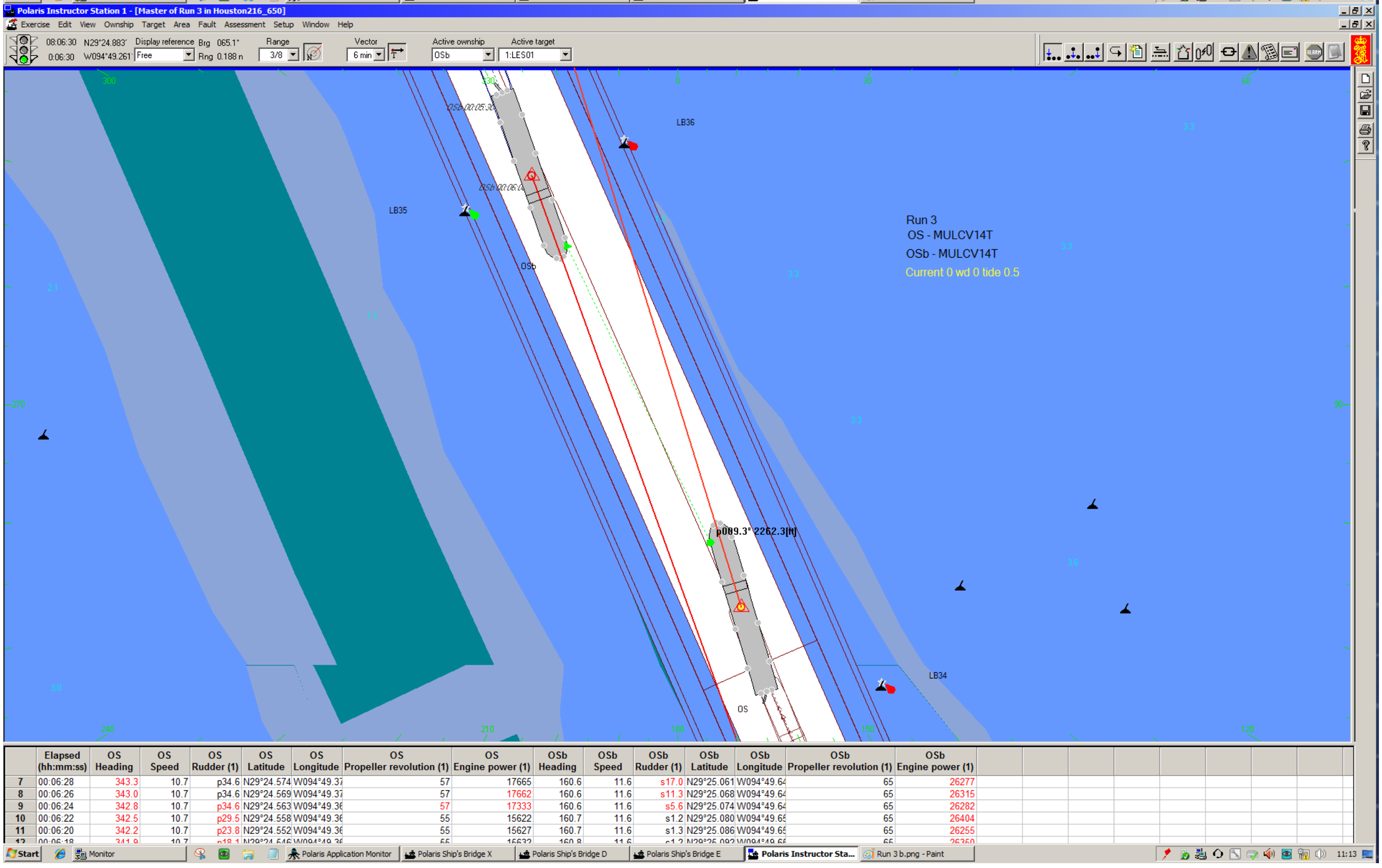
Run 3



Polaris Instructor Station 1 - [Master of Run 3 in Houston216_650]

08:05:09 N29°24.792' Display reference Free Brg 091.3° Range 3/4 Vector 6 min Active ownship OSb Active target 1:LES01
0:05:09 W094°48.860' Rng 0.198 n

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:05:08	336.0	10.8	p5.9	N29°24.353	W094°49.27	51	11680	157.8	11.1	s0.1	N29°25.297	W094°49.75	65	26825
8	00:05:06	336.0	10.8	p4.3	N29°24.348	W094°49.26	51	11675	157.8	11.1	s0.1	N29°25.303	W094°49.75	65	26800
9	00:05:04	336.0	10.8	p4.3	N29°24.342	W094°49.26	51	11670	157.7	11.1	s0.1	N29°25.308	W094°49.75	65	26927
10	00:05:02	335.9	10.9	p3.3	N29°24.336	W094°49.26	51	11664	157.6	11.1	p4.1	N29°25.314	W094°49.75	65	26881
11	00:05:00	335.9	10.9	s0.3	N29°24.331	W094°49.25	51	11659	157.6	11.1	p8.9	N29°25.320	W094°49.76	65	26841



Polaris Instructor Station 1 - [Master of Run 3 in Houston216_650]

08:06:30 N29°24.883' Display reference Free Brg 065.1° Range 3/8 Vector 6 min Active ownship OSb Active target 1:LES01
0:06:30 W094°49.261' Rng 0.188 n

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:06:28	343.3	10.7	p34.6	N29°24.574	W094°49.37	57	17665	160.6	11.6	s17.0	N29°25.061	W094°49.64	65	26277
8	00:06:26	343.0	10.7	p34.6	N29°24.569	W094°49.37	57	17662	160.6	11.6	s11.3	N29°25.068	W094°49.64	65	26315
9	00:06:24	342.8	10.7	p34.6	N29°24.563	W094°49.36	57	17333	160.6	11.6	s5.6	N29°25.074	W094°49.64	65	26282
10	00:06:22	342.5	10.7	p29.5	N29°24.558	W094°49.36	55	15622	160.7	11.6	s1.2	N29°25.080	W094°49.65	65	26404
11	00:06:20	342.2	10.7	p23.8	N29°24.552	W094°49.36	55	15627	160.7	11.6	s1.3	N29°25.086	W094°49.65	65	26255

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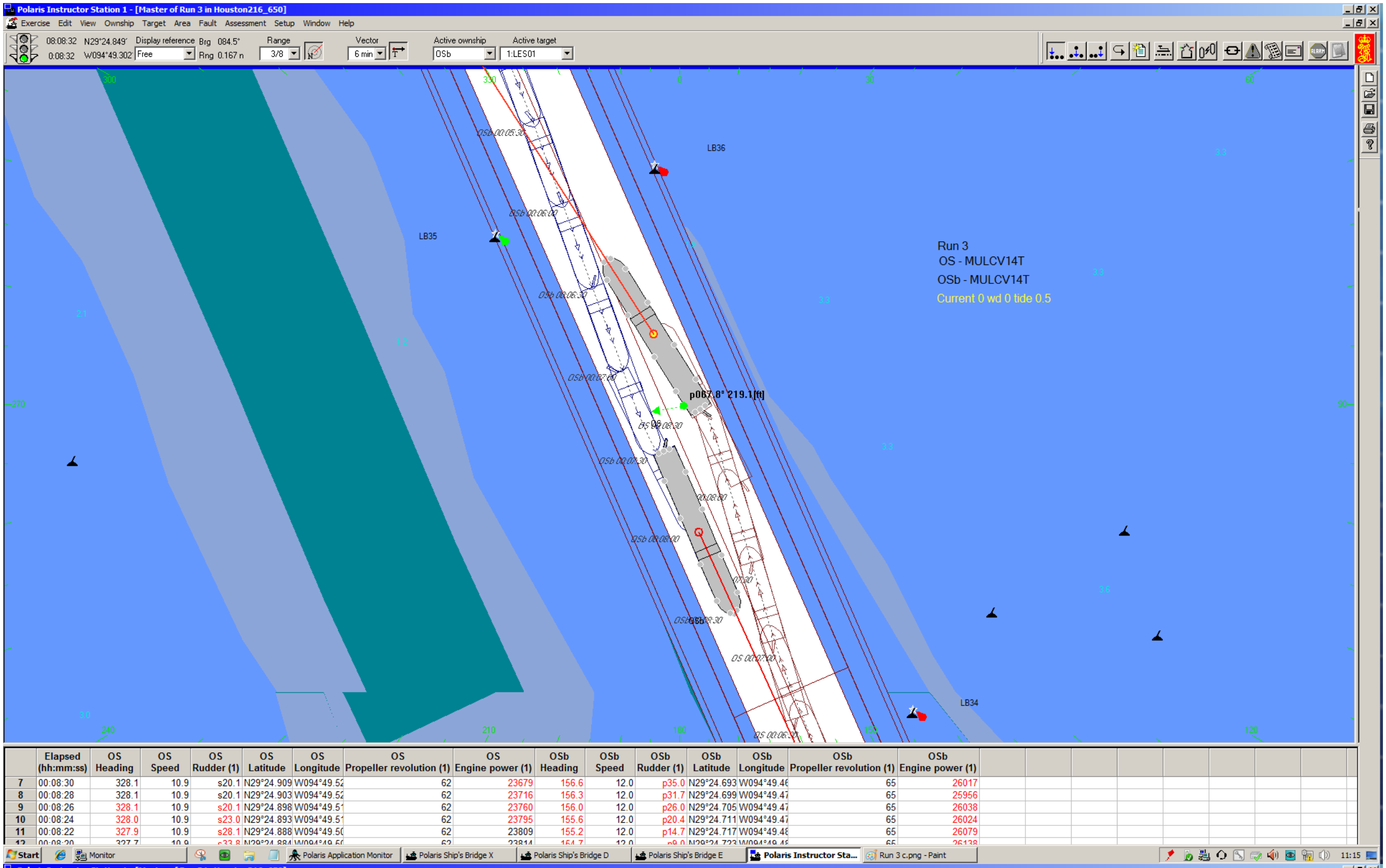
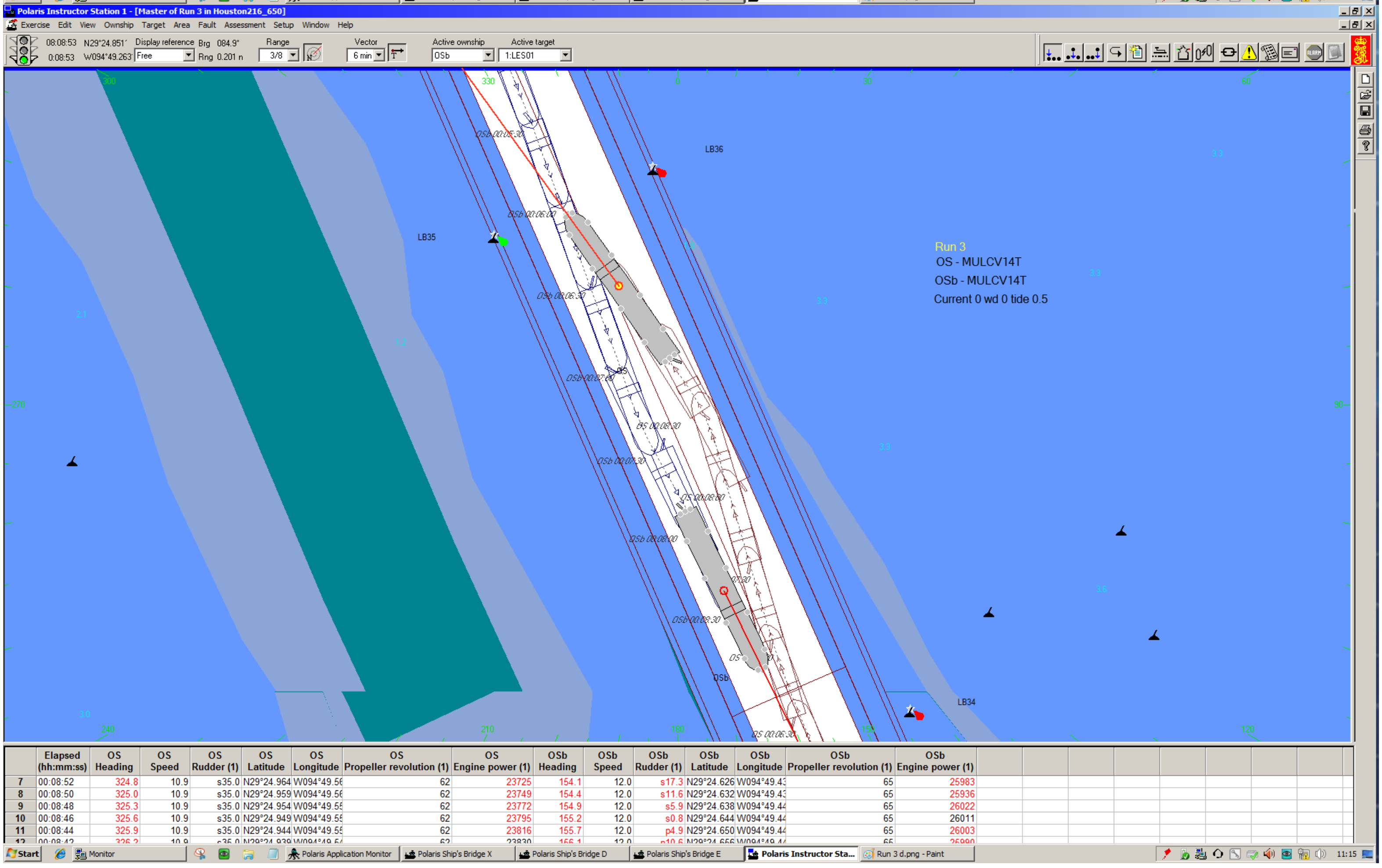


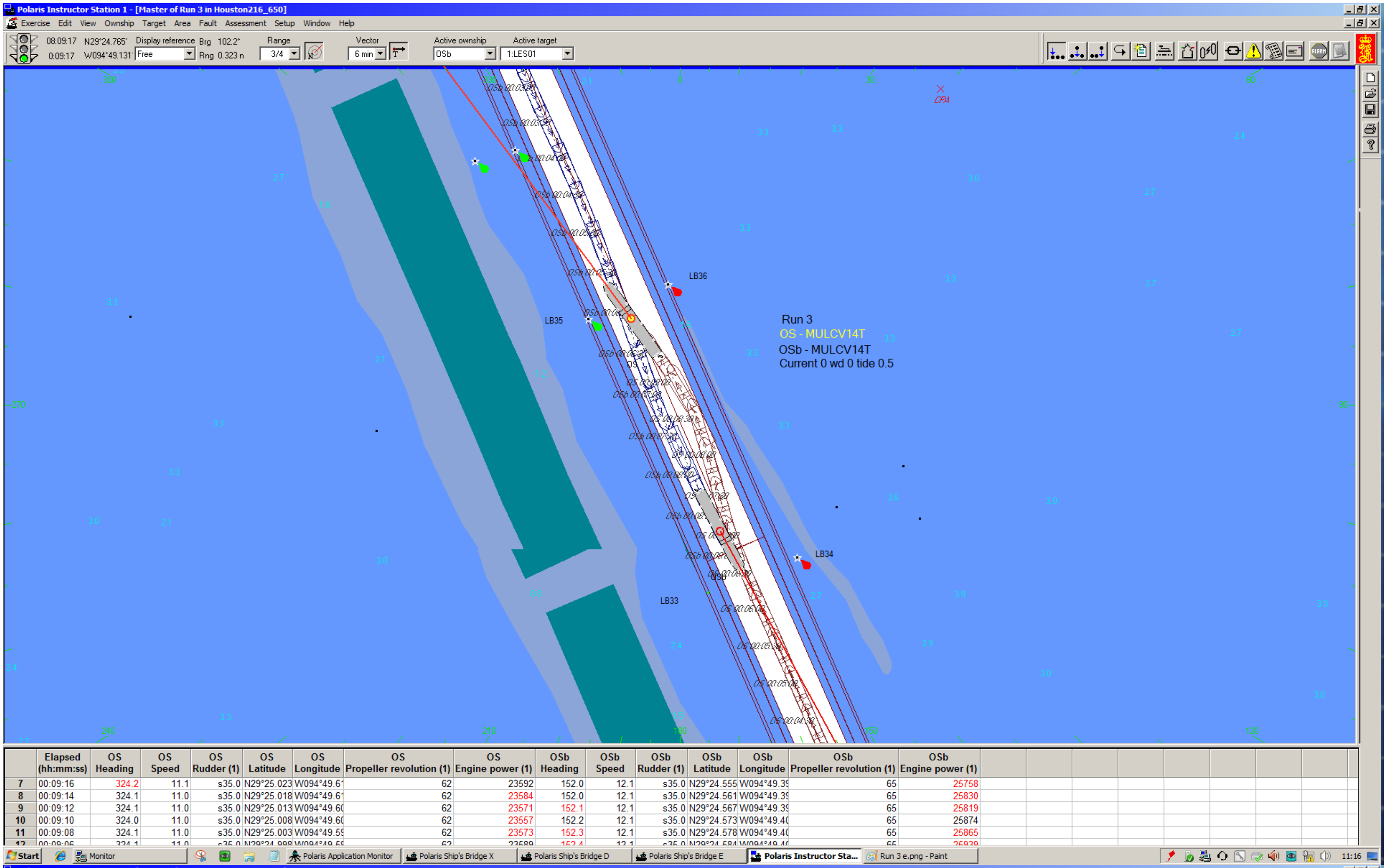
Run 3
OS - MULCV14T
OSb - MULCV14T
Current 0 wd 0 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:08:30	328.1	10.9	s20.1	N29°24.909	W094°49.52	62	23679	156.6	12.0	p35.0	N29°24.693	W094°49.46	65	26017
8	00:08:28	328.1	10.9	s20.1	N29°24.903	W094°49.52	62	23716	156.3	12.0	p31.7	N29°24.699	W094°49.47	65	25956
9	00:08:26	328.1	10.9	s20.1	N29°24.898	W094°49.51	62	23760	156.0	12.0	p26.0	N29°24.705	W094°49.47	65	26038
10	00:08:24	328.0	10.9	s23.0	N29°24.893	W094°49.51	62	23795	155.6	12.0	p20.4	N29°24.711	W094°49.47	65	26024
11	00:08:22	327.9	10.9	s28.1	N29°24.888	W094°49.50	62	23809	155.2	12.0	p14.7	N29°24.717	W094°49.48	65	26079



Run 3
OS - MULCV14T
OSb - MULCV14T
Current 0 wd 0 tide 0.5

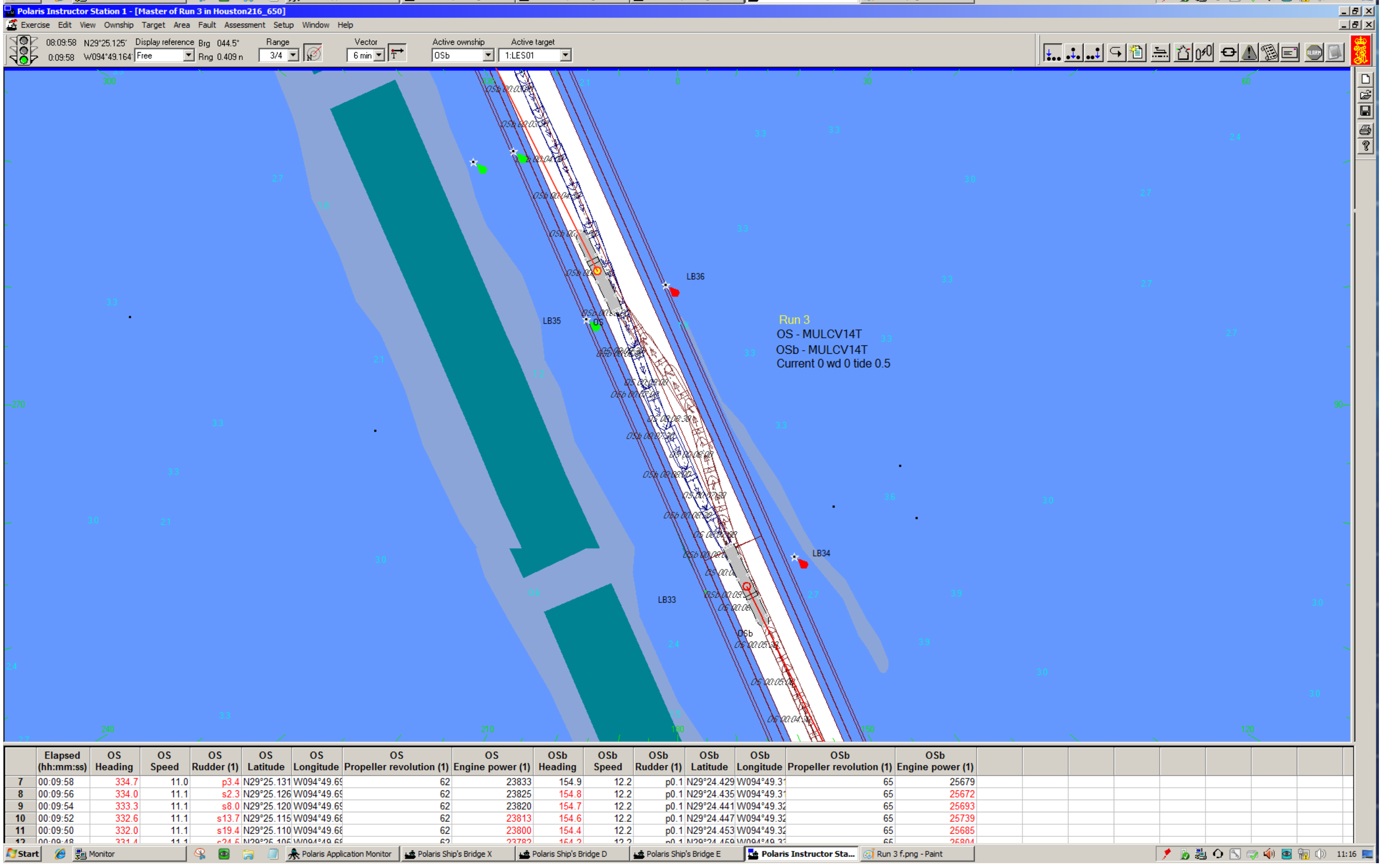
	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:08:52	324.8	10.9	s35.0	N29°24.964	W094°49.56	62	23725	154.1	12.0	s17.3	N29°24.626	W094°49.43	65	25983
8	00:08:50	325.0	10.9	s35.0	N29°24.959	W094°49.56	62	23749	154.4	12.0	s11.6	N29°24.632	W094°49.43	65	25936
9	00:08:48	325.3	10.9	s35.0	N29°24.954	W094°49.55	62	23772	154.9	12.0	s5.9	N29°24.638	W094°49.44	65	26022
10	00:08:46	325.6	10.9	s35.0	N29°24.949	W094°49.55	62	23795	155.2	12.0	s0.8	N29°24.644	W094°49.44	65	26011
11	00:08:44	325.9	10.9	s35.0	N29°24.944	W094°49.55	62	23816	155.7	12.0	p4.9	N29°24.650	W094°49.44	65	26003



08:09:17 N29°24.765′ Display reference: Free Brg 102.2°
0:09:17 W094°49.131′ Rng 0.323 n
Range 3/4
Vector 6 min
Active ownship OSb
Active target 1:LES01

Run 3
OS - MULCV14T
OSb - MULCV14T
Current 0 wd 0 tide 0.5

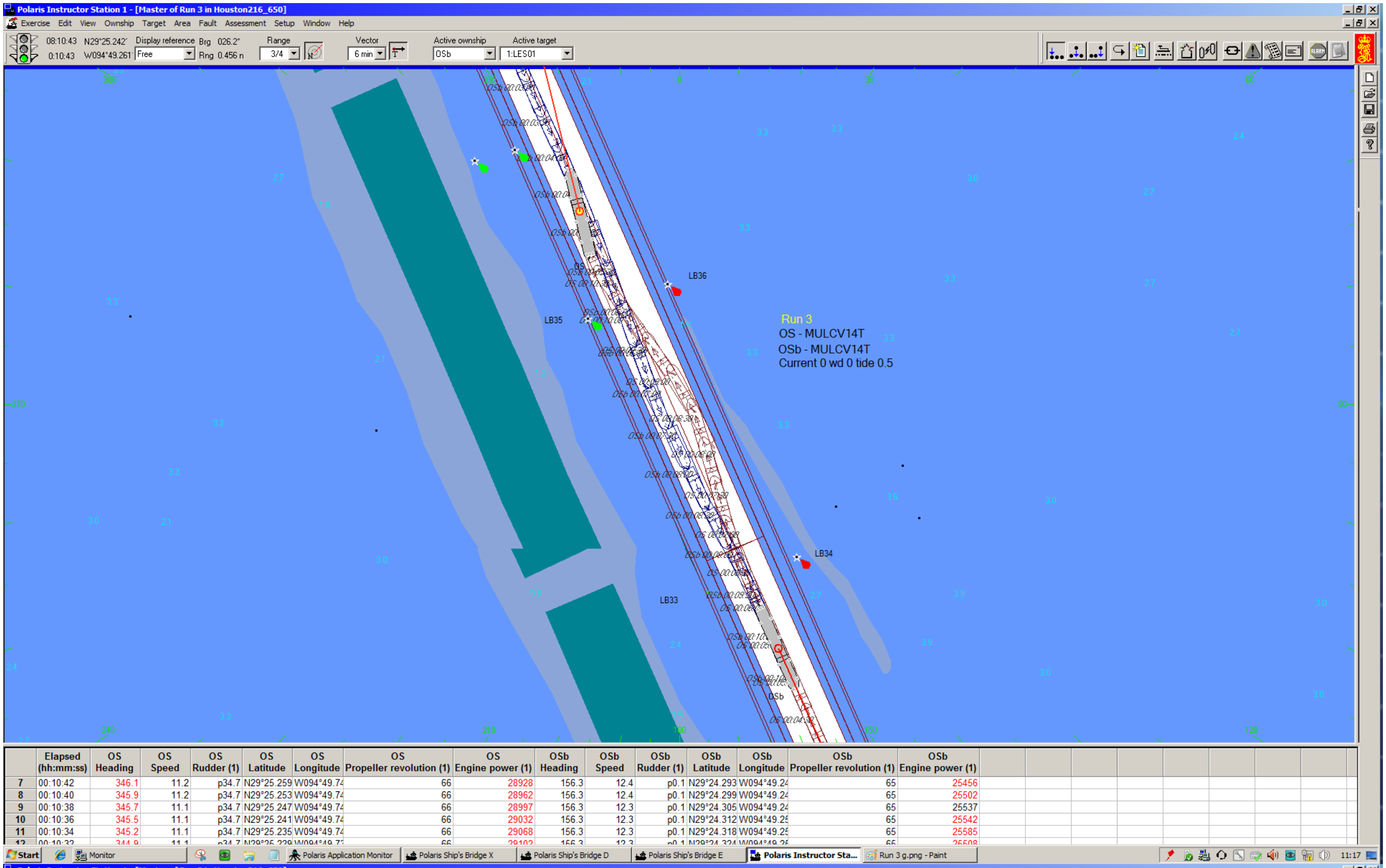
	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:09:16	324.2	11.1	s35.0	N29°25.023	W094°49.6	62	23592	152.0	12.1	s35.0	N29°24.555	W094°49.3	65	25758
8	00:09:14	324.1	11.0	s35.0	N29°25.018	W094°49.6	62	23584	152.0	12.1	s35.0	N29°24.561	W094°49.3	65	25830
9	00:09:12	324.1	11.0	s35.0	N29°25.013	W094°49.6	62	23571	152.1	12.1	s35.0	N29°24.567	W094°49.3	65	25819
10	00:09:10	324.0	11.0	s35.0	N29°25.008	W094°49.6	62	23557	152.2	12.1	s35.0	N29°24.573	W094°49.4	65	25874
11	00:09:08	324.1	11.0	s35.0	N29°25.003	W094°49.5	62	23573	152.3	12.1	s35.0	N29°24.578	W094°49.4	65	25865



08:09:58 N29°25.125′ Display reference: Free Brg 044.5°
0:09:58 W094°49.164′ Rng 0.409 n
Range 3/4
Vector 6 min
Active ownship OSb
Active target 1:LES01

Run 3
OS - MULCV14T
OSb - MULCV14T
Current 0 wd 0 tide 0.5

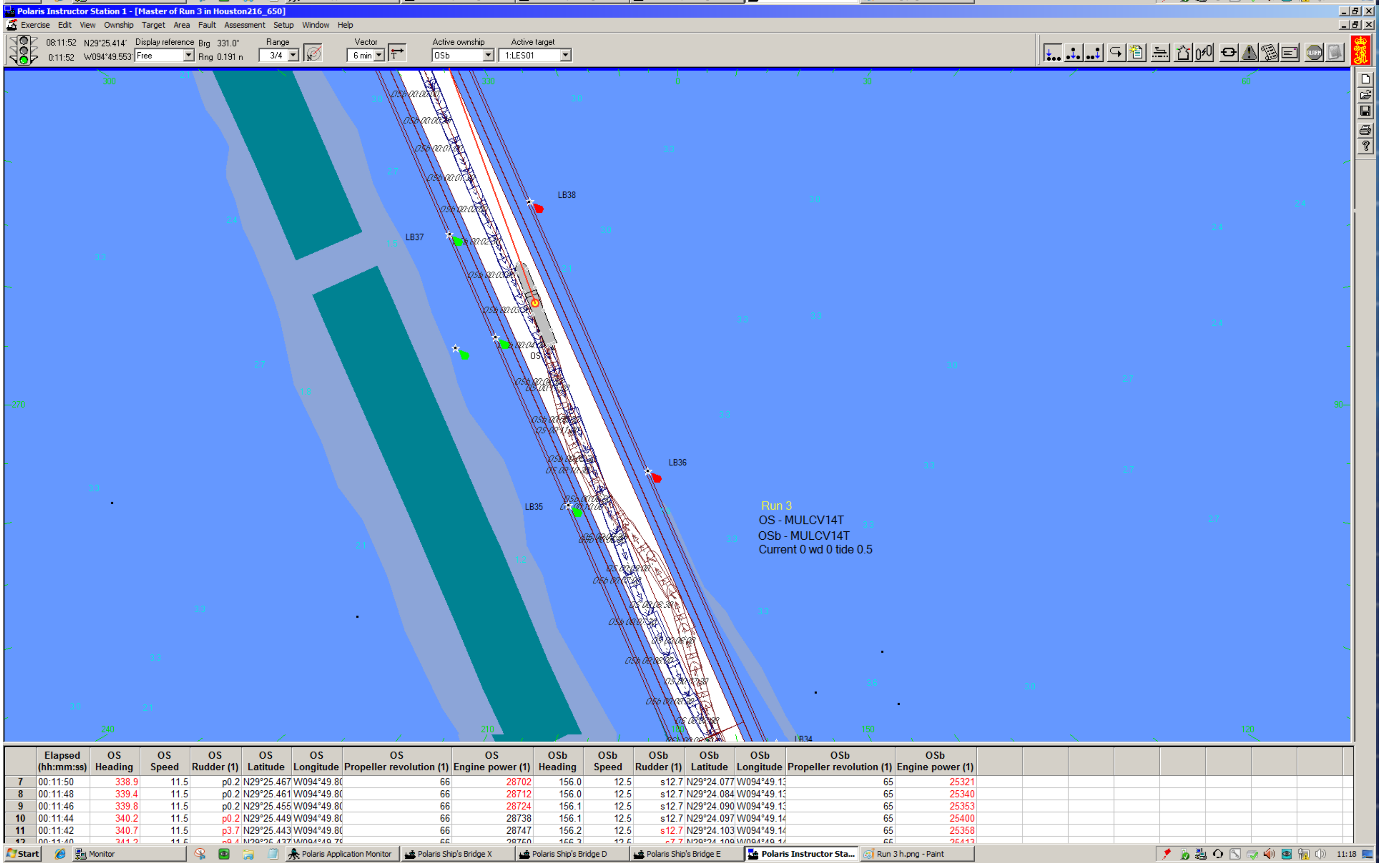
	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:09:58	334.7	11.0	p3.4	N29°25.131	W094°49.6	62	23833	154.9	12.2	p0.1	N29°24.429	W094°49.3	65	25679
8	00:09:56	334.0	11.1	s2.3	N29°25.126	W094°49.6	62	23825	154.8	12.2	p0.1	N29°24.435	W094°49.3	65	25672
9	00:09:54	333.3	11.1	s8.0	N29°25.120	W094°49.6	62	23820	154.7	12.2	p0.1	N29°24.441	W094°49.3	65	25693
10	00:09:52	332.6	11.1	s13.7	N29°25.115	W094°49.6	62	23813	154.6	12.2	p0.1	N29°24.447	W094°49.3	65	25739
11	00:09:50	332.0	11.1	s19.4	N29°25.110	W094°49.6	62	23800	154.4	12.2	p0.1	N29°24.453	W094°49.3	65	25685



Polaris Instructor Station 1 - [Master of Run 3 in Houston216_650]

08:10:43 N29°25.242′ 0:10:43 W094°49.261′ Display reference Free Brg 026.2° Rng 0.456 n Range 3/4 Vector 6 min Active ownship OSb Active target 1:LES01

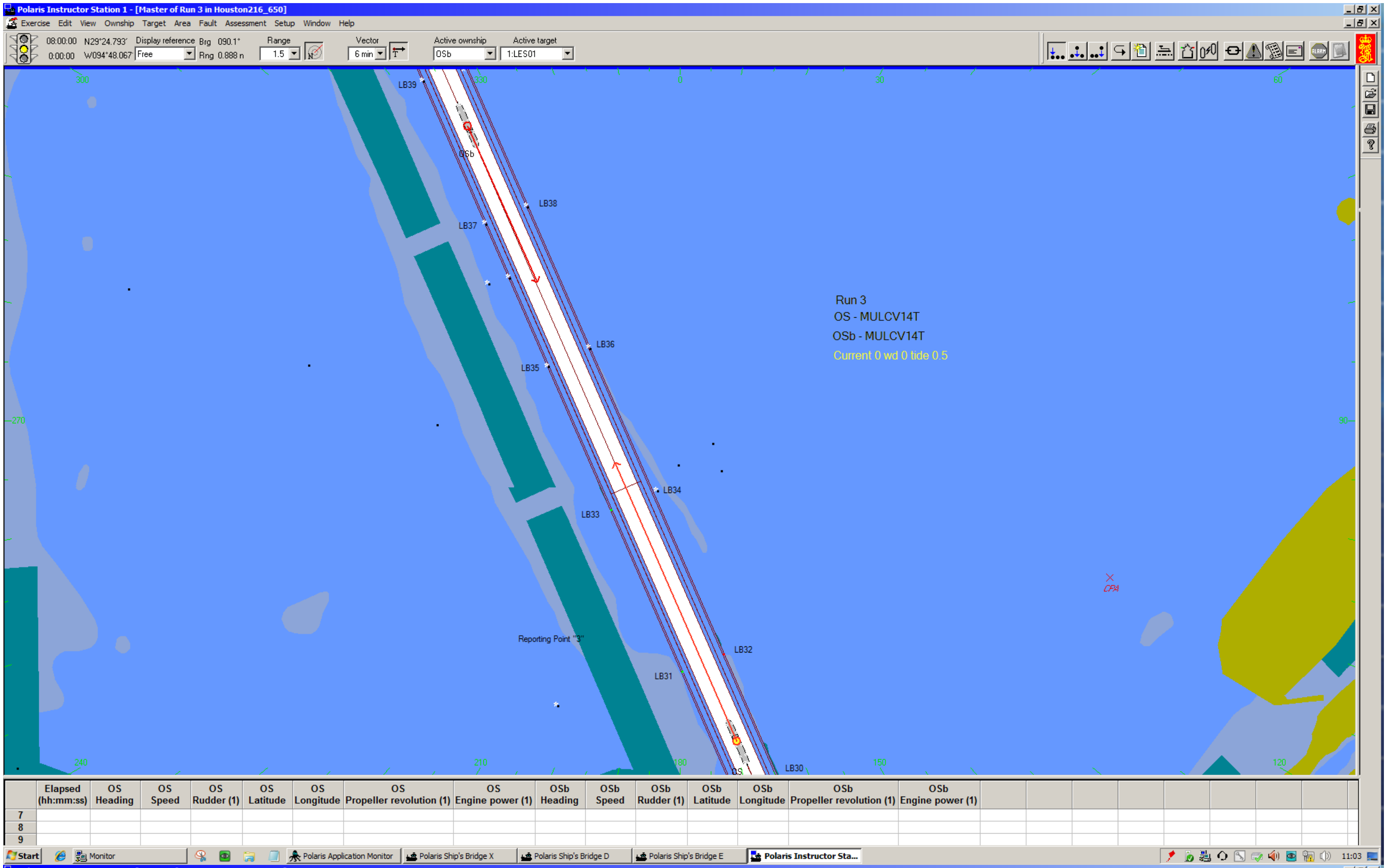
	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:10:42	346.1	11.2	p34.7	N29°25.259	W094°49.74	66	28928	156.3	12.4	p0.1	N29°24.293	W094°49.24	65	25456
8	00:10:40	345.9	11.2	p34.7	N29°25.253	W094°49.74	66	28962	156.3	12.4	p0.1	N29°24.299	W094°49.24	65	25502
9	00:10:38	345.7	11.1	p34.7	N29°25.247	W094°49.74	66	28997	156.3	12.3	p0.1	N29°24.305	W094°49.24	65	25537
10	00:10:36	345.5	11.1	p34.7	N29°25.241	W094°49.74	66	29032	156.3	12.3	p0.1	N29°24.312	W094°49.25	65	25542
11	00:10:34	345.2	11.1	p34.7	N29°25.235	W094°49.74	66	29068	156.3	12.3	p0.1	N29°24.318	W094°49.25	65	25585



Polaris Instructor Station 1 - [Master of Run 3 in Houston216_650]

08:11:52 N29°25.414′ 0:11:52 W094°49.553′ Display reference Free Brg 331.0° Rng 0.191 n Range 3/4 Vector 6 min Active ownship OSb Active target 1:LES01

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:11:50	338.9	11.5	p0.2	N29°25.467	W094°49.80	66	28702	156.0	12.5	s12.7	N29°24.077	W094°49.13	65	25321
8	00:11:48	339.4	11.5	p0.2	N29°25.461	W094°49.80	66	28712	156.0	12.5	s12.7	N29°24.084	W094°49.13	65	25340
9	00:11:46	339.8	11.5	p0.2	N29°25.455	W094°49.80	66	28724	156.1	12.5	s12.7	N29°24.090	W094°49.13	65	25353
10	00:11:44	340.2	11.5	p0.2	N29°25.449	W094°49.80	66	28738	156.1	12.5	s12.7	N29°24.097	W094°49.14	65	25400
11	00:11:42	340.7	11.5	p3.7	N29°25.443	W094°49.80	66	28747	156.2	12.5	s12.7	N29°24.103	W094°49.14	65	25358



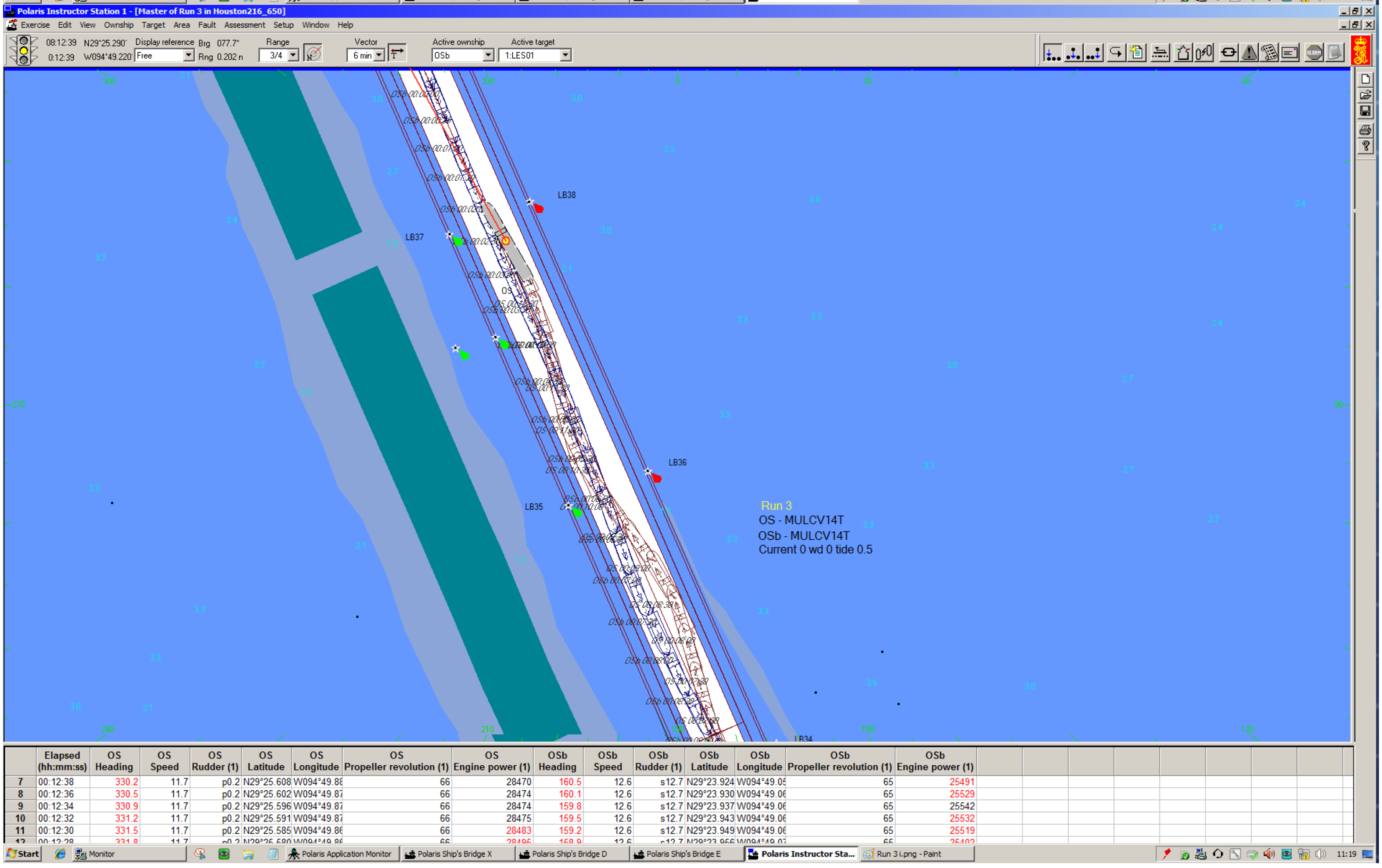
Polaris Instructor Station 1 - [Master of Run 3 in Houston216_650]

08:00:00 N29°24.793′ Display reference: Free Brg 090.1° Rng 0.888 n Range 1.5 Vector 6 min Active ownship OSb Active target 1:LES01

0:00:00 W094°48.067′

Run 3
OS - MULCV14T
OSb - MULCV14T
Current 0 wd 0 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7															
8															
9															



Polaris Instructor Station 1 - [Master of Run 3 in Houston216_650]

08:12:39 N29°25.290′ Display reference: Free Brg 077.7° Rng 0.202 n Range 3/4 Vector 6 min Active ownship OSb Active target 1:LES01

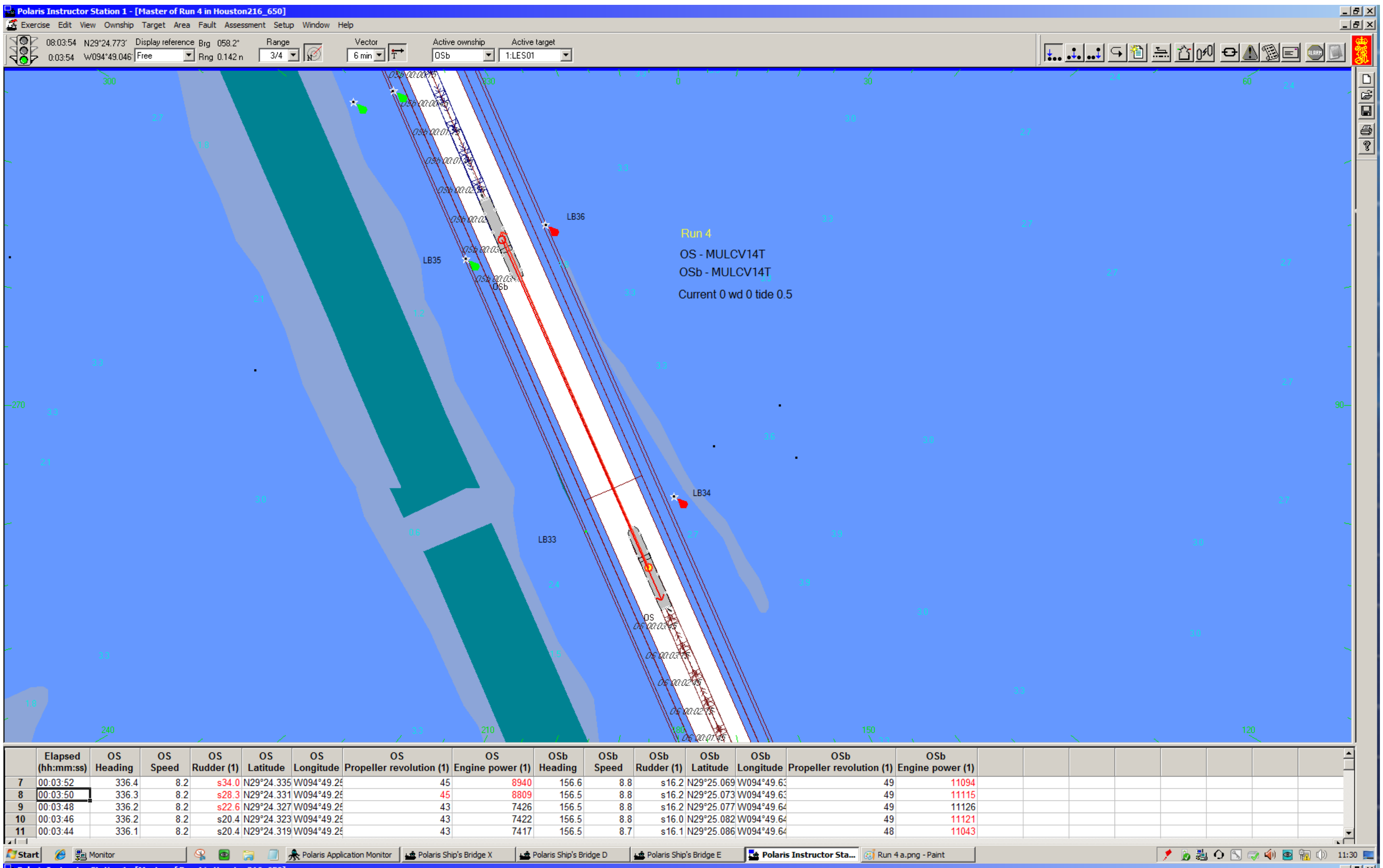
0:12:39 W094°49.220′

Run 3
OS - MULCV14T
OSb - MULCV14T
Current 0 wd 0 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:12:38	330.2	11.7	p0.2	N29°25.608	W094°49.88	66	28470	160.5	12.6	s12.7	N29°23.924	W094°49.05	65	25491
8	00:12:36	330.5	11.7	p0.2	N29°25.602	W094°49.87	66	28474	160.1	12.6	s12.7	N29°23.930	W094°49.06	65	25529
9	00:12:34	330.9	11.7	p0.2	N29°25.596	W094°49.87	66	28474	159.8	12.6	s12.7	N29°23.937	W094°49.06	65	25542
10	00:12:32	331.2	11.7	p0.2	N29°25.591	W094°49.87	66	28475	159.5	12.6	s12.7	N29°23.943	W094°49.06	65	25532
11	00:12:30	331.5	11.7	p0.2	N29°25.585	W094°49.86	66	28483	159.2	12.6	s12.7	N29°23.949	W094°49.06	65	25519

June 26, 2019

Run 4



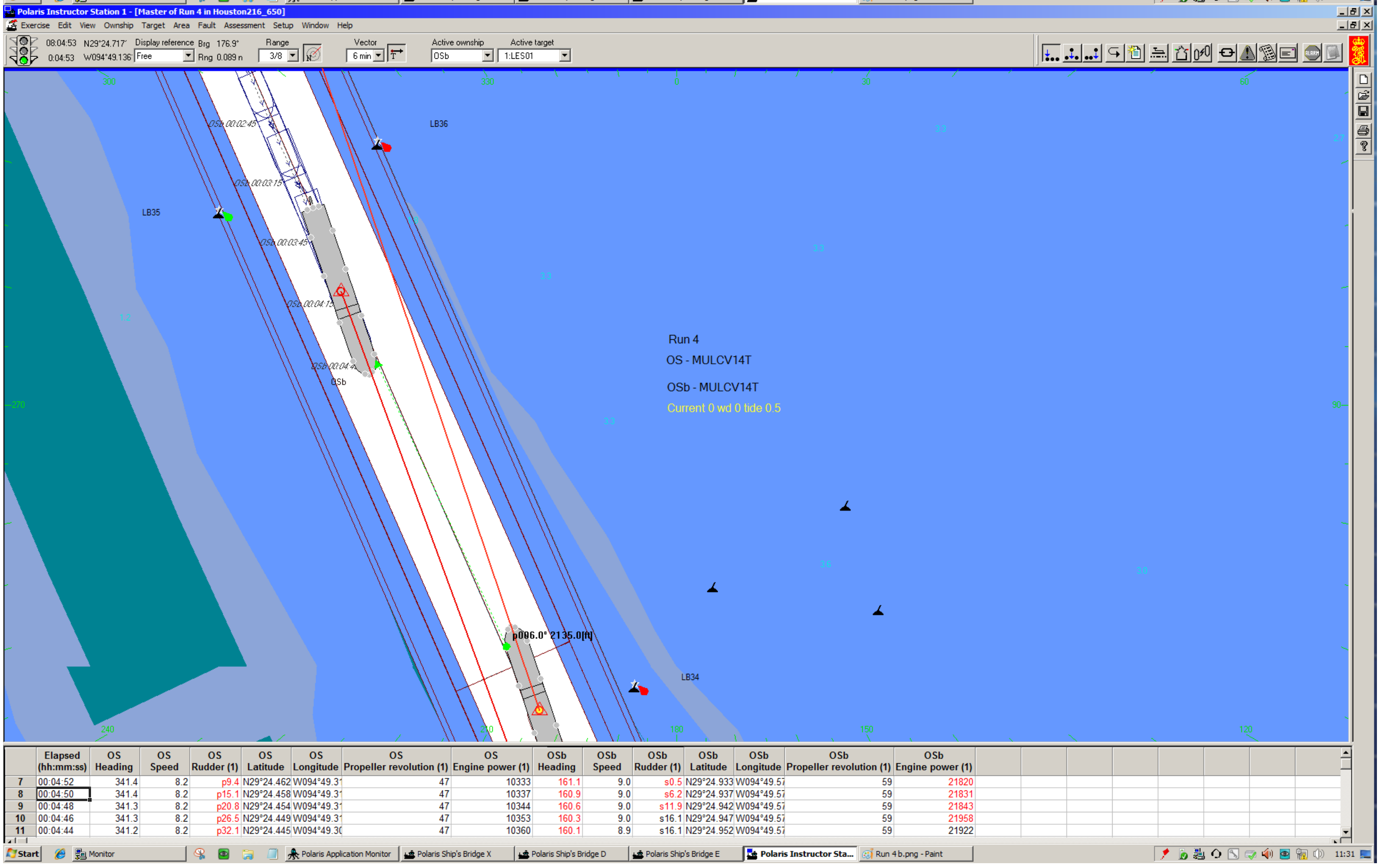
Run 4

OS - MULCV14T

OSb - MULCV14T

Current 0 wd 0 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:03:52	336.4	8.2	s34.0	N29°24.335	W094°49.25	45	8940	156.6	8.8	s16.2	N29°25.069	W094°49.63	49	11094
8	00:03:50	336.3	8.2	s28.3	N29°24.331	W094°49.25	45	8809	156.5	8.8	s16.2	N29°25.073	W094°49.63	49	11115
9	00:03:48	336.2	8.2	s22.6	N29°24.327	W094°49.25	43	7426	156.5	8.8	s16.2	N29°25.077	W094°49.64	49	11126
10	00:03:46	336.2	8.2	s20.4	N29°24.323	W094°49.25	43	7422	156.5	8.8	s16.0	N29°25.082	W094°49.64	49	11121
11	00:03:44	336.1	8.2	s20.4	N29°24.319	W094°49.25	43	7417	156.5	8.7	s16.1	N29°25.086	W094°49.64	48	11043



Run 4

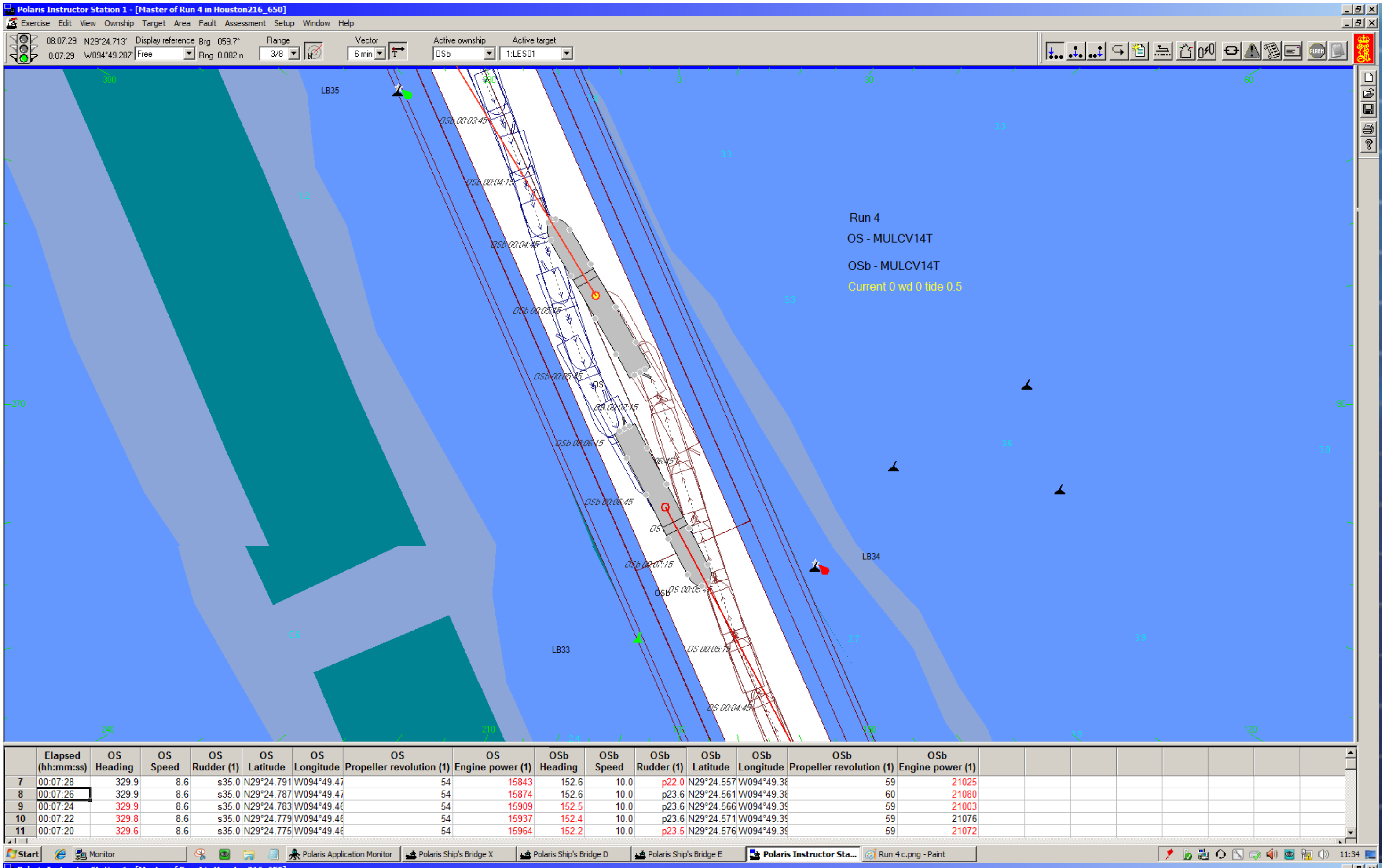
OS - MULCV14T

OSb - MULCV14T

Current 0 wd 0 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:04:52	341.4	8.2	p9.4	N29°24.462	W094°49.31	47	10333	161.1	9.0	s0.5	N29°24.933	W094°49.57	59	21820
8	00:04:50	341.4	8.2	p15.1	N29°24.458	W094°49.31	47	10337	160.9	9.0	s6.2	N29°24.937	W094°49.57	59	21831
9	00:04:48	341.3	8.2	p20.8	N29°24.454	W094°49.31	47	10344	160.6	9.0	s11.9	N29°24.942	W094°49.57	59	21843
10	00:04:46	341.3	8.2	p26.5	N29°24.449	W094°49.31	47	10353	160.3	9.0	s16.1	N29°24.947	W094°49.57	59	21958
11	00:04:44	341.2	8.2	p32.1	N29°24.445	W094°49.30	47	10360	160.1	8.9	s16.1	N29°24.952	W094°49.57	59	21922

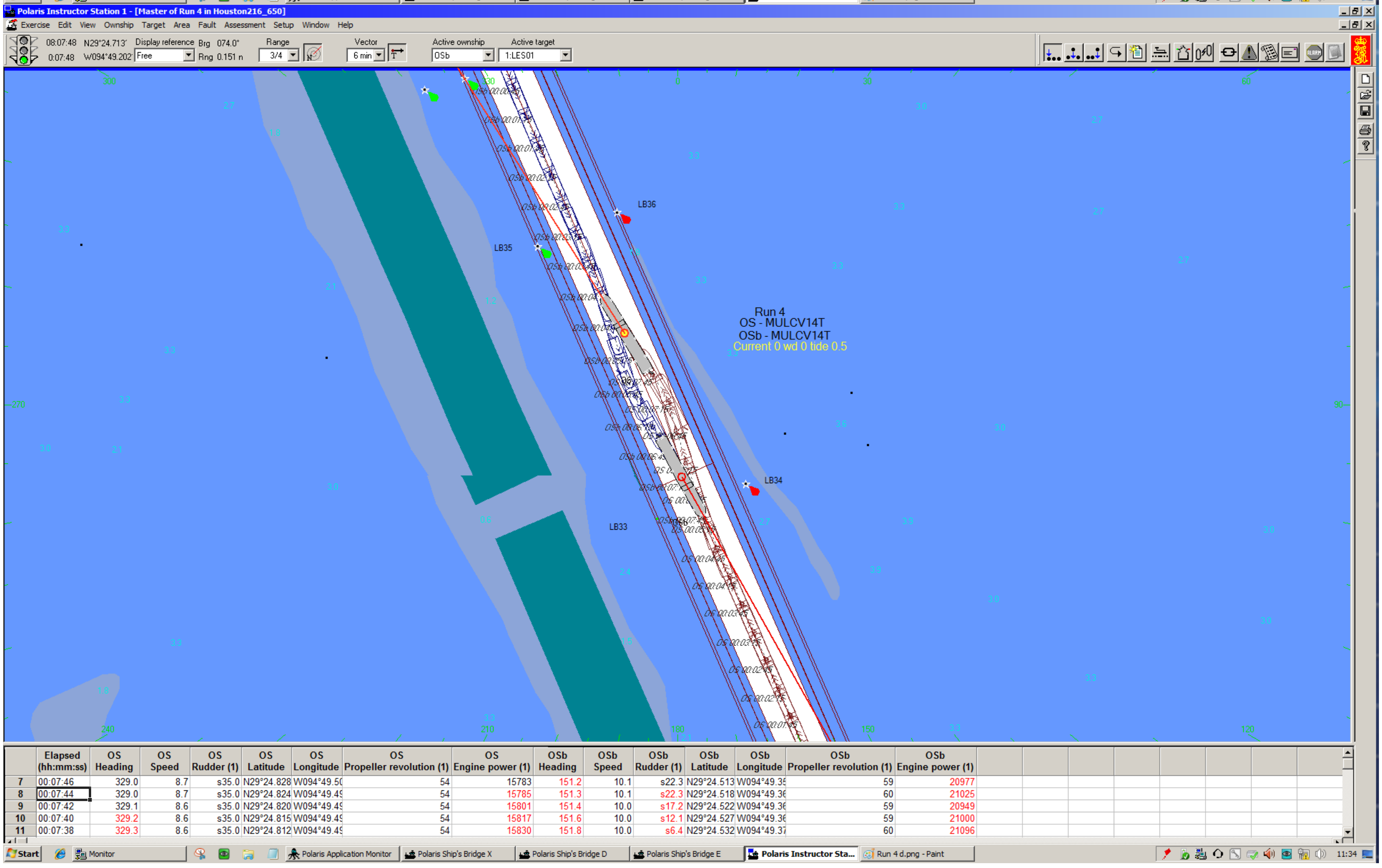
June 26, 2019



Polaris Instructor Station 1 - [Master of Run 4 in Houston216_650]

08:07:29 N29°24.713' Display reference Free Brg 059.7° Rng 0.082 n
0:07:29 W094°49.287'
Range 3/8
Vector 6 min
Active ownship OSb
Active target 1:LES01

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:07:28	329.9	8.6	s35.0	N29°24.791	W094°49.47	54	15843	152.6	10.0	p22.0	N29°24.557	W094°49.38	59	21025
8	00:07:26	329.9	8.6	s35.0	N29°24.787	W094°49.47	54	15874	152.6	10.0	p23.6	N29°24.561	W094°49.38	60	21080
9	00:07:24	329.9	8.6	s35.0	N29°24.783	W094°49.46	54	15909	152.5	10.0	p23.6	N29°24.566	W094°49.3	59	21003
10	00:07:22	329.8	8.6	s35.0	N29°24.779	W094°49.46	54	15937	152.4	10.0	p23.6	N29°24.571	W094°49.3	59	21076
11	00:07:20	329.6	8.6	s35.0	N29°24.775	W094°49.46	54	15964	152.2	10.0	p23.5	N29°24.576	W094°49.3	59	21072

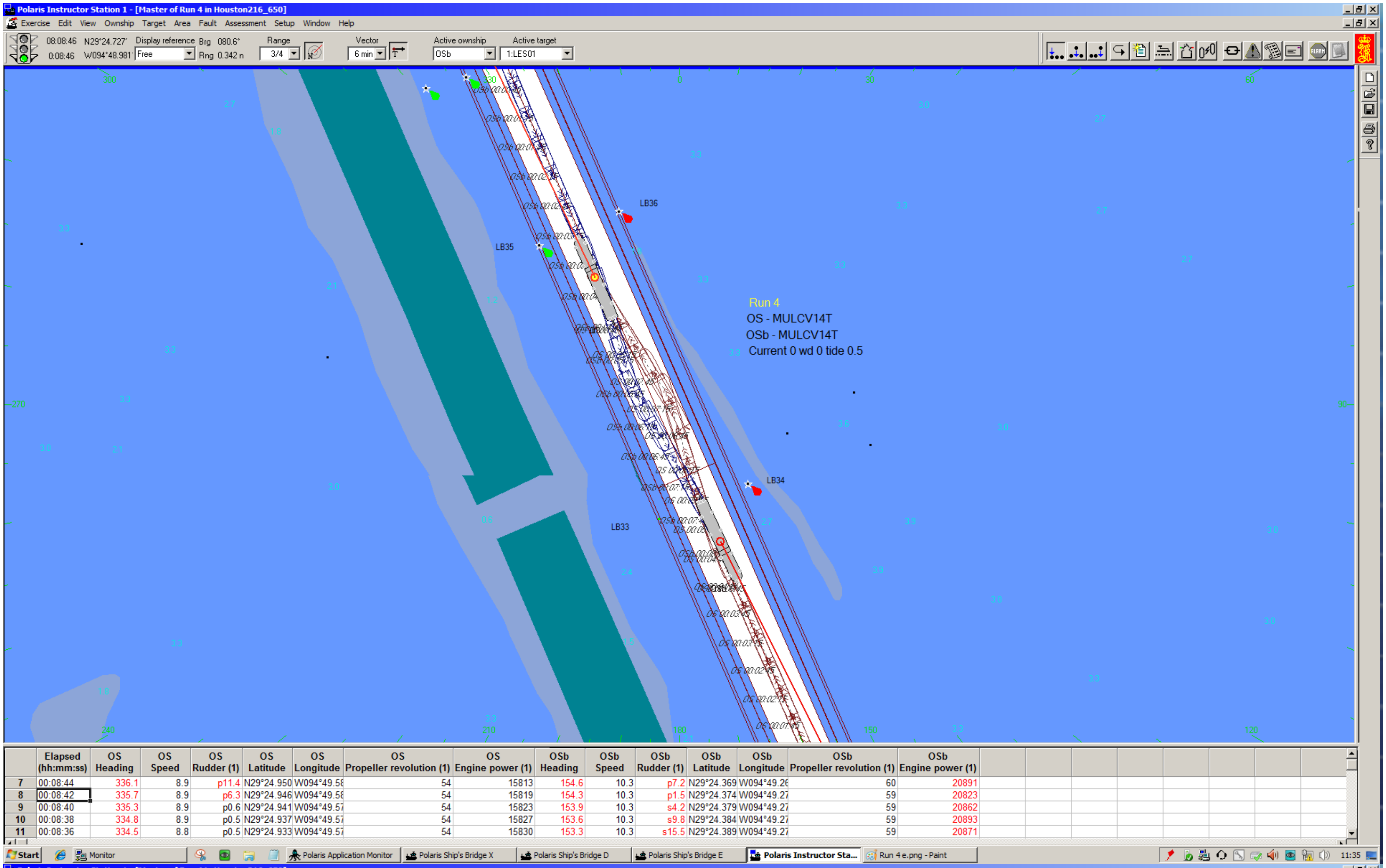


Polaris Instructor Station 1 - [Master of Run 4 in Houston216_650]

08:07:48 N29°24.713' Display reference Free Brg 074.0° Rng 0.151 n
0:07:48 W094°49.202'
Range 3/4
Vector 6 min
Active ownship OSb
Active target 1:LES01

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:07:46	329.0	8.7	s35.0	N29°24.828	W094°49.5	54	15783	151.2	10.1	s22.3	N29°24.513	W094°49.35	59	20977
8	00:07:44	329.0	8.7	s35.0	N29°24.824	W094°49.4	54	15785	151.3	10.1	s22.3	N29°24.518	W094°49.36	60	21025
9	00:07:42	329.1	8.6	s35.0	N29°24.820	W094°49.4	54	15801	151.4	10.0	s17.2	N29°24.522	W094°49.36	59	20949
10	00:07:40	329.2	8.6	s35.0	N29°24.815	W094°49.4	54	15817	151.6	10.0	s12.1	N29°24.527	W094°49.36	59	21000
11	00:07:38	329.3	8.6	s35.0	N29°24.812	W094°49.4	54	15830	151.8	10.0	s6.4	N29°24.532	W094°49.37	60	21096

June 26, 2019

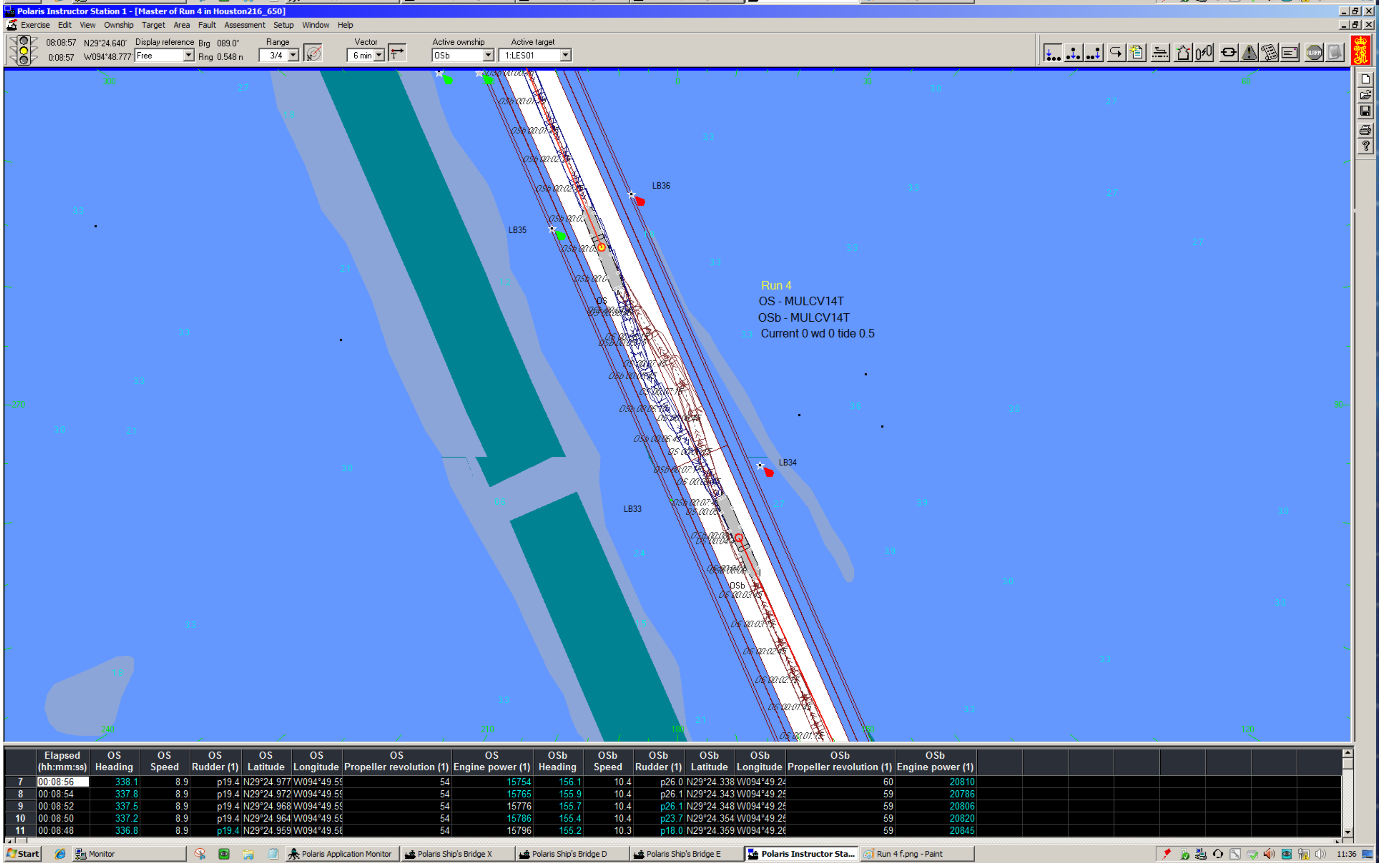


Polaris Instructor Station 1 - [Master of Run 4 in Houston216_650]

08:08:46 N29°24.727′ 0:08:46 W094°48.981′ Display reference Free Brg 080.6° Rng 0.342 n Range 3/4 Vector 6 min Active ownship OSb Active target 1:LES01

Run 4
OS - MULCV14T
OSb - MULCV14T
Current 0 wd 0 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:08:44	336.1	8.9	p11.4	N29°24.950	W094°49.58	54	15813	154.6	10.3	p7.2	N29°24.369	W094°49.26	60	20891
8	00:08:42	335.7	8.9	p6.3	N29°24.946	W094°49.58	54	15819	154.3	10.3	p1.5	N29°24.374	W094°49.27	59	20823
9	00:08:40	335.3	8.9	p0.6	N29°24.941	W094°49.57	54	15823	153.9	10.3	s4.2	N29°24.379	W094°49.27	59	20862
10	00:08:38	334.8	8.9	p0.5	N29°24.937	W094°49.57	54	15827	153.6	10.3	s9.8	N29°24.384	W094°49.27	59	20893
11	00:08:36	334.5	8.8	p0.5	N29°24.933	W094°49.57	54	15830	153.3	10.3	s15.5	N29°24.389	W094°49.27	59	20871



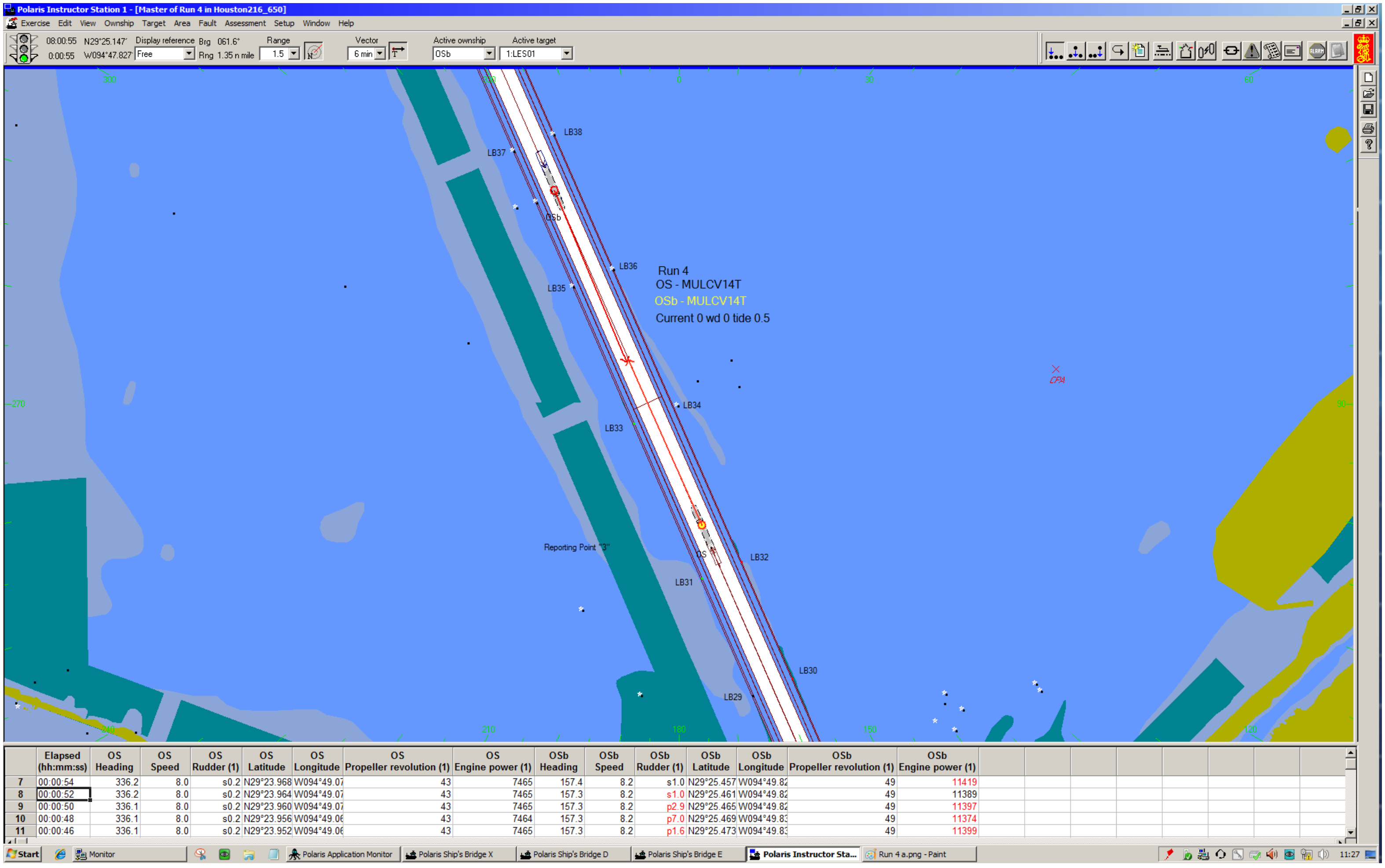
Polaris Instructor Station 1 - [Master of Run 4 in Houston216_650]

08:08:57 N29°24.640′ 0:08:57 W094°48.777′ Display reference Free Brg 089.0° Rng 0.548 n Range 3/4 Vector 6 min Active ownship OSb Active target 1:LES01

Run 4
OS - MULCV14T
OSb - MULCV14T
Current 0 wd 0 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:08:56	338.1	8.9	p19.4	N29°24.977	W094°49.59	54	15754	156.1	10.4	p26.0	N29°24.338	W094°49.24	60	20810
8	00:08:54	337.8	8.9	p19.4	N29°24.972	W094°49.59	54	15765	155.9	10.4	p26.1	N29°24.343	W094°49.25	59	20786
9	00:08:52	337.5	8.9	p19.4	N29°24.968	W094°49.59	54	15776	155.7	10.4	p26.1	N29°24.348	W094°49.25	59	20806
10	00:08:50	337.2	8.9	p19.4	N29°24.964	W094°49.59	54	15786	155.4	10.4	p23.7	N29°24.354	W094°49.25	59	20820
11	00:08:48	336.8	8.9	p19.4	N29°24.959	W094°49.58	54	15796	155.2	10.3	p18.0	N29°24.359	W094°49.26	59	20845

June 26, 2019



Polaris Instructor Station 1 - [Master of Run 4 in Houston216_650]

08:00:55 N29°25.147′
0:00:55 W094°47.827′
Display reference: Free
Brg 061.6°
Rng 1.35 n mile
Range: 1.5
Vector: 6 min
Active ownship: OSb
Active target: 1:LES01

Run 4
OS - MULCV14T
OSb - MULCV14T
Current 0 wd 0 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:00:54	336.2	8.0	s0.2	N29°23.968	W094°49.07	43	7465	157.4	8.2	s1.0	N29°25.457	W094°49.82	49	11419
8	00:00:52	336.2	8.0	s0.2	N29°23.964	W094°49.07	43	7465	157.3	8.2	s1.0	N29°25.461	W094°49.82	49	11389
9	00:00:50	336.1	8.0	s0.2	N29°23.960	W094°49.07	43	7465	157.3	8.2	p2.9	N29°25.465	W094°49.82	49	11397
10	00:00:48	336.1	8.0	s0.2	N29°23.956	W094°49.06	43	7464	157.3	8.2	p7.0	N29°25.469	W094°49.83	49	11374
11	00:00:46	336.1	8.0	s0.2	N29°23.952	W094°49.06	43	7465	157.3	8.2	p1.6	N29°25.473	W094°49.83	49	11399

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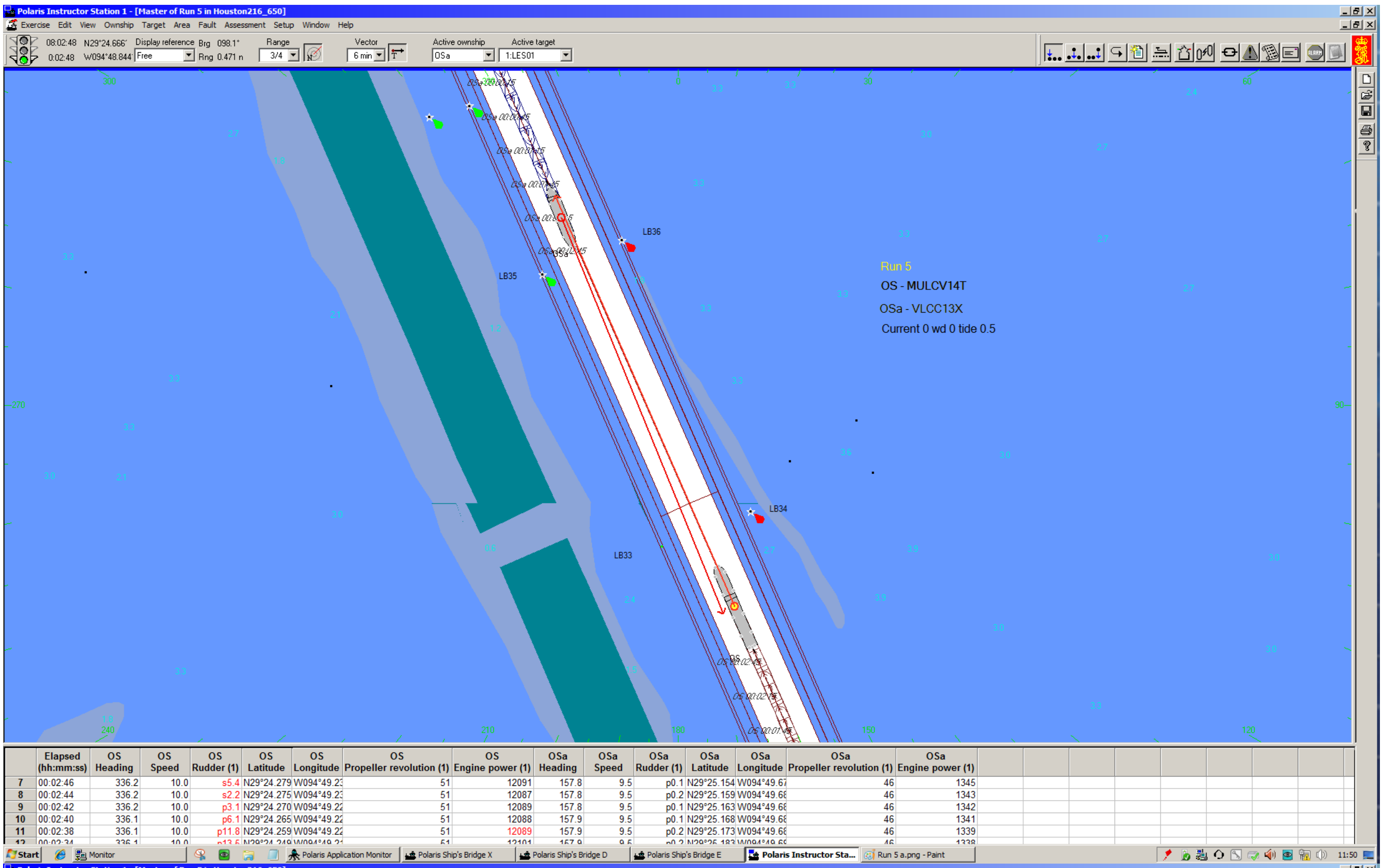
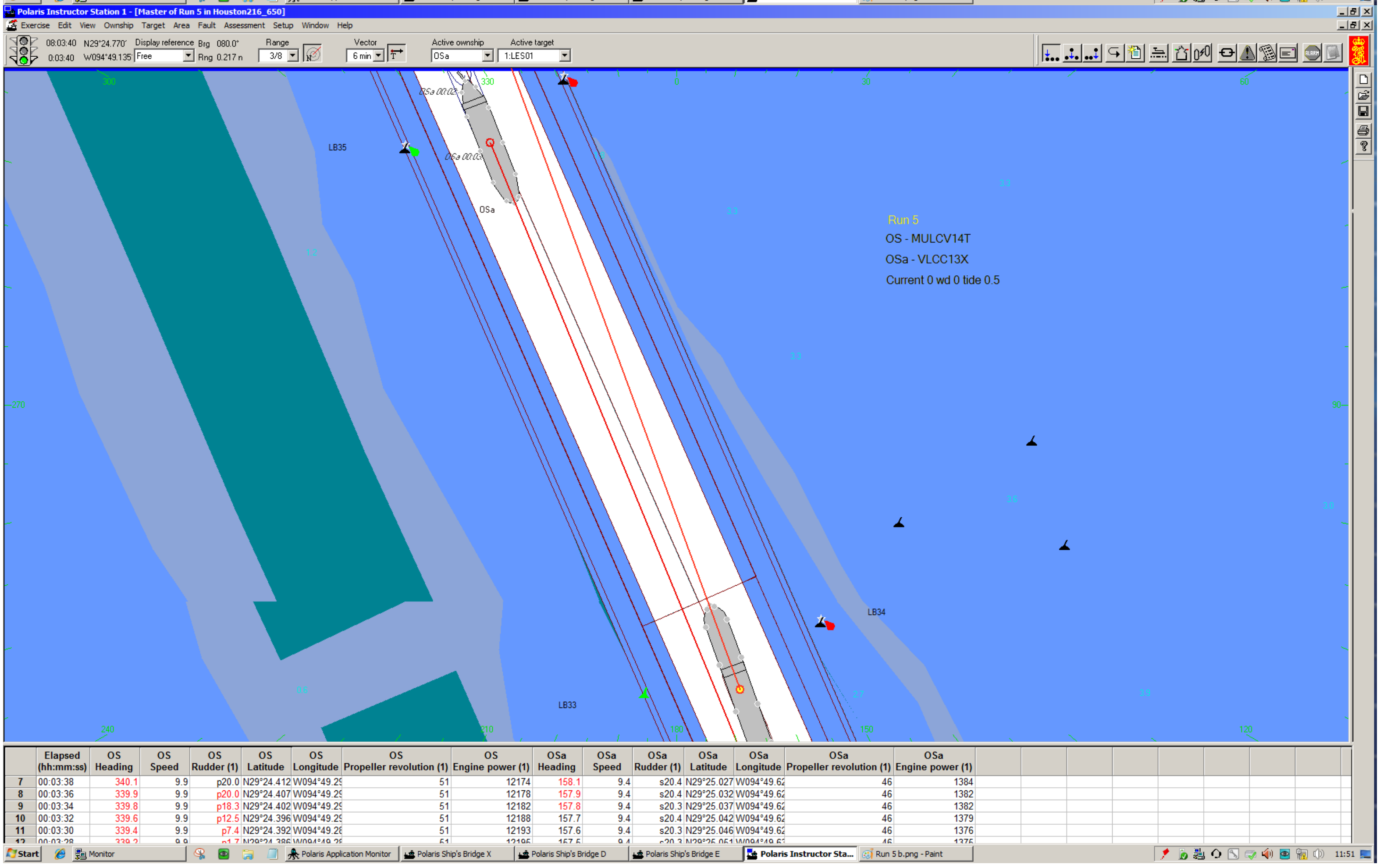
Run 5



08:02:48 N29°24.666' Display reference Free Brg 098.1° Rng 0.471 n
0:02:48 W094°48.844'
Range 3/4
Vector 6 min
Active ownship OSa
Active target 1:LES01

Run 5
OS - MULCV14T
OSa - VLCC13X
Current 0 wd 0 tide 0.5

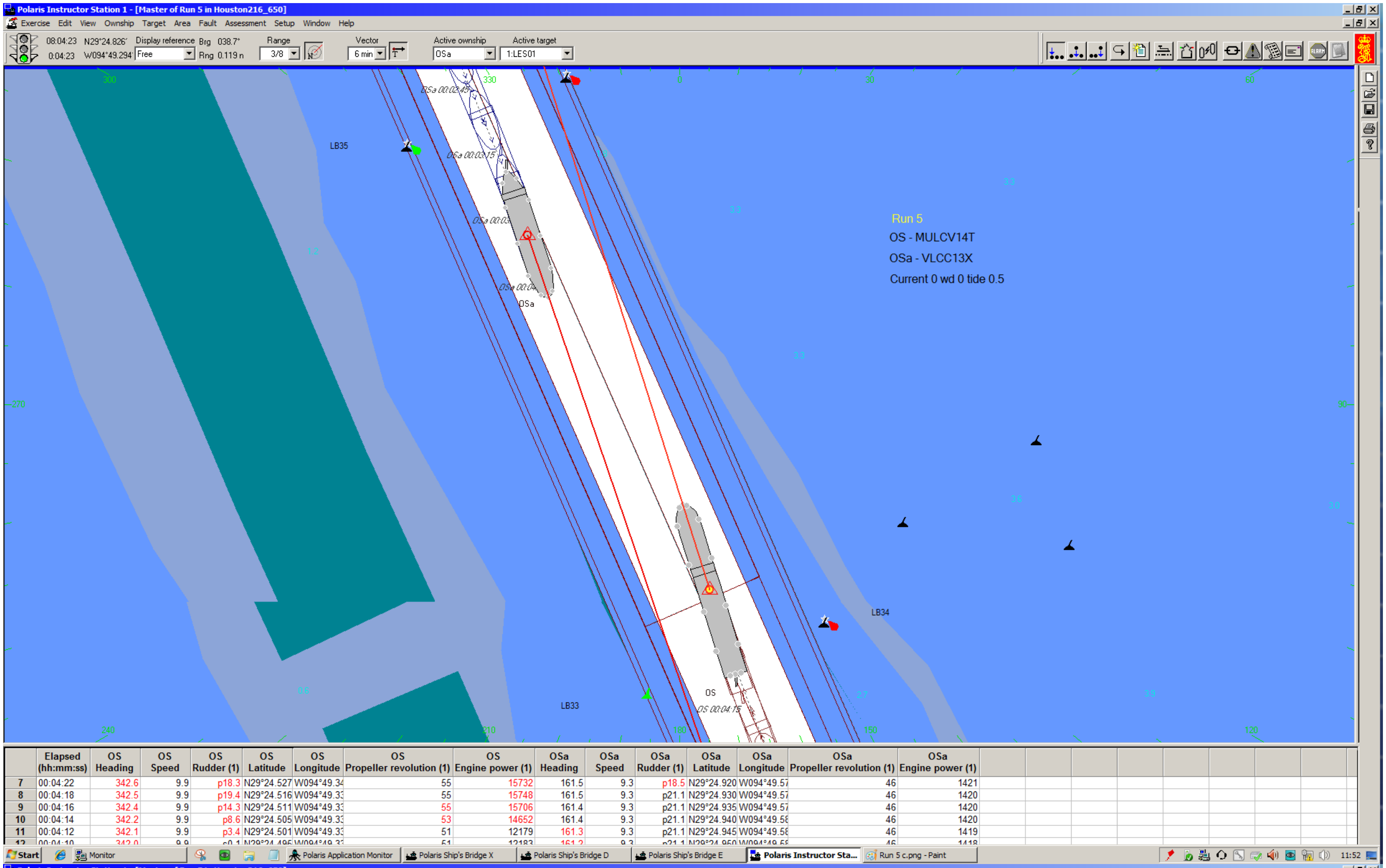
	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:02:46	336.2	10.0	s5.4	N29°24.279	W094°49.23	51	12091	157.8	9.5	p0.1	N29°25.154	W094°49.67	46	1345
8	00:02:44	336.2	10.0	s2.2	N29°24.275	W094°49.23	51	12087	157.8	9.5	p0.2	N29°25.159	W094°49.68	46	1343
9	00:02:42	336.2	10.0	p3.1	N29°24.270	W094°49.22	51	12089	157.8	9.5	p0.1	N29°25.163	W094°49.68	46	1342
10	00:02:40	336.1	10.0	p6.1	N29°24.265	W094°49.22	51	12088	157.9	9.5	p0.1	N29°25.168	W094°49.68	46	1341
11	00:02:38	336.1	10.0	p11.8	N29°24.259	W094°49.22	51	12089	157.9	9.5	p0.2	N29°25.173	W094°49.68	46	1339



08:03:40 N29°24.770' Display reference Free Brg 080.0° Rng 0.217 n
0:03:40 W094°49.135'
Range 3/8
Vector 6 min
Active ownship OSa
Active target 1:LES01

Run 5
OS - MULCV14T
OSa - VLCC13X
Current 0 wd 0 tide 0.5

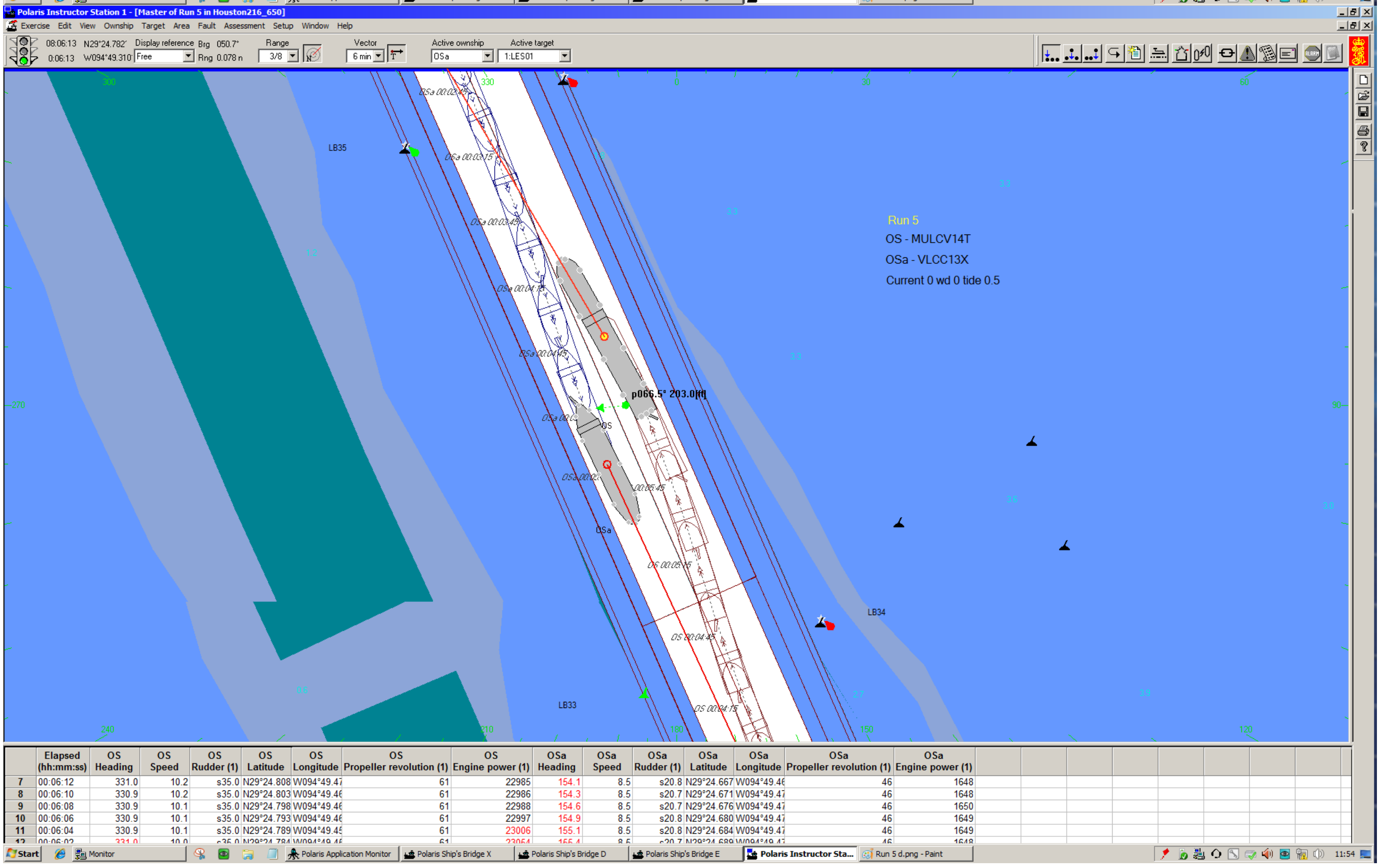
	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:03:38	340.1	9.9	p20.0	N29°24.412	W094°49.29	51	12174	158.1	9.4	s20.4	N29°25.027	W094°49.62	46	1384
8	00:03:36	339.9	9.9	p20.0	N29°24.407	W094°49.29	51	12178	157.9	9.4	s20.4	N29°25.032	W094°49.62	46	1382
9	00:03:34	339.8	9.9	p18.3	N29°24.402	W094°49.29	51	12182	157.8	9.4	s20.3	N29°25.037	W094°49.62	46	1382
10	00:03:32	339.6	9.9	p12.5	N29°24.396	W094°49.29	51	12188	157.7	9.4	s20.4	N29°25.042	W094°49.62	46	1379
11	00:03:30	339.4	9.9	p7.4	N29°24.392	W094°49.28	51	12193	157.6	9.4	s20.3	N29°25.046	W094°49.62	46	1376



Polaris Instructor Station 1 - [Master of Run 5 in Houston216_650]

Run 5
OS - MULCV14T
OSa - VLCC13X
Current 0 wd 0 tide 0.5

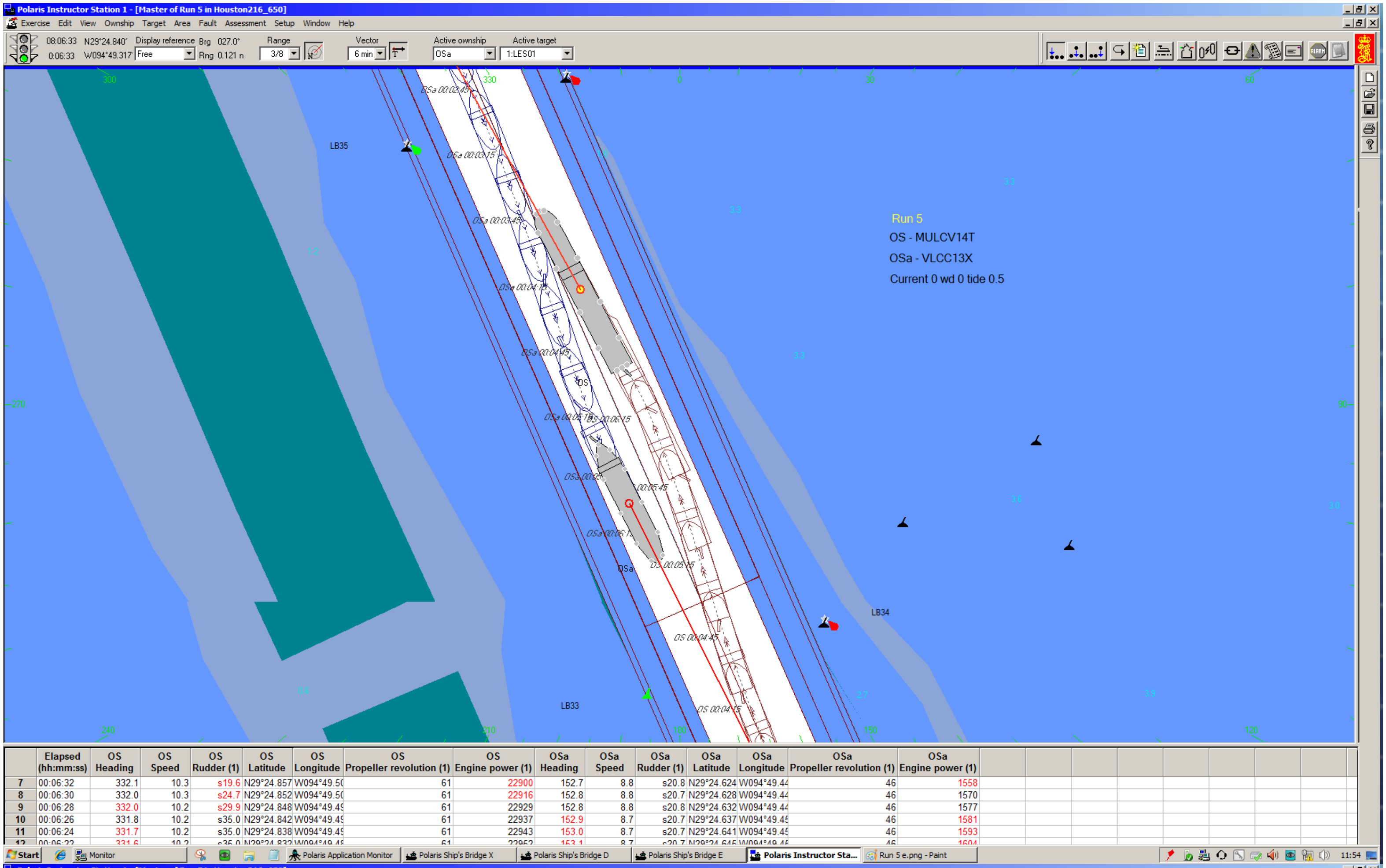
	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:04:22	342.6	9.9	p18.3	N29°24.527	W094°49.34	55	15732	161.5	9.3	p18.5	N29°24.920	W094°49.57	46	1421
8	00:04:18	342.5	9.9	p19.4	N29°24.516	W094°49.33	55	15748	161.5	9.3	p21.1	N29°24.930	W094°49.57	46	1420
9	00:04:16	342.4	9.9	p14.3	N29°24.511	W094°49.33	55	15706	161.4	9.3	p21.1	N29°24.935	W094°49.57	46	1420
10	00:04:14	342.2	9.9	p8.6	N29°24.505	W094°49.33	53	14652	161.4	9.3	p21.1	N29°24.940	W094°49.58	46	1420
11	00:04:12	342.1	9.9	p3.4	N29°24.501	W094°49.33	51	12179	161.3	9.3	p21.1	N29°24.945	W094°49.58	46	1419



Polaris Instructor Station 1 - [Master of Run 5 in Houston216_650]

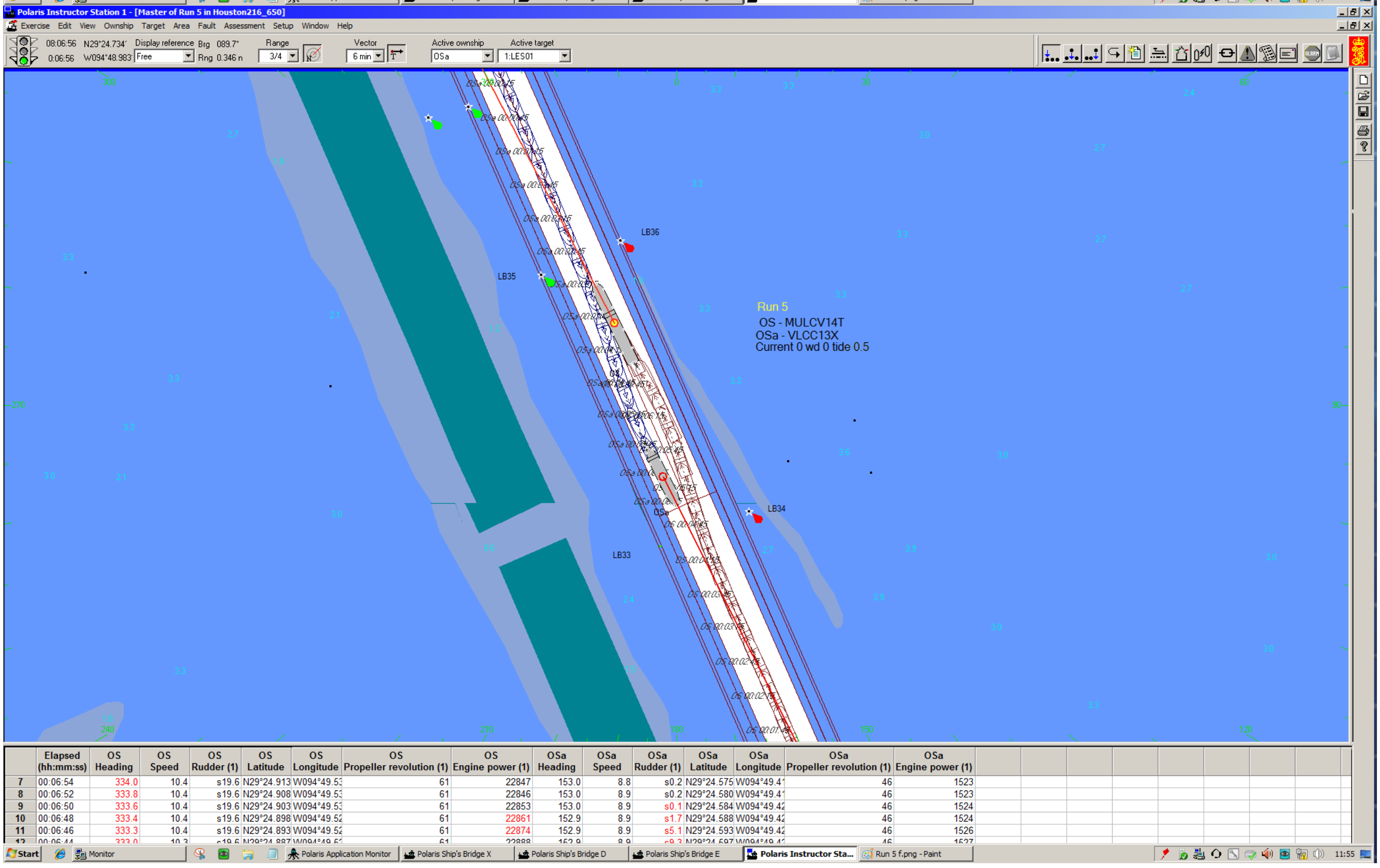
Run 5
OS - MULCV14T
OSa - VLCC13X
Current 0 wd 0 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:06:12	331.0	10.2	s35.0	N29°24.808	W094°49.47	61	22985	154.1	8.5	s20.8	N29°24.667	W094°49.46	46	1648
8	00:06:10	330.9	10.2	s35.0	N29°24.803	W094°49.46	61	22986	154.3	8.5	s20.7	N29°24.671	W094°49.47	46	1648
9	00:06:08	330.9	10.1	s35.0	N29°24.798	W094°49.46	61	22988	154.6	8.5	s20.7	N29°24.676	W094°49.47	46	1650
10	00:06:06	330.9	10.1	s35.0	N29°24.793	W094°49.46	61	22997	154.9	8.5	s20.8	N29°24.680	W094°49.47	46	1649
11	00:06:04	330.9	10.1	s35.0	N29°24.789	W094°49.45	61	23006	155.1	8.5	s20.8	N29°24.684	W094°49.47	46	1649



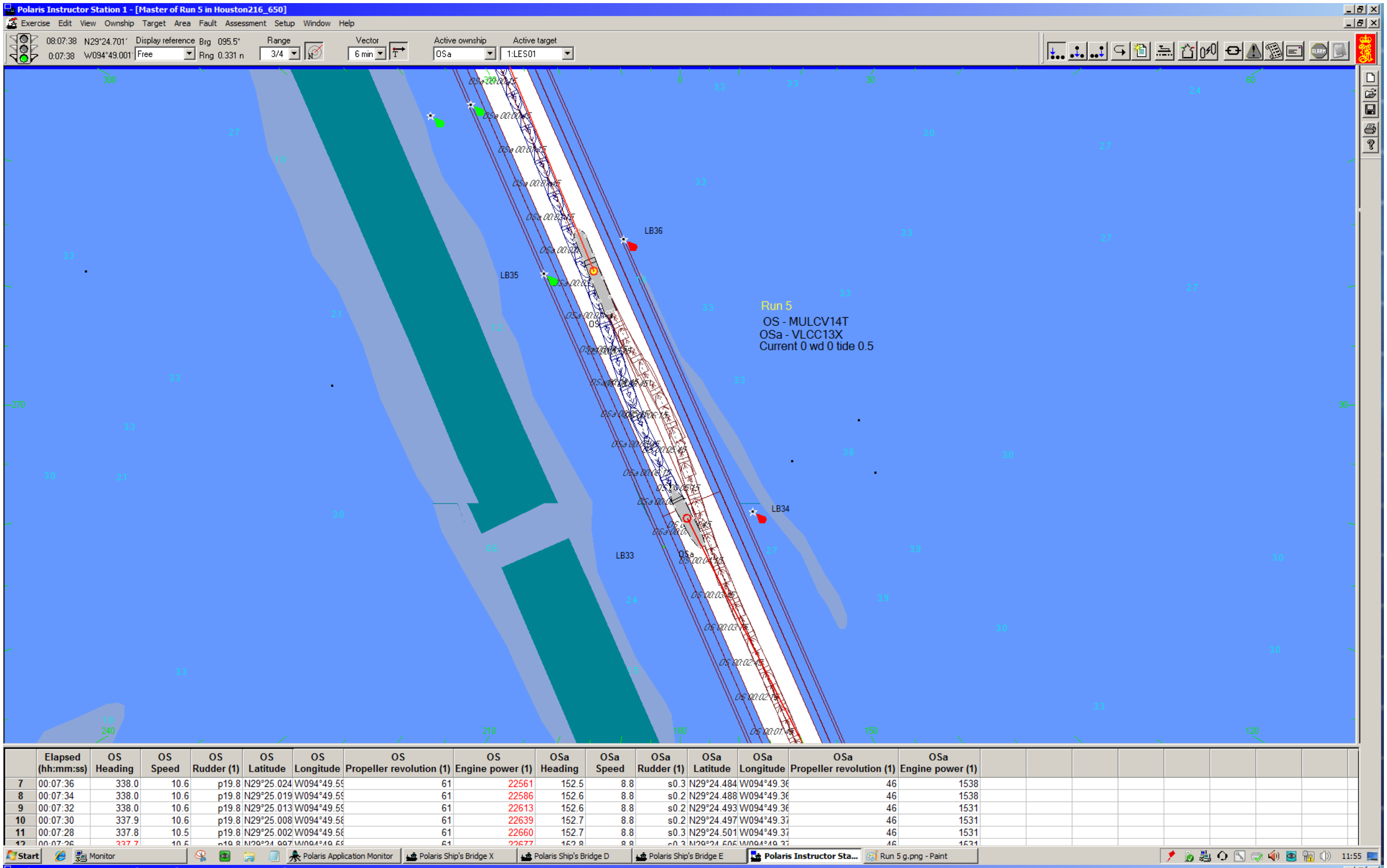
Run 5
OS - MULCV14T
OSa - VLCC13X
Current 0 wd 0 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:06:32	332.1	10.3	s19.6	N29°24.857	W094°49.5	61	22900	152.7	8.8	s20.8	N29°24.624	W094°49.4	46	1558
8	00:06:30	332.0	10.3	s24.7	N29°24.852	W094°49.5	61	22916	152.8	8.8	s20.7	N29°24.628	W094°49.4	46	1570
9	00:06:28	332.0	10.2	s29.9	N29°24.848	W094°49.4	61	22929	152.8	8.8	s20.8	N29°24.632	W094°49.4	46	1577
10	00:06:26	331.8	10.2	s35.0	N29°24.842	W094°49.4	61	22937	152.9	8.7	s20.7	N29°24.637	W094°49.4	46	1581
11	00:06:24	331.7	10.2	s35.0	N29°24.838	W094°49.4	61	22943	153.0	8.7	s20.7	N29°24.641	W094°49.4	46	1593



Run 5
OS - MULCV14T
OSa - VLCC13X
Current 0 wd 0 tide 0.5

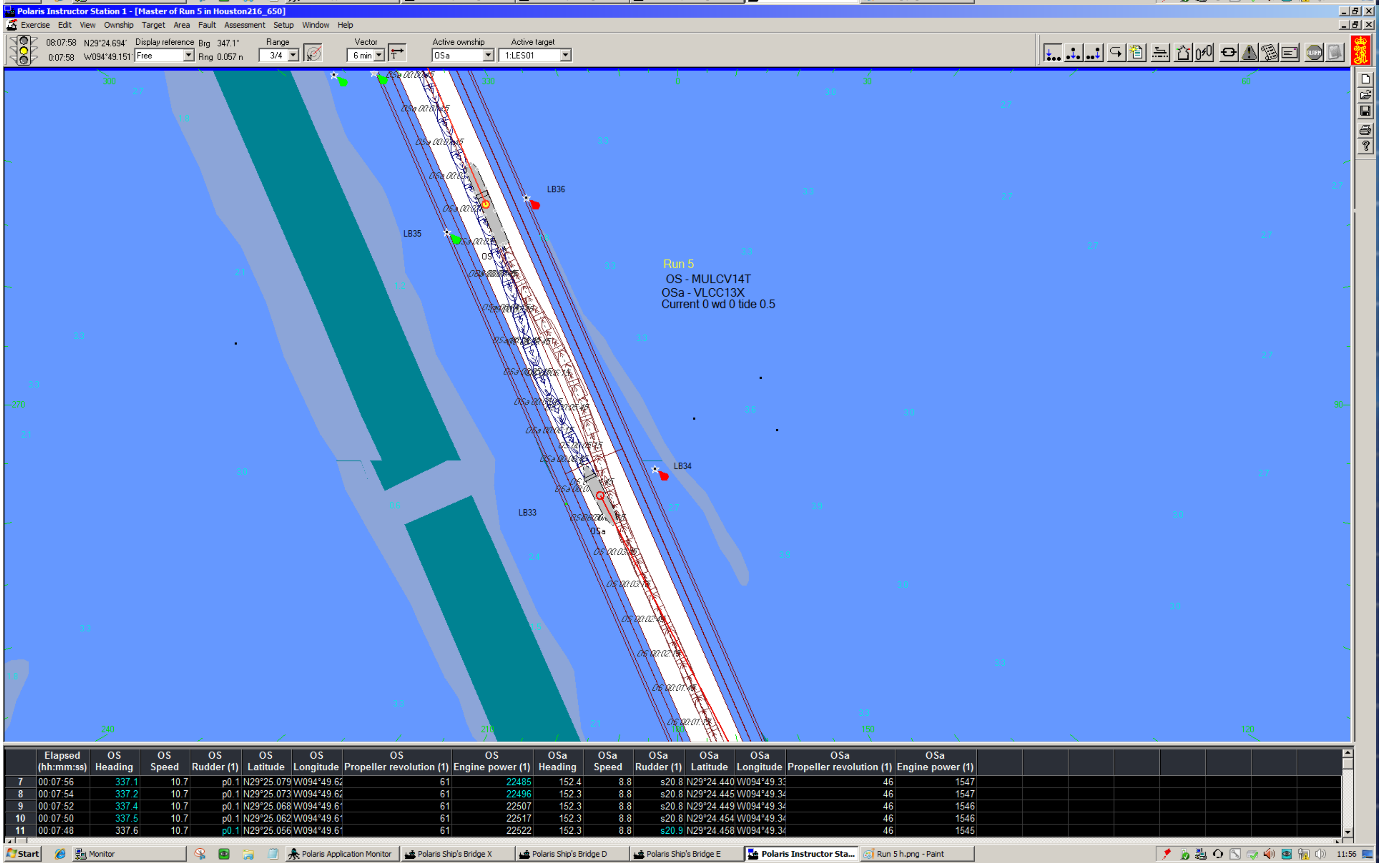
	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:06:54	334.0	10.4	s19.6	N29°24.913	W094°49.5	61	22847	153.0	8.8	s0.2	N29°24.575	W094°49.4	46	1523
8	00:06:52	333.8	10.4	s19.6	N29°24.908	W094°49.5	61	22846	153.0	8.9	s0.2	N29°24.580	W094°49.4	46	1523
9	00:06:50	333.6	10.4	s19.6	N29°24.903	W094°49.5	61	22853	153.0	8.9	s0.1	N29°24.584	W094°49.4	46	1524
10	00:06:48	333.4	10.4	s19.6	N29°24.898	W094°49.5	61	22861	152.9	8.9	s1.7	N29°24.588	W094°49.4	46	1524
11	00:06:46	333.3	10.4	s19.6	N29°24.893	W094°49.5	61	22874	152.9	8.9	s5.1	N29°24.593	W094°49.4	46	1526



08:07:38 N29°24.701′ Display reference: Free Brg 095.5°
0:07:38 W094°49.001′ Rng 0.331 n
Range: 3/4 Vector: 6 min Active ownship: OSa Active target: 1:LES01

Run 5
OS - MULCV14T
OSa - VLCC13X
Current 0 wd 0 tide 0.5

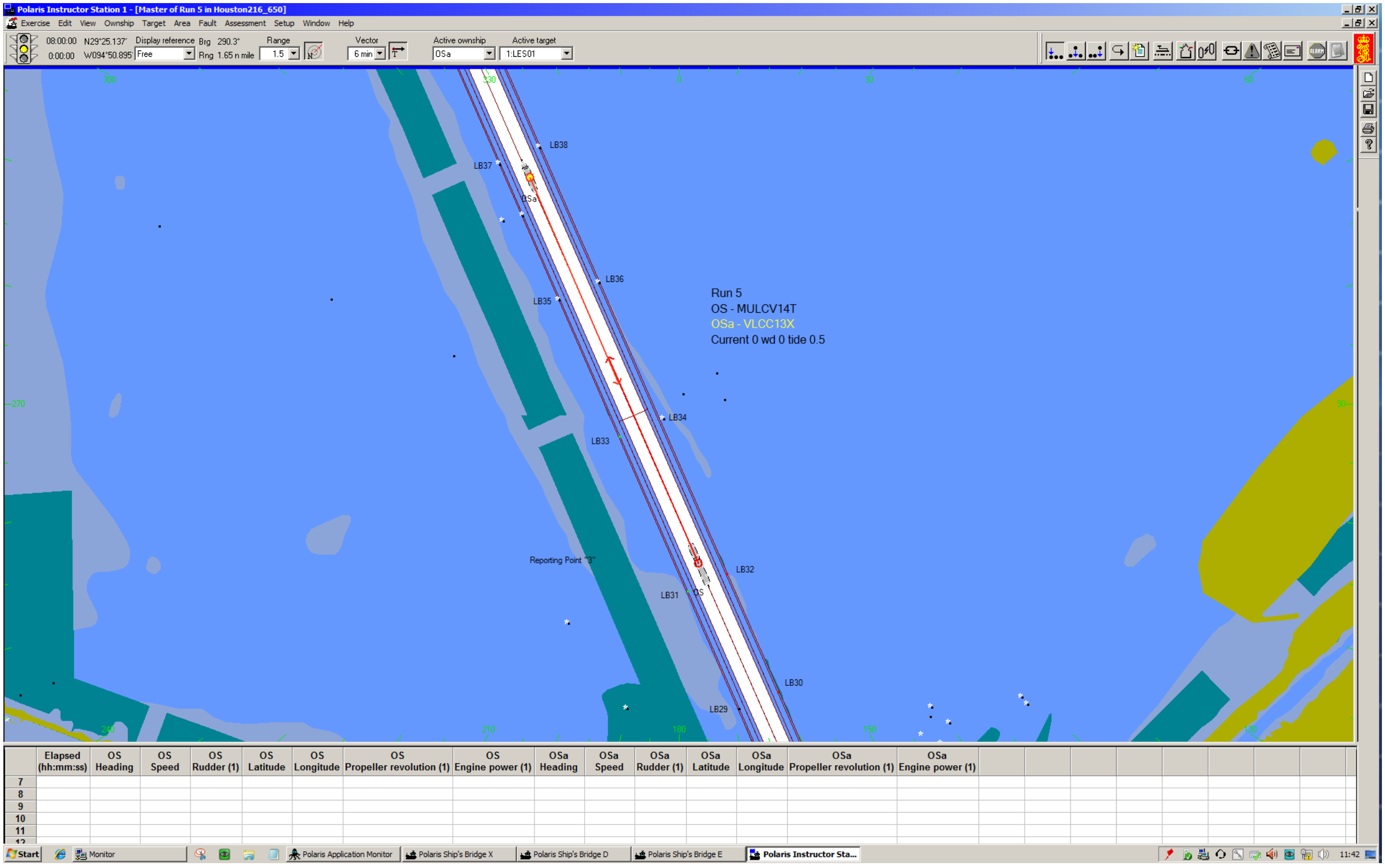
	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:07:36	338.0	10.6	p19.8	N29°25.024	W094°49.59	61	22561	152.5	8.8	s0.3	N29°24.484	W094°49.36	46	1538
8	00:07:34	338.0	10.6	p19.8	N29°25.019	W094°49.59	61	22586	152.6	8.8	s0.2	N29°24.488	W094°49.36	46	1538
9	00:07:32	338.0	10.6	p19.8	N29°25.013	W094°49.59	61	22613	152.6	8.8	s0.2	N29°24.493	W094°49.36	46	1531
10	00:07:30	337.9	10.6	p19.8	N29°25.008	W094°49.58	61	22639	152.7	8.8	s0.2	N29°24.497	W094°49.37	46	1531
11	00:07:28	337.8	10.5	p19.8	N29°25.002	W094°49.58	61	22660	152.7	8.8	s0.3	N29°24.501	W094°49.37	46	1531



08:07:58 N29°24.694′ Display reference: Free Brg 347.1°
0:07:58 W094°49.151′ Rng 0.057 n
Range: 3/4 Vector: 6 min Active ownship: OSa Active target: 1:LES01

Run 5
OS - MULCV14T
OSa - VLCC13X
Current 0 wd 0 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:07:56	337.1	10.7	p0.1	N29°25.079	W094°49.62	61	22485	152.4	8.8	s20.8	N29°24.440	W094°49.33	46	1547
8	00:07:54	337.2	10.7	p0.1	N29°25.073	W094°49.62	61	22496	152.3	8.8	s20.8	N29°24.445	W094°49.34	46	1547
9	00:07:52	337.4	10.7	p0.1	N29°25.068	W094°49.61	61	22507	152.3	8.8	s20.8	N29°24.449	W094°49.34	46	1546
10	00:07:50	337.5	10.7	p0.1	N29°25.062	W094°49.61	61	22517	152.3	8.8	s20.8	N29°24.454	W094°49.34	46	1546
11	00:07:48	337.6	10.7	p0.1	N29°25.056	W094°49.61	61	22522	152.3	8.8	s20.9	N29°24.458	W094°49.34	46	1545



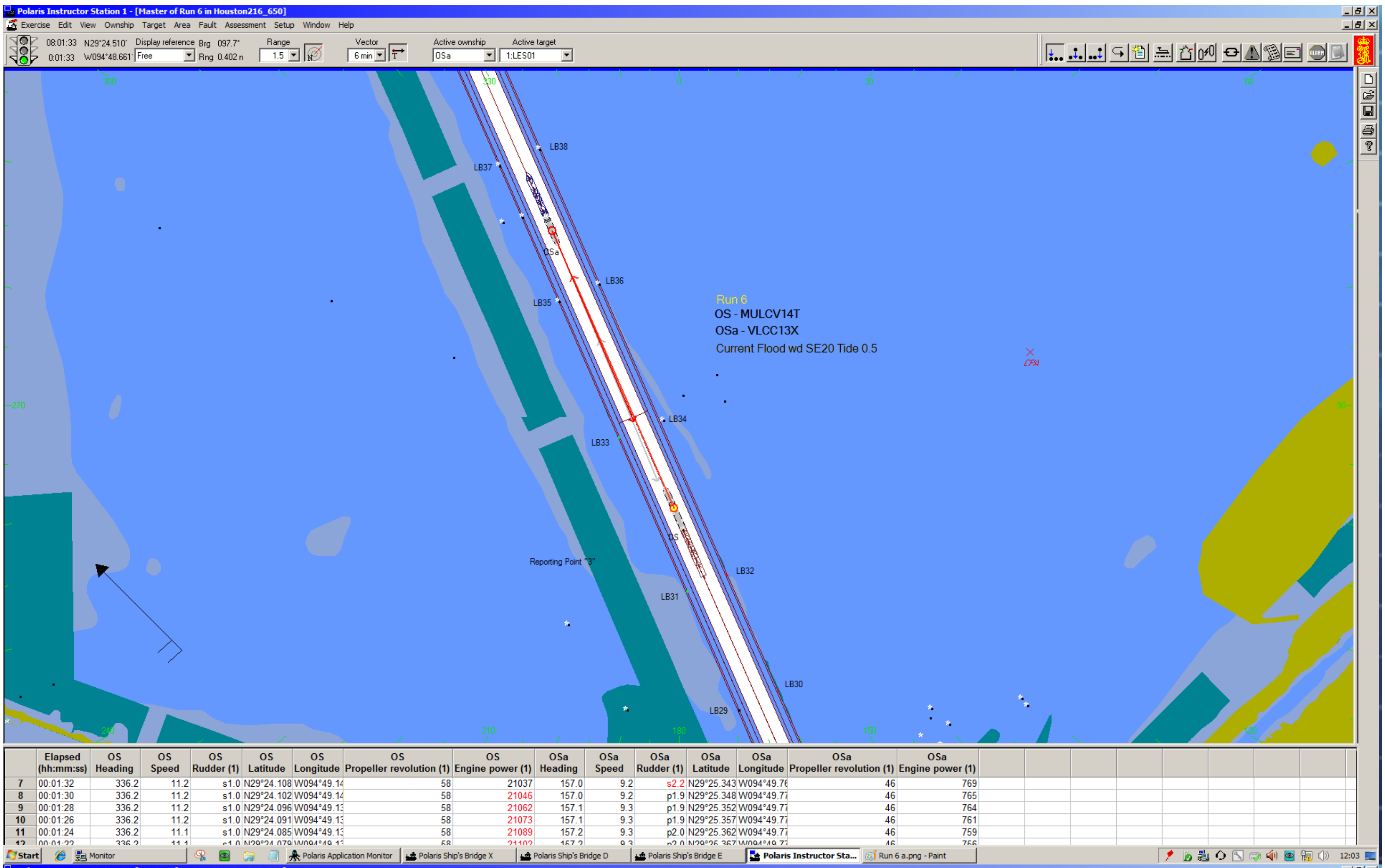
Polaris Instructor Station 1 - [Master of Run 5 in Houston216_650]

08:00:00 N29°25.137'
0:00:00 W094°50.895'
Display reference: Free
Brg 290.3°
Rng 1.65 n mile
Range: 1.5
Vector: 6 min
Active ownship: OSa
Active target: 1:LES01

Run 5
OS - MULCV14T
OSa - VLCC13X
Current 0 wd 0 tide 0.5

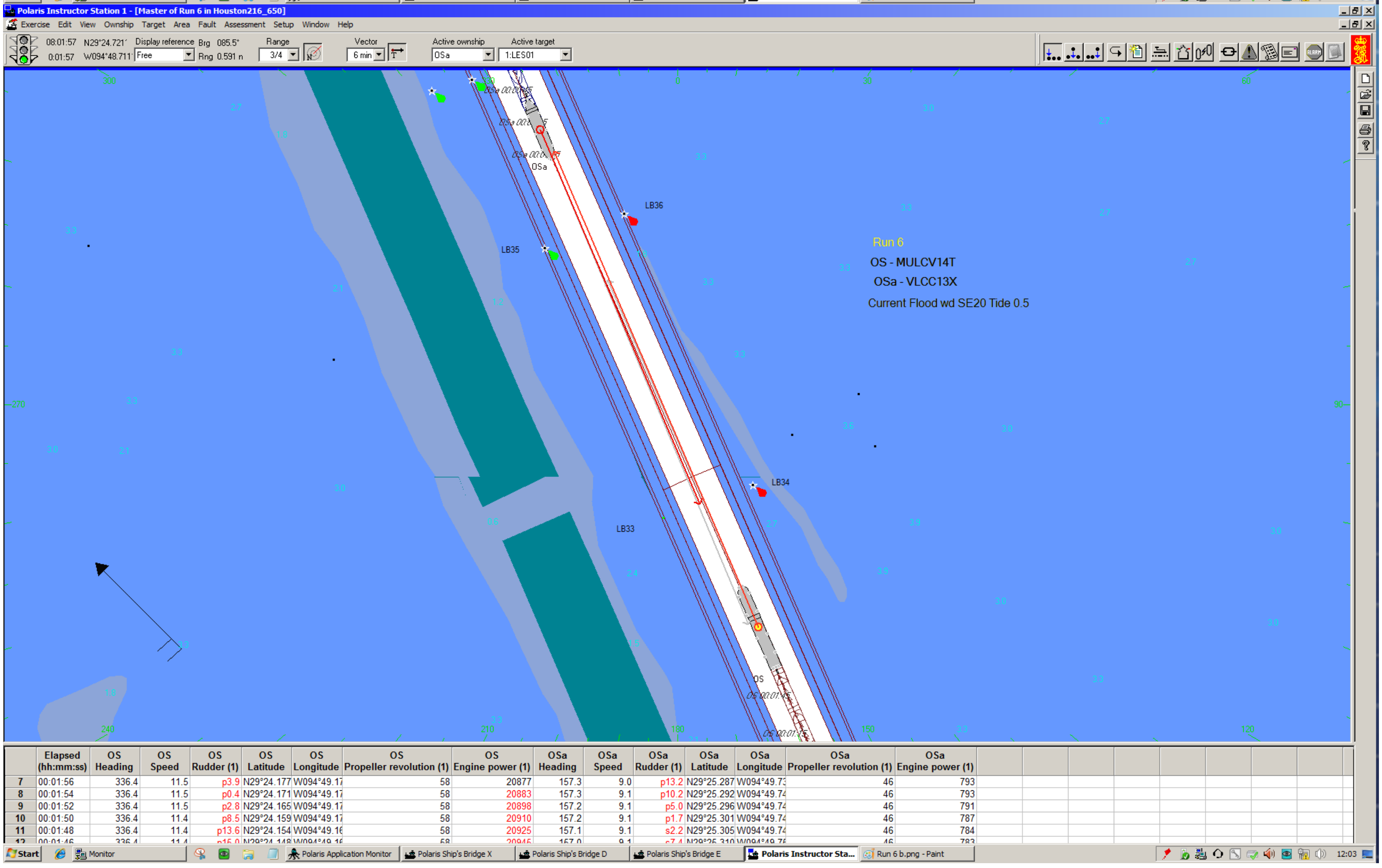
	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7															
8															
9															
10															
11															

Run 6



Run 6
OS - MULCV14T
OSa - VLCC13X
Current Flood wd SE20 Tide 0.5

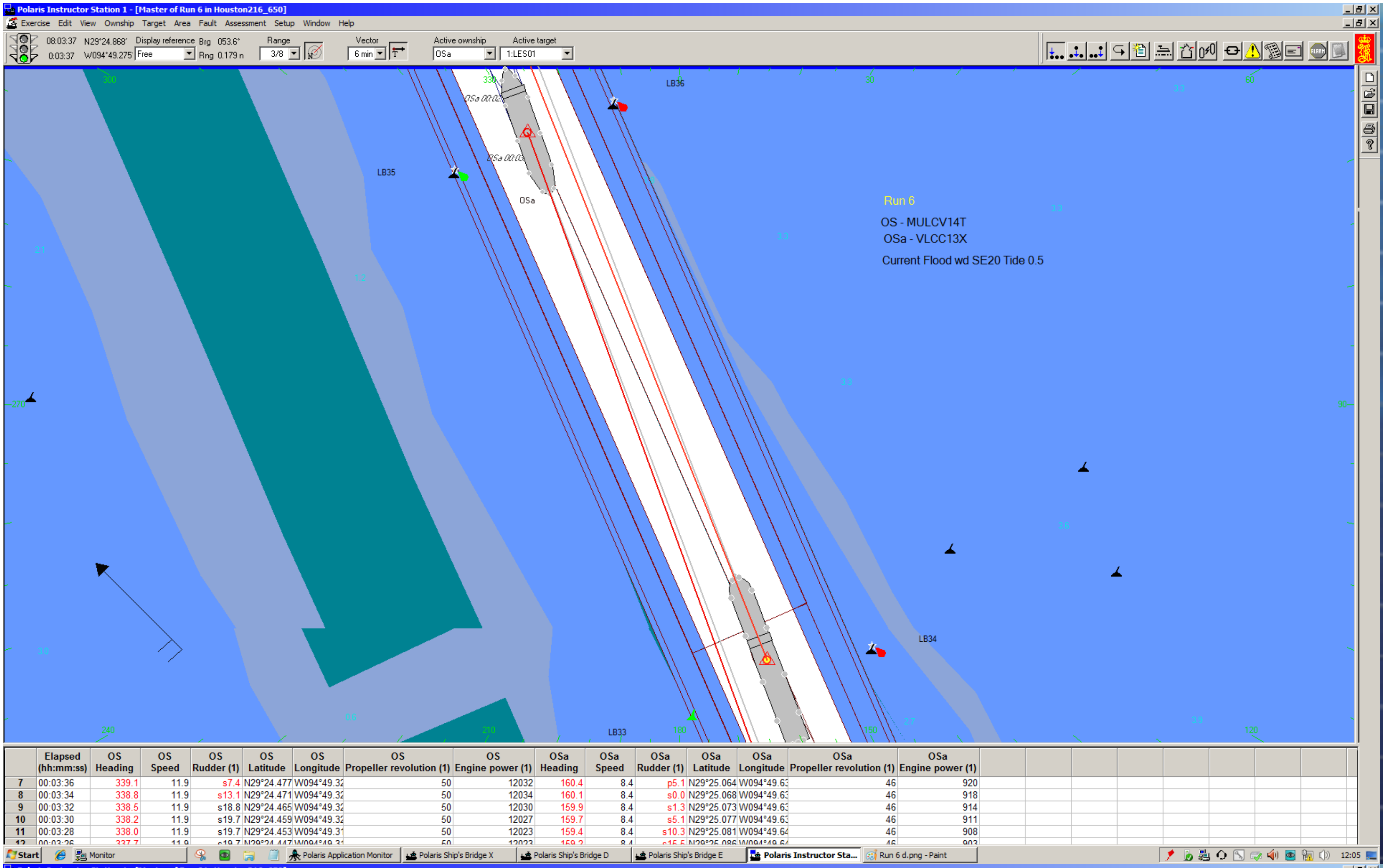
	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:01:32	336.2	11.2	s1.0	N29°24.108	W094°49.14	58	21037	157.0	9.2	s2.2	N29°25.343	W094°49.76	46	769
8	00:01:30	336.2	11.2	s1.0	N29°24.102	W094°49.14	58	21046	157.0	9.2	p1.9	N29°25.348	W094°49.77	46	765
9	00:01:28	336.2	11.2	s1.0	N29°24.096	W094°49.13	58	21062	157.1	9.3	p1.9	N29°25.352	W094°49.77	46	764
10	00:01:26	336.2	11.2	s1.0	N29°24.091	W094°49.13	58	21073	157.1	9.3	p1.9	N29°25.357	W094°49.77	46	761
11	00:01:24	336.2	11.1	s1.0	N29°24.085	W094°49.13	58	21089	157.2	9.3	p2.0	N29°25.362	W094°49.77	46	759



Run 6
OS - MULCV14T
OSa - VLCC13X
Current Flood wd SE20 Tide 0.5

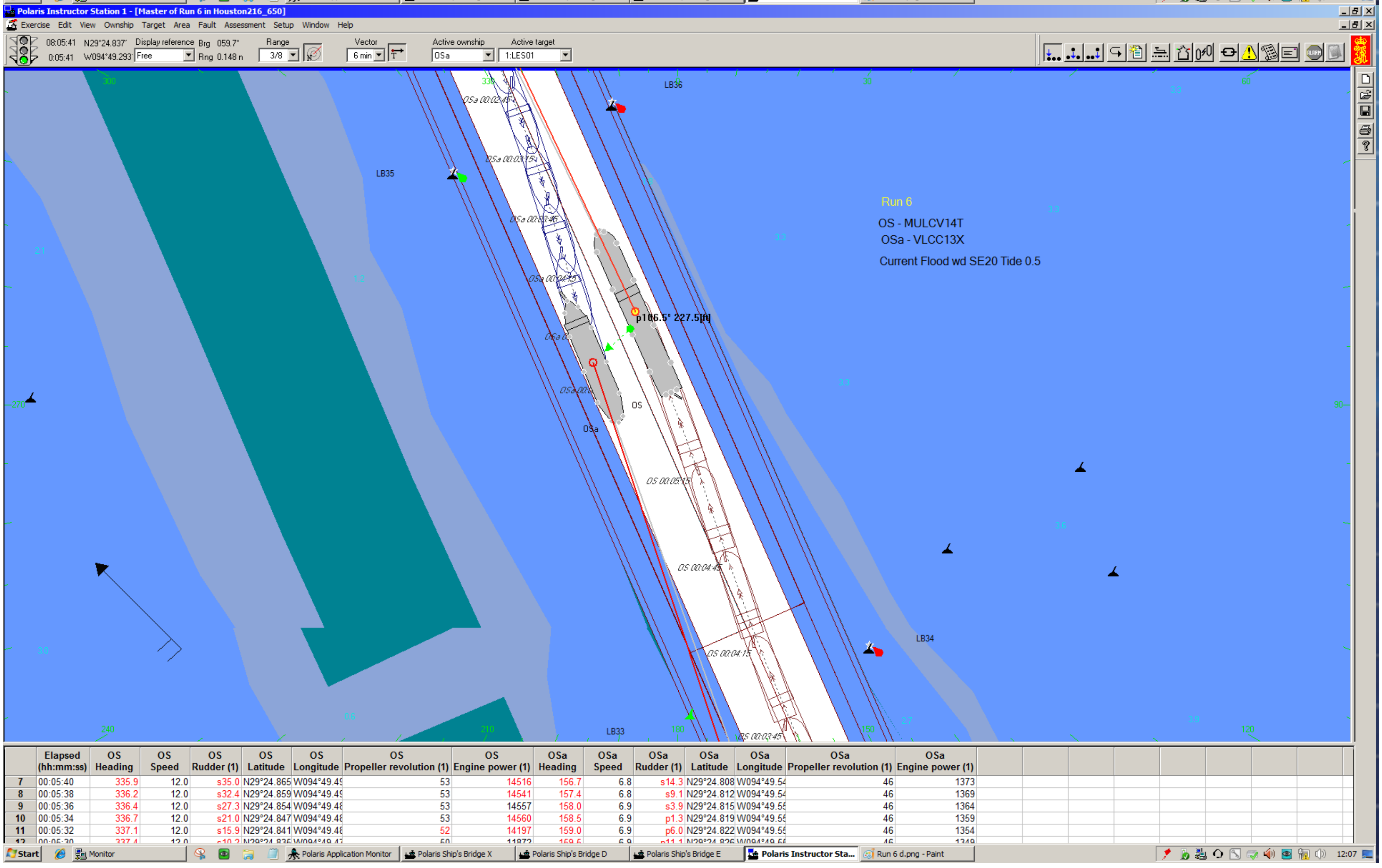
	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:01:56	336.4	11.5	p3.9	N29°24.177	W094°49.17	58	20877	157.3	9.0	p13.2	N29°25.287	W094°49.73	46	793
8	00:01:54	336.4	11.5	p0.4	N29°24.171	W094°49.17	58	20883	157.3	9.1	p10.2	N29°25.292	W094°49.74	46	793
9	00:01:52	336.4	11.5	p2.8	N29°24.165	W094°49.17	58	20898	157.2	9.1	p5.0	N29°25.296	W094°49.74	46	791
10	00:01:50	336.4	11.4	p8.5	N29°24.159	W094°49.17	58	20910	157.2	9.1	p1.7	N29°25.301	W094°49.74	46	787
11	00:01:48	336.4	11.4	p13.6	N29°24.154	W094°49.16	58	20925	157.1	9.1	s2.2	N29°25.305	W094°49.74	46	784

June 26, 2019



Run 6
OS - MULCV14T
OSa - VLCC13X
Current Flood wd SE20 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:03:36	339.1	11.9	s7.4	N29°24.477	W094°49.32	50	12032	160.4	8.4	p5.1	N29°25.064	W094°49.63	46	920
8	00:03:34	338.8	11.9	s13.1	N29°24.471	W094°49.32	50	12034	160.1	8.4	s0.0	N29°25.068	W094°49.63	46	918
9	00:03:32	338.5	11.9	s18.8	N29°24.465	W094°49.32	50	12030	159.9	8.4	s1.3	N29°25.073	W094°49.63	46	914
10	00:03:30	338.2	11.9	s19.7	N29°24.459	W094°49.32	50	12027	159.7	8.4	s5.1	N29°25.077	W094°49.63	46	911
11	00:03:28	338.0	11.9	s19.7	N29°24.453	W094°49.31	50	12023	159.4	8.4	s10.3	N29°25.081	W094°49.64	46	908



Run 6
OS - MULCV14T
OSa - VLCC13X
Current Flood wd SE20 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:05:40	335.9	12.0	s35.0	N29°24.865	W094°49.49	53	14516	156.7	6.8	s14.3	N29°24.808	W094°49.54	46	1373
8	00:05:38	336.2	12.0	s32.4	N29°24.859	W094°49.49	53	14541	157.4	6.8	s9.1	N29°24.812	W094°49.54	46	1369
9	00:05:36	336.4	12.0	s27.3	N29°24.854	W094°49.48	53	14557	158.0	6.9	s3.9	N29°24.815	W094°49.55	46	1364
10	00:05:34	336.7	12.0	s21.0	N29°24.847	W094°49.48	53	14560	158.5	6.9	p1.3	N29°24.819	W094°49.55	46	1359
11	00:05:32	337.1	12.0	s15.9	N29°24.841	W094°49.48	52	14197	159.0	6.9	p6.0	N29°24.822	W094°49.55	46	1354

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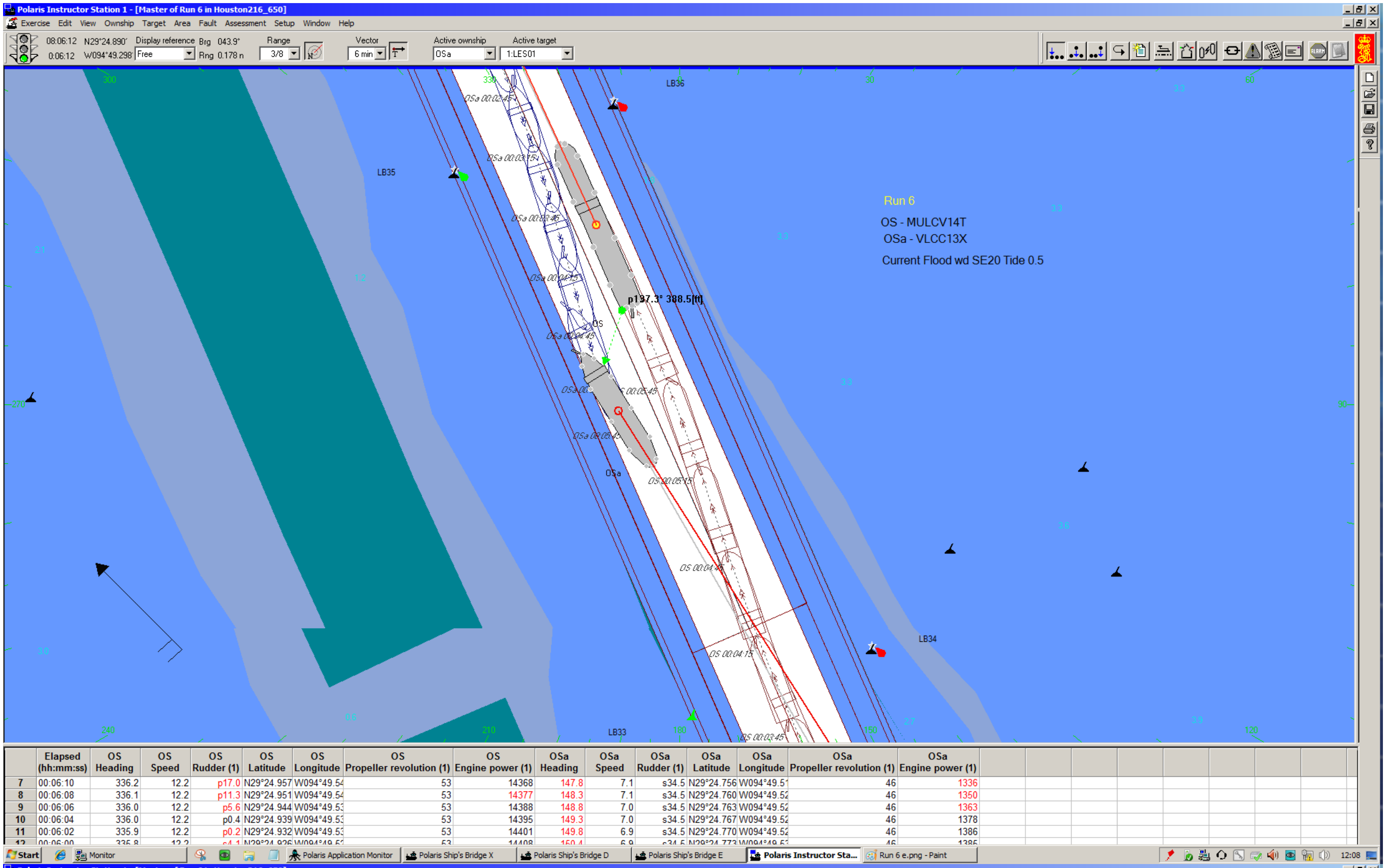
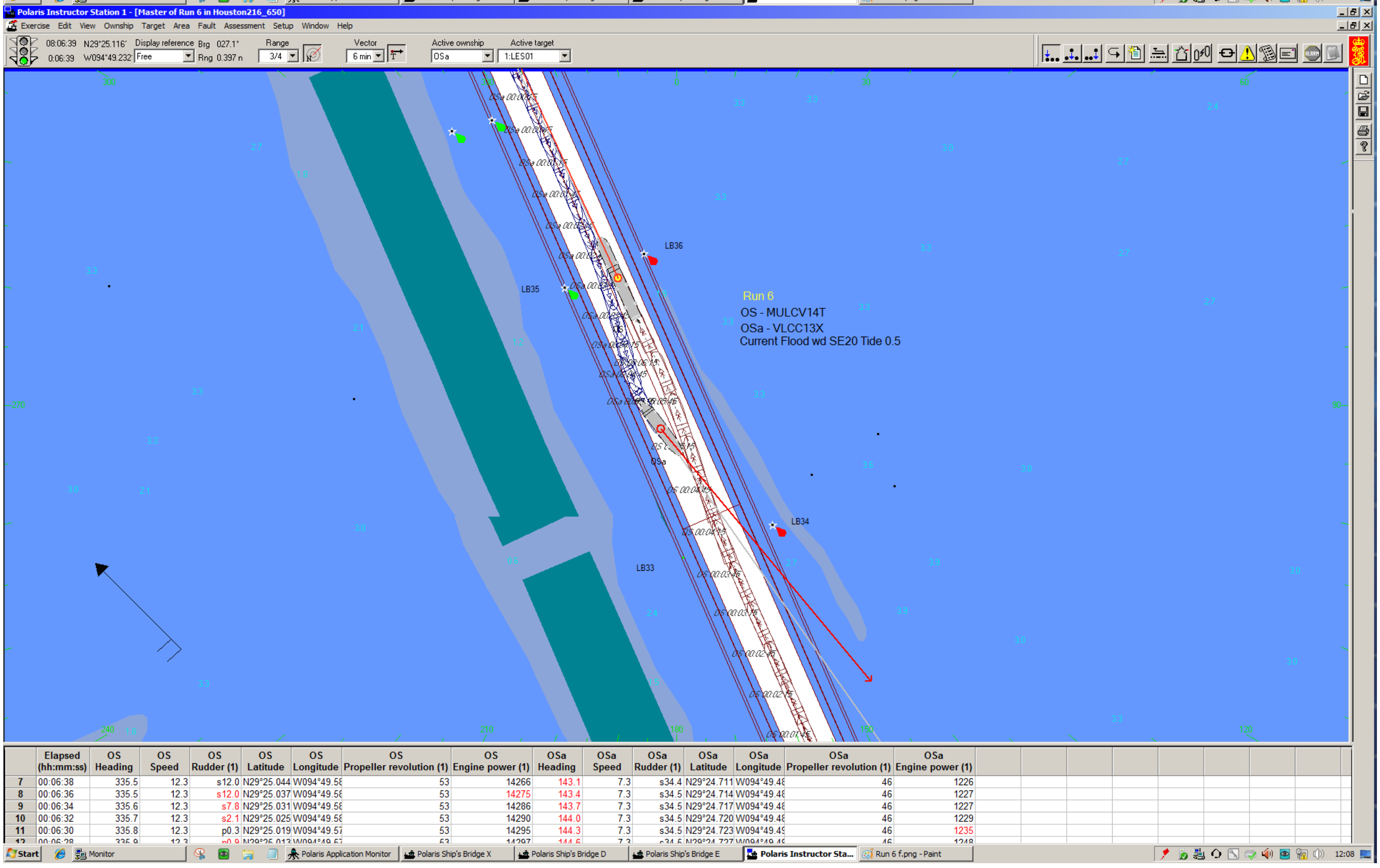


Polaris Instructor Station 1 - [Master of Run 6 in Houston216_650]

08:06:12 N29°24.890' Display reference Free Brg 043.9° Rng 0.178 n
0:06:12 W094°49.298' Range 3/8 Vector 6 min Active ownship OSa Active target 1:LES01

Run 6
OS - MULCV14T
OSa - VLCC13X
Current Flood wd SE20 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:06:10	336.2	12.2	p17.0	N29°24.957	W094°49.54	53	14368	147.8	7.1	s34.5	N29°24.756	W094°49.51	46	1336
8	00:06:08	336.1	12.2	p11.3	N29°24.951	W094°49.54	53	14377	148.3	7.1	s34.5	N29°24.760	W094°49.52	46	1350
9	00:06:06	336.0	12.2	p5.6	N29°24.944	W094°49.53	53	14388	148.8	7.0	s34.5	N29°24.763	W094°49.52	46	1363
10	00:06:04	336.0	12.2	p0.4	N29°24.939	W094°49.53	53	14395	149.3	7.0	s34.5	N29°24.767	W094°49.52	46	1378
11	00:06:02	335.9	12.2	p0.2	N29°24.932	W094°49.53	53	14401	149.8	6.9	s34.5	N29°24.770	W094°49.52	46	1386



Polaris Instructor Station 1 - [Master of Run 6 in Houston216_650]

08:06:39 N29°25.116' Display reference Free Brg 027.1° Rng 0.397 n
0:06:39 W094°49.232' Range 3/4 Vector 6 min Active ownship OSa Active target 1:LES01

Run 6
OS - MULCV14T
OSa - VLCC13X
Current Flood wd SE20 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:06:38	335.5	12.3	s12.0	N29°25.044	W094°49.58	53	14266	143.1	7.3	s34.4	N29°24.711	W094°49.48	46	1226
8	00:06:36	335.5	12.3	s12.0	N29°25.037	W094°49.58	53	14275	143.4	7.3	s34.5	N29°24.714	W094°49.48	46	1227
9	00:06:34	335.6	12.3	s7.8	N29°25.031	W094°49.58	53	14286	143.7	7.3	s34.5	N29°24.717	W094°49.48	46	1227
10	00:06:32	335.7	12.3	s2.1	N29°25.025	W094°49.58	53	14290	144.0	7.3	s34.5	N29°24.720	W094°49.48	46	1229
11	00:06:30	335.8	12.3	p0.3	N29°25.019	W094°49.57	53	14295	144.3	7.3	s34.5	N29°24.723	W094°49.49	46	1235

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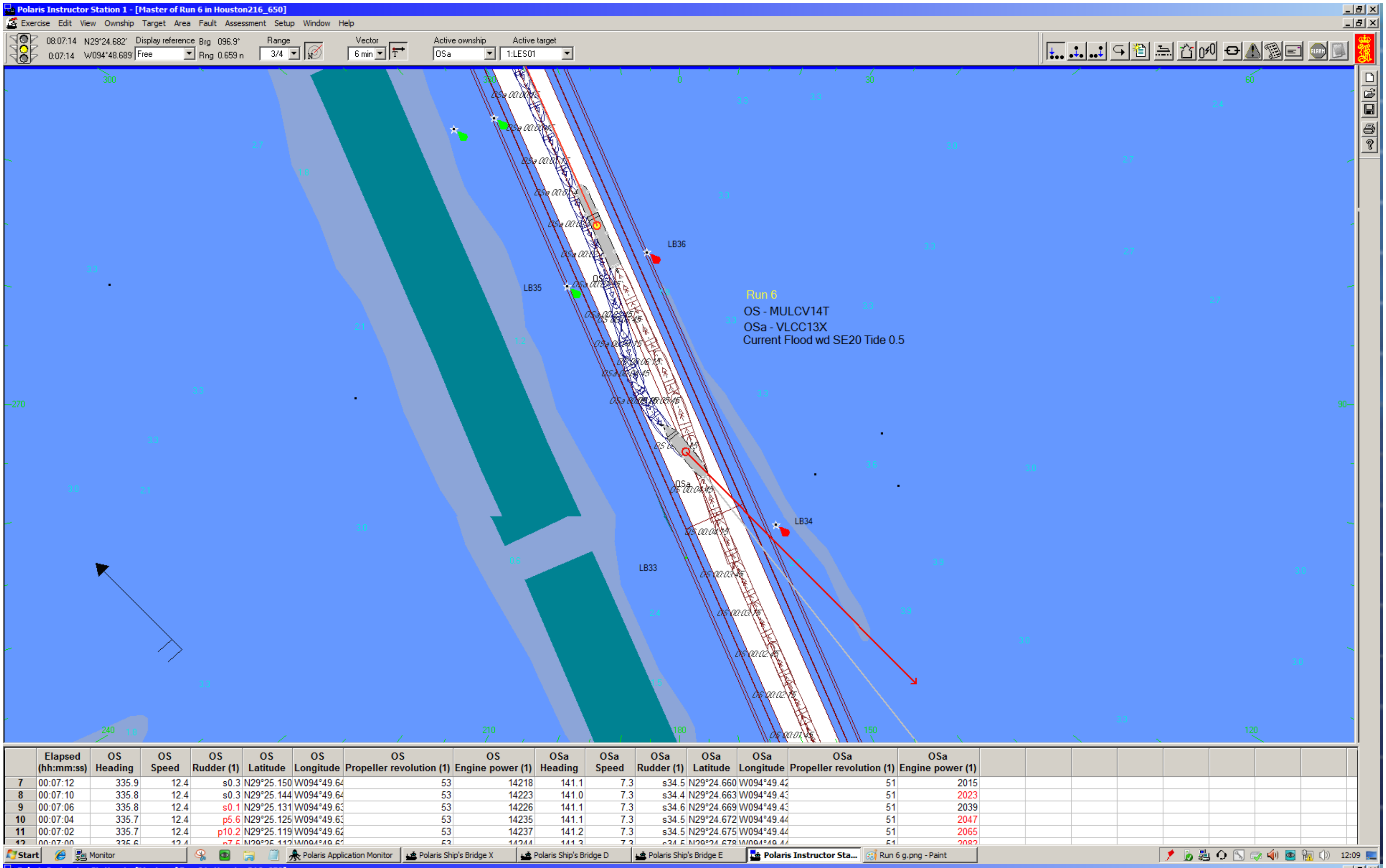
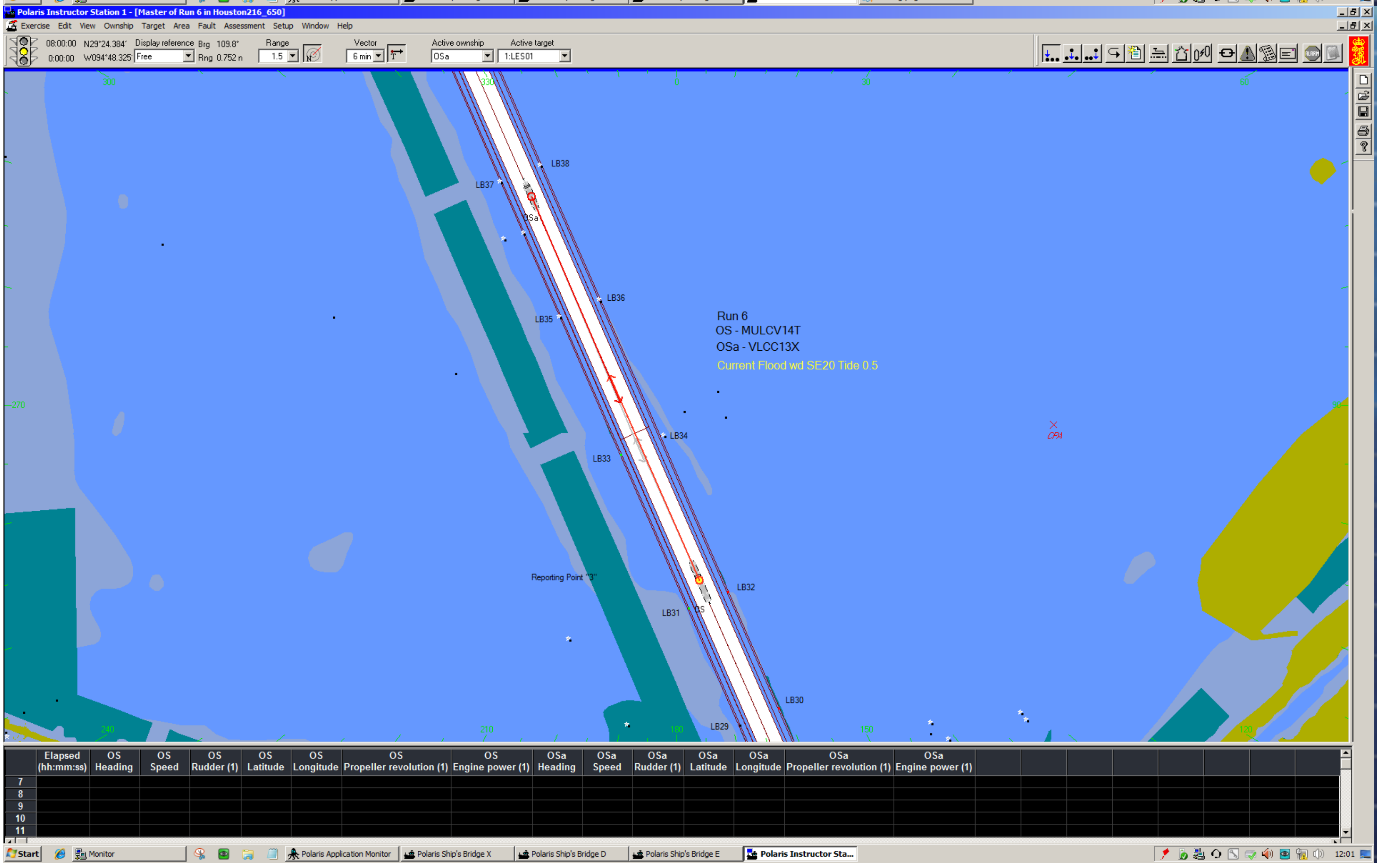


08:07:14 N29°24.682' Display reference Free Brg 096.9° Range 3/4 Vector 6 min Active ownship OSa Active target 1:LES01
0:07:14 W094°48.689' Rng 0.659 n

Run 6
OS - MULCV14T
OSa - VLCC13X
Current Flood wd SE20 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:07:12	335.9	12.4	s0.3	N29°25.150	W094°49.64	53	14218	141.1	7.3	s34.5	N29°24.660	W094°49.42	51	2015
8	00:07:10	335.8	12.4	s0.3	N29°25.144	W094°49.64	53	14223	141.0	7.3	s34.4	N29°24.663	W094°49.43	51	2023
9	00:07:06	335.8	12.4	s0.1	N29°25.131	W094°49.63	53	14226	141.1	7.3	s34.6	N29°24.669	W094°49.43	51	2039
10	00:07:04	335.7	12.4	p5.6	N29°25.125	W094°49.63	53	14235	141.1	7.3	s34.5	N29°24.672	W094°49.44	51	2047
11	00:07:02	335.7	12.4	p10.2	N29°25.119	W094°49.62	53	14237	141.2	7.3	s34.5	N29°24.675	W094°49.44	51	2065



08:00:00 N29°24.384' Display reference Free Brg 109.8° Range 1.5 Vector 6 min Active ownship OSa Active target 1:LES01
0:00:00 W094°48.325' Rng 0.752 n

Run 6
OS - MULCV14T
OSa - VLCC13X
Current Flood wd SE20 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7															
8															
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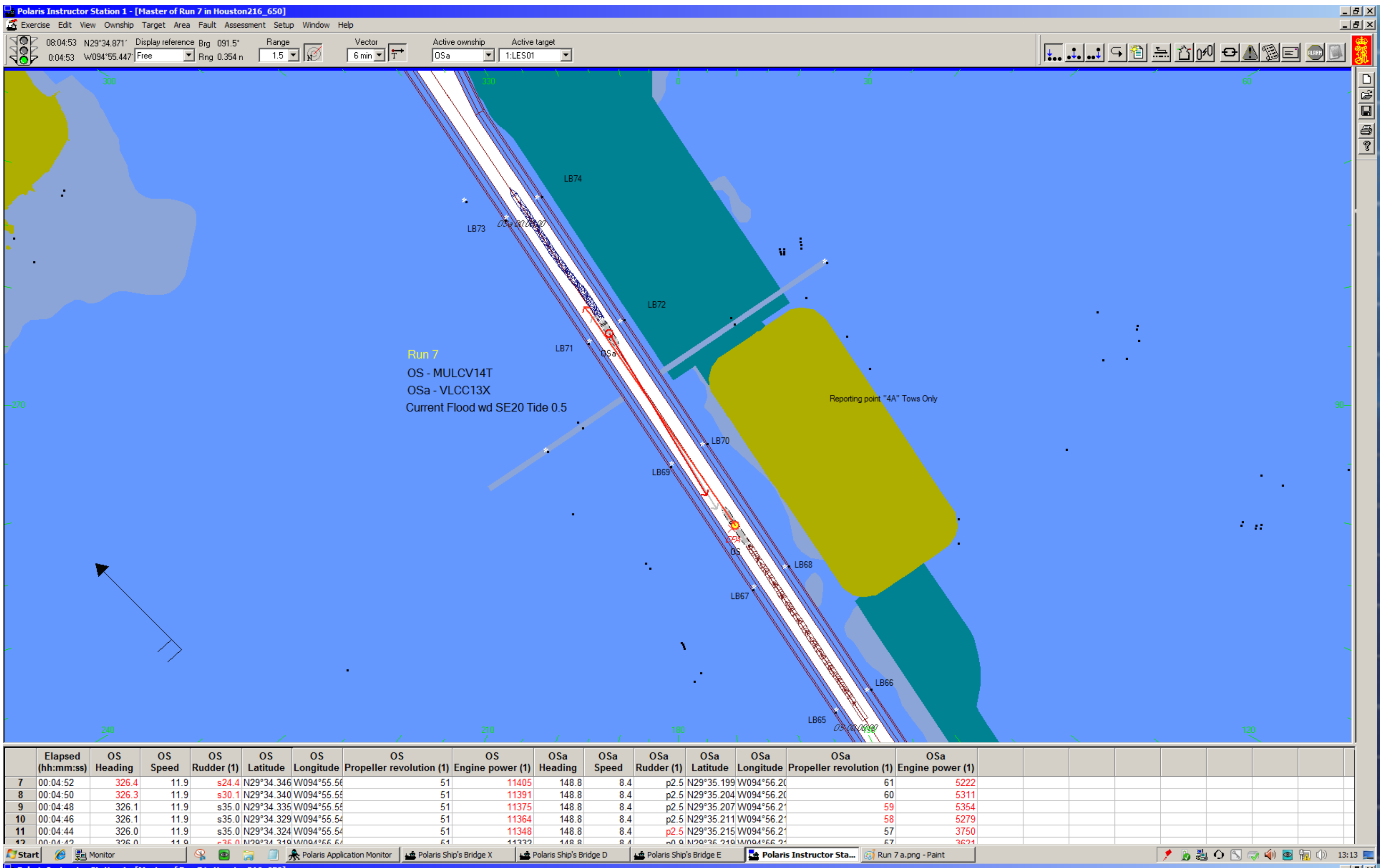
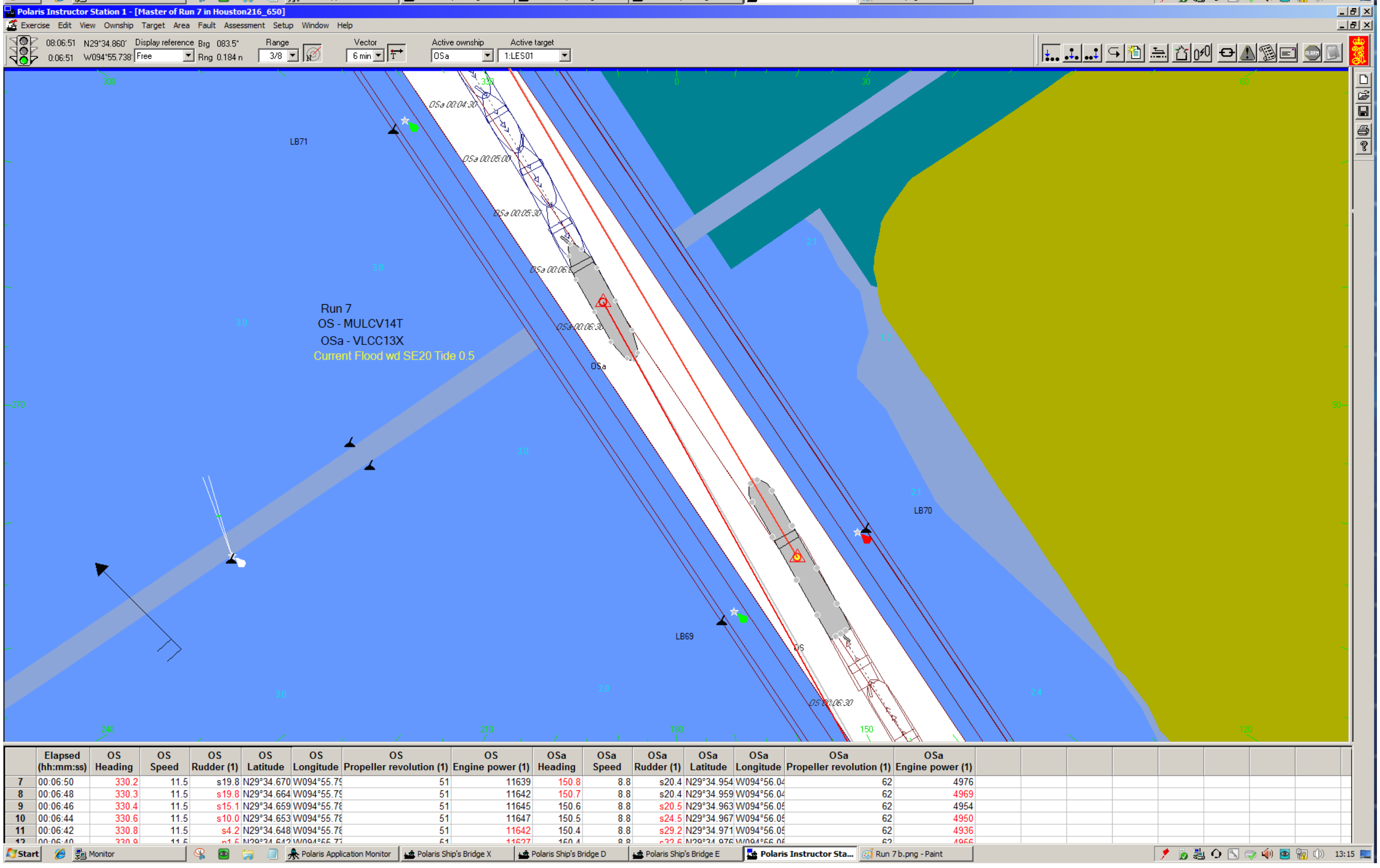
Run 7



	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:04:52	326.4	11.9	s24.4	N29°34.346	W094°55.5	51	11405	148.8	8.4	p2.5	N29°35.199	W094°56.2	61	5222
8	00:04:50	326.3	11.9	s30.1	N29°34.340	W094°55.5	51	11391	148.8	8.4	p2.5	N29°35.204	W094°56.2	60	5311
9	00:04:48	326.1	11.9	s35.0	N29°34.335	W094°55.5	51	11375	148.8	8.4	p2.5	N29°35.207	W094°56.2	59	5354
10	00:04:46	326.1	11.9	s35.0	N29°34.329	W094°55.5	51	11364	148.8	8.4	p2.5	N29°35.211	W094°56.2	58	5279
11	00:04:44	326.0	11.9	s35.0	N29°34.324	W094°55.5	51	11348	148.8	8.4	p2.5	N29°35.215	W094°56.2	57	3750



	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:06:50	330.2	11.5	s19.8	N29°34.670	W094°55.7	51	11639	150.8	8.8	s20.4	N29°34.954	W094°56.0	62	4976
8	00:06:48	330.3	11.5	s19.8	N29°34.664	W094°55.7	51	11642	150.7	8.8	s20.4	N29°34.959	W094°56.0	62	4969
9	00:06:46	330.4	11.5	s15.1	N29°34.659	W094°55.7	51	11645	150.6	8.8	s20.5	N29°34.963	W094°56.0	62	4954
10	00:06:44	330.6	11.5	s10.0	N29°34.653	W094°55.7	51	11647	150.5	8.8	s24.5	N29°34.967	W094°56.0	62	4950
11	00:06:42	330.8	11.5	s4.2	N29°34.648	W094°55.7	51	11642	150.4	8.8	s29.2	N29°34.971	W094°56.0	62	4936

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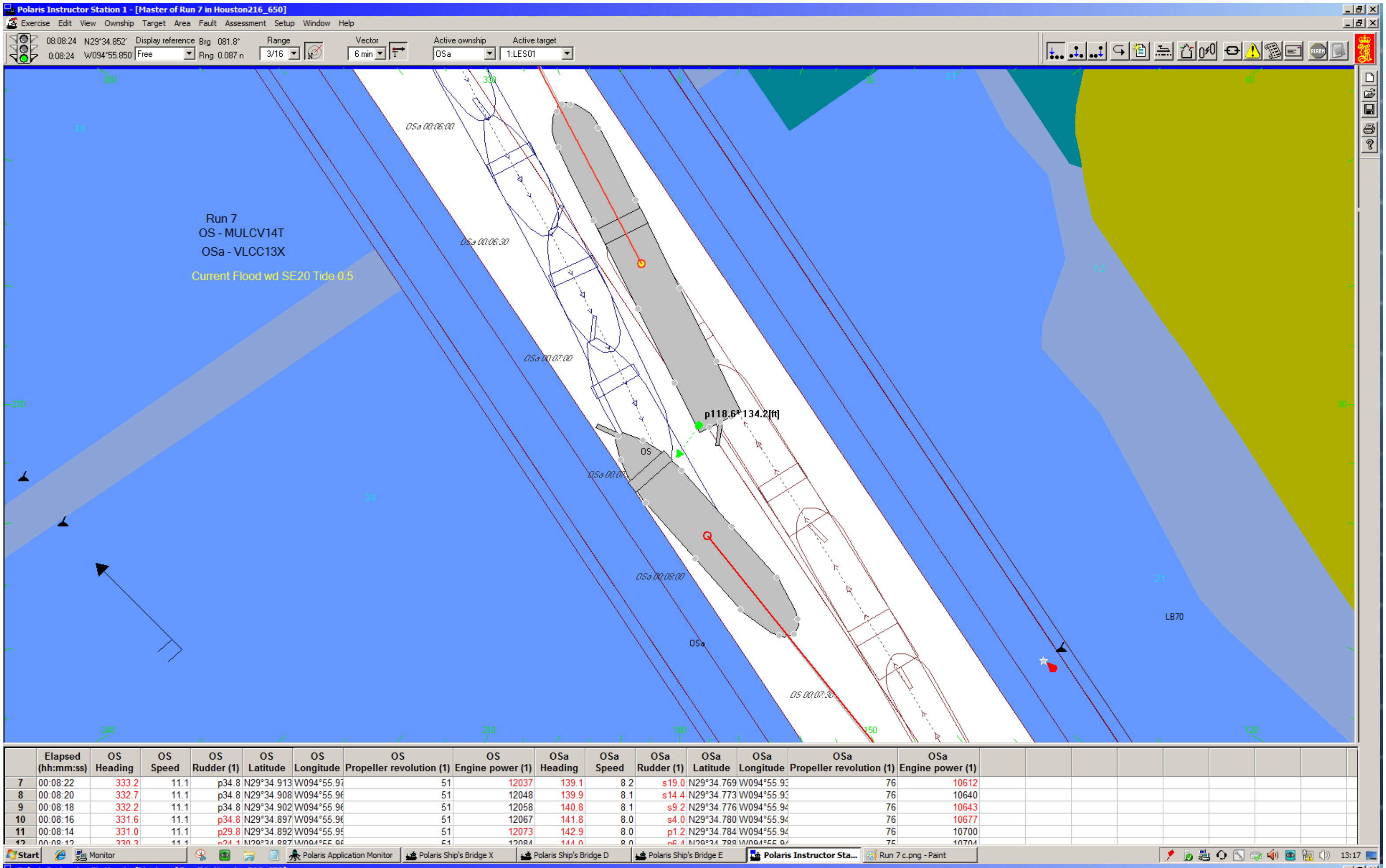
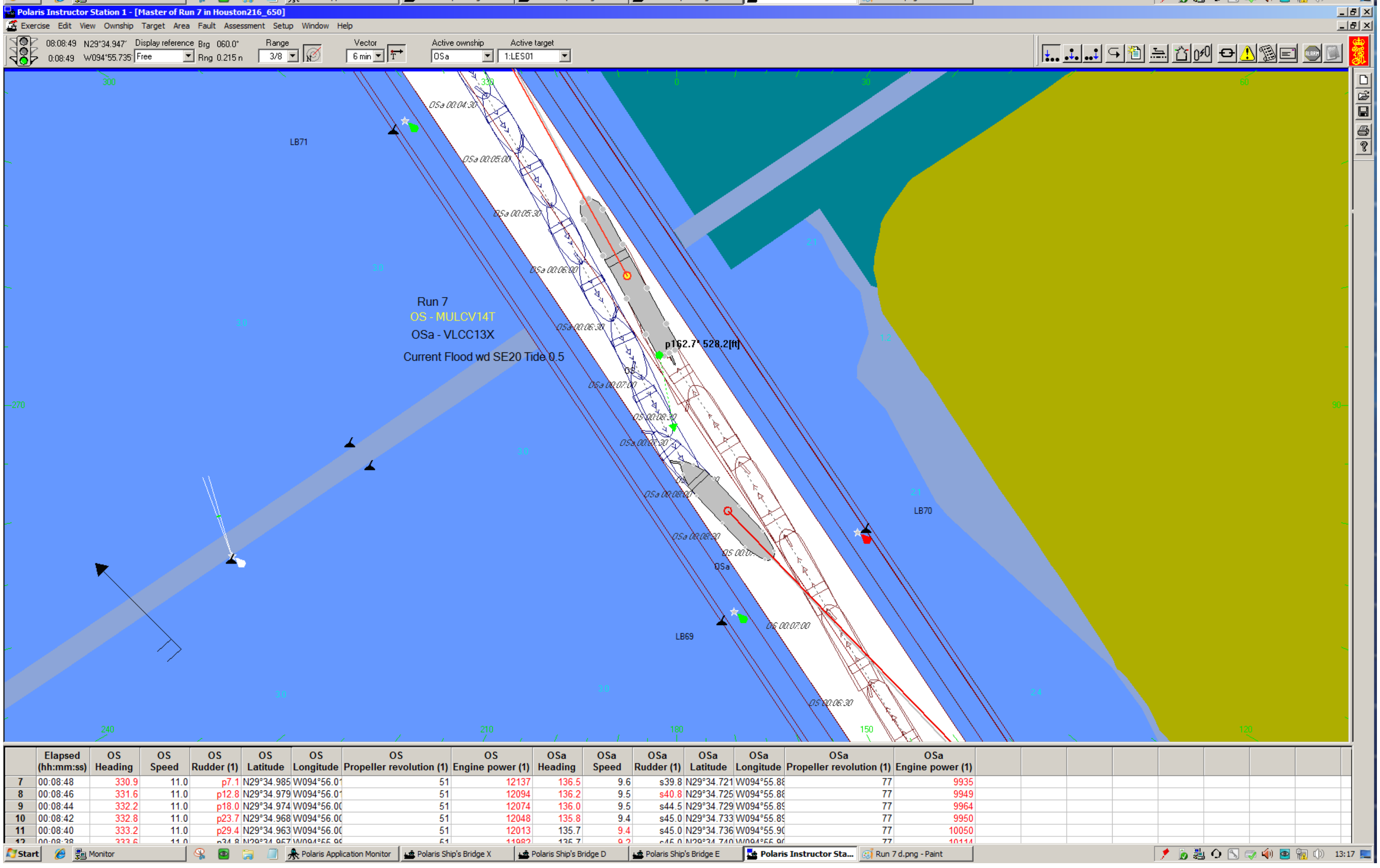


Polaris Instructor Station 1 - [Master of Run 7 in Houston216_650]

08:08:24 N29°34.852′ Display reference Free Brg 081.8° Range 3/16 Vector 6 min Active ownship OSa Active target 1:LES01

0:08:24 W094°55.850′ Rng 0.087 n

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:08:22	333.2	11.1	p34.8	N29°34.913	W094°55.97	51	12037	139.1	8.2	s19.0	N29°34.769	W094°55.93	76	10612
8	00:08:20	332.7	11.1	p34.8	N29°34.908	W094°55.96	51	12048	139.9	8.1	s14.4	N29°34.773	W094°55.93	76	10640
9	00:08:18	332.2	11.1	p34.8	N29°34.902	W094°55.96	51	12058	140.8	8.1	s9.2	N29°34.776	W094°55.94	76	10643
10	00:08:16	331.6	11.1	p34.8	N29°34.897	W094°55.96	51	12067	141.8	8.0	s4.0	N29°34.780	W094°55.94	76	10677
11	00:08:14	331.0	11.1	p29.8	N29°34.892	W094°55.95	51	12073	142.9	8.0	p1.2	N29°34.784	W094°55.94	76	10700

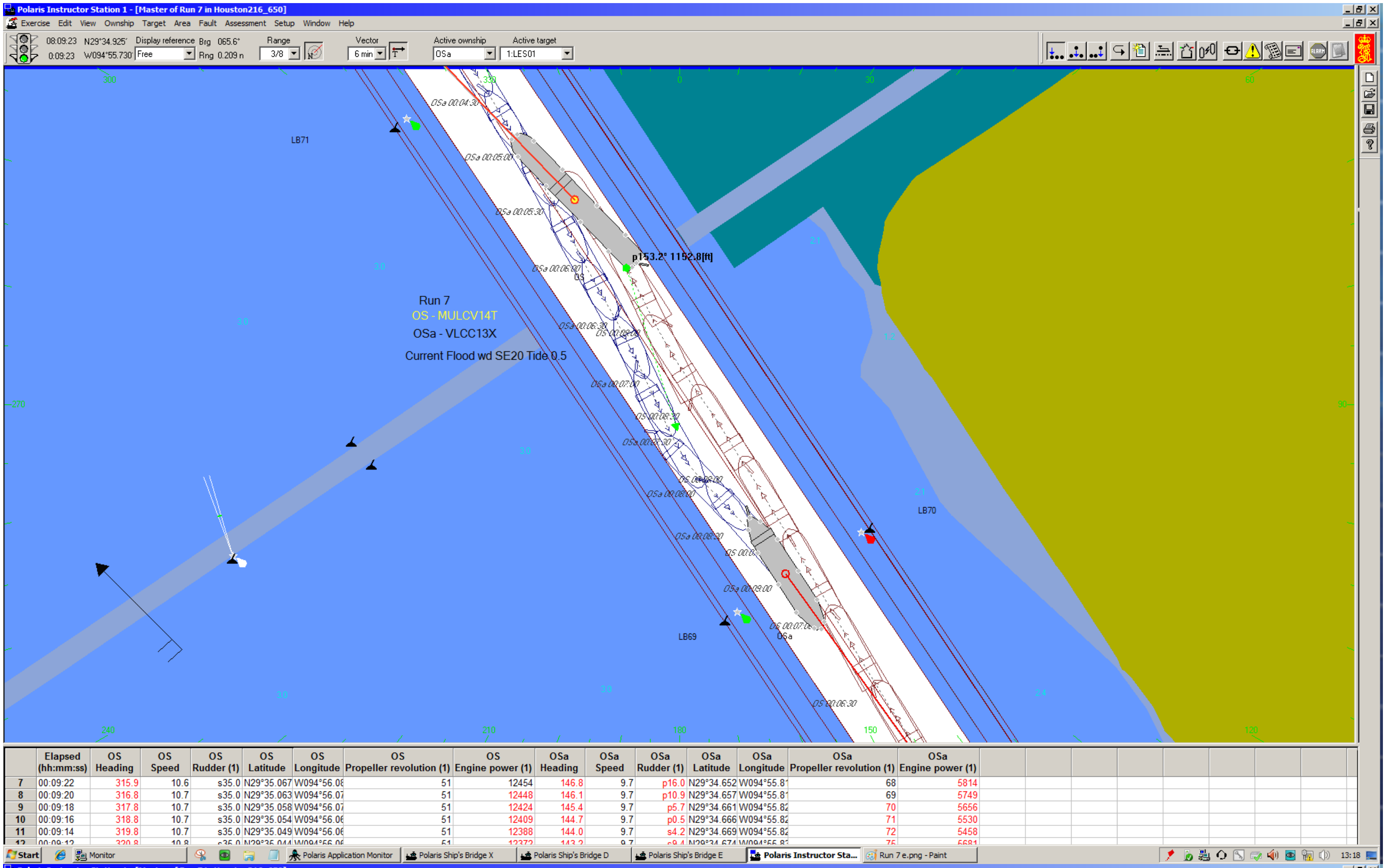


Polaris Instructor Station 1 - [Master of Run 7 in Houston216_650]

08:08:49 N29°34.947′ Display reference Free Brg 060.0° Range 3/8 Vector 6 min Active ownship OSa Active target 1:LES01

0:08:49 W094°55.735′ Rng 0.215 n

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:08:48	330.9	11.0	p7.1	N29°34.985	W094°56.01	51	12137	136.5	9.6	s39.8	N29°34.721	W094°55.88	77	9935
8	00:08:46	331.6	11.0	p12.8	N29°34.979	W094°56.01	51	12094	136.2	9.5	s40.8	N29°34.725	W094°55.88	77	9949
9	00:08:44	332.2	11.0	p18.0	N29°34.974	W094°56.00	51	12074	136.0	9.5	s44.5	N29°34.729	W094°55.89	77	9964
10	00:08:42	332.8	11.0	p23.7	N29°34.968	W094°56.00	51	12048	135.8	9.4	s45.0	N29°34.733	W094°55.89	77	9950
11	00:08:40	333.2	11.0	p29.4	N29°34.963	W094°56.00	51	12013	135.7	9.4	s45.0	N29°34.736	W094°55.90	77	10050

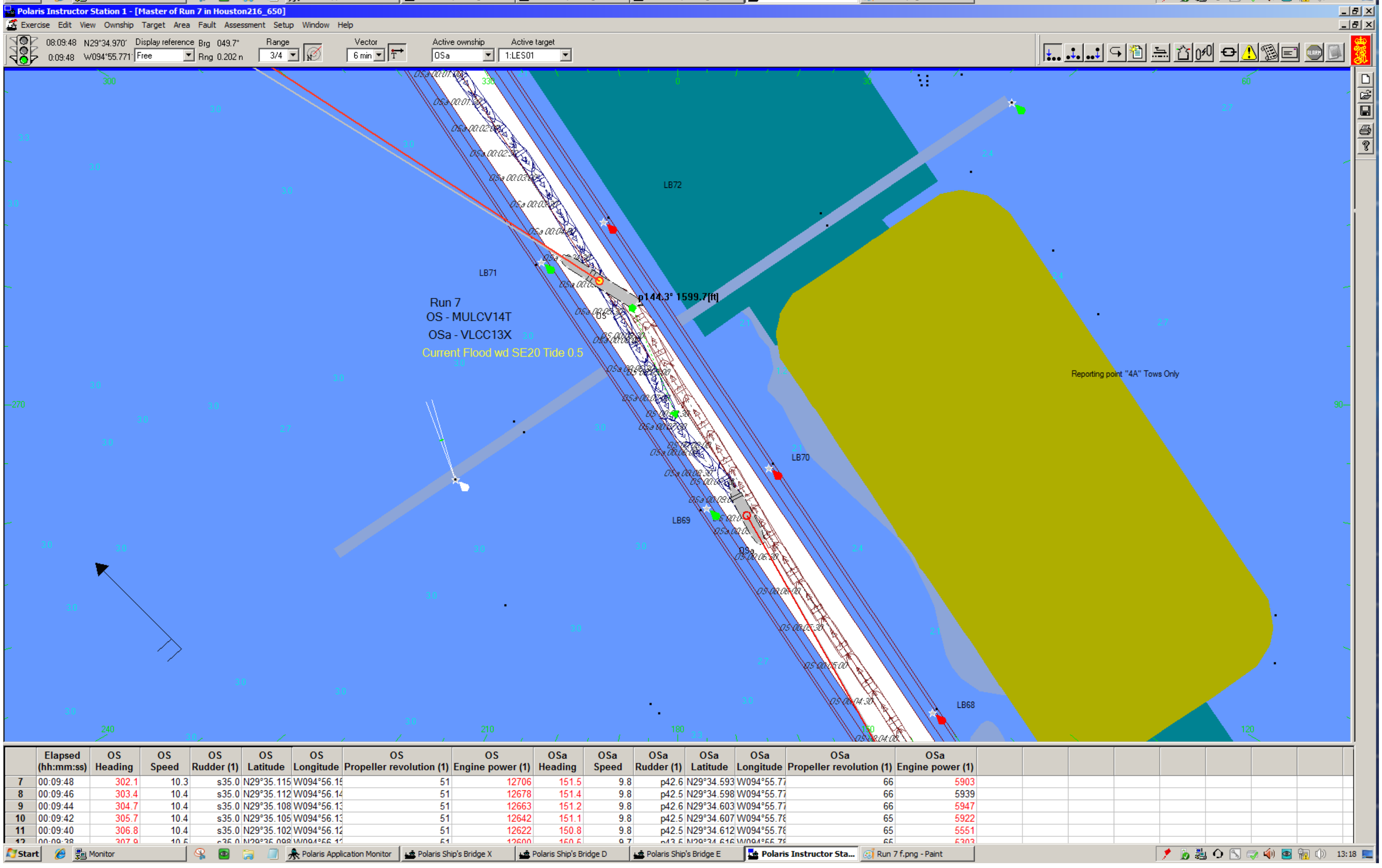


Polaris Instructor Station 1 - [Master of Run 7 in Houston216_650]

08:09:23 N29°34.925' W094°55.730' 0:09:23 Display reference Free Brg 065.6° Rng 0.209 n Range 3/8 Vector 6 min Active ownship OSa Active target 1:LES01

Run 7
OS - MULCV14T
OSa - VLCC13X
Current Flood wd SE20 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:09:22	315.9	10.6	s35.0	N29°35.067	W094°56.08	51	12454	146.8	9.7	p16.0	N29°34.652	W094°55.81	68	5814
8	00:09:20	316.8	10.7	s35.0	N29°35.063	W094°56.07	51	12448	146.1	9.7	p10.9	N29°34.657	W094°55.81	69	5749
9	00:09:18	317.8	10.7	s35.0	N29°35.058	W094°56.07	51	12424	145.4	9.7	p5.7	N29°34.661	W094°55.82	70	5656
10	00:09:16	318.8	10.7	s35.0	N29°35.054	W094°56.06	51	12409	144.7	9.7	p0.5	N29°34.666	W094°55.82	71	5530
11	00:09:14	319.8	10.7	s35.0	N29°35.049	W094°56.06	51	12388	144.0	9.7	s4.2	N29°34.669	W094°55.82	72	5458

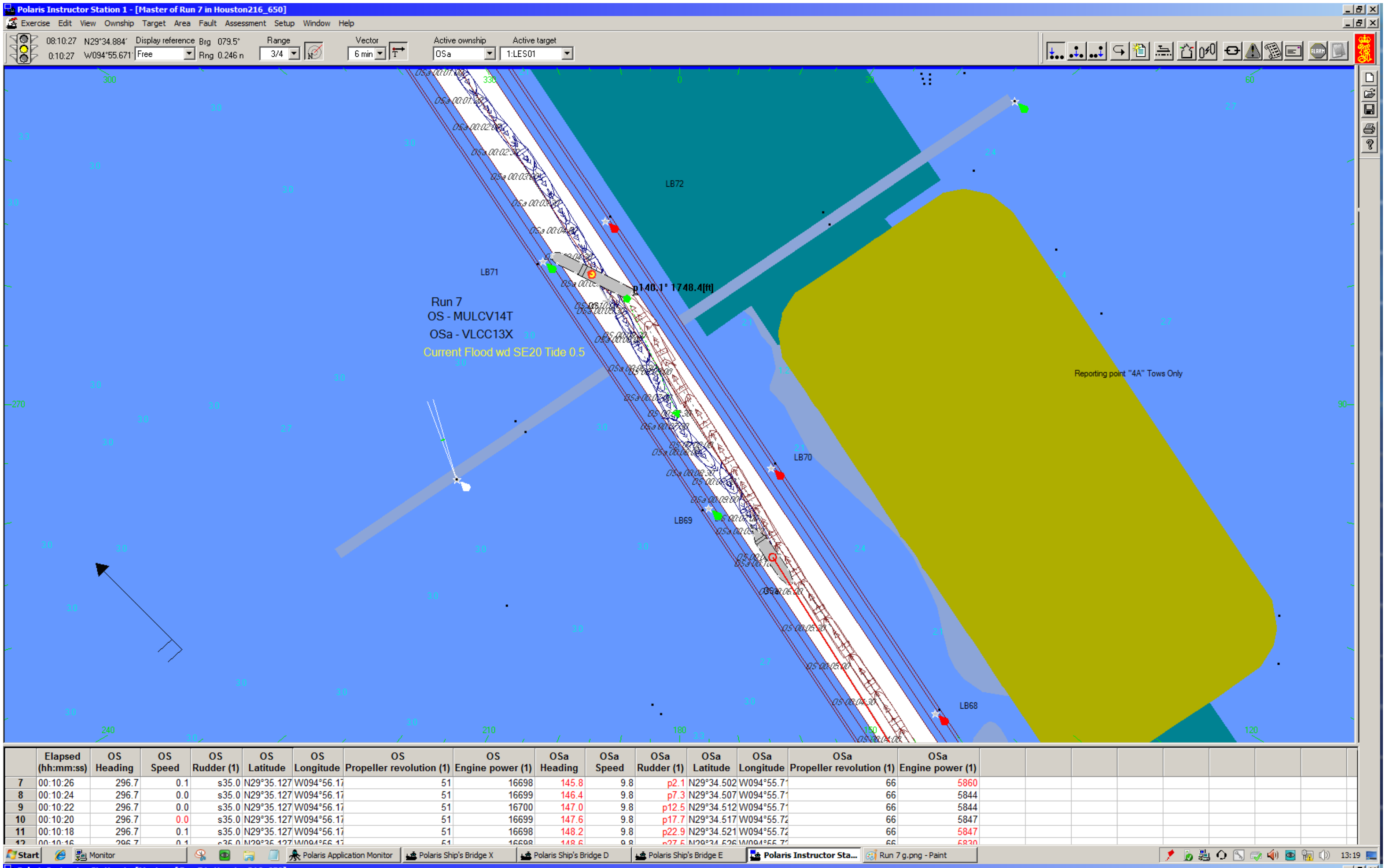


Polaris Instructor Station 1 - [Master of Run 7 in Houston216_650]

08:09:48 N29°34.970' W094°55.771' 0:09:48 Display reference Free Brg 049.7° Rng 0.202 n Range 3/4 Vector 6 min Active ownship OSa Active target 1:LES01

Run 7
OS - MULCV14T
OSa - VLCC13X
Current Flood wd SE20 Tide 0.5

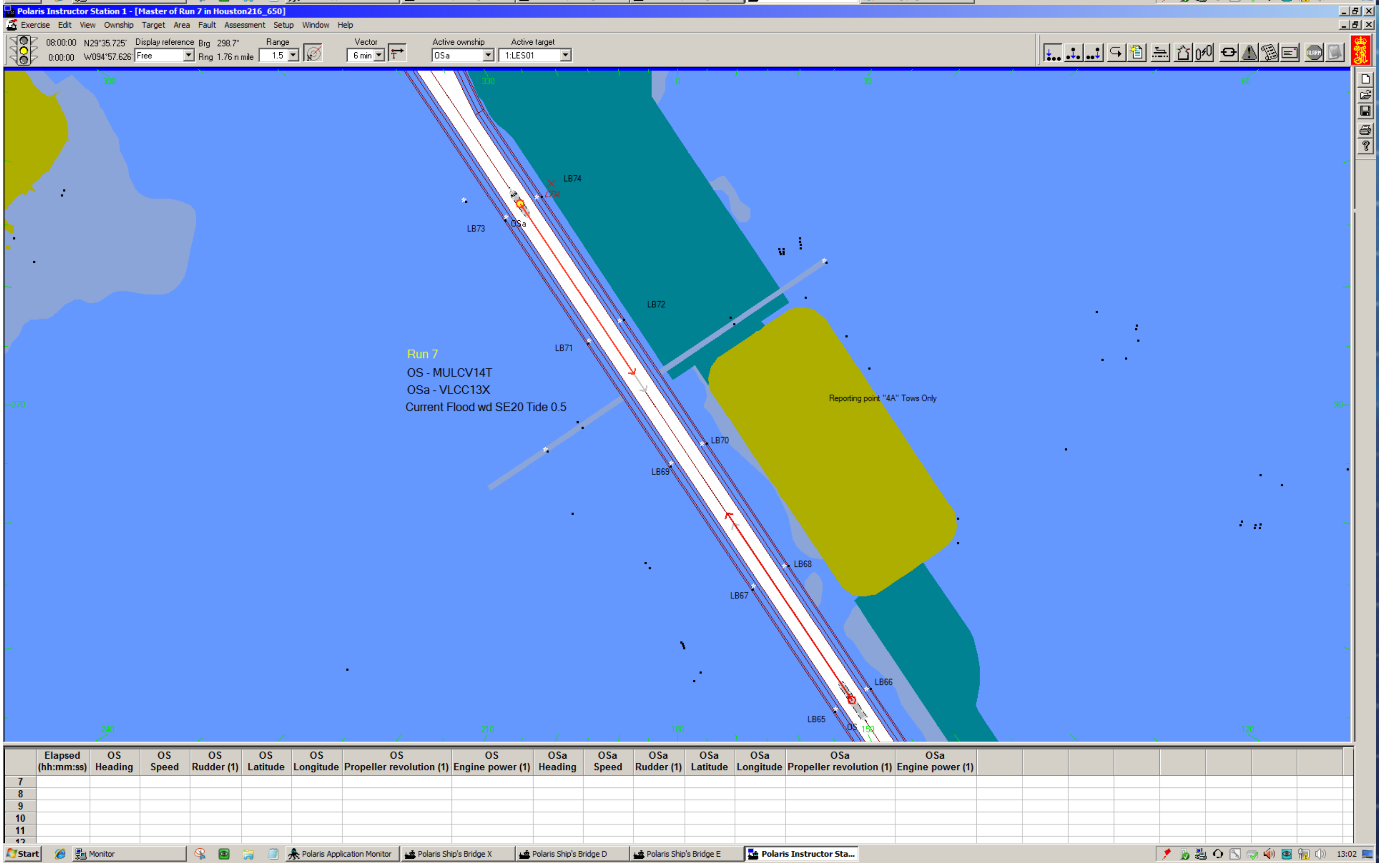
	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:09:48	302.1	10.3	s35.0	N29°35.115	W094°56.15	51	12706	151.5	9.8	p42.6	N29°34.593	W094°55.77	66	5903
8	00:09:46	303.4	10.4	s35.0	N29°35.112	W094°56.14	51	12678	151.4	9.8	p42.5	N29°34.598	W094°55.77	66	5939
9	00:09:44	304.7	10.4	s35.0	N29°35.108	W094°56.13	51	12663	151.2	9.8	p42.6	N29°34.603	W094°55.77	66	5947
10	00:09:42	305.7	10.4	s35.0	N29°35.105	W094°56.13	51	12642	151.1	9.8	p42.5	N29°34.607	W094°55.78	65	5922
11	00:09:40	306.8	10.4	s35.0	N29°35.102	W094°56.12	51	12622	150.8	9.8	p42.5	N29°34.612	W094°55.78	65	5551



08:10:27 N29°34.884′ Display reference Free Brg 079.5° Rng 0.246 n
0:10:27 W094°55.671′
Range 3/4
Vector 6 min
Active ownship OSa
Active target 1:LES01

Run 7
OS - MULCV14T
OSa - VLCC13X
Current Flood wd SE20 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:10:26	296.7	0.1	s35.0	N29°35.127	W094°56.17	51	16698	145.8	9.8	p2.1	N29°34.502	W094°55.71	66	5860
8	00:10:24	296.7	0.0	s35.0	N29°35.127	W094°56.17	51	16699	146.4	9.8	p7.3	N29°34.507	W094°55.71	66	5844
9	00:10:22	296.7	0.0	s35.0	N29°35.127	W094°56.17	51	16700	147.0	9.8	p12.5	N29°34.512	W094°55.71	66	5844
10	00:10:20	296.7	0.0	s35.0	N29°35.127	W094°56.17	51	16699	147.6	9.8	p17.7	N29°34.517	W094°55.72	66	5847
11	00:10:18	296.7	0.1	s35.0	N29°35.127	W094°56.17	51	16698	148.2	9.8	p22.9	N29°34.521	W094°55.72	66	5847
12	00:10:16	296.7	0.1	s35.0	N29°35.127	W094°56.17	51	16698	148.6	9.8	p27.5	N29°34.526	W094°55.72	66	5830



08:00:00 N29°35.725′ Display reference Free Brg 298.7° Rng 1.76 n mile
0:00:00 W094°57.626′
Range 1.5
Vector 6 min
Active ownship OSa
Active target 1:LES01

Run 7
OS - MULCV14T
OSa - VLCC13X
Current Flood wd SE20 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7															
8															
9															
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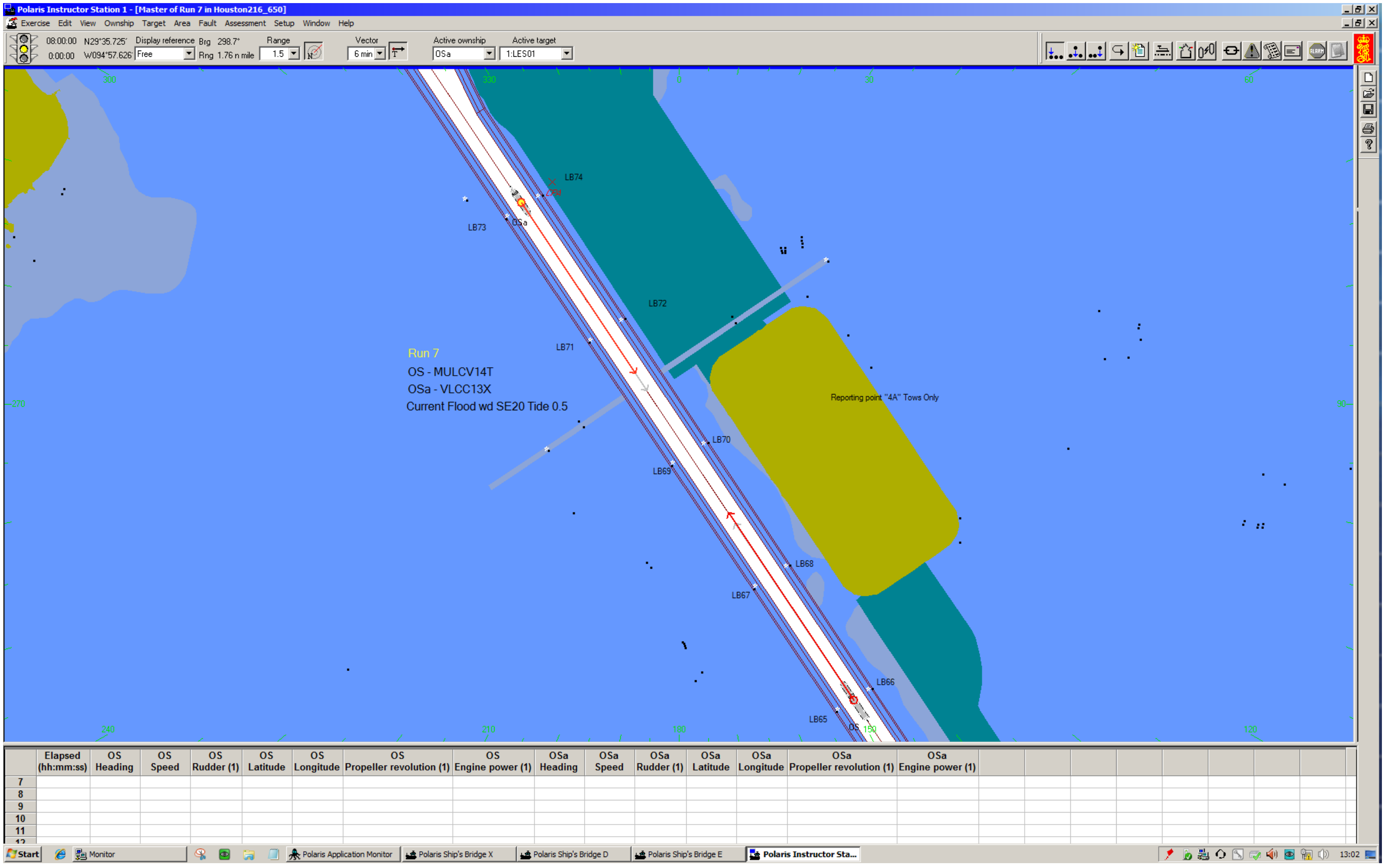
11															

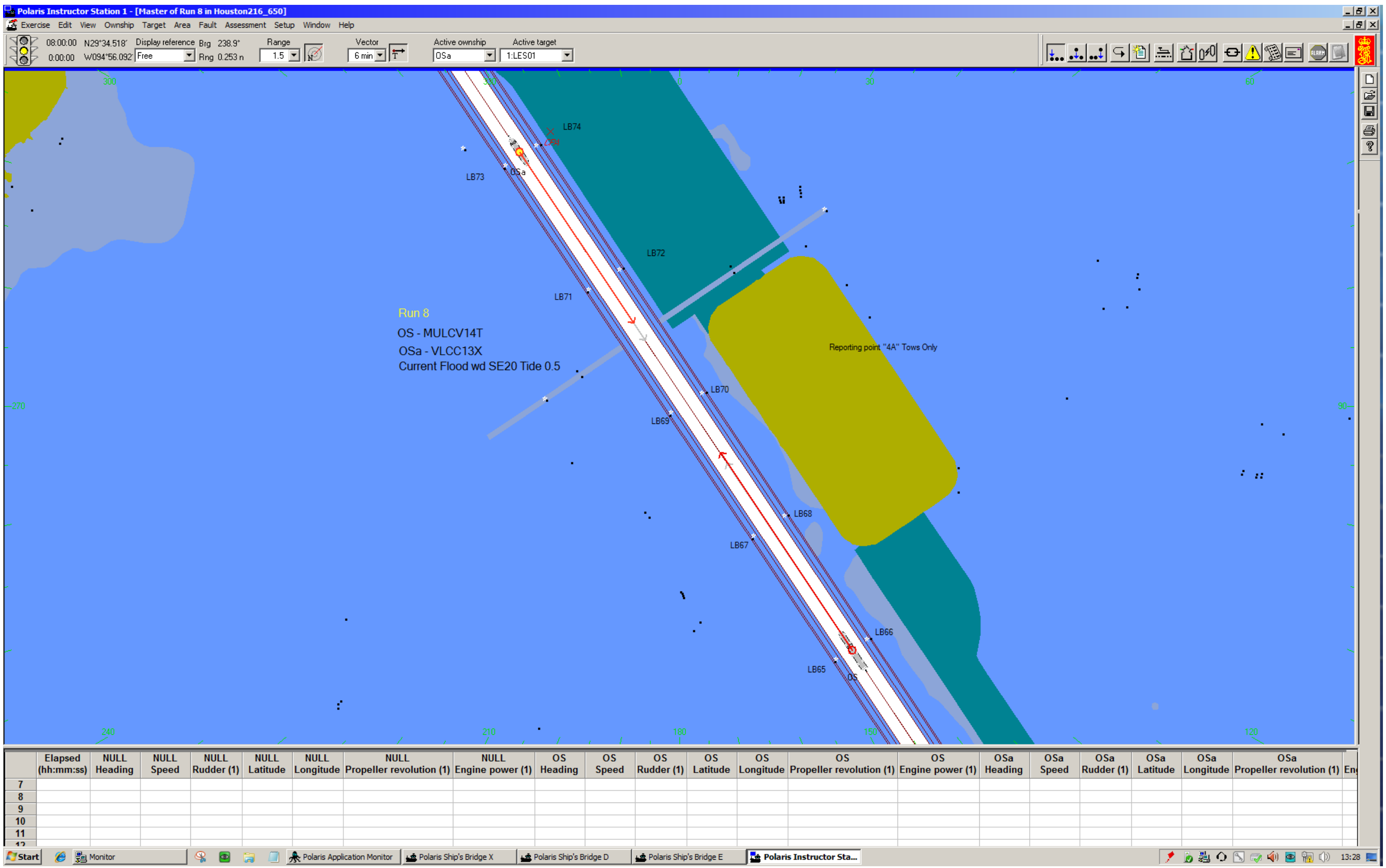


08:00:00 N29°35.725′
0:00:00 W094°57.626′
Display reference: Free
Brg 298.7°
Rng 1.76 n mile
Range: 1.5
Vector: 6 min
Active ownship: OSa
Active target: 1:LES01

Run 7
OS - MULCV14T
OSa - VLCC13X
Current Flood wd SE20 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7															
8															
9															
10															
11															

Run 8



Polaris Instructor Station 1 - [Master of Run 8 in Houston216_650]

08:00:00 N29°34.518' Display reference Free Brg 238.9° Rng 0.253 n Range 1.5 Vector 6 min Active ownship OSa Active target 1:LES01
0:00:00 W094°56.092'

Run 8

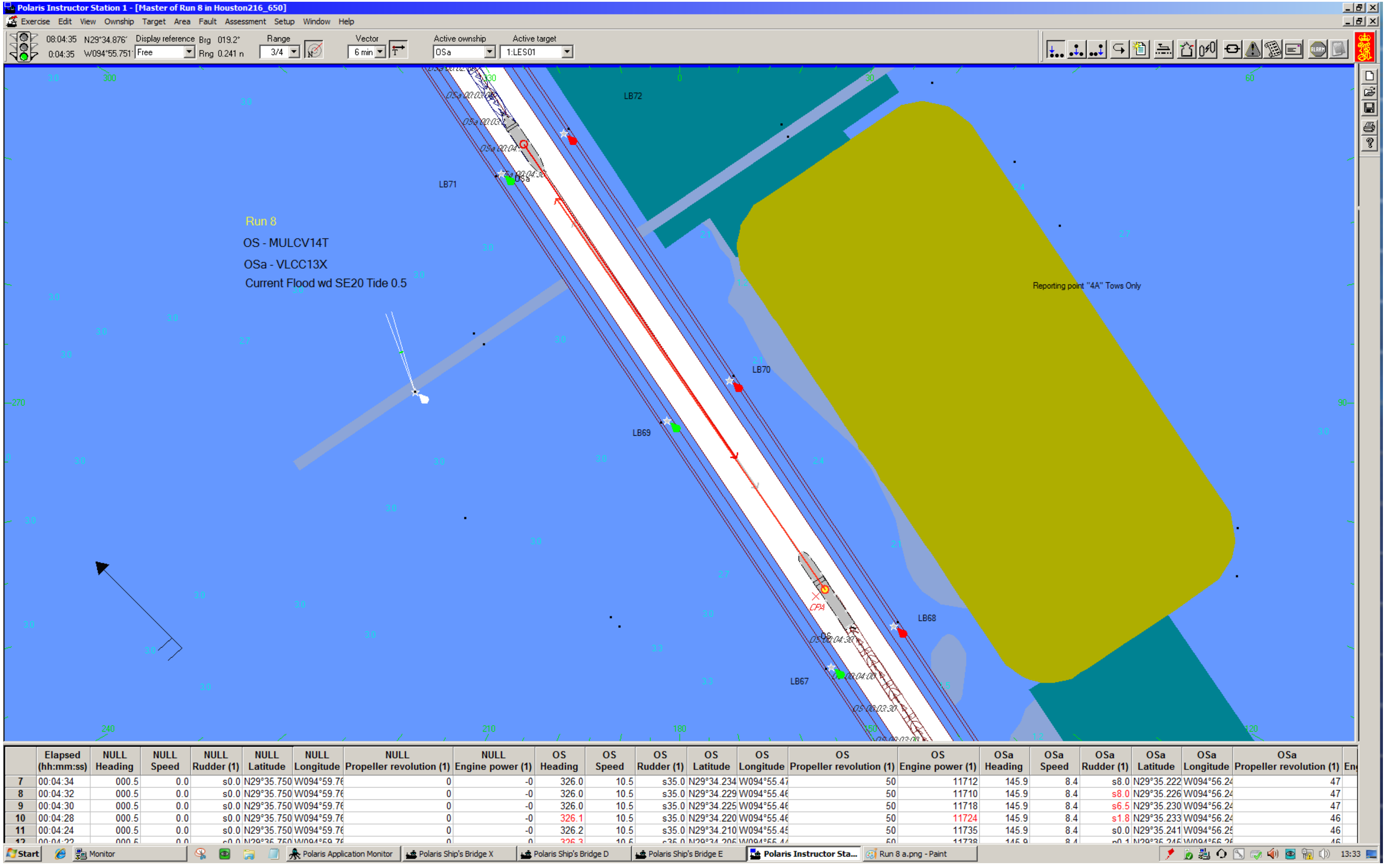
OS - MULCV14T

OSa - VLCC13X

Current Flood wd SE20 Tide 0.5

Reporting point "4A" Tows Only

	Elapsed (hh:mm:ss)	NULL Heading	NULL Speed	NULL Rudder (1)	NULL Latitude	NULL Longitude	NULL Propeller revolution (1)	NULL Engine power (1)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	En
7																						
8																						
9																						
10																						
11																						



Polaris Instructor Station 1 - [Master of Run 8 in Houston216_650]

08:04:35 N29°34.876' Display reference Free Brg 019.2° Rng 0.241 n Range 3/4 Vector 6 min Active ownship OSa Active target 1:LES01
0:04:35 W094°55.751'

Run 8

OS - MULCV14T

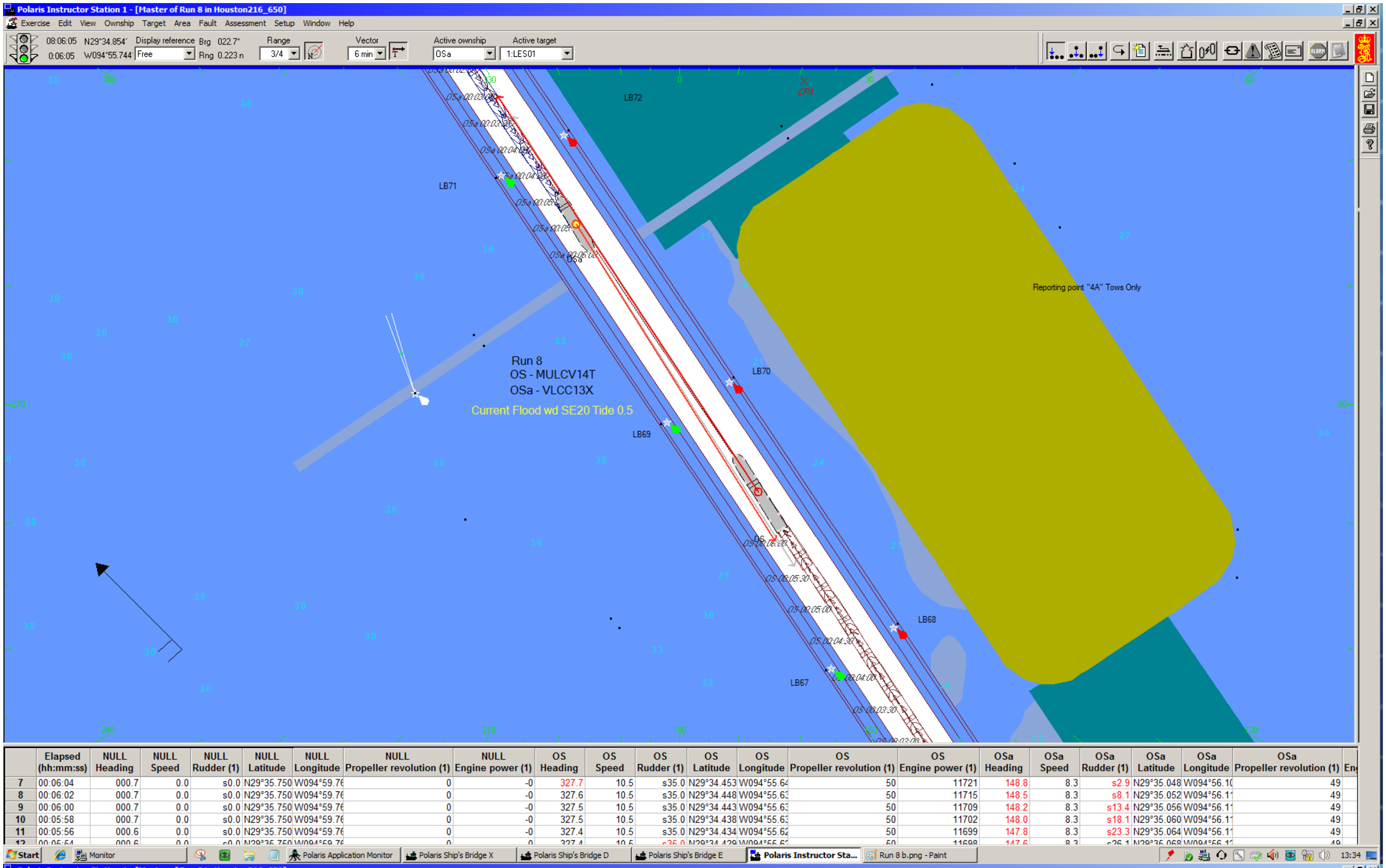
OSa - VLCC13X

Current Flood wd SE20 Tide 0.5

Reporting point "4A" Tows Only

	Elapsed (hh:mm:ss)	NULL Heading	NULL Speed	NULL Rudder (1)	NULL Latitude	NULL Longitude	NULL Propeller revolution (1)	NULL Engine power (1)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)
7	00:04:34	000.5	0.0	s0.0	N29°35.750	W094°59.76	0	-0	326.0	10.5	s35.0	N29°34.234	W094°55.47	50	11712	145.9	8.4	s8.0	N29°35.222	W094°56.24	47
8	00:04:32	000.5	0.0	s0.0	N29°35.750	W094°59.76	0	-0	326.0	10.5	s35.0	N29°34.229	W094°55.46	50	11710	145.9	8.4	s8.0	N29°35.226	W094°56.24	47
9	00:04:30	000.5	0.0	s0.0	N29°35.750	W094°59.76	0	-0	326.0	10.5	s35.0	N29°34.225	W094°55.46	50	11718	145.9	8.4	s6.5	N29°35.230	W094°56.24	47
10	00:04:28	000.5	0.0	s0.0	N29°35.750	W094°59.76	0	-0	326.1	10.5	s35.0	N29°34.220	W094°55.46	50	11724	145.9	8.4	s1.8	N29°35.233	W094°56.24	46
11	00:04:24	000.5	0.0	s0.0	N29°35.750	W094°59.76	0	-0	326.2	10.5	s35.0	N29°34.210	W094°55.45	50	11735	145.9	8.4	s0.0	N29°35.241	W094°56.25	46

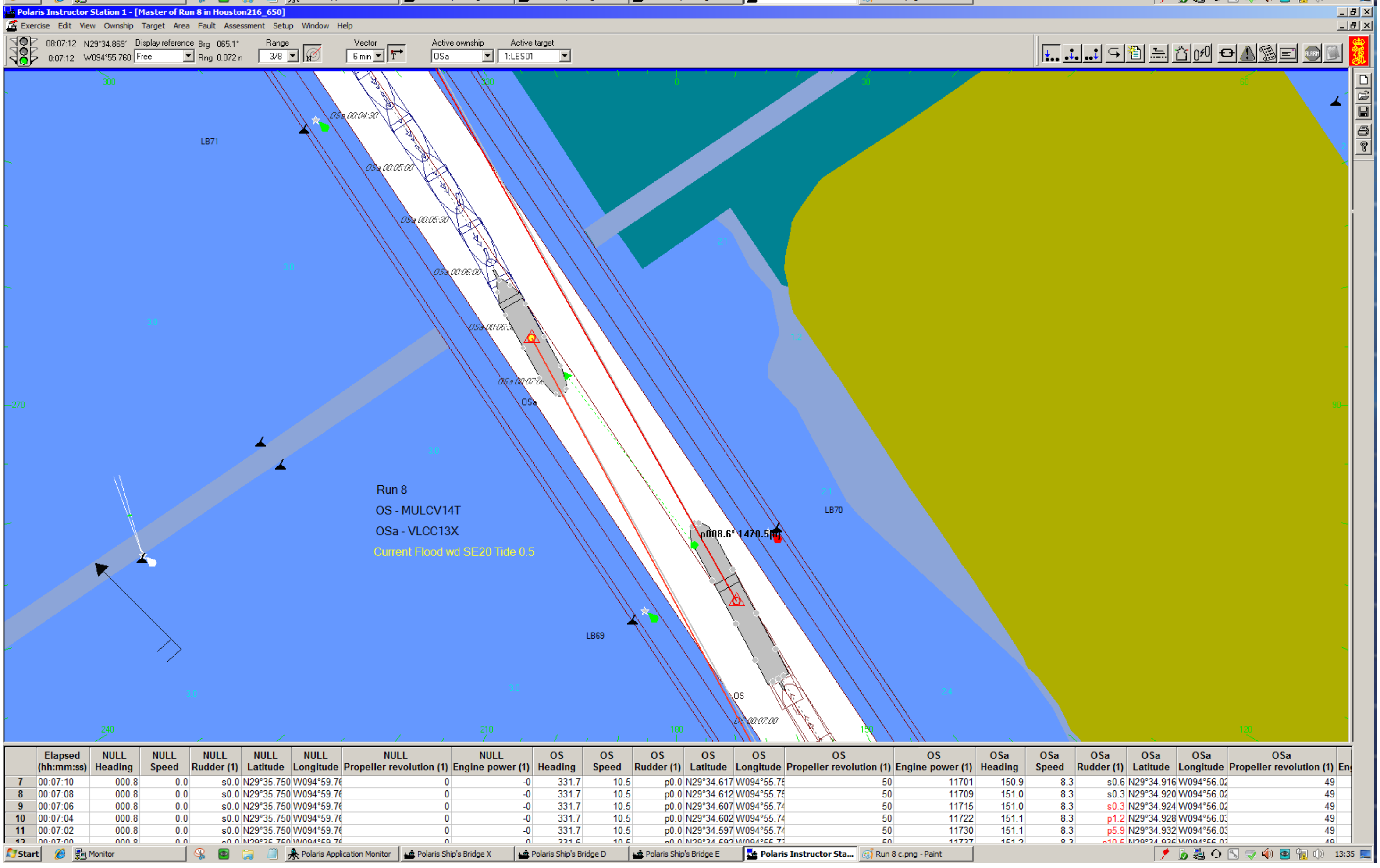
June 26, 2019



08:06:05 N29°34.854′ Display reference Free Brg 022.7° Range 3/4 Vector 6 min Active ownship OSa Active target 1:LES01
0:06:05 W094°55.744′ Rng 0.223 n

Run 8
OS - MULCV14T
OSa - VLCC13X
Current Flood wd SE20 Tide 0.5

	Elapsed (hh:mm:ss)	NULL Heading	NULL Speed	NULL Rudder (1)	NULL Latitude	NULL Longitude	NULL Propeller revolution (1)	NULL Engine power (1)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)
7	00:06:04	000.7	0.0	s0.0	N29°35.750	W094°59.76	0	-0	327.7	10.5	s35.0	N29°34.453	W094°55.64	50	11721	148.8	8.3	s2.9	N29°35.048	W094°56.10	49
8	00:06:02	000.7	0.0	s0.0	N29°35.750	W094°59.76	0	-0	327.6	10.5	s35.0	N29°34.448	W094°55.63	50	11715	148.5	8.3	s8.1	N29°35.052	W094°56.11	49
9	00:06:00	000.7	0.0	s0.0	N29°35.750	W094°59.76	0	-0	327.5	10.5	s35.0	N29°34.443	W094°55.63	50	11709	148.2	8.3	s13.4	N29°35.056	W094°56.11	49
10	00:05:58	000.7	0.0	s0.0	N29°35.750	W094°59.76	0	-0	327.5	10.5	s35.0	N29°34.438	W094°55.63	50	11702	148.0	8.3	s18.1	N29°35.060	W094°56.11	49
11	00:05:56	000.6	0.0	s0.0	N29°35.750	W094°59.76	0	-0	327.4	10.5	s35.0	N29°34.434	W094°55.62	50	11699	147.8	8.3	s23.3	N29°35.064	W094°56.11	49



08:07:12 N29°34.869′ Display reference Free Brg 065.1° Range 3/8 Vector 6 min Active ownship OSa Active target 1:LES01
0:07:12 W094°55.760′ Rng 0.072 n

Run 8
OS - MULCV14T
OSa - VLCC13X
Current Flood wd SE20 Tide 0.5

	Elapsed (hh:mm:ss)	NULL Heading	NULL Speed	NULL Rudder (1)	NULL Latitude	NULL Longitude	NULL Propeller revolution (1)	NULL Engine power (1)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)
7	00:07:10	000.8	0.0	s0.0	N29°35.750	W094°59.76	0	-0	331.7	10.5	p0.0	N29°34.617	W094°55.75	50	11701	150.9	8.3	s0.6	N29°34.916	W094°56.02	49
8	00:07:08	000.8	0.0	s0.0	N29°35.750	W094°59.76	0	-0	331.7	10.5	p0.0	N29°34.612	W094°55.75	50	11709	151.0	8.3	s0.3	N29°34.920	W094°56.02	49
9	00:07:06	000.8	0.0	s0.0	N29°35.750	W094°59.76	0	-0	331.7	10.5	p0.0	N29°34.607	W094°55.74	50	11715	151.0	8.3	s0.3	N29°34.924	W094°56.02	49
10	00:07:04	000.8	0.0	s0.0	N29°35.750	W094°59.76	0	-0	331.7	10.5	p0.0	N29°34.602	W094°55.74	50	11722	151.1	8.3	p1.2	N29°34.928	W094°56.03	49
11	00:07:02	000.8	0.0	s0.0	N29°35.750	W094°59.76	0	-0	331.7	10.5	p0.0	N29°34.597	W094°55.74	50	11730	151.1	8.3	p5.9	N29°34.932	W094°56.03	49

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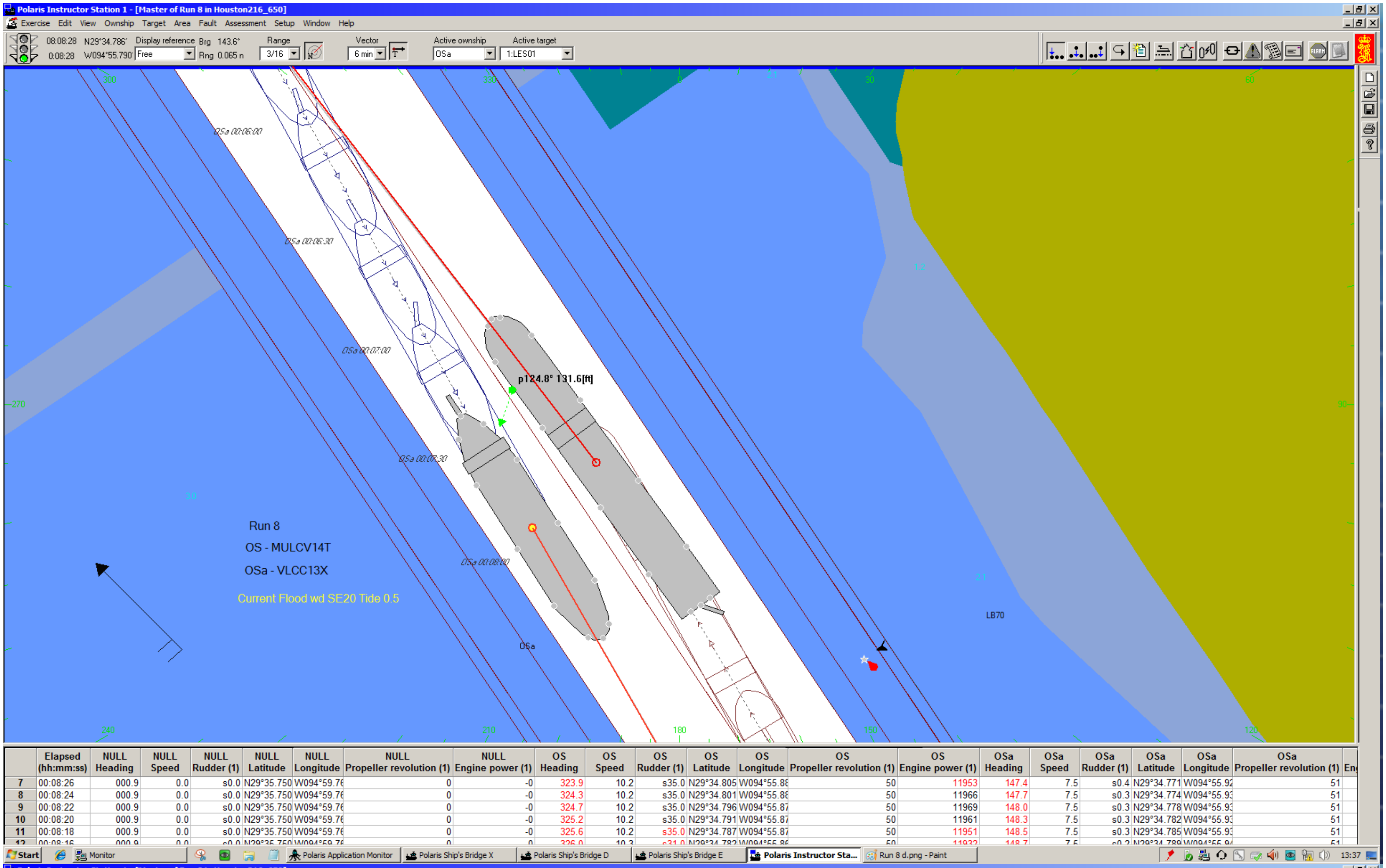
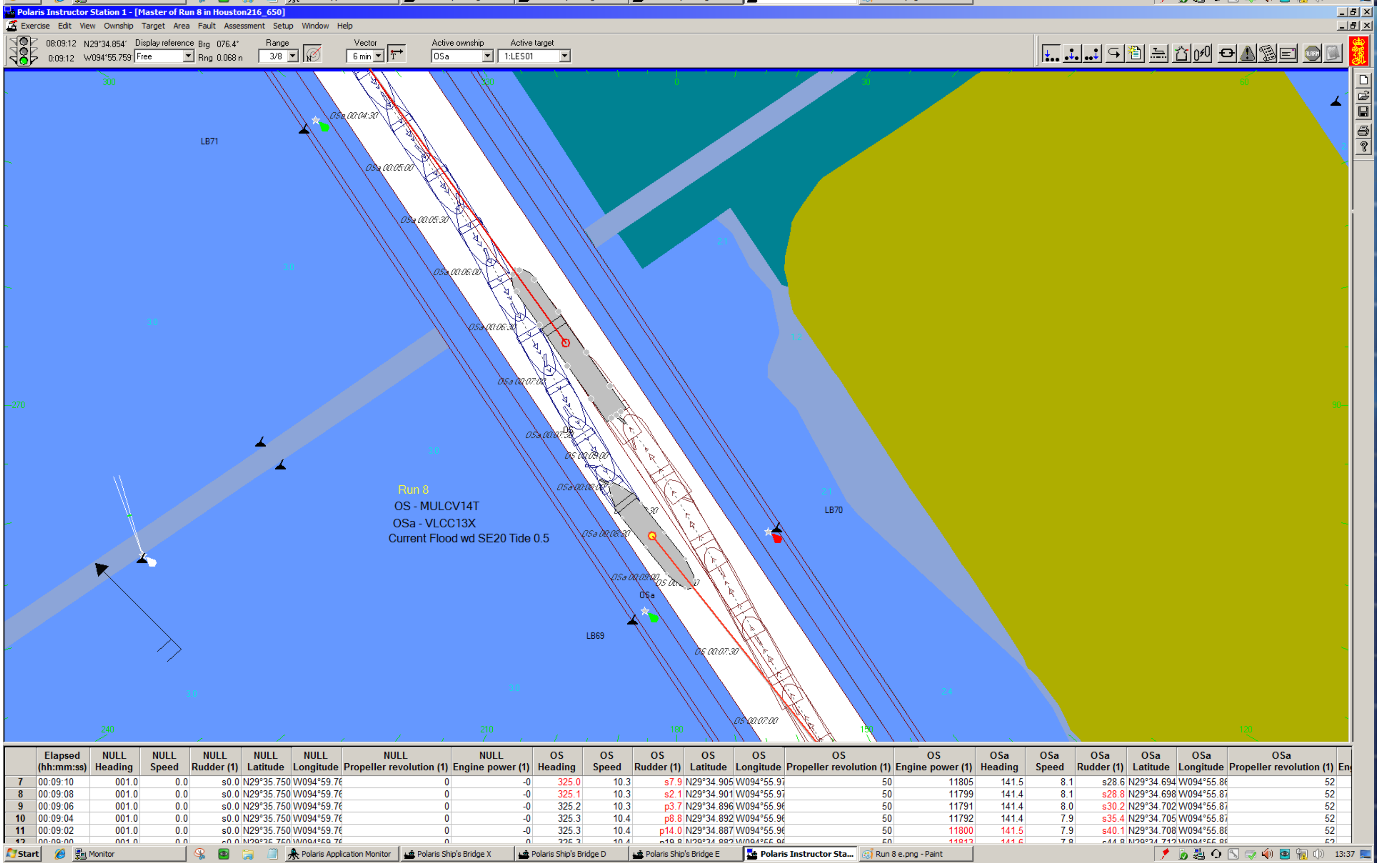


Polaris Instructor Station 1 - [Master of Run 8 in Houston216_650]

08:08:28 N29°34.786'
0:08:28 W094°55.790'
Display reference: Free
Brg 143.6°
Rng 0.065 n
Range: 3/16
Vector: 6 min
Active ownship: OSa
Active target: 1:LES01

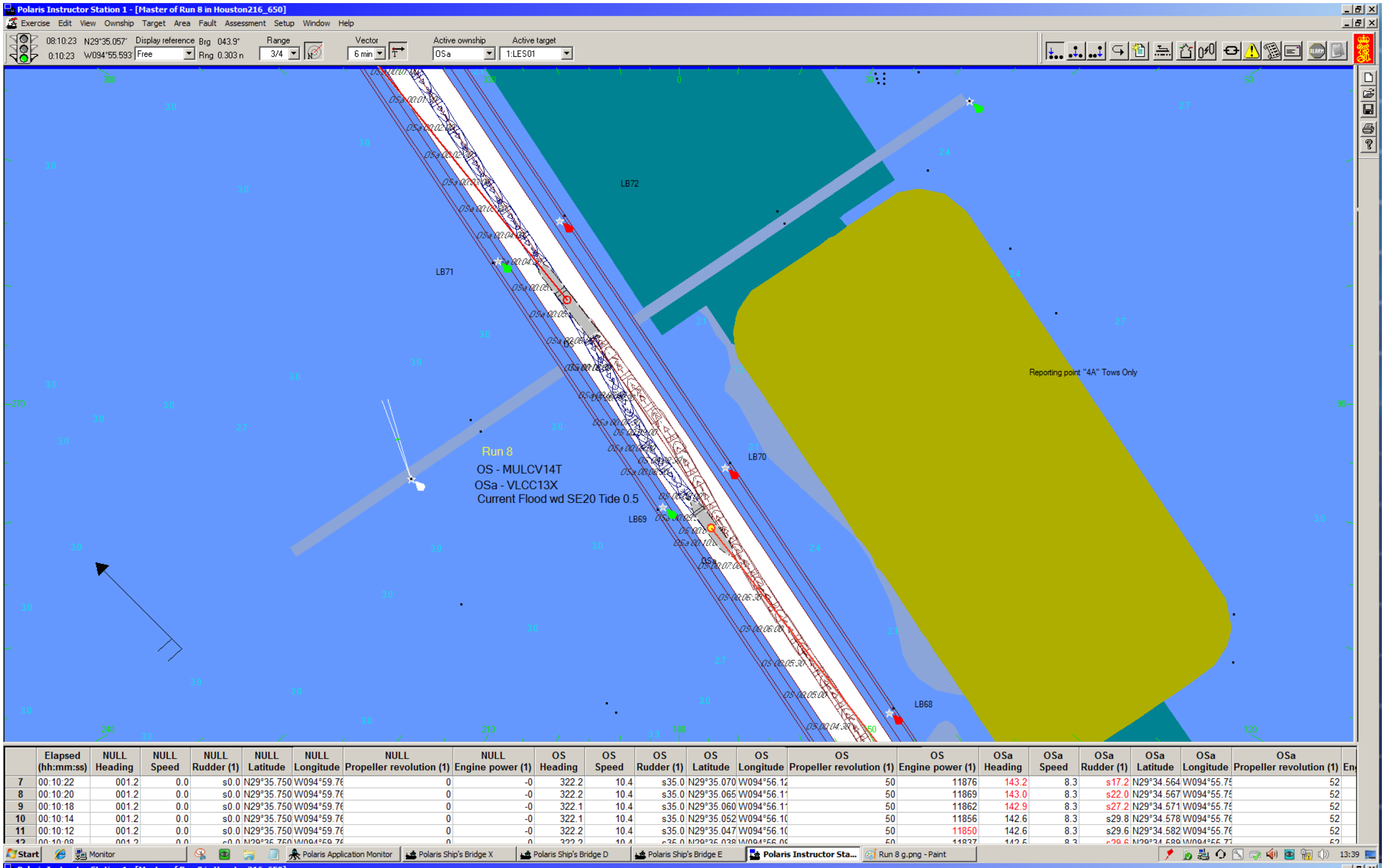
	Elapsed (hh:mm:ss)	NULL Heading	NULL Speed	NULL Rudder (1)	NULL Latitude	NULL Longitude	NULL Propeller revolution (1)	NULL Engine power (1)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)
7	00:08:26	000.9	0.0	s0.0	N29°35.750	W094°59.76	0	-0	323.9	10.2	s35.0	N29°34.805	W094°55.88	50	11953	147.4	7.5	s0.4	N29°34.771	W094°55.92	51
8	00:08:24	000.9	0.0	s0.0	N29°35.750	W094°59.76	0	-0	324.3	10.2	s35.0	N29°34.801	W094°55.88	50	11966	147.7	7.5	s0.3	N29°34.774	W094°55.93	51
9	00:08:22	000.9	0.0	s0.0	N29°35.750	W094°59.76	0	-0	324.7	10.2	s35.0	N29°34.796	W094°55.87	50	11969	148.0	7.5	s0.3	N29°34.778	W094°55.93	51
10	00:08:20	000.9	0.0	s0.0	N29°35.750	W094°59.76	0	-0	325.2	10.2	s35.0	N29°34.791	W094°55.87	50	11961	148.3	7.5	s0.3	N29°34.782	W094°55.93	51
11	00:08:18	000.9	0.0	s0.0	N29°35.750	W094°59.76	0	-0	325.6	10.2	s35.0	N29°34.787	W094°55.87	50	11951	148.5	7.5	s0.3	N29°34.785	W094°55.93	51



Polaris Instructor Station 1 - [Master of Run 8 in Houston216_650]

08:09:12 N29°34.854'
0:09:12 W094°55.759'
Display reference: Free
Brg 076.4°
Rng 0.068 n
Range: 3/8
Vector: 6 min
Active ownship: OSa
Active target: 1:LES01

	Elapsed (hh:mm:ss)	NULL Heading	NULL Speed	NULL Rudder (1)	NULL Latitude	NULL Longitude	NULL Propeller revolution (1)	NULL Engine power (1)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)
7	00:09:10	001.0	0.0	s0.0	N29°35.750	W094°59.76	0	-0	325.0	10.3	s7.9	N29°34.905	W094°55.97	50	11805	141.5	8.1	s28.6	N29°34.694	W094°55.86	52
8	00:09:08	001.0	0.0	s0.0	N29°35.750	W094°59.76	0	-0	325.1	10.3	s2.1	N29°34.901	W094°55.97	50	11799	141.4	8.1	s28.8	N29°34.698	W094°55.87	52
9	00:09:06	001.0	0.0	s0.0	N29°35.750	W094°59.76	0	-0	325.2	10.3	p3.7	N29°34.896	W094°55.96	50	11791	141.4	8.0	s30.2	N29°34.702	W094°55.87	52
10	00:09:04	001.0	0.0	s0.0	N29°35.750	W094°59.76	0	-0	325.3	10.4	p8.8	N29°34.892	W094°55.96	50	11792	141.4	7.9	s35.4	N29°34.705	W094°55.87	52
11	00:09:02	001.0	0.0	s0.0	N29°35.750	W094°59.76	0	-0	325.3	10.4	p14.0	N29°34.887	W094°55.96	50	11800	141.5	7.9	s40.1	N29°34.708	W094°55.88	52

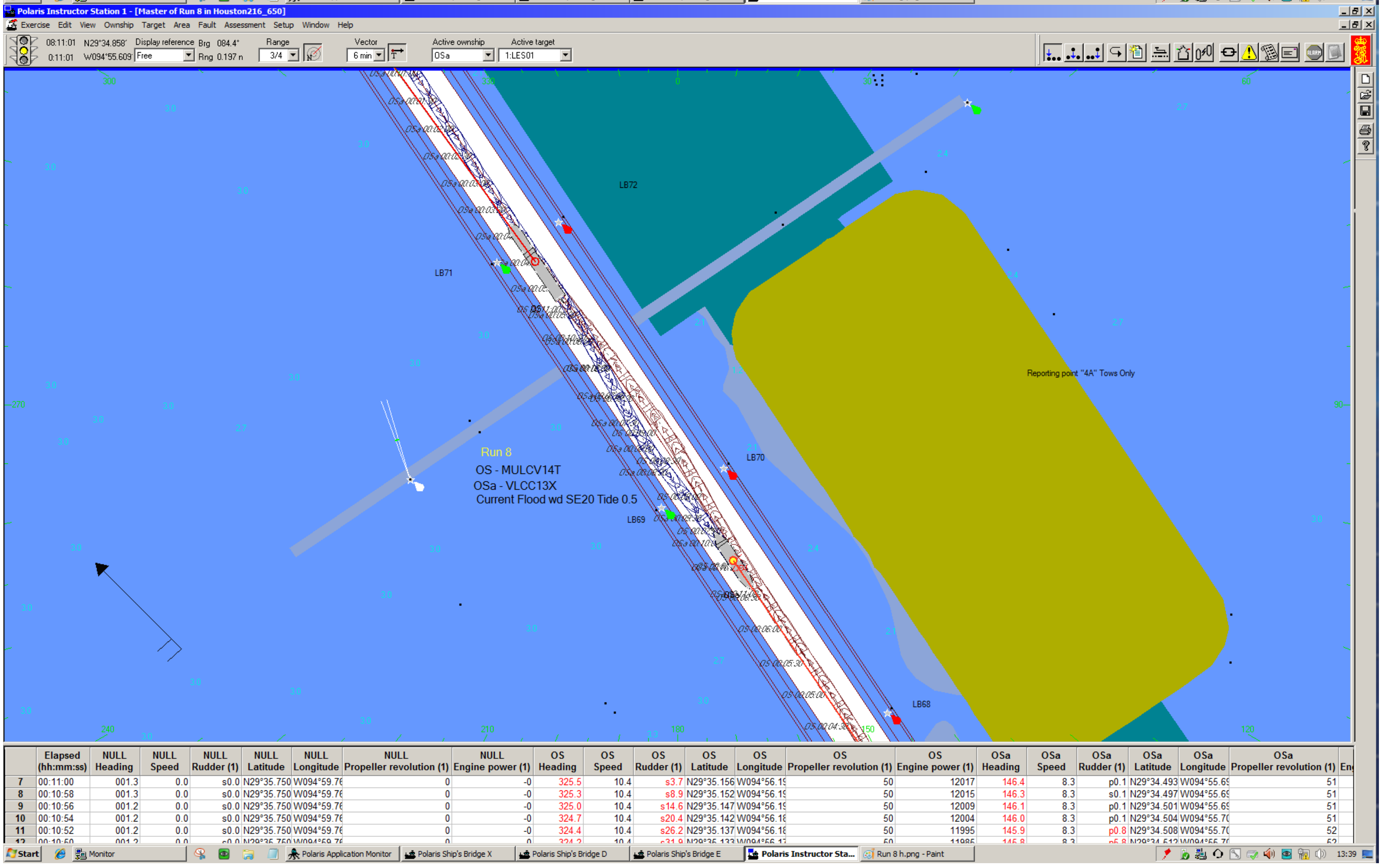


Polaris Instructor Station 1 - [Master of Run 8 in Houston216_650]

08:10:23 N29°35.057′ Display reference Free Brg 043.9° Rng 0.303 n Range 3/4 Vector 6 min Active ownship OSa Active target 1:LES01

0:10:23 W094°55.593′

	Elapsed (hh:mm:ss)	NULL Heading	NULL Speed	NULL Rudder (1)	NULL Latitude	NULL Longitude	NULL Propeller revolution (1)	NULL Engine power (1)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)
7	00:10:22	001.2	0.0	s0.0	N29°35.750	W094°59.76	0	-0	322.2	10.4	s35.0	N29°35.070	W094°56.12	50	11876	143.2	8.3	s17.2	N29°34.564	W094°55.75	52
8	00:10:20	001.2	0.0	s0.0	N29°35.750	W094°59.76	0	-0	322.2	10.4	s35.0	N29°35.065	W094°56.11	50	11869	143.0	8.3	s22.0	N29°34.567	W094°55.75	52
9	00:10:18	001.2	0.0	s0.0	N29°35.750	W094°59.76	0	-0	322.1	10.4	s35.0	N29°35.060	W094°56.11	50	11862	142.9	8.3	s27.2	N29°34.571	W094°55.75	52
10	00:10:14	001.2	0.0	s0.0	N29°35.750	W094°59.76	0	-0	322.1	10.4	s35.0	N29°35.052	W094°56.10	50	11856	142.6	8.3	s29.8	N29°34.578	W094°55.76	52
11	00:10:12	001.2	0.0	s0.0	N29°35.750	W094°59.76	0	-0	322.2	10.4	s35.0	N29°35.047	W094°56.10	50	11850	142.6	8.3	s29.6	N29°34.582	W094°55.76	52



Polaris Instructor Station 1 - [Master of Run 8 in Houston216_650]

08:11:01 N29°34.858′ Display reference Free Brg 084.4° Rng 0.197 n Range 3/4 Vector 6 min Active ownship OSa Active target 1:LES01

0:11:01 W094°55.609′

	Elapsed (hh:mm:ss)	NULL Heading	NULL Speed	NULL Rudder (1)	NULL Latitude	NULL Longitude	NULL Propeller revolution (1)	NULL Engine power (1)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)
7	00:11:00	001.3	0.0	s0.0	N29°35.750	W094°59.76	0	-0	325.5	10.4	s3.7	N29°35.156	W094°56.19	50	12017	146.4	8.3	p0.1	N29°34.493	W094°55.69	51
8	00:10:58	001.3	0.0	s0.0	N29°35.750	W094°59.76	0	-0	325.3	10.4	s8.9	N29°35.152	W094°56.19	50	12015	146.3	8.3	s0.1	N29°34.497	W094°55.69	51
9	00:10:56	001.2	0.0	s0.0	N29°35.750	W094°59.76	0	-0	325.0	10.4	s14.6	N29°35.147	W094°56.19	50	12009	146.1	8.3	p0.1	N29°34.501	W094°55.69	51
10	00:10:54	001.2	0.0	s0.0	N29°35.750	W094°59.76	0	-0	324.7	10.4	s20.4	N29°35.142	W094°56.18	50	12004	146.0	8.3	p0.1	N29°34.504	W094°55.70	51
11	00:10:52	001.2	0.0	s0.0	N29°35.750	W094°59.76	0	-0	324.4	10.4	s26.2	N29°35.137	W094°56.18	50	11995	145.9	8.3	p0.8	N29°34.508	W094°55.70	52

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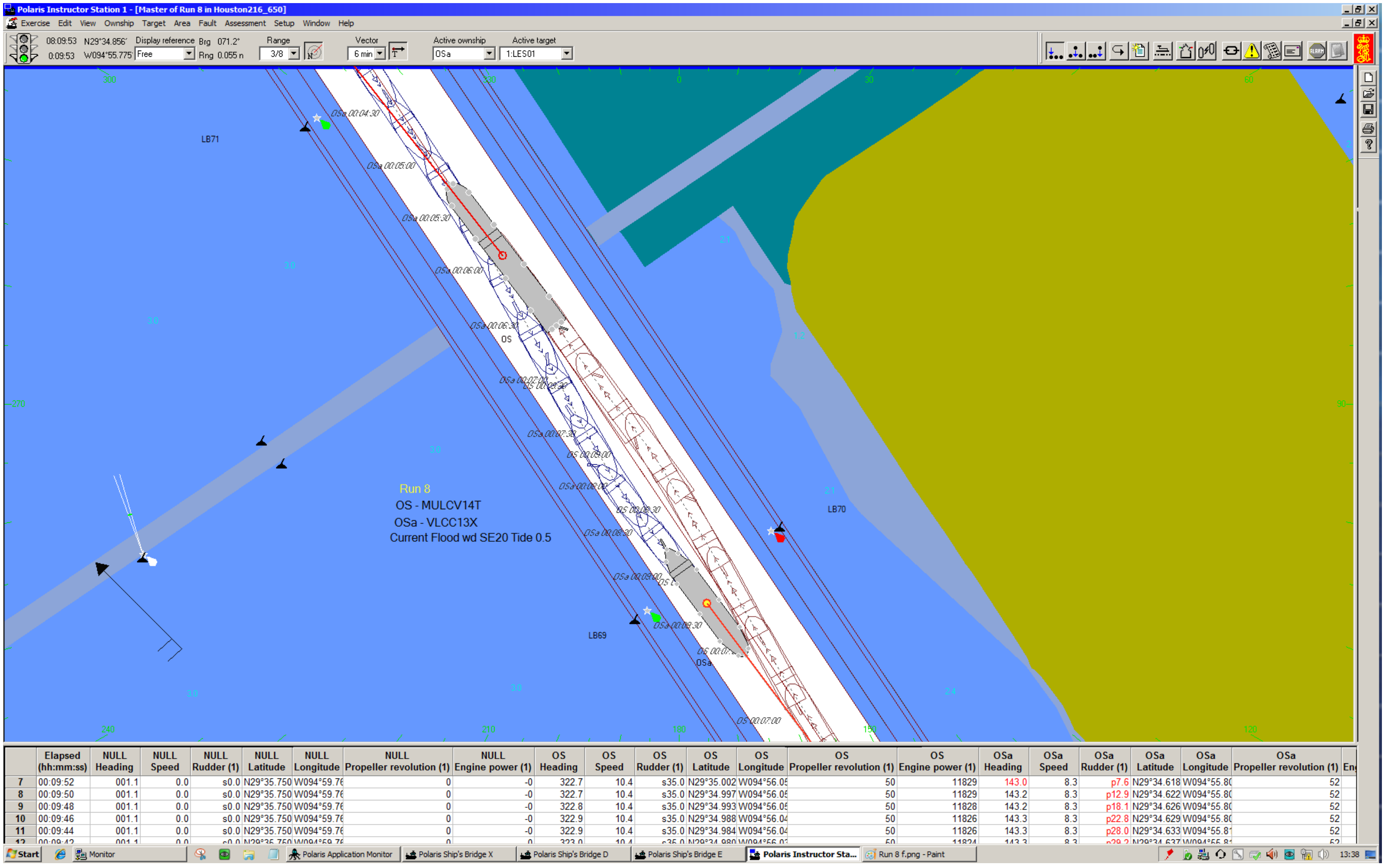

Polaris Instructor Station 1 - [Master of Run 8 in Houston216_650]

08:09:53 N29°34.856' Display reference Free Brg 071.2° Range 3/8 Vector 6 min Active ownship OSa Active target 1:LES01

0:09:53 W094°55.775' Rng 0.055 n

	Elapsed (hh:mm:ss)	NULL Heading	NULL Speed	NULL Rudder (1)	NULL Latitude	NULL Longitude	NULL Propeller revolution (1)	NULL Engine power (1)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)
7	00:09:52	001.1	0.0	s0.0	N29°35.750	W094°59.76	0	-0	322.7	10.4	s35.0	N29°35.002	W094°56.05	50	11829	143.0	8.3	p7.6	N29°34.618	W094°55.80	52
8	00:09:50	001.1	0.0	s0.0	N29°35.750	W094°59.76	0	-0	322.7	10.4	s35.0	N29°34.997	W094°56.05	50	11829	143.2	8.3	p12.9	N29°34.622	W094°55.80	52
9	00:09:48	001.1	0.0	s0.0	N29°35.750	W094°59.76	0	-0	322.8	10.4	s35.0	N29°34.993	W094°56.05	50	11828	143.2	8.3	p18.1	N29°34.626	W094°55.80	52
10	00:09:46	001.1	0.0	s0.0	N29°35.750	W094°59.76	0	-0	322.9	10.4	s35.0	N29°34.988	W094°56.04	50	11826	143.3	8.3	p22.8	N29°34.629	W094°55.80	52
11	00:09:44	001.1	0.0	s0.0	N29°35.750	W094°59.76	0	-0	322.9	10.4	s35.0	N29°34.984	W094°56.04	50	11826	143.3	8.3	p28.0	N29°34.633	W094°55.81	52

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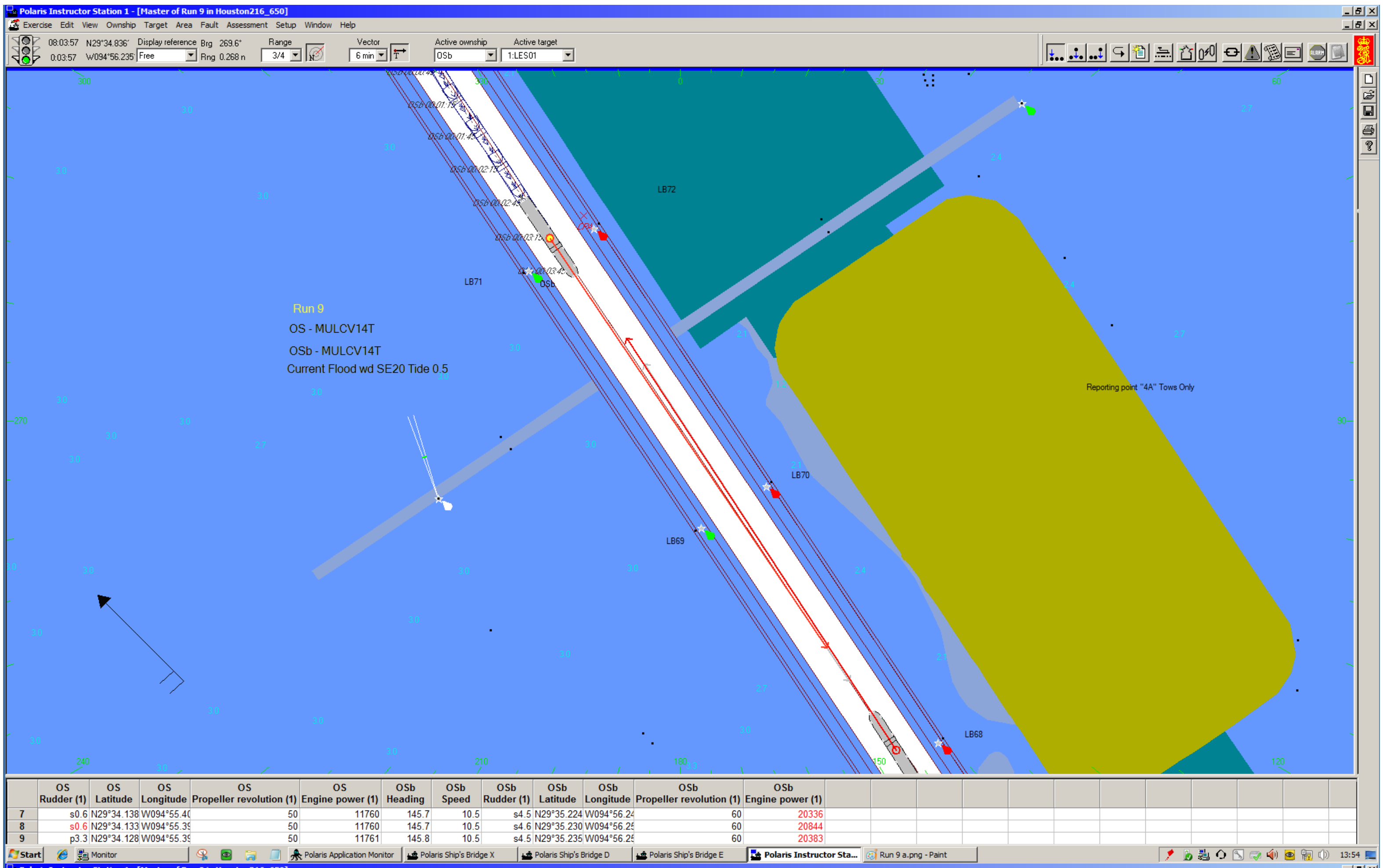
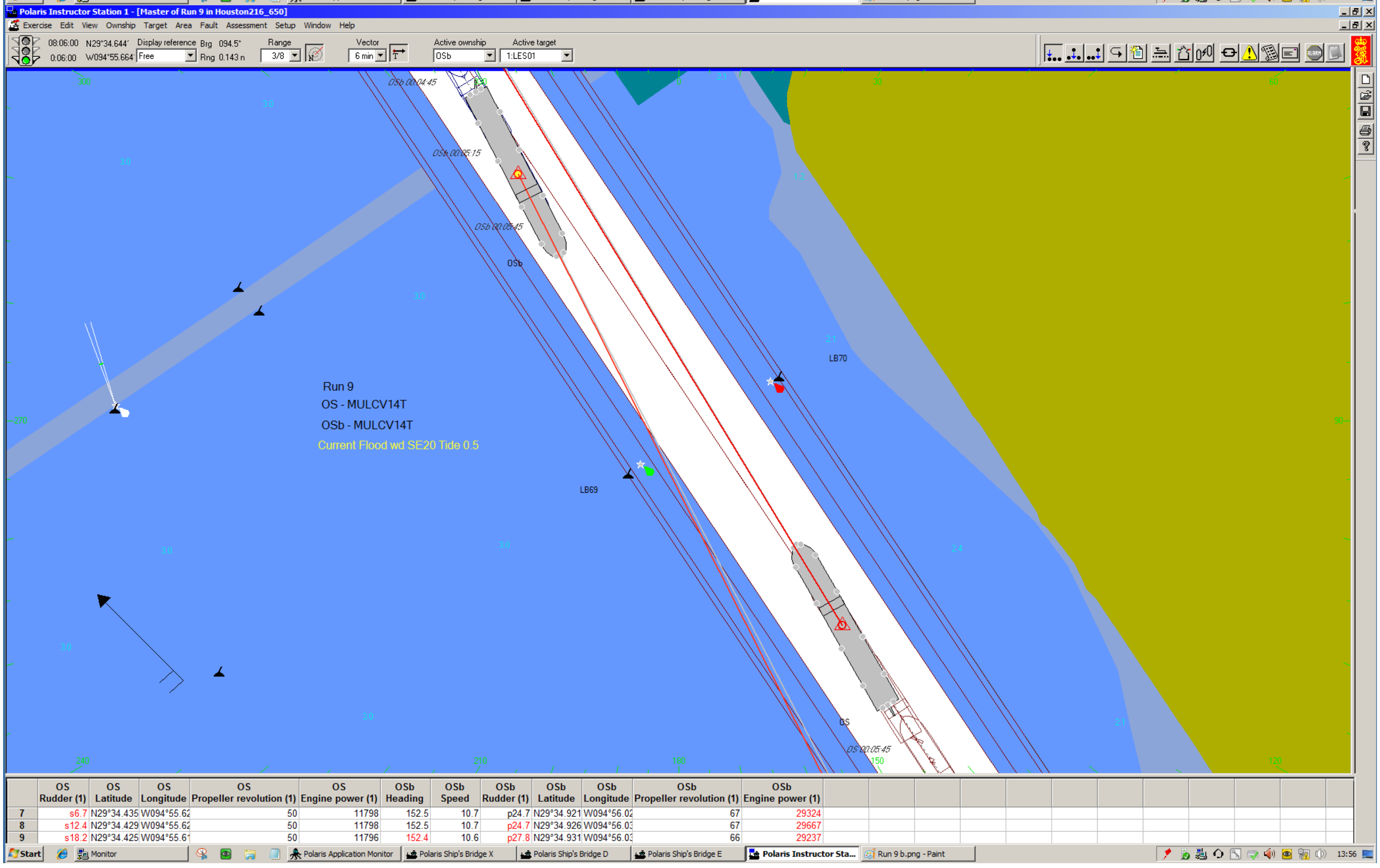
Run 9


Polaris Instructor Station 1 - [Master of Run 9 in Houston216_650]

08:03:57 N29°34.836′ Display reference Free Brg 269.6° Rng 0.268 n Range 3/4 Vector 6 min Active ownship OSb Active target 1:LES01
0:03:57 W094°56.235′

Run 9
OS - MULCV14T
OSb - MULCV14T
Current Flood wd SE20 Tide 0.5

	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	s0.6	N29°34.138	W094°55.40	50	11760	145.7	10.5	s4.5	N29°35.224	W094°56.24	60	20336
8	s0.6	N29°34.133	W094°55.39	50	11760	145.7	10.5	s4.6	N29°35.230	W094°56.25	60	20844
9	p3.3	N29°34.128	W094°55.39	50	11761	145.8	10.5	s4.5	N29°35.235	W094°56.25	60	20383


Polaris Instructor Station 1 - [Master of Run 9 in Houston216_650]

08:06:00 N29°34.644′ Display reference Free Brg 094.5° Rng 0.143 n Range 3/8 Vector 6 min Active ownship OSb Active target 1:LES01
0:06:00 W094°55.664′

Run 9
OS - MULCV14T
OSb - MULCV14T
Current Flood wd SE20 Tide 0.5

	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	s6.7	N29°34.435	W094°55.62	50	11798	152.5	10.7	p24.7	N29°34.921	W094°56.02	67	29324
8	s12.4	N29°34.429	W094°55.62	50	11798	152.5	10.7	p24.7	N29°34.926	W094°56.03	67	29667
9	s18.2	N29°34.425	W094°55.61	50	11796	152.4	10.6	p27.8	N29°34.931	W094°56.03	66	29237

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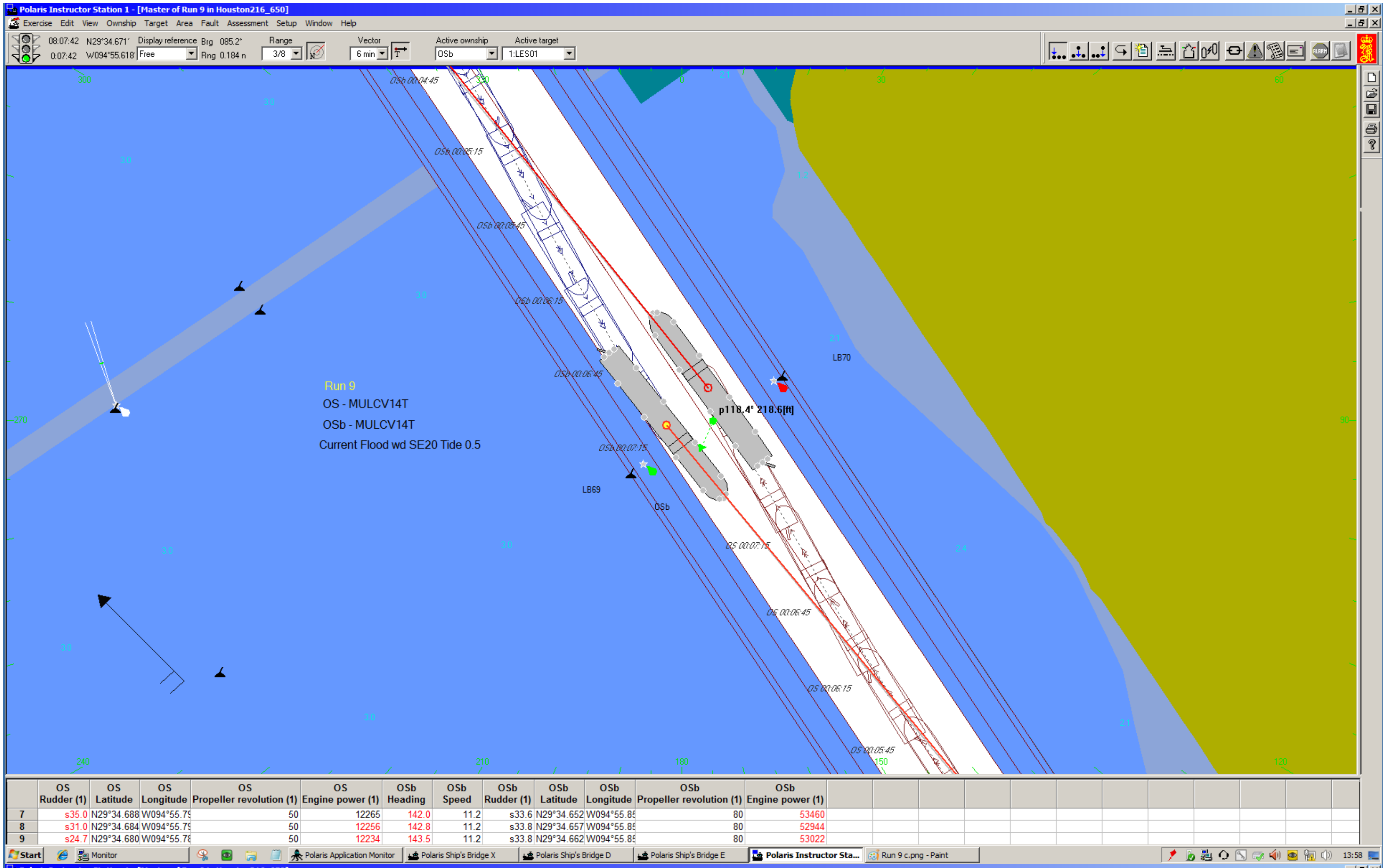
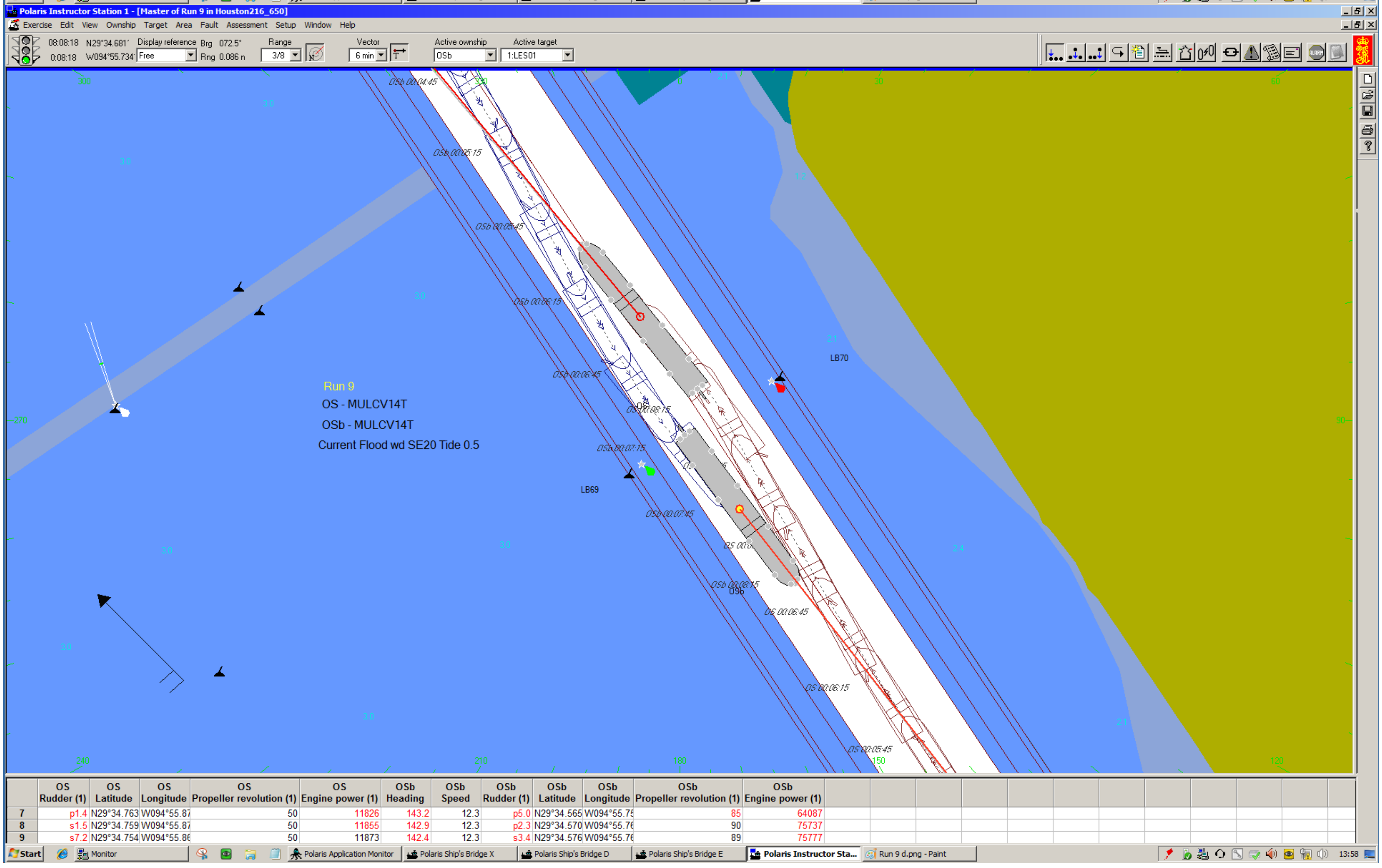


08:07:42 N29°34.671′ Display reference Free Brg 085.2° Rng 0.184 n Range 3/8 Vector 6 min Active ownship OSb Active target 1:LES01

0:07:42 W094°55.618′

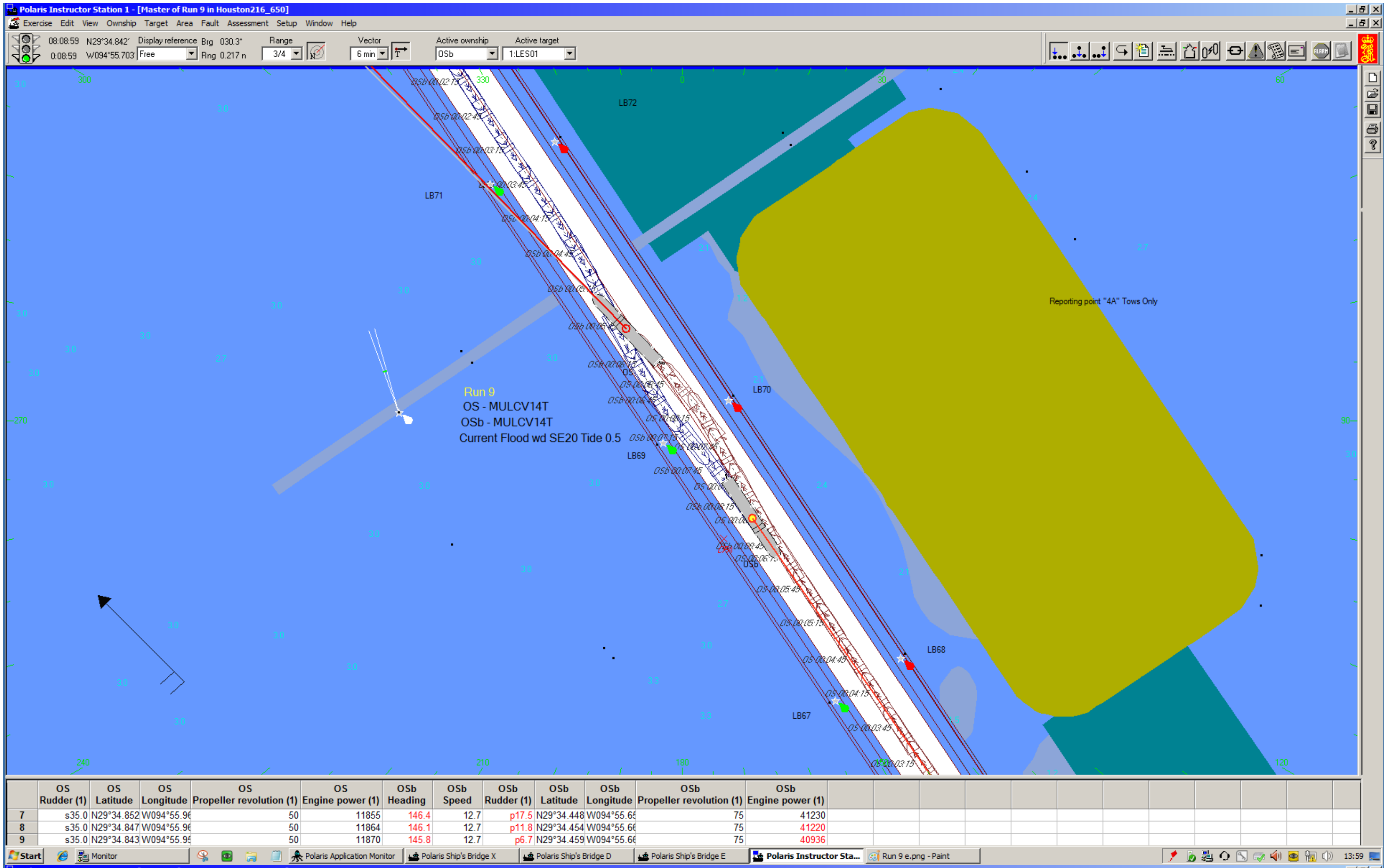
	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	s35.0	N29°34.688	W094°55.7	50	12265	142.0	11.2	s33.6	N29°34.652	W094°55.8	80	53460
8	s31.0	N29°34.684	W094°55.7	50	12256	142.8	11.2	s33.8	N29°34.657	W094°55.8	80	52944
9	s24.7	N29°34.680	W094°55.7	50	12234	143.5	11.2	s33.8	N29°34.662	W094°55.8	80	53022



08:08:18 N29°34.681′ Display reference Free Brg 072.5° Rng 0.086 n Range 3/8 Vector 6 min Active ownship OSb Active target 1:LES01

0:08:18 W094°55.734′

	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	p1.4	N29°34.763	W094°55.8	50	11826	143.2	12.3	p5.0	N29°34.565	W094°55.7	85	64087
8	s1.5	N29°34.759	W094°55.8	50	11855	142.9	12.3	p2.3	N29°34.570	W094°55.7	90	75737
9	s7.2	N29°34.754	W094°55.8	50	11873	142.4	12.3	s3.4	N29°34.576	W094°55.7	89	75777



Polaris Instructor Station 1 - [Master of Run 9 in Houston216_650]

08:08:59 N29°34.842' Display reference Free Brg 030.3° Rng 0.217 n

0:08:59 W094°55.703'

Range 3/4 Vector 6 min Active ownship OSb Active target 1:LES01

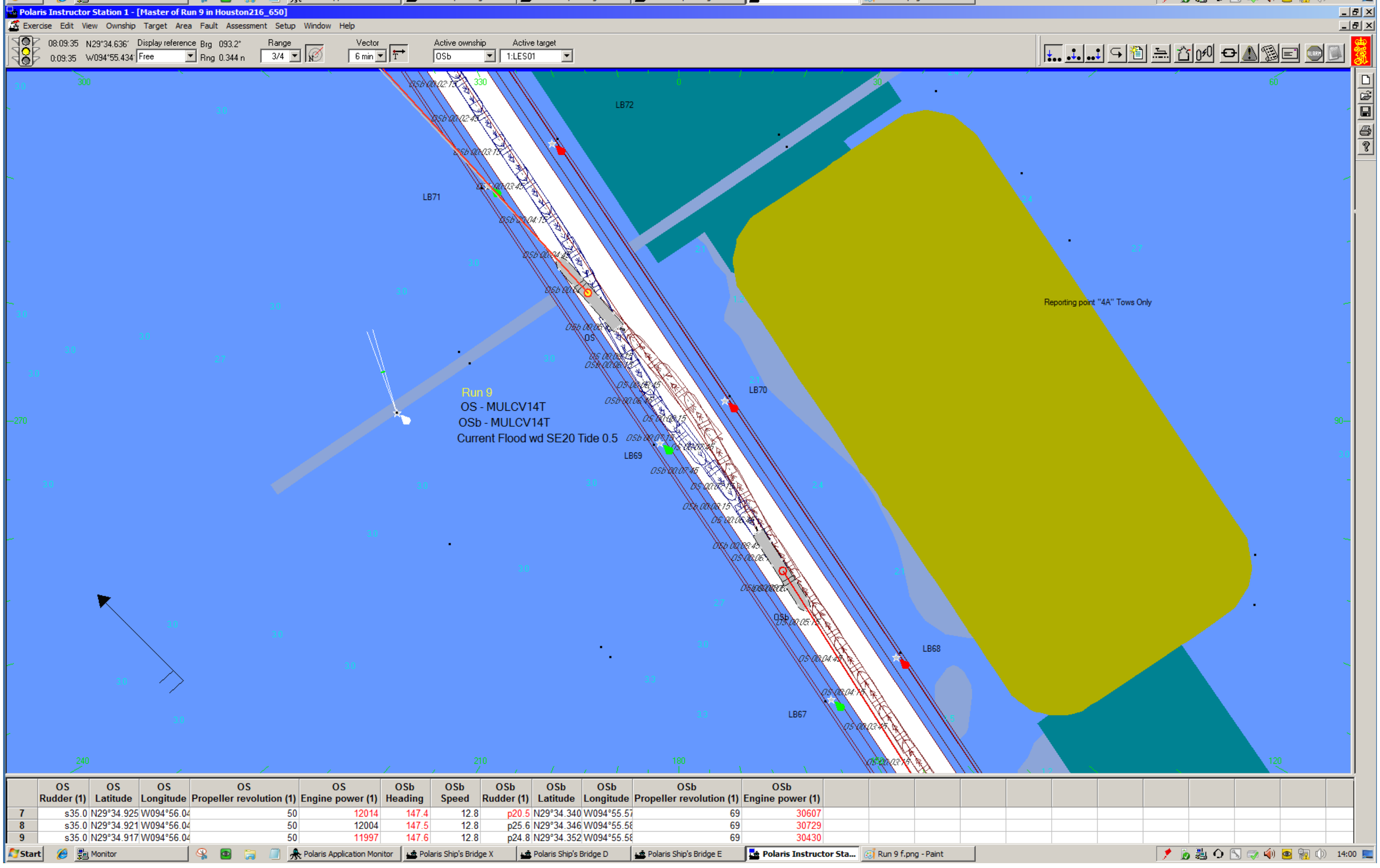
Run 9

OS - MULCV14T

OSb - MULCV14T

Current Flood wd SE20 Tide 0.5

	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	s35.0	N29°34.852	W094°55.96	50	11855	146.4	12.7	p17.5	N29°34.448	W094°55.65	75	41230
8	s35.0	N29°34.847	W094°55.96	50	11864	146.1	12.7	p11.8	N29°34.454	W094°55.66	75	41220
9	s35.0	N29°34.843	W094°55.95	50	11870	145.8	12.7	p6.7	N29°34.459	W094°55.66	75	40936



Polaris Instructor Station 1 - [Master of Run 9 in Houston216_650]

08:09:35 N29°34.636' Display reference Free Brg 093.2° Rng 0.344 n

0:09:35 W094°55.434'

Range 3/4 Vector 6 min Active ownship OSb Active target 1:LES01

Run 9

OS - MULCV14T

OSb - MULCV14T

Current Flood wd SE20 Tide 0.5

	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	s35.0	N29°34.925	W094°56.04	50	12014	147.4	12.8	p20.5	N29°34.340	W094°55.57	69	30607
8	s35.0	N29°34.921	W094°56.04	50	12004	147.5	12.8	p25.6	N29°34.346	W094°55.58	69	30729
9	s35.0	N29°34.917	W094°56.04	50	11997	147.6	12.8	p24.8	N29°34.352	W094°55.58	69	30430

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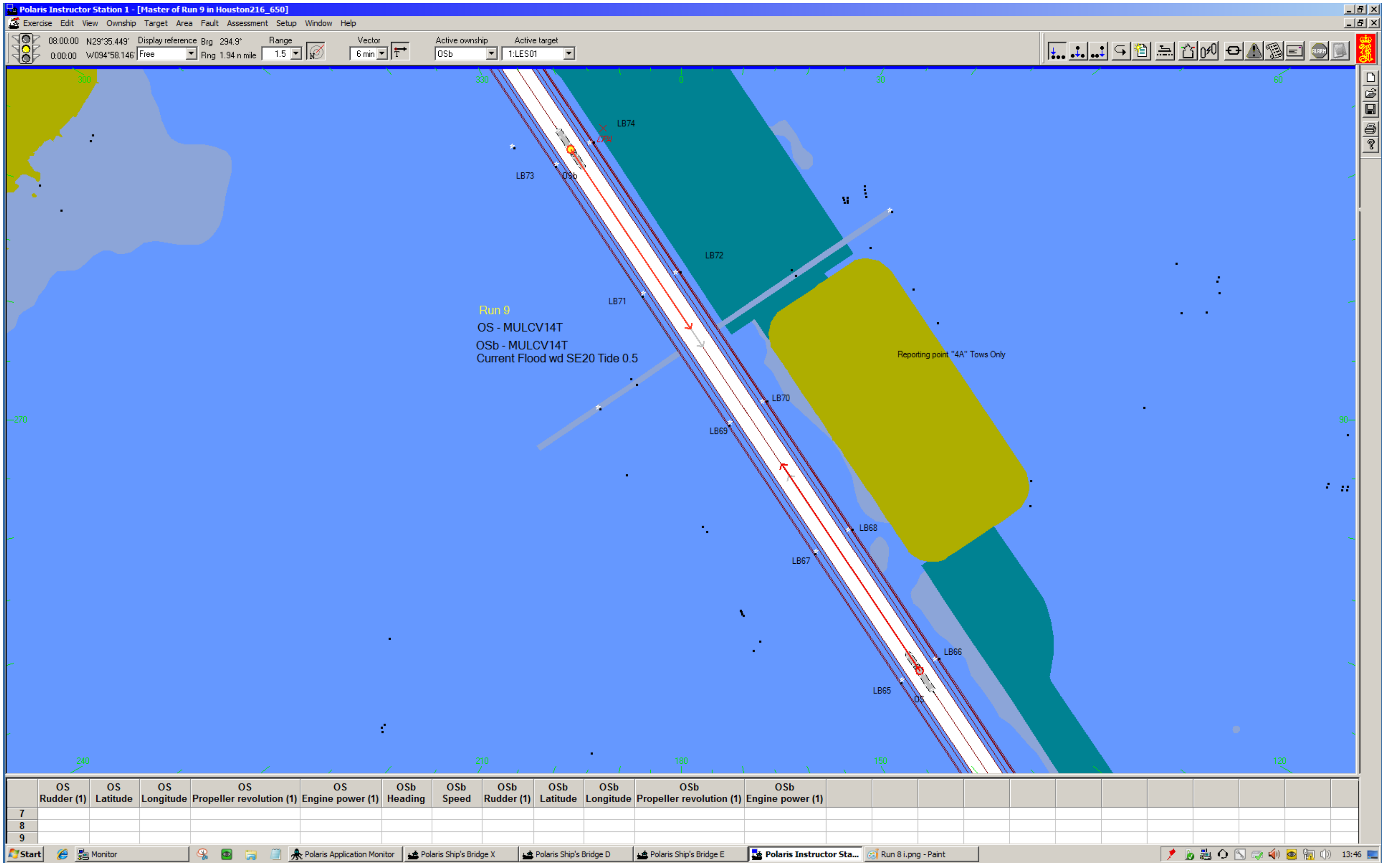

Polaris Instructor Station 1 - [Master of Run 9 in Houston216_650]

08:00:00 N29°35.449′
0:00:00 W094°58.146′
Display reference: Free
Brg 294.9°
Rng 1.94 n mile
Range: 1.5
Vector: 6 min
Active ownship: OSb
Active target: 1:LES01

Run 9

OS - MULCV14T

OSb - MULCV14T
Current Flood wd SE20 Tide 0.5

Reporting point "4A" Tows Only

	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7												
8												
9												

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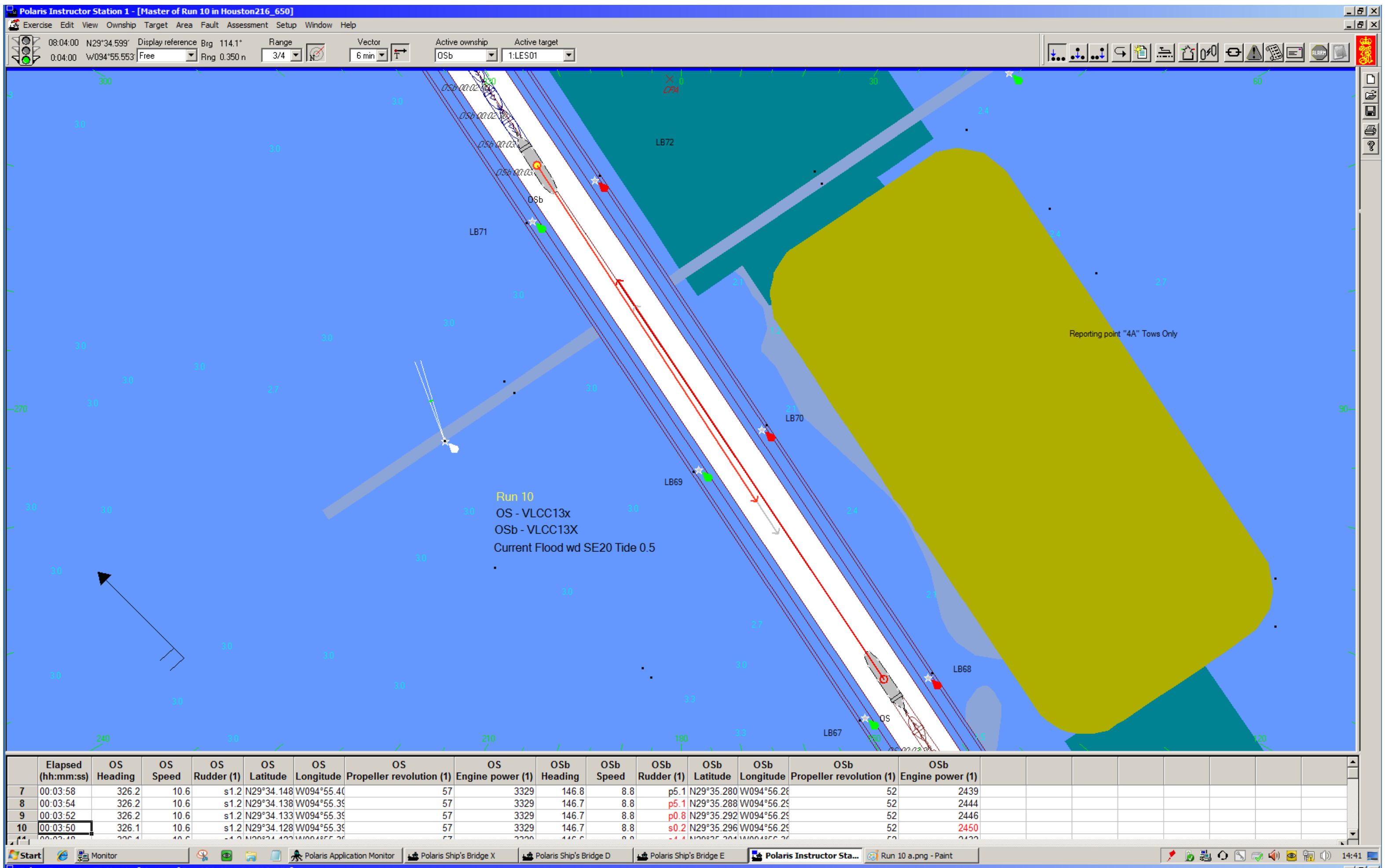
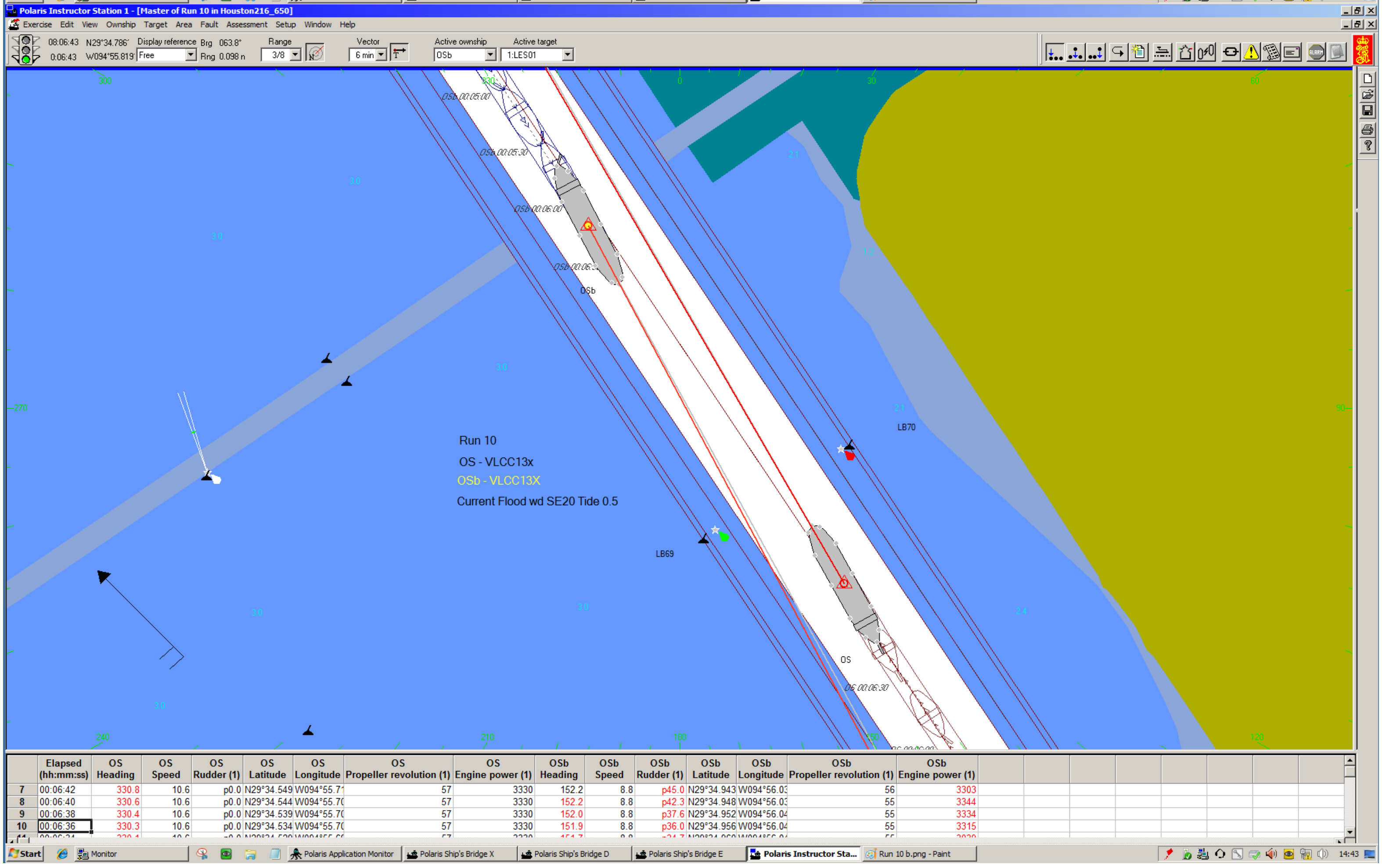
Run 10



Polaris Instructor Station 1 - [Master of Run 10 in Houston216_650]

08:04:00 N29°34.599' Display reference Free Brg 114.1° Rng 0.350 n
0:04:00 W094°55.553' Range 3/4 Vector 6 min Active ownship OSb Active target 1:LES01

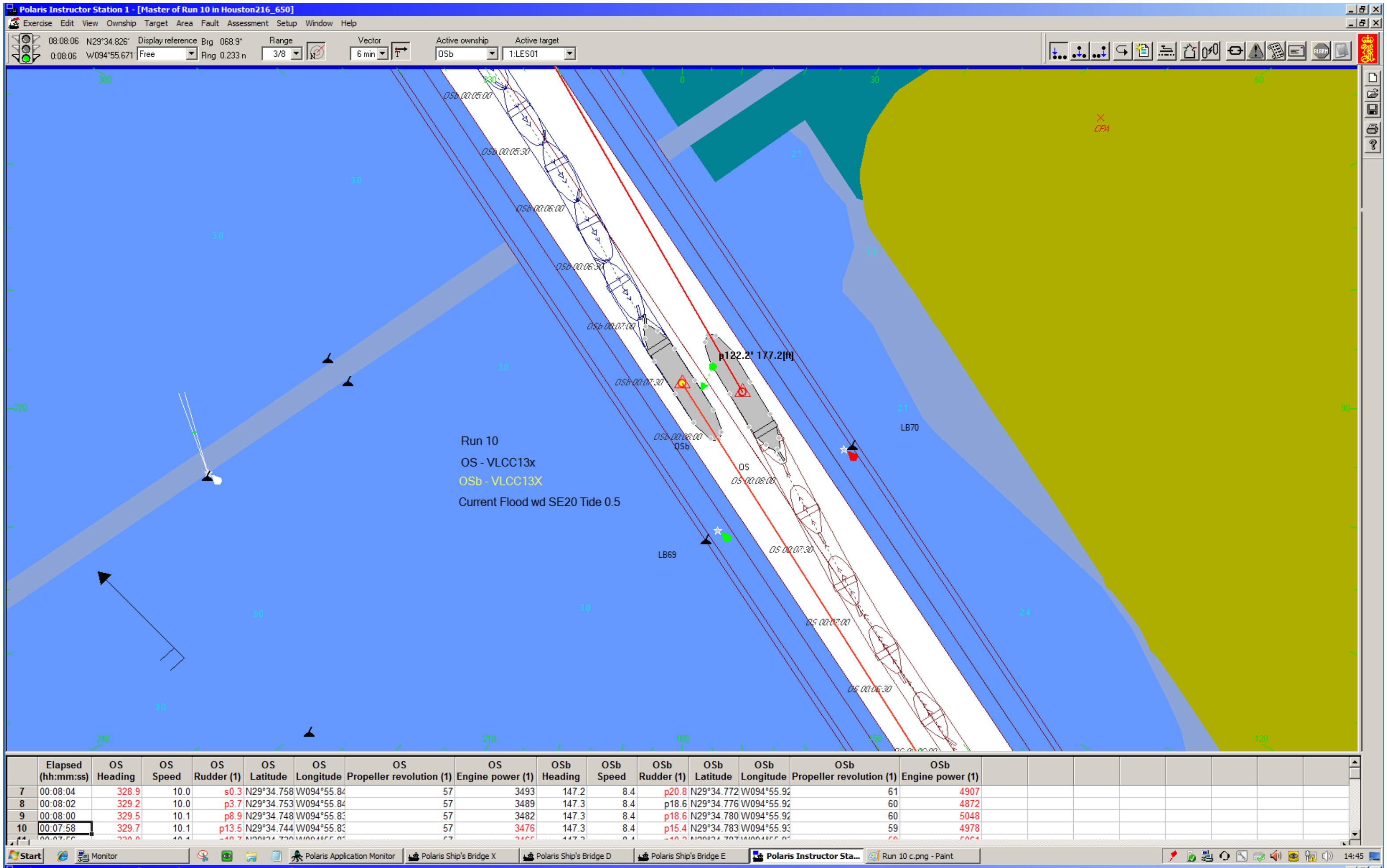
	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:03:58	326.2	10.6	s1.2	N29°34.148	W094°55.4	57	3329	146.8	8.8	p5.1	N29°35.280	W094°56.2	52	2439
8	00:03:54	326.2	10.6	s1.2	N29°34.138	W094°55.3	57	3329	146.7	8.8	p5.1	N29°35.288	W094°56.2	52	2444
9	00:03:52	326.2	10.6	s1.2	N29°34.133	W094°55.3	57	3329	146.7	8.8	p0.8	N29°35.292	W094°56.2	52	2446
10	00:03:50	326.1	10.6	s1.2	N29°34.128	W094°55.3	57	3329	146.7	8.8	s0.2	N29°35.296	W094°56.2	52	2450



Polaris Instructor Station 1 - [Master of Run 10 in Houston216_650]

08:06:43 N29°34.786' Display reference Free Brg 063.8° Rng 0.098 n
0:06:43 W094°55.819' Range 3/8 Vector 6 min Active ownship OSb Active target 1:LES01

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:06:42	330.8	10.6	p0.0	N29°34.549	W094°55.7	57	3330	152.2	8.8	p45.0	N29°34.943	W094°56.0	56	3303
8	00:06:40	330.6	10.6	p0.0	N29°34.544	W094°55.7	57	3330	152.2	8.8	p42.3	N29°34.948	W094°56.0	55	3344
9	00:06:38	330.4	10.6	p0.0	N29°34.539	W094°55.7	57	3330	152.0	8.8	p37.6	N29°34.952	W094°56.0	55	3334
10	00:06:36	330.3	10.6	p0.0	N29°34.534	W094°55.7	57	3330	151.9	8.8	p36.0	N29°34.956	W094°56.0	55	3315

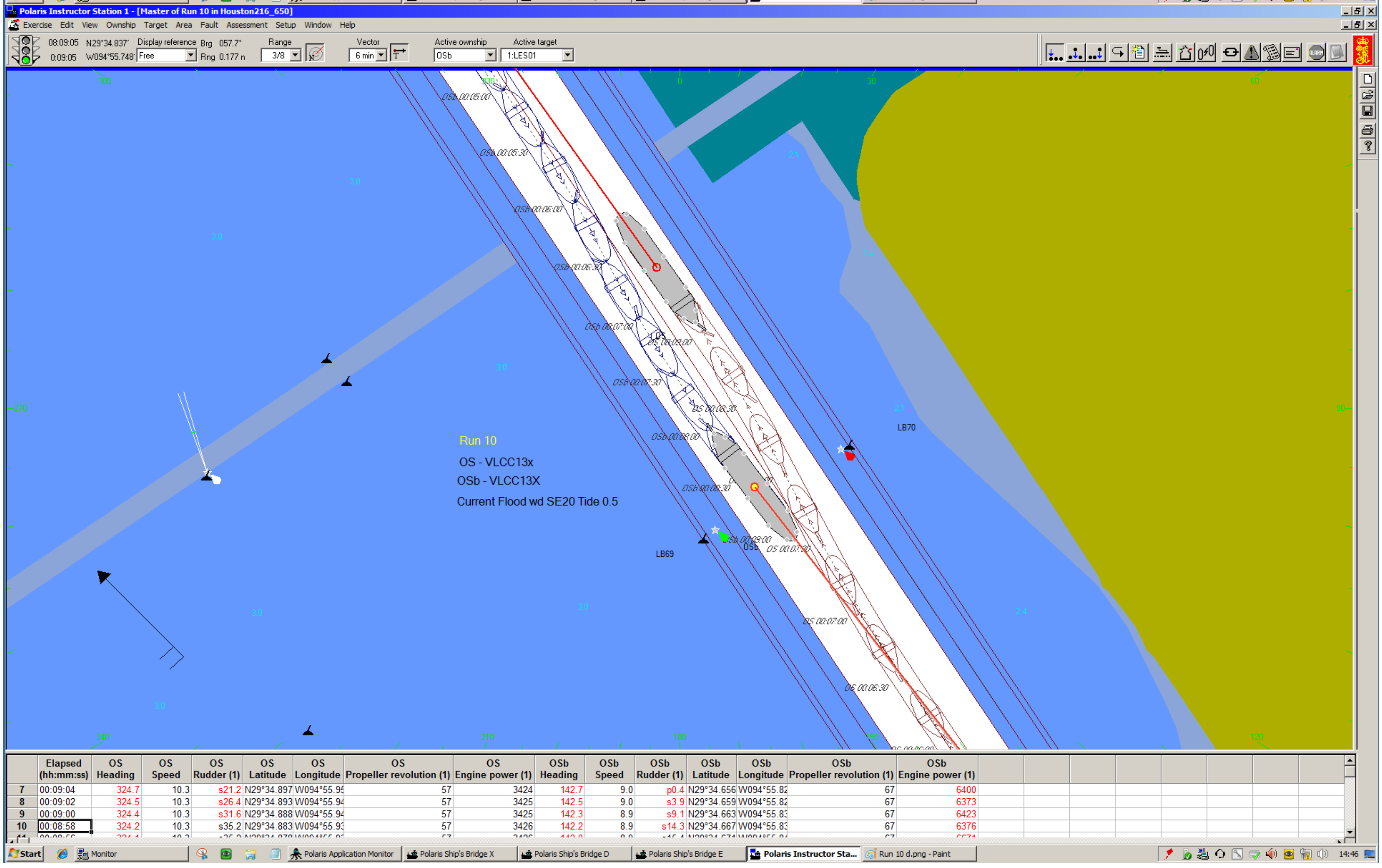


Polaris Instructor Station 1 - [Master of Run 10 in Houston216_650]

08:08:06 N29°34.826' Display reference Free Brg 068.9° Rng 0.233 n Range 3/8 Vector 6 min Active ownship OSb Active target 1:LES01

0:08:06 W094°55.671'

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:08:04	328.9	10.0	s0.3	N29°34.758	W094°55.84	57	3493	147.2	8.4	p20.8	N29°34.772	W094°55.92	61	4907
8	00:08:02	329.2	10.0	p3.7	N29°34.753	W094°55.84	57	3489	147.3	8.4	p18.6	N29°34.776	W094°55.92	60	4872
9	00:08:00	329.5	10.1	p8.9	N29°34.748	W094°55.83	57	3482	147.3	8.4	p18.6	N29°34.780	W094°55.92	60	5048
10	00:07:58	329.7	10.1	p13.5	N29°34.744	W094°55.83	57	3476	147.3	8.4	p15.4	N29°34.783	W094°55.93	59	4978



Polaris Instructor Station 1 - [Master of Run 10 in Houston216_650]

08:09:05 N29°34.837' Display reference Free Brg 057.7° Rng 0.177 n Range 3/8 Vector 6 min Active ownship OSb Active target 1:LES01

0:09:05 W094°55.748'

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:09:04	324.7	10.3	s21.2	N29°34.897	W094°55.95	57	3424	142.7	9.0	p0.4	N29°34.656	W094°55.82	67	6400
8	00:09:02	324.5	10.3	s26.4	N29°34.893	W094°55.94	57	3425	142.5	9.0	s3.9	N29°34.659	W094°55.82	67	6373
9	00:09:00	324.4	10.3	s31.6	N29°34.888	W094°55.94	57	3425	142.3	8.9	s9.1	N29°34.663	W094°55.83	67	6423
10	00:08:58	324.2	10.3	s35.2	N29°34.883	W094°55.93	57	3426	142.2	8.9	s14.3	N29°34.667	W094°55.83	67	6376

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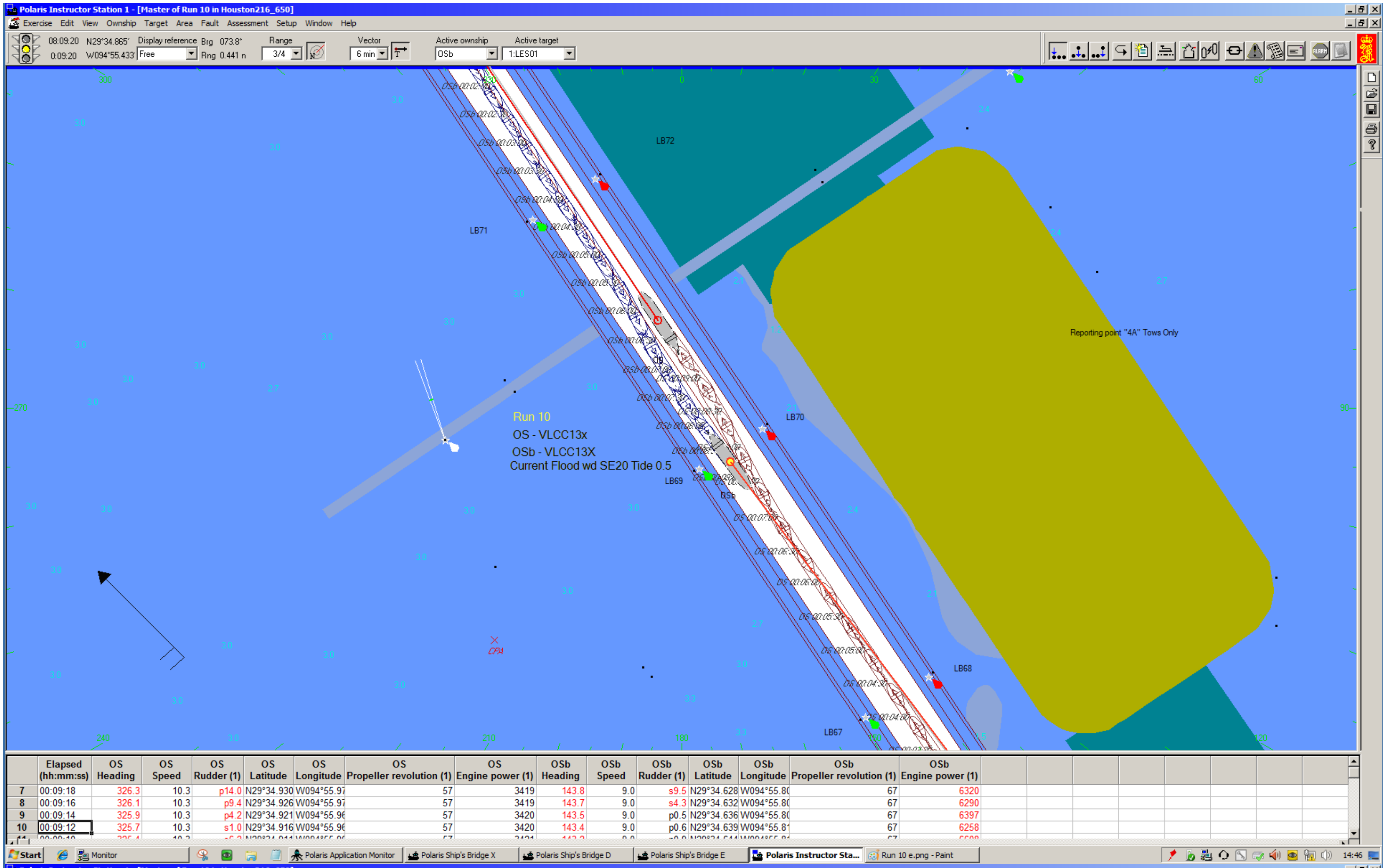
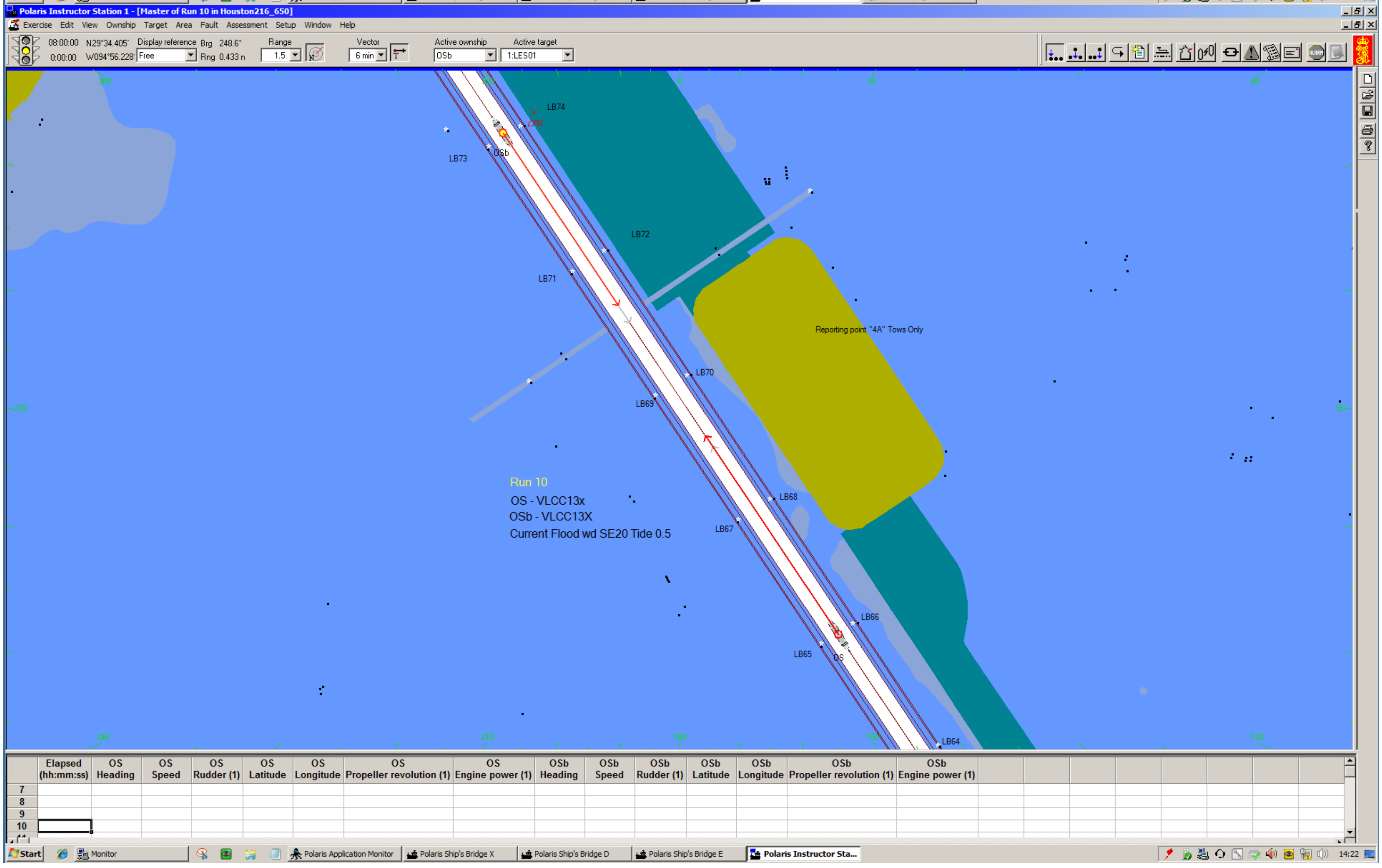


08:09:20 N29°34.865' Display reference Free Brg 073.8° Rng 0.441 n Range 3/4 Vector 6 min Active ownship OSb Active target 1:LES01

0:09:20 W094°55.433'

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:09:18	326.3	10.3	p14.0	N29°34.930	W094°55.97	57	3419	143.8	9.0	s9.5	N29°34.628	W094°55.80	67	6320
8	00:09:16	326.1	10.3	p9.4	N29°34.926	W094°55.97	57	3419	143.7	9.0	s4.3	N29°34.632	W094°55.80	67	6290
9	00:09:14	325.9	10.3	p4.2	N29°34.921	W094°55.96	57	3420	143.5	9.0	p0.5	N29°34.636	W094°55.80	67	6397
10	00:09:12	325.7	10.3	s1.0	N29°34.916	W094°55.96	57	3420	143.4	9.0	p0.6	N29°34.639	W094°55.81	67	6258

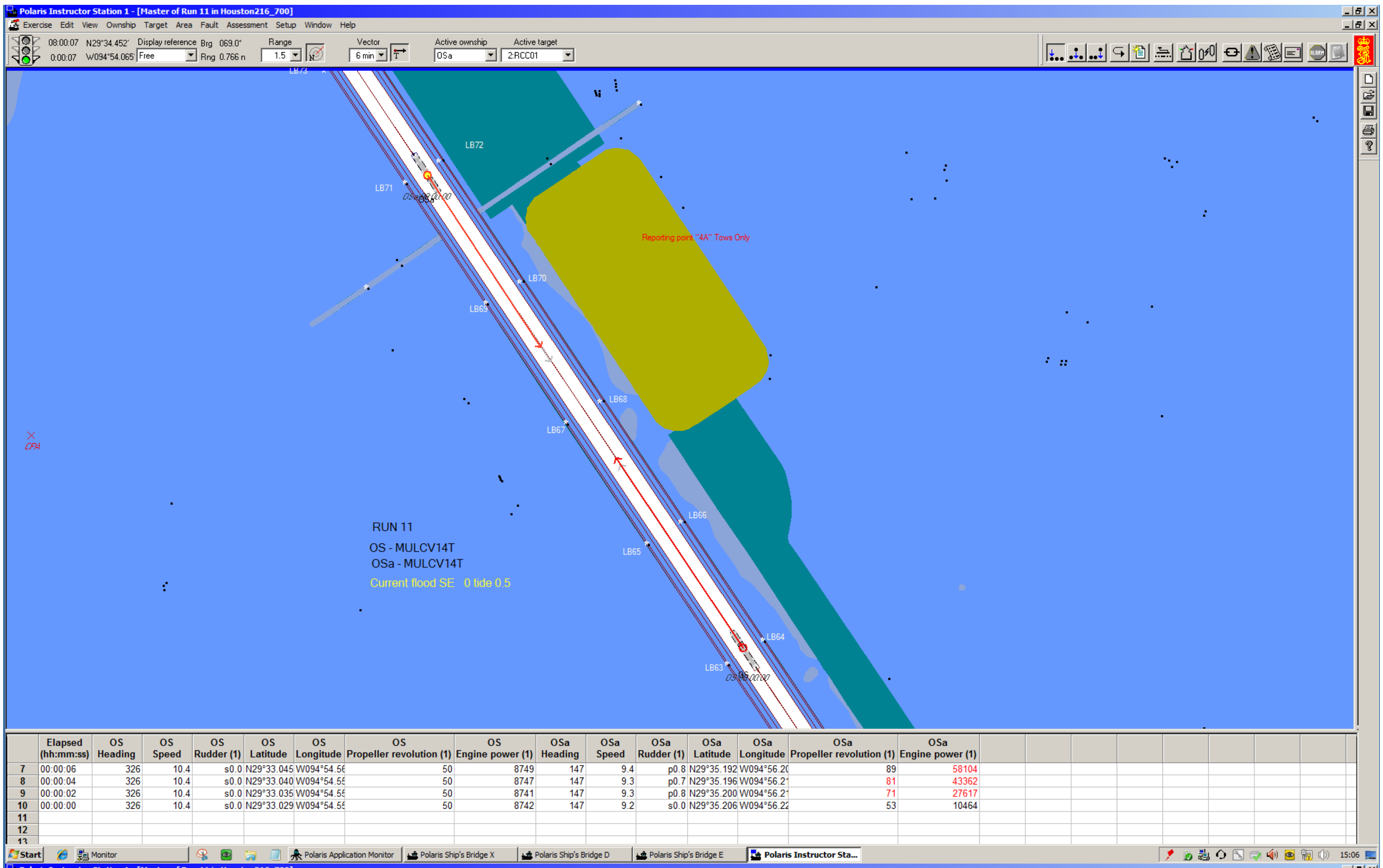


08:00:00 N29°34.405' Display reference Free Brg 248.6° Rng 0.433 n Range 1.5 Vector 6 min Active ownship OSb Active target 1:LES01

0:00:00 W094°56.228'

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7															
8															
9															
10															

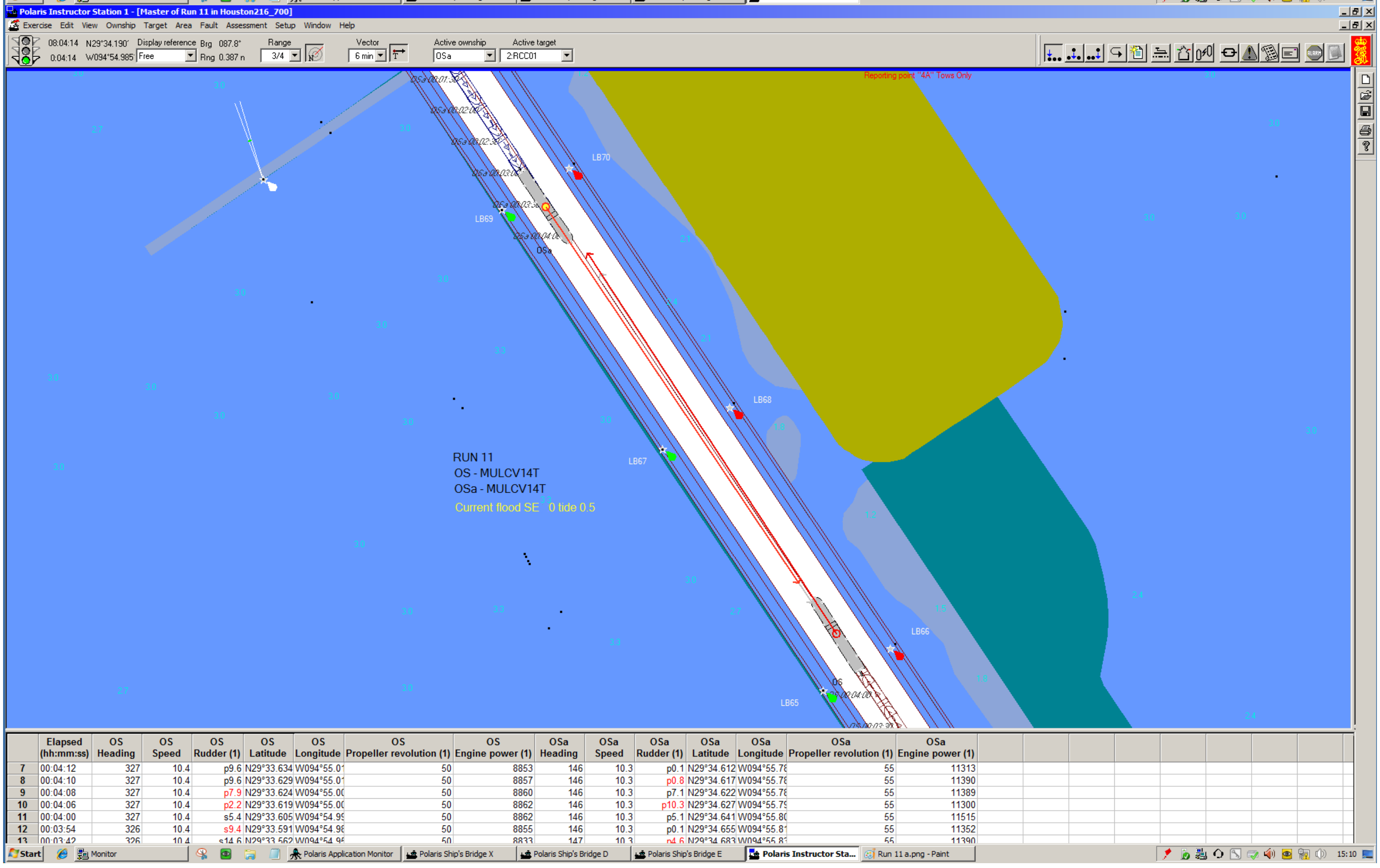
Run 11



08:00:07 N29°34.452' Display reference Free Brg 069.0° Range 1.5 Vector 6 min Active ownship OSa Active target 2:RCC01

0:00:07 W094°54.065 Rng 0.766 n

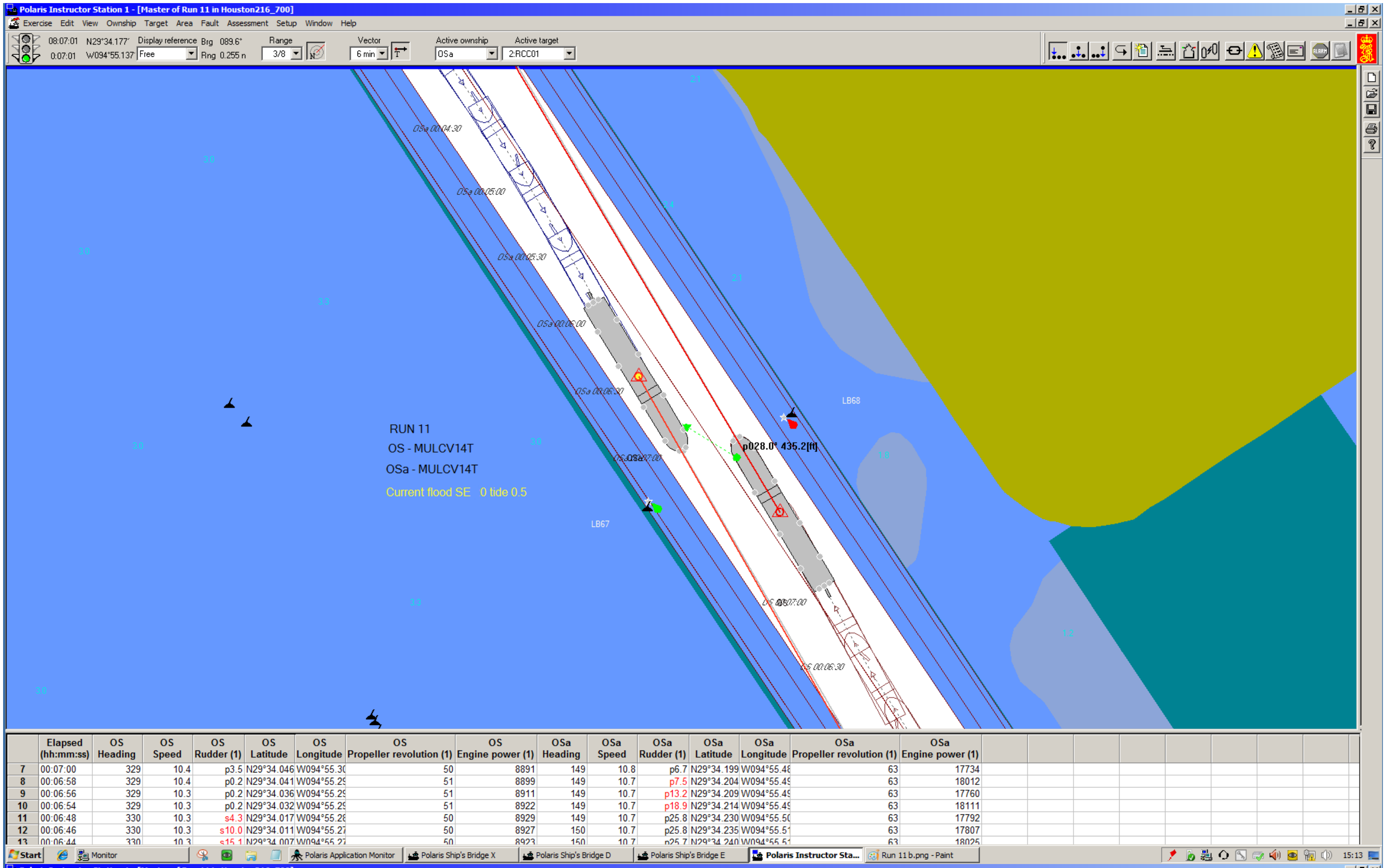
	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:00:06	326	10.4	s0.0	N29°33.045	W094°54.56	50	8749	147	9.4	p0.8	N29°35.192	W094°56.20	89	58104
8	00:00:04	326	10.4	s0.0	N29°33.040	W094°54.55	50	8747	147	9.3	p0.7	N29°35.196	W094°56.21	81	43362
9	00:00:02	326	10.4	s0.0	N29°33.035	W094°54.55	50	8741	147	9.3	p0.8	N29°35.200	W094°56.21	71	27617
10	00:00:00	326	10.4	s0.0	N29°33.029	W094°54.55	50	8742	147	9.2	s0.0	N29°35.206	W094°56.22	53	10464
11															
12															
13															



08:04:14 N29°34.190' Display reference Free Brg 087.8° Range 3/4 Vector 6 min Active ownship OSa Active target 2:RCC01

0:04:14 W094°54.985 Rng 0.387 n

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:04:12	327	10.4	p9.6	N29°33.634	W094°55.01	50	8853	146	10.3	p0.1	N29°34.612	W094°55.78	55	11313
8	00:04:10	327	10.4	p9.6	N29°33.629	W094°55.01	50	8857	146	10.3	p0.8	N29°34.617	W094°55.78	55	11390
9	00:04:08	327	10.4	p7.9	N29°33.624	W094°55.00	50	8860	146	10.3	p7.1	N29°34.622	W094°55.78	55	11389
10	00:04:06	327	10.4	p2.2	N29°33.619	W094°55.00	50	8862	146	10.3	p10.3	N29°34.627	W094°55.79	55	11300
11	00:04:00	327	10.4	s5.4	N29°33.605	W094°54.99	50	8862	146	10.3	p5.1	N29°34.641	W094°55.80	55	11515
12	00:03:54	326	10.4	s9.4	N29°33.591	W094°54.98	50	8855	146	10.3	p0.1	N29°34.655	W094°55.81	55	11352
13	00:03:42	326	10.4	s14.6	N29°33.562	W094°54.96	50	8833	147	10.3	p4.6	N29°34.683	W094°55.83	55	11390



Polaris Instructor Station 1 - [Master of Run 11 in Houston216_700]

08:07:01 N29°34.177' W094°55.137' 0:07:01

Display reference: Free

Brg 089.6° Rng 0.255 n

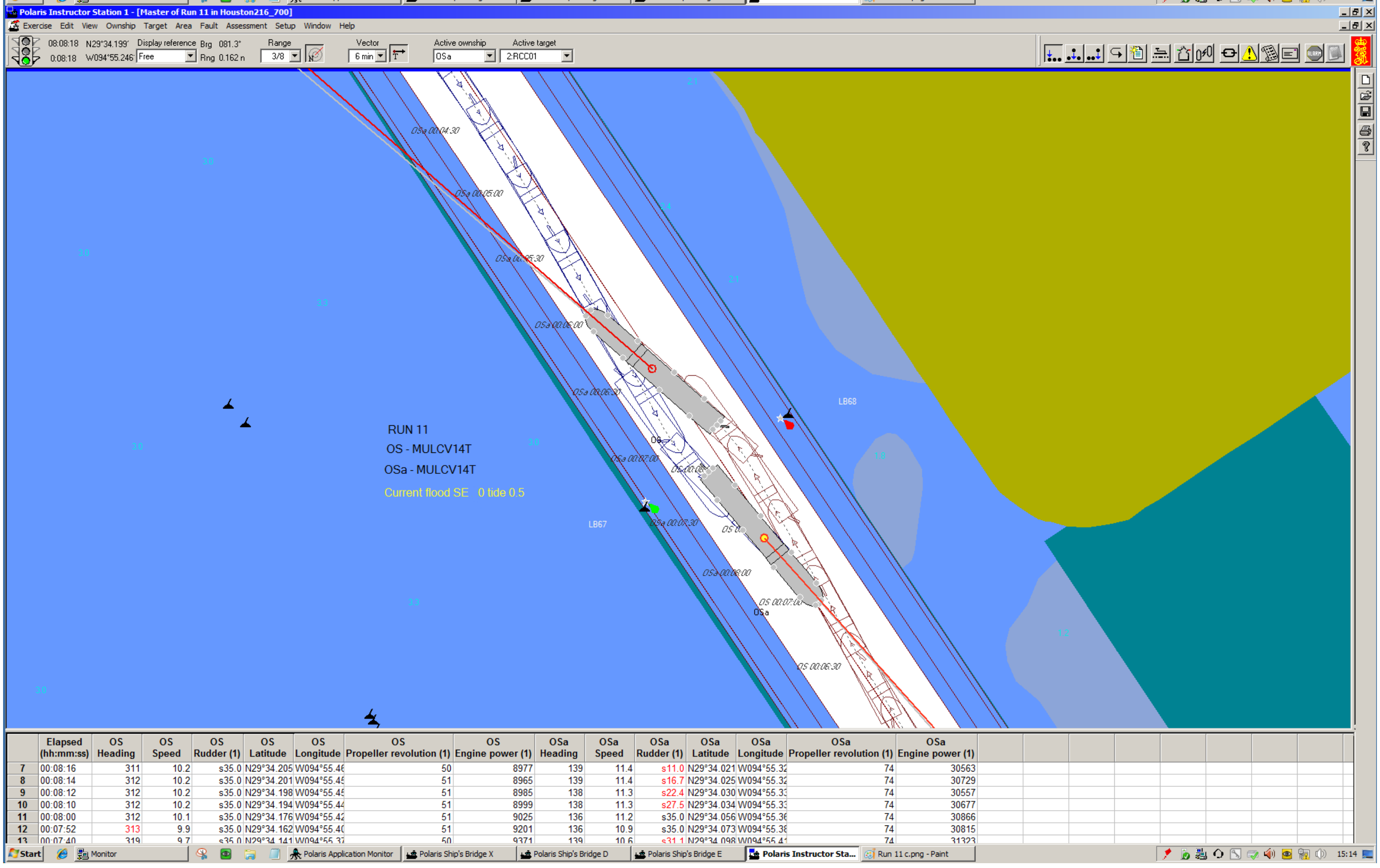
Range: 3/8

Vector: 6 min

Active ownship: OSa

Active target: 2:RCC01

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:07:00	329	10.4	p3.5	N29°34.046	W094°55.30	50	8891	149	10.8	p6.7	N29°34.199	W094°55.48	63	17734
8	00:06:58	329	10.4	p0.2	N29°34.041	W094°55.29	51	8899	149	10.7	p7.5	N29°34.204	W094°55.49	63	18012
9	00:06:56	329	10.3	p0.2	N29°34.036	W094°55.29	51	8911	149	10.7	p13.2	N29°34.209	W094°55.49	63	17760
10	00:06:54	329	10.3	p0.2	N29°34.032	W094°55.29	51	8922	149	10.7	p18.9	N29°34.214	W094°55.49	63	18111
11	00:06:48	330	10.3	s4.3	N29°34.017	W094°55.28	50	8929	149	10.7	p25.8	N29°34.230	W094°55.50	63	17792
12	00:06:46	330	10.3	s10.0	N29°34.011	W094°55.27	50	8927	150	10.7	p25.8	N29°34.235	W094°55.51	63	17807
13	00:06:44	330	10.3	s15.1	N29°34.007	W094°55.27	50	8923	150	10.7	p25.7	N29°34.240	W094°55.51	63	18025



Polaris Instructor Station 1 - [Master of Run 11 in Houston216_700]

08:08:18 N29°34.199' W094°55.246' 0:08:18

Display reference: Free

Brg 081.3° Rng 0.162 n

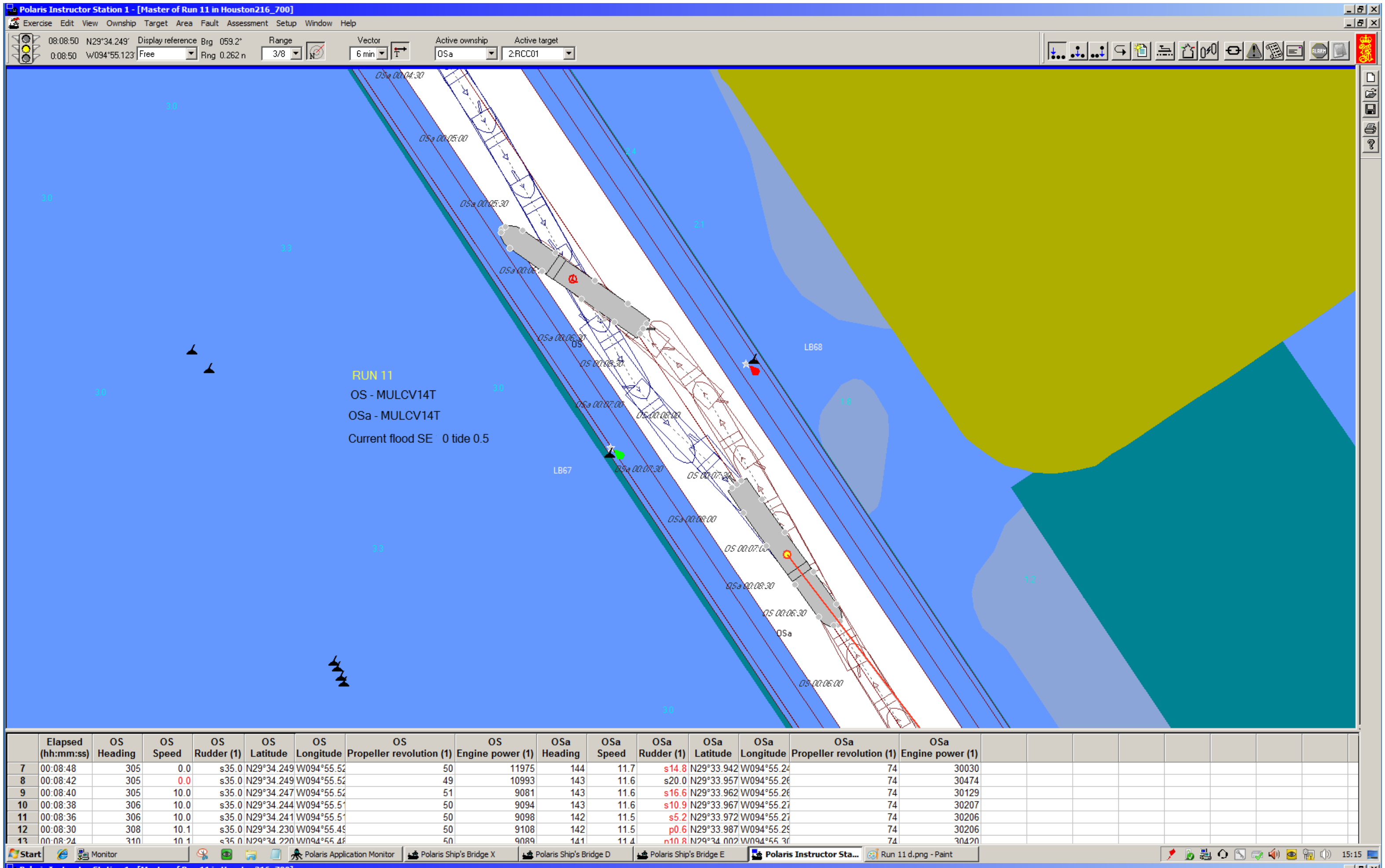
Range: 3/8

Vector: 6 min

Active ownship: OSa

Active target: 2:RCC01

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:08:16	311	10.2	s35.0	N29°34.205	W094°55.46	50	8977	139	11.4	s11.0	N29°34.021	W094°55.32	74	30563
8	00:08:14	312	10.2	s35.0	N29°34.201	W094°55.45	51	8965	139	11.4	s16.7	N29°34.025	W094°55.32	74	30729
9	00:08:12	312	10.2	s35.0	N29°34.198	W094°55.45	51	8985	138	11.3	s22.4	N29°34.030	W094°55.33	74	30557
10	00:08:10	312	10.2	s35.0	N29°34.194	W094°55.44	51	8999	138	11.3	s27.5	N29°34.034	W094°55.33	74	30677
11	00:08:00	312	10.1	s35.0	N29°34.176	W094°55.42	51	9025	136	11.2	s35.0	N29°34.056	W094°55.36	74	30866
12	00:07:52	313	9.9	s35.0	N29°34.162	W094°55.40	51	9201	136	10.9	s35.0	N29°34.073	W094°55.38	74	30815
13	00:07:40	319	9.7	s35.0	N29°34.141	W094°55.37	50	9371	139	10.6	s31.1	N29°34.098	W094°55.41	74	31323



Polaris Instructor Station 1 - [Master of Run 11 in Houston216_700]

08:08:50 N29°34.249' Display reference: Free Brg 059.2° Rng 0.262 n Range 3/8 Vector 6 min Active ownship OSa Active target 2:RCC01

0:08:50 W094°55.123'

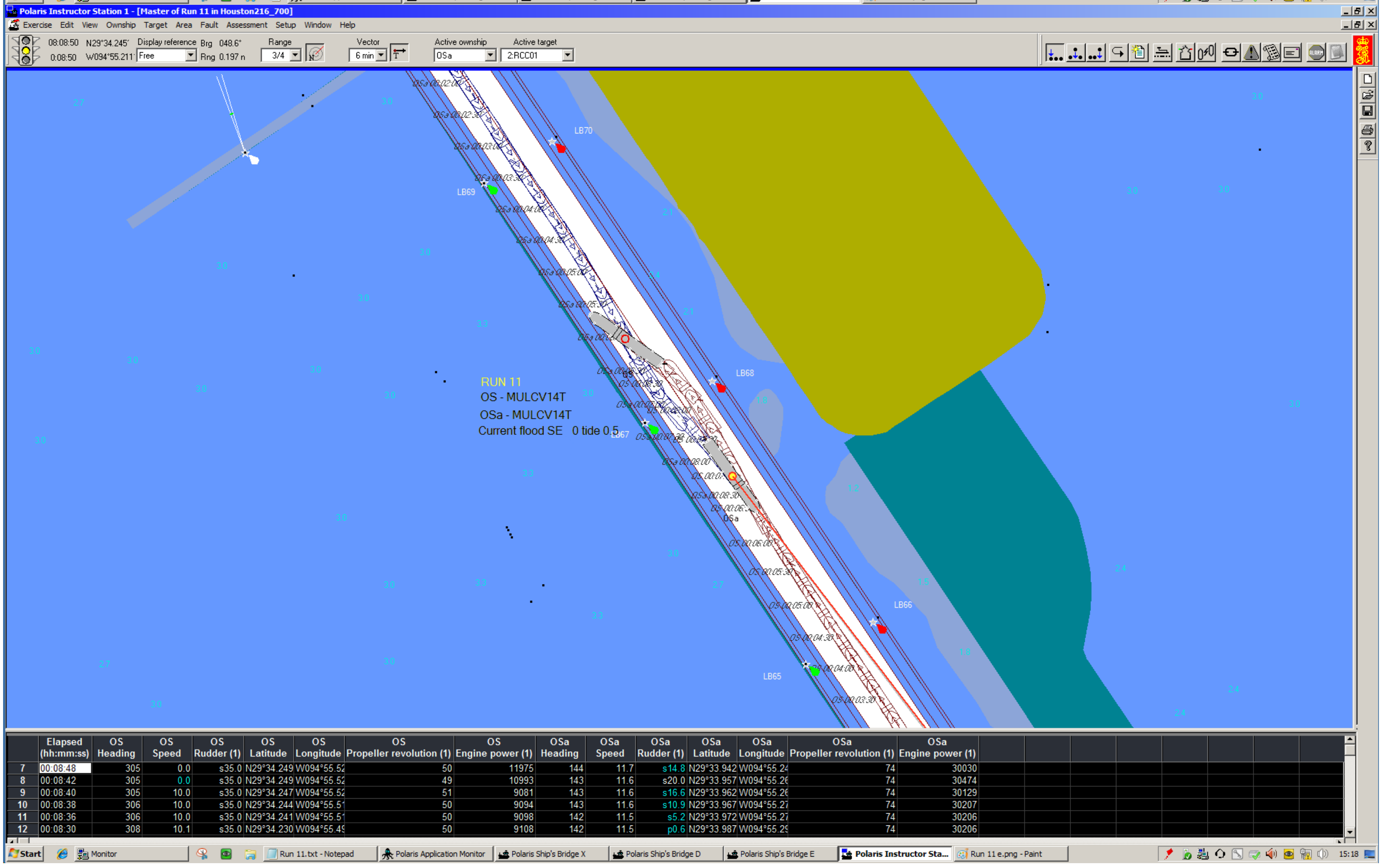
RUN 11

OS - MULCV14T

OSa - MULCV14T

Current flood SE 0 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:08:48	305	0.0	s35.0	N29°34.249	W094°55.52	50	11975	144	11.7	s14.8	N29°33.942	W094°55.24	74	30030
8	00:08:42	305	0.0	s35.0	N29°34.249	W094°55.52	49	10993	143	11.6	s20.0	N29°33.957	W094°55.26	74	30474
9	00:08:40	305	10.0	s35.0	N29°34.247	W094°55.52	51	9081	143	11.6	s16.6	N29°33.962	W094°55.26	74	30129
10	00:08:38	306	10.0	s35.0	N29°34.244	W094°55.51	50	9094	143	11.6	s10.9	N29°33.967	W094°55.27	74	30207
11	00:08:36	306	10.0	s35.0	N29°34.241	W094°55.51	50	9098	142	11.5	s5.2	N29°33.972	W094°55.27	74	30206
12	00:08:30	308	10.1	s35.0	N29°34.230	W094°55.49	50	9108	142	11.5	p0.6	N29°33.987	W094°55.29	74	30206
13	00:08:24	310	10.1	s35.0	N29°34.220	W094°55.48	50	9089	141	11.4	p10.8	N29°34.002	W094°55.30	74	30420



Polaris Instructor Station 1 - [Master of Run 11 in Houston216_700]

08:08:50 N29°34.245' Display reference: Free Brg 048.6° Rng 0.197 n Range 3/4 Vector 6 min Active ownship OSa Active target 2:RCC01

0:08:50 W094°55.211'

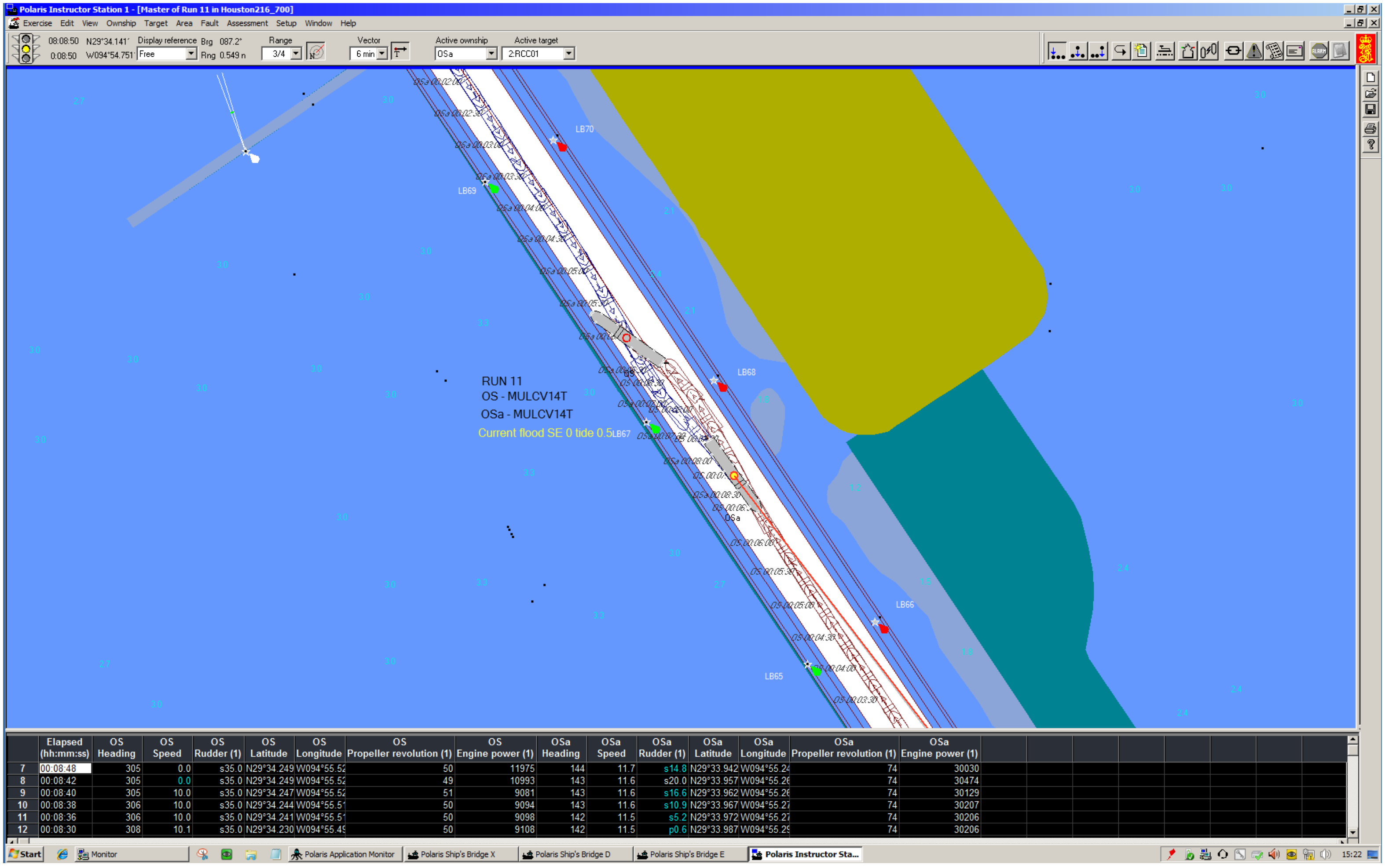
RUN 11

OS - MULCV14T

OSa - MULCV14T

Current flood SE 0 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:08:48	305	0.0	s35.0	N29°34.249	W094°55.52	50	11975	144	11.7	s14.8	N29°33.942	W094°55.24	74	30030
8	00:08:42	305	0.0	s35.0	N29°34.249	W094°55.52	49	10993	143	11.6	s20.0	N29°33.957	W094°55.26	74	30474
9	00:08:40	305	10.0	s35.0	N29°34.247	W094°55.52	51	9081	143	11.6	s16.6	N29°33.962	W094°55.26	74	30129
10	00:08:38	306	10.0	s35.0	N29°34.244	W094°55.51	50	9094	143	11.6	s10.9	N29°33.967	W094°55.27	74	30207
11	00:08:36	306	10.0	s35.0	N29°34.241	W094°55.51	50	9098	142	11.5	s5.2	N29°33.972	W094°55.27	74	30206
12	00:08:30	308	10.1	s35.0	N29°34.230	W094°55.49	50	9108	142	11.5	p0.6	N29°33.987	W094°55.29	74	30206



08:08:50 N29°34.141′ Display reference Free Brg 087.2° Rng 0.549 n

0:08:50 W094°54.751′

Range 3/4

Vector 6 min

Active ownship OSa

Active target 2:RCC01

RUN 11

OS - MULCV14T

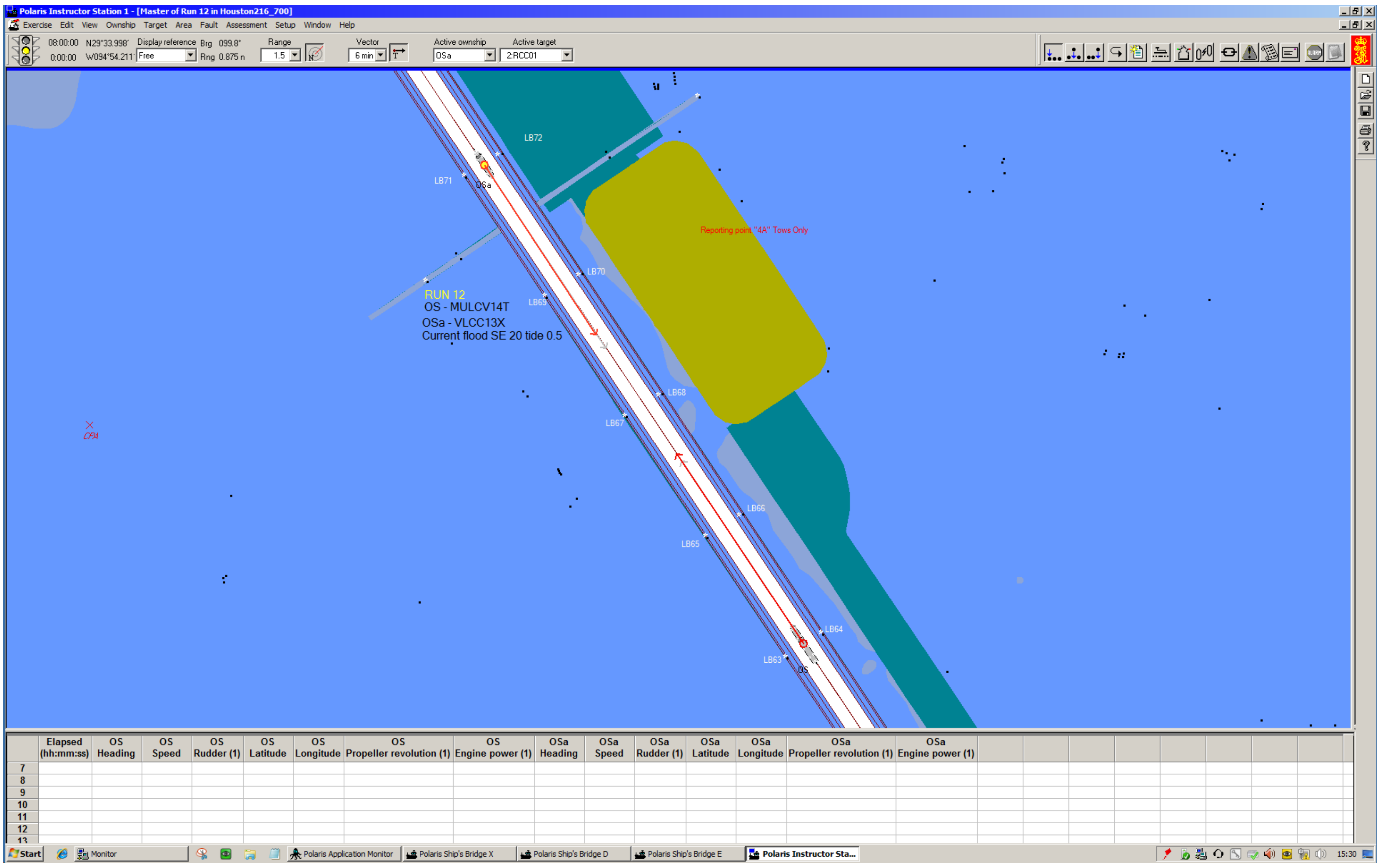
OSa - MULCV14T

Current flood SE 0 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:08:48	305	0.0	s35.0	N29°34.249	W094°55.52	50	11975	144	11.7	s14.8	N29°33.942	W094°55.24	74	30030
8	00:08:42	305	0.0	s35.0	N29°34.249	W094°55.52	49	10993	143	11.6	s20.0	N29°33.957	W094°55.26	74	30474
9	00:08:40	305	10.0	s35.0	N29°34.247	W094°55.52	51	9081	143	11.6	s16.6	N29°33.962	W094°55.26	74	30129
10	00:08:38	306	10.0	s35.0	N29°34.244	W094°55.51	50	9094	143	11.6	s10.9	N29°33.967	W094°55.27	74	30207
11	00:08:36	306	10.0	s35.0	N29°34.241	W094°55.51	50	9098	142	11.5	s5.2	N29°33.972	W094°55.27	74	30206
12	00:08:30	308	10.1	s35.0	N29°34.230	W094°55.49	50	9108	142	11.5	p0.6	N29°33.987	W094°55.29	74	30206

June 26, 2019

Run 12



Polaris Instructor Station 1 - [Master of Run 12 in Houston216_700]

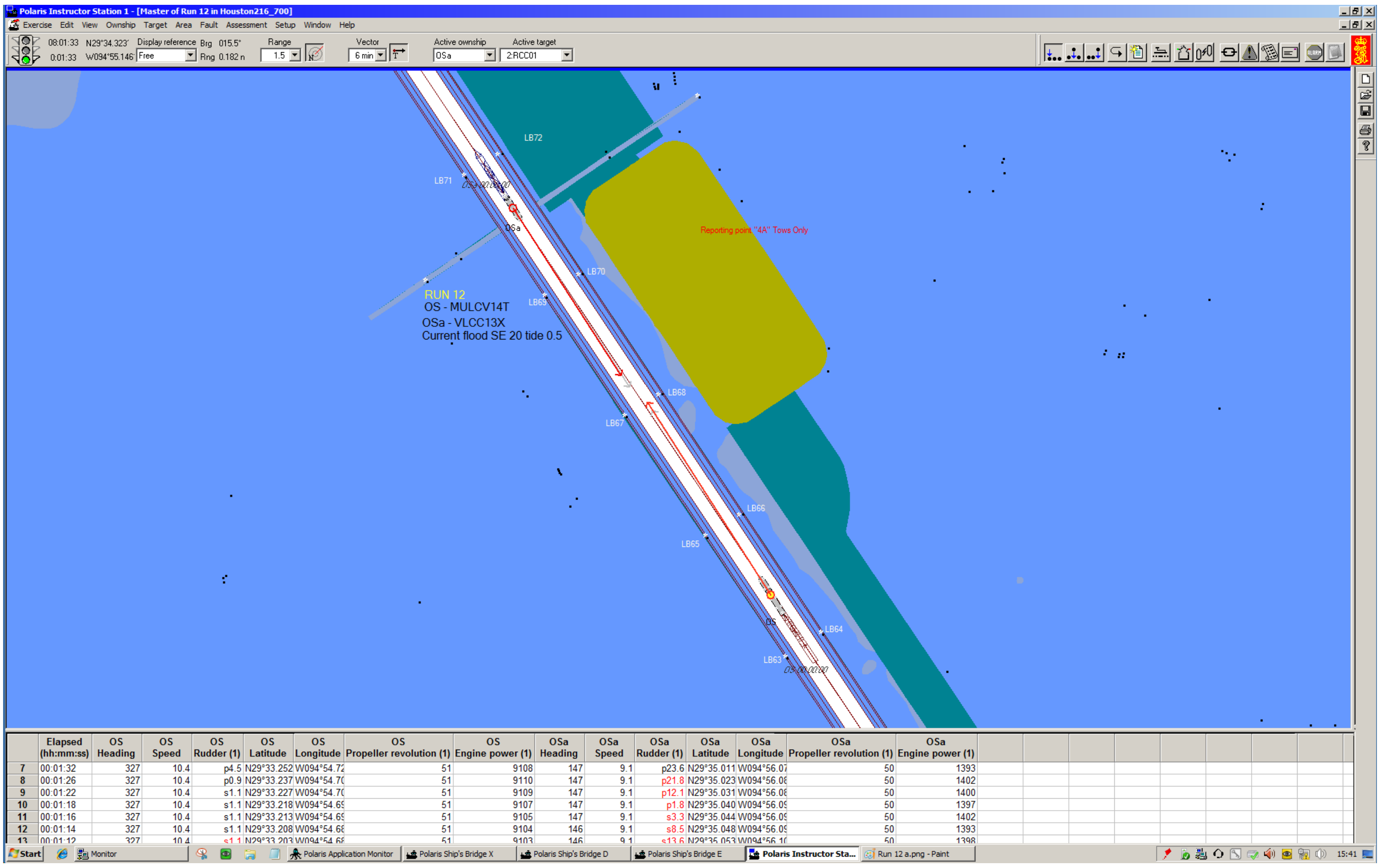
08:00:00 N29°33.998' Display reference Free Brg 099.8° Rng 0.875 n
0:00:00 W094°54.211

Range 1.5 · Vector 6 min · Active ownship OSa · Active target 2:RCC01

RUN 12
OS - MULCV14T
OSa - VLCC13X
Current flood SE 20 tide 0.5

Reporting point "4A" Tows Only

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7															
8															
9															
10															
11															
12															
13															



Polaris Instructor Station 1 - [Master of Run 12 in Houston216_700]

08:01:33 N29°34.323' Display reference Free Brg 015.5° Rng 0.182 n
0:01:33 W094°55.146'

Range 1.5 · Vector 6 min · Active ownship OSa · Active target 2:RCC01

RUN 12
OS - MULCV14T
OSa - VLCC13X
Current flood SE 20 tide 0.5

Reporting point "4A" Tows Only

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:01:32	327	10.4	p4.5	N29°33.252	W094°54.72	51	9108	147	9.1	p23.6	N29°35.011	W094°56.07	50	1393
8	00:01:26	327	10.4	p0.9	N29°33.237	W094°54.70	51	9110	147	9.1	p21.8	N29°35.023	W094°56.08	50	1402
9	00:01:22	327	10.4	s1.1	N29°33.227	W094°54.70	51	9109	147	9.1	p12.1	N29°35.031	W094°56.08	50	1400
10	00:01:18	327	10.4	s1.1	N29°33.218	W094°54.69	51	9107	147	9.1	p1.8	N29°35.040	W094°56.09	50	1397
11	00:01:16	327	10.4	s1.1	N29°33.213	W094°54.69	51	9105	147	9.1	s3.3	N29°35.044	W094°56.09	50	1402
12	00:01:14	327	10.4	s1.1	N29°33.208	W094°54.68	51	9104	146	9.1	s8.5	N29°35.048	W094°56.09	50	1393
13	00:01:12	327	10.4	s1.1	N29°33.203	W094°54.68	51	9103	146	9.1	s13.6	N29°35.053	W094°56.10	50	1398

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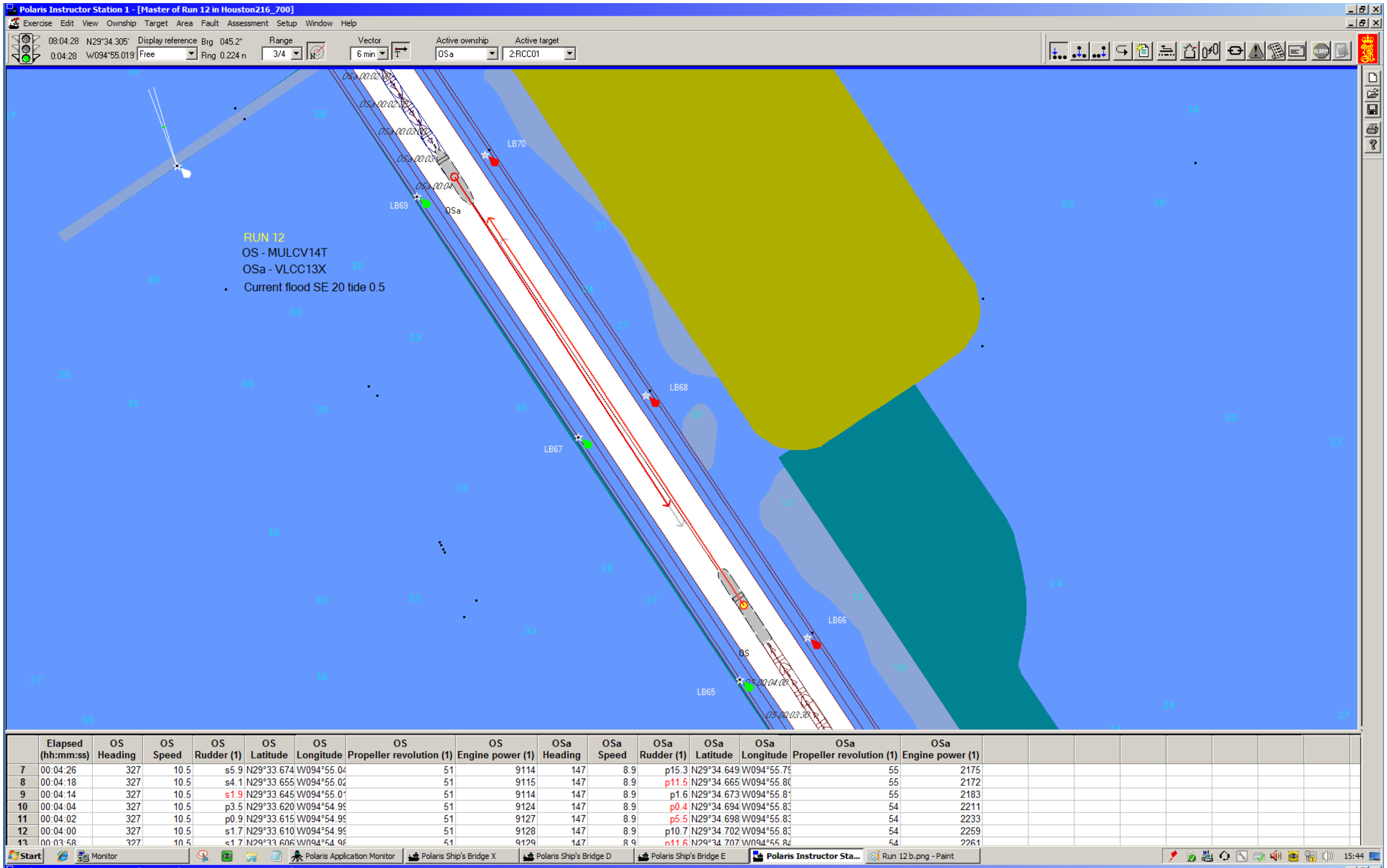
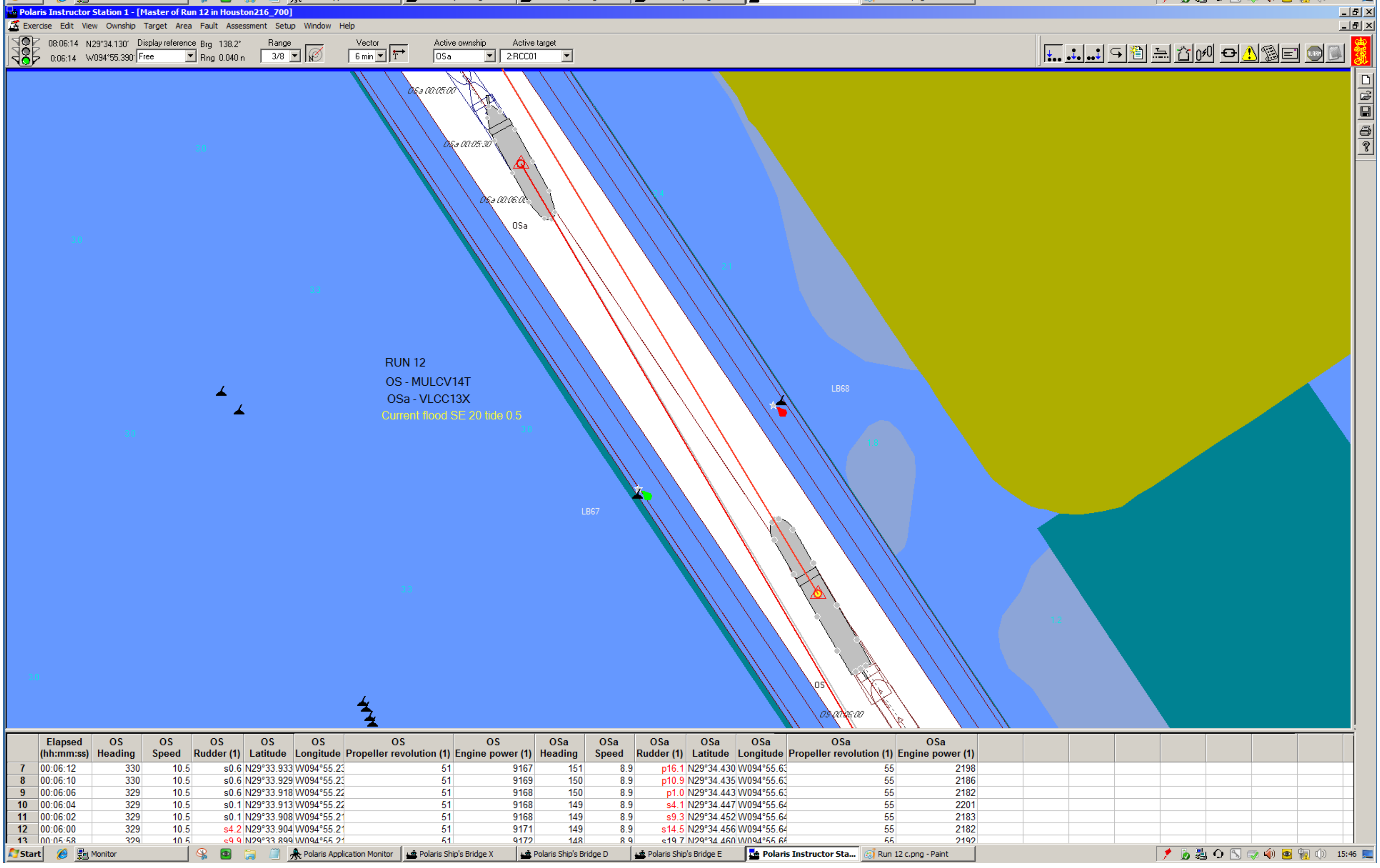


08:04:28 N29°34.305' Display reference Brg 045.2°
0:04:28 W094°55.019' Free Rng 0.224 n
Range 3/4
Vector 6 min
Active ownship OSa
Active target 2:RCC01

RUN 12
OS - MULCV14T
OSa - VLCC13X
Current flood SE 20 tide 0.5

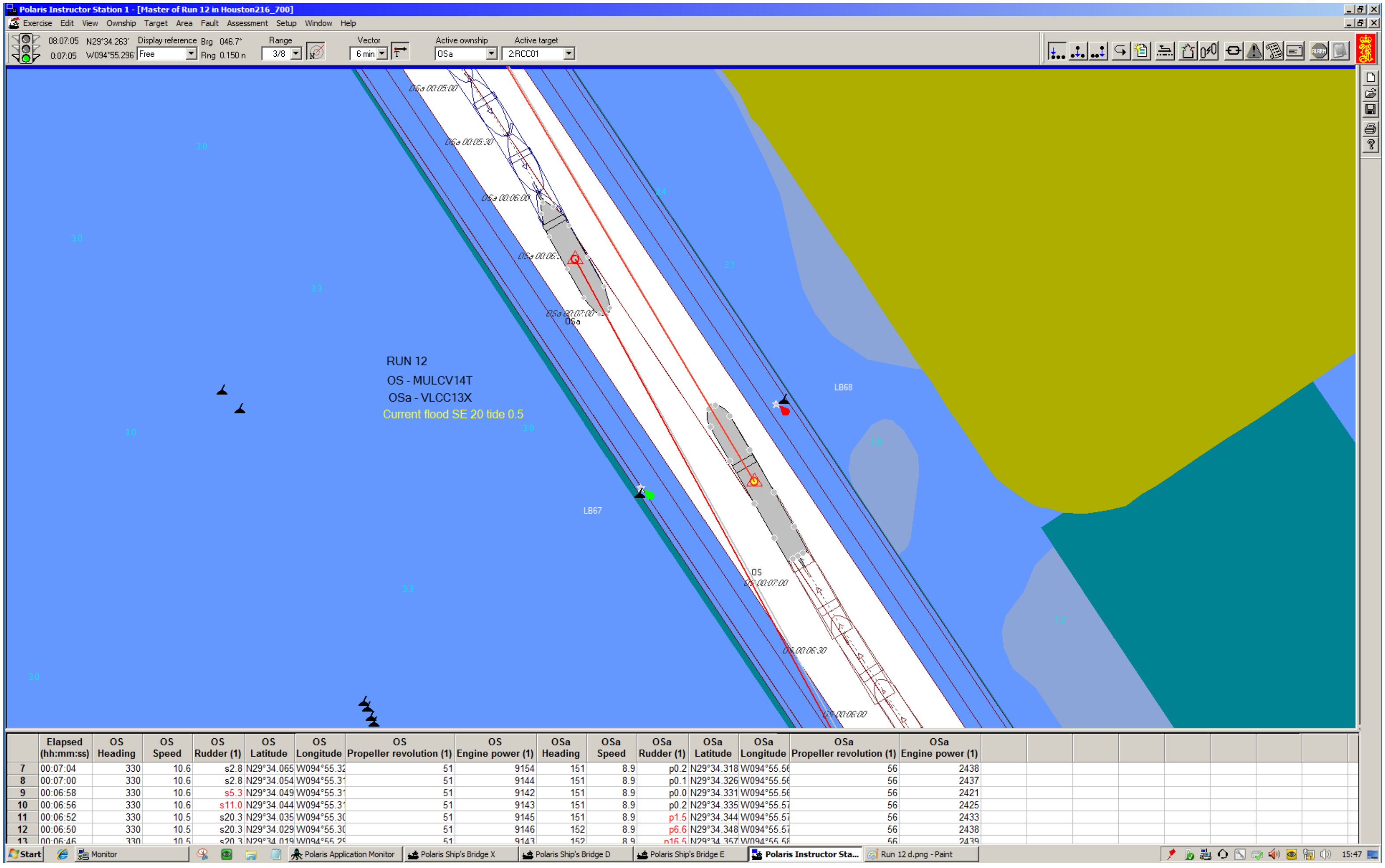
	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:04:26	327	10.5	s5.9	N29°33.674	W094°55.04	51	9114	147	8.9	p15.3	N29°34.649	W094°55.79	55	2175
8	00:04:18	327	10.5	s4.1	N29°33.655	W094°55.02	51	9115	147	8.9	p11.5	N29°34.665	W094°55.80	55	2172
9	00:04:14	327	10.5	s1.9	N29°33.645	W094°55.01	51	9114	147	8.9	p1.6	N29°34.673	W094°55.81	55	2183
10	00:04:04	327	10.5	p3.5	N29°33.620	W094°54.99	51	9124	147	8.9	p0.4	N29°34.694	W094°55.83	54	2211
11	00:04:02	327	10.5	p0.9	N29°33.615	W094°54.99	51	9127	147	8.9	p5.5	N29°34.698	W094°55.83	54	2233
12	00:04:00	327	10.5	s1.7	N29°33.610	W094°54.99	51	9128	147	8.9	p10.7	N29°34.702	W094°55.83	54	2259
13	00:03:58	327	10.5	s1.7	N29°33.606	W094°54.98	51	9129	147	8.9	p11.6	N29°34.707	W094°55.84	54	2261



08:06:14 N29°34.130' Display reference Brg 138.2°
0:06:14 W094°55.390' Free Rng 0.040 n
Range 3/8
Vector 6 min
Active ownship OSa
Active target 2:RCC01

RUN 12
OS - MULCV14T
OSa - VLCC13X
Current flood SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:06:12	330	10.5	s0.6	N29°33.933	W094°55.23	51	9167	151	8.9	p16.1	N29°34.430	W094°55.63	55	2198
8	00:06:10	330	10.5	s0.6	N29°33.929	W094°55.23	51	9169	150	8.9	p10.9	N29°34.435	W094°55.63	55	2186
9	00:06:06	329	10.5	s0.6	N29°33.918	W094°55.22	51	9168	150	8.9	p1.0	N29°34.443	W094°55.63	55	2182
10	00:06:04	329	10.5	s0.1	N29°33.913	W094°55.22	51	9168	149	8.9	s4.1	N29°34.447	W094°55.64	55	2201
11	00:06:02	329	10.5	s0.1	N29°33.908	W094°55.21	51	9168	149	8.9	s9.3	N29°34.452	W094°55.64	55	2183
12	00:06:00	329	10.5	s4.2	N29°33.904	W094°55.21	51	9171	149	8.9	s14.5	N29°34.456	W094°55.64	55	2182
13	00:05:58	329	10.5	s9.9	N29°33.899	W094°55.21	51	9172	148	8.9	s19.7	N29°34.460	W094°55.65	55	2192

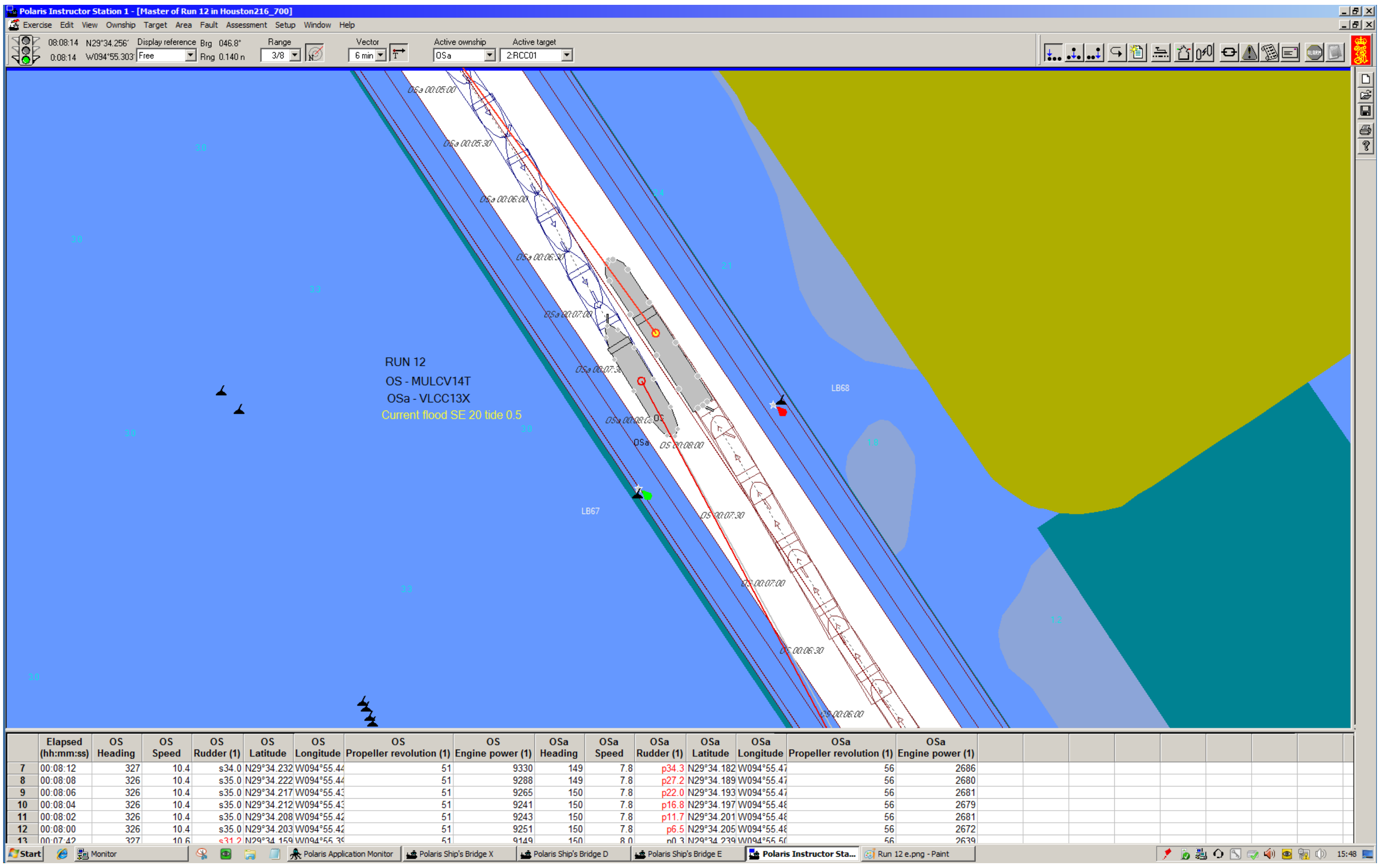


Polaris Instructor Station 1 - [Master of Run 12 in Houston216_700]

08:07:05 N29°34.263′ Display reference: Free Brg 046.7° Rng 0.150 n Range 3/8 Vector 6 min Active ownship OSa Active target 2:RCC01

0:07:05 W094°55.296′

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:07:04	330	10.6	s2.8	N29°34.065	W094°55.32	51	9154	151	8.9	p0.2	N29°34.318	W094°55.56	56	2438
8	00:07:00	330	10.6	s2.8	N29°34.054	W094°55.31	51	9144	151	8.9	p0.1	N29°34.326	W094°55.56	56	2437
9	00:06:58	330	10.6	s5.3	N29°34.049	W094°55.31	51	9142	151	8.9	p0.0	N29°34.331	W094°55.56	56	2421
10	00:06:56	330	10.6	s11.0	N29°34.044	W094°55.31	51	9143	151	8.9	p0.2	N29°34.335	W094°55.57	56	2425
11	00:06:52	330	10.5	s20.3	N29°34.035	W094°55.30	51	9145	151	8.9	p1.5	N29°34.344	W094°55.57	56	2433
12	00:06:50	330	10.5	s20.3	N29°34.029	W094°55.30	51	9146	152	8.9	p6.6	N29°34.348	W094°55.57	56	2438
13	00:06:46	330	10.5	s20.3	N29°34.019	W094°55.29	51	9143	152	8.9	p16.5	N29°34.357	W094°55.58	56	2439

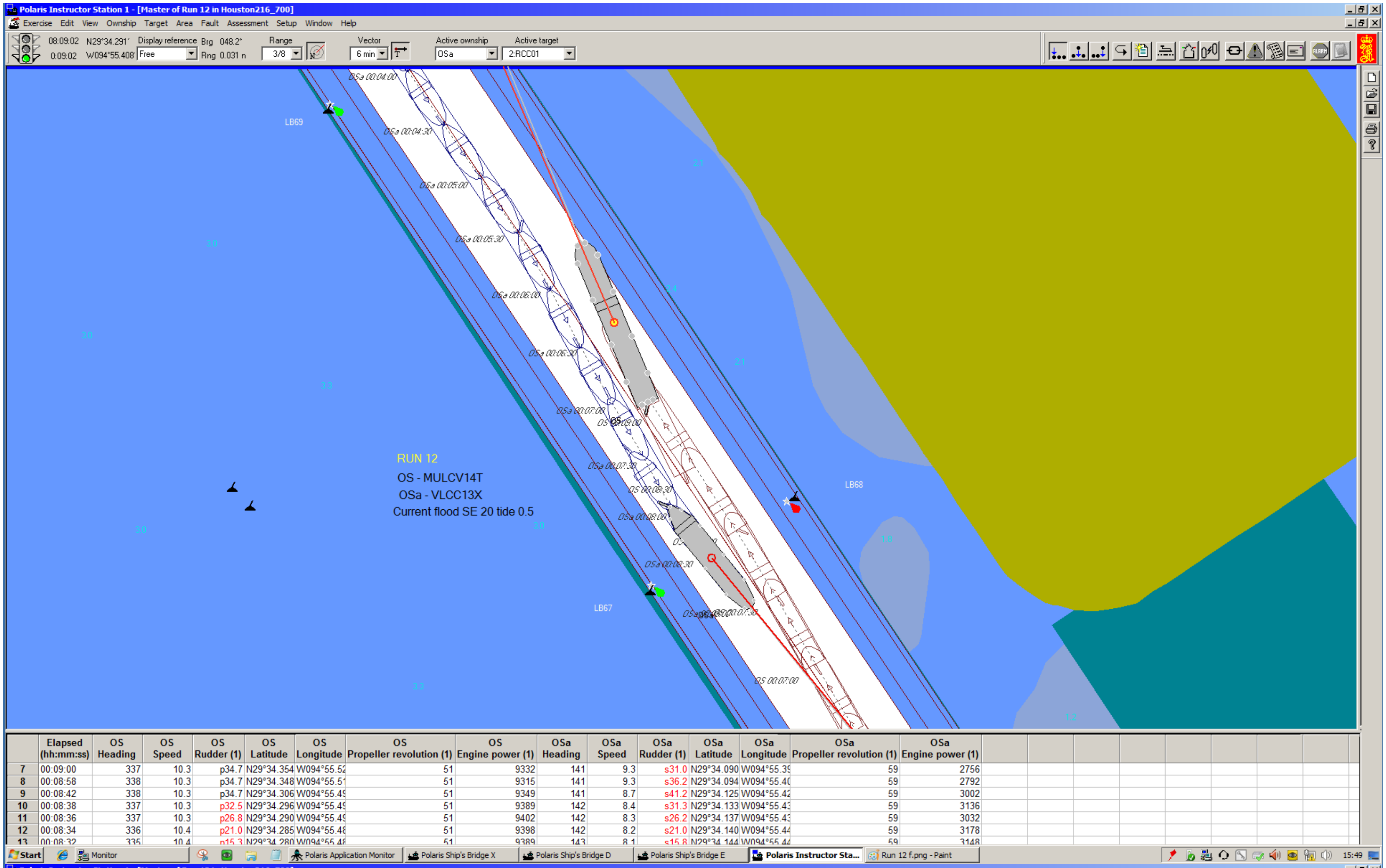


Polaris Instructor Station 1 - [Master of Run 12 in Houston216_700]

08:08:14 N29°34.256′ Display reference: Free Brg 046.8° Rng 0.140 n Range 3/8 Vector 6 min Active ownship OSa Active target 2:RCC01

0:08:14 W094°55.303′

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:08:12	327	10.4	s34.0	N29°34.232	W094°55.44	51	9330	149	7.8	p34.3	N29°34.182	W094°55.47	56	2686
8	00:08:08	326	10.4	s35.0	N29°34.222	W094°55.44	51	9288	149	7.8	p27.2	N29°34.189	W094°55.47	56	2680
9	00:08:06	326	10.4	s35.0	N29°34.217	W094°55.43	51	9265	150	7.8	p22.0	N29°34.193	W094°55.47	56	2681
10	00:08:04	326	10.4	s35.0	N29°34.212	W094°55.43	51	9241	150	7.8	p16.8	N29°34.197	W094°55.48	56	2679
11	00:08:02	326	10.4	s35.0	N29°34.208	W094°55.42	51	9243	150	7.8	p11.7	N29°34.201	W094°55.48	56	2681
12	00:08:00	326	10.4	s35.0	N29°34.203	W094°55.42	51	9251	150	7.8	p6.5	N29°34.205	W094°55.48	56	2672
13	00:07:42	327	10.6	s31.2	N29°34.159	W094°55.39	51	9149	150	8.0	p0.3	N29°34.239	W094°55.50	56	2639



08:09:02 N29°34.291' Display reference Free Brg 048.2° Rng 0.031 n

0:09:02 W094°55.408'

Range 3/8

Vector 6 min

Active ownship OSa

Active target 2:RCC01

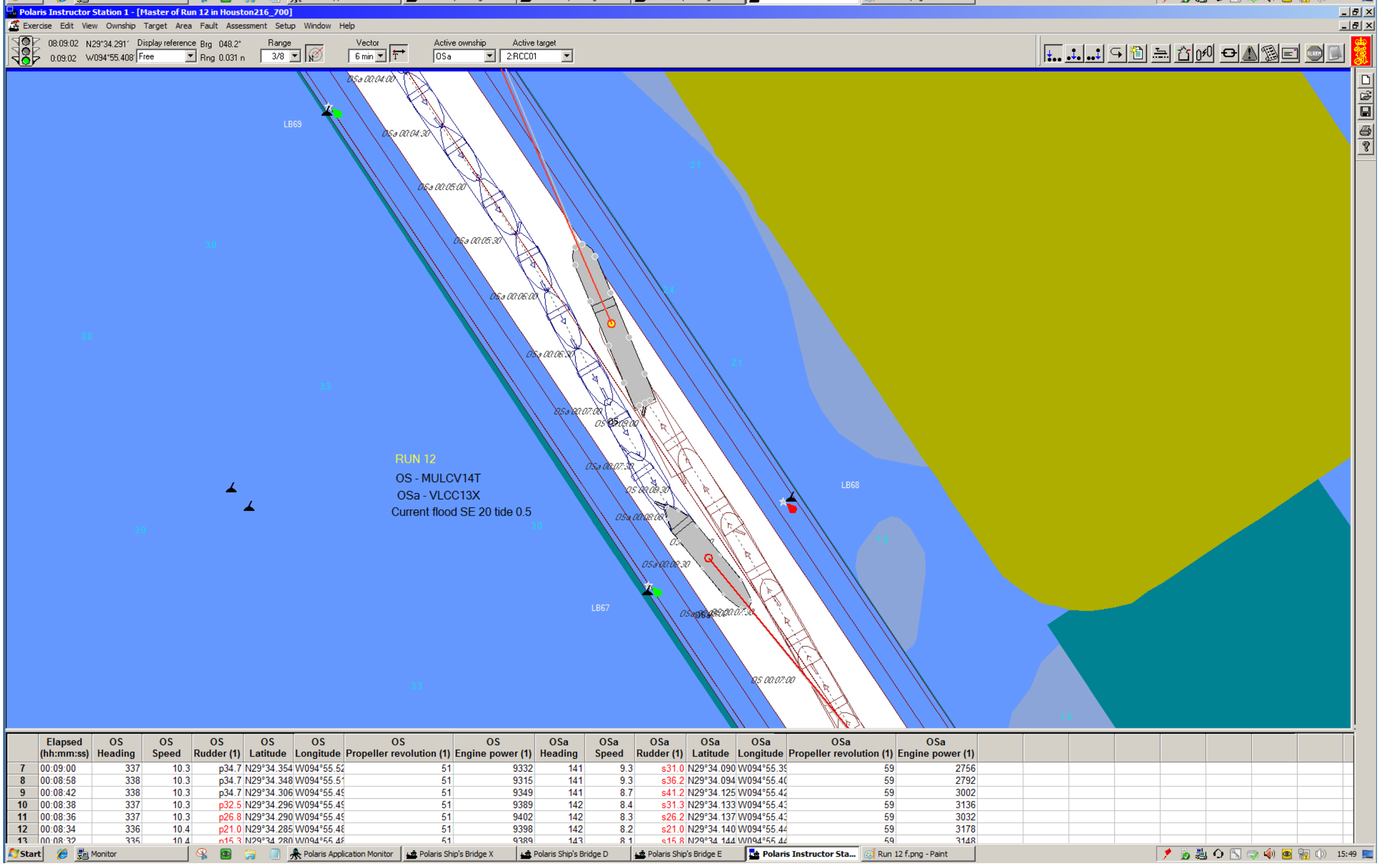
RUN 12

OS - MULCV14T

OSa - VLCC13X

Current flood SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:09:00	337	10.3	p34.7	N29°34.354	W094°55.52	51	9332	141	9.3	s31.0	N29°34.090	W094°55.39	59	2756
8	00:08:58	338	10.3	p34.7	N29°34.348	W094°55.51	51	9315	141	9.3	s36.2	N29°34.094	W094°55.40	59	2792
9	00:08:42	338	10.3	p34.7	N29°34.306	W094°55.49	51	9349	141	8.7	s41.2	N29°34.125	W094°55.42	59	3002
10	00:08:38	337	10.3	p32.5	N29°34.296	W094°55.49	51	9389	142	8.4	s31.3	N29°34.133	W094°55.43	59	3136
11	00:08:36	337	10.3	p26.8	N29°34.290	W094°55.49	51	9402	142	8.3	s26.2	N29°34.137	W094°55.43	59	3032
12	00:08:34	336	10.4	p21.0	N29°34.285	W094°55.48	51	9398	142	8.2	s21.0	N29°34.140	W094°55.44	59	3178
13	00:08:32	335	10.4	p15.3	N29°34.280	W094°55.48	51	9389	143	8.1	s15.8	N29°34.144	W094°55.44	59	3148


08:09:02 N29°34.291' Display reference Free Brg 048.2° Rng 0.031 n

0:09:02 W094°55.408'

Range 3/8

Vector 6 min

Active ownship OSa

Active target 2:RCC01

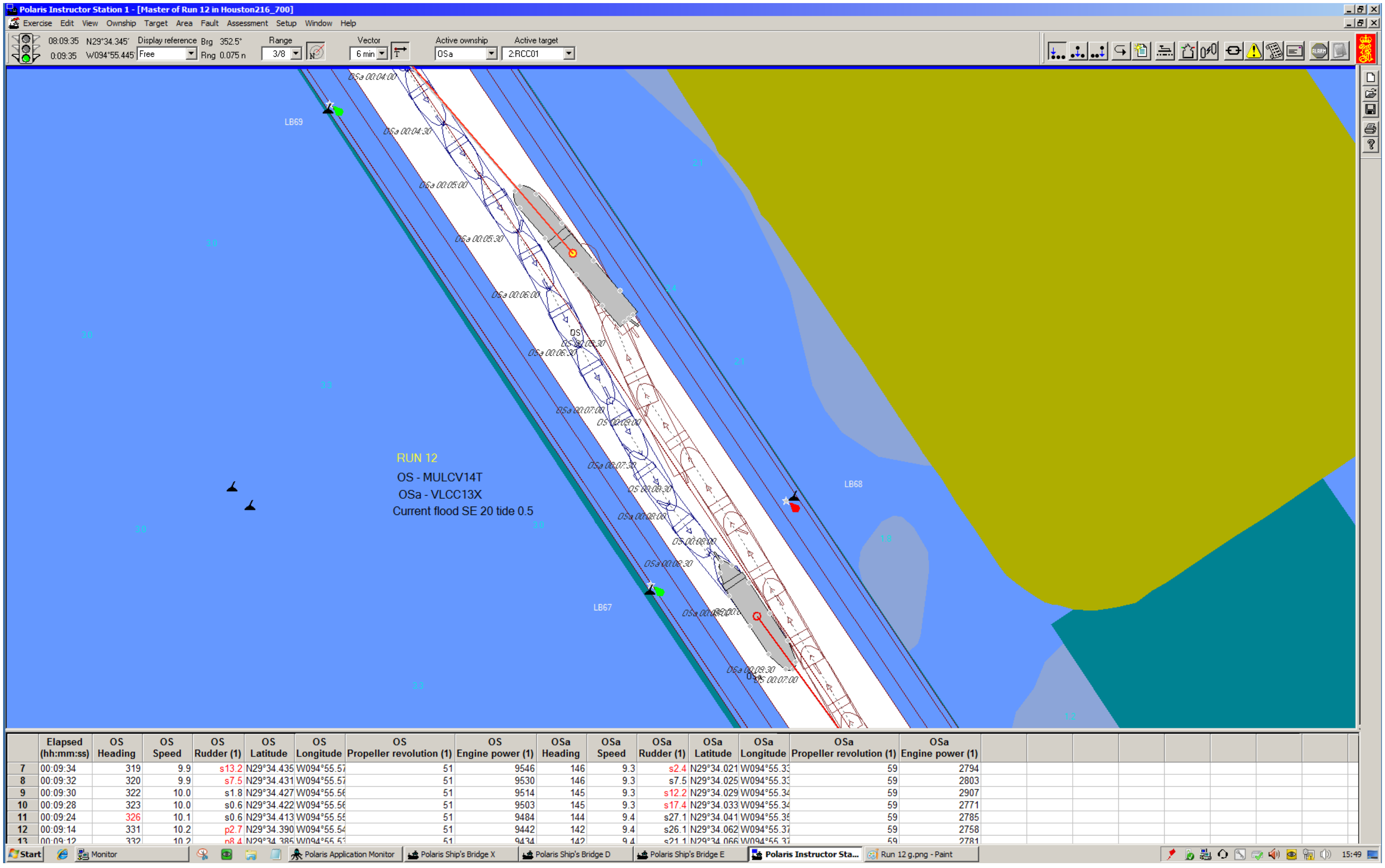
RUN 12

OS - MULCV14T

OSa - VLCC13X

Current flood SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:09:00	337	10.3	p34.7	N29°34.354	W094°55.52	51	9332	141	9.3	s31.0	N29°34.090	W094°55.39	59	2756
8	00:08:58	338	10.3	p34.7	N29°34.348	W094°55.51	51	9315	141	9.3	s36.2	N29°34.094	W094°55.40	59	2792
9	00:08:42	338	10.3	p34.7	N29°34.306	W094°55.49	51	9349	141	8.7	s41.2	N29°34.125	W094°55.42	59	3002
10	00:08:38	337	10.3	p32.5	N29°34.296	W094°55.49	51	9389	142	8.4	s31.3	N29°34.133	W094°55.43	59	3136
11	00:08:36	337	10.3	p26.8	N29°34.290	W094°55.49	51	9402	142	8.3	s26.2	N29°34.137	W094°55.43	59	3032
12	00:08:34	336	10.4	p21.0	N29°34.285	W094°55.48	51	9398	142	8.2	s21.0	N29°34.140	W094°55.44	59	3178
13	00:08:32	335	10.4	p15.3	N29°34.280	W094°55.48	51	9389	143	8.1	s15.8	N29°34.144	W094°55.44	59	3148



Polaris Instructor Station 1 - [Master of Run 12 in Houston216_700]

08:09:35 N29°34.345′ Display reference: Free Brg 352.5° Rng 0.075 n Range 3/8 Vector 6 min Active ownship OSa Active target 2:RCC01

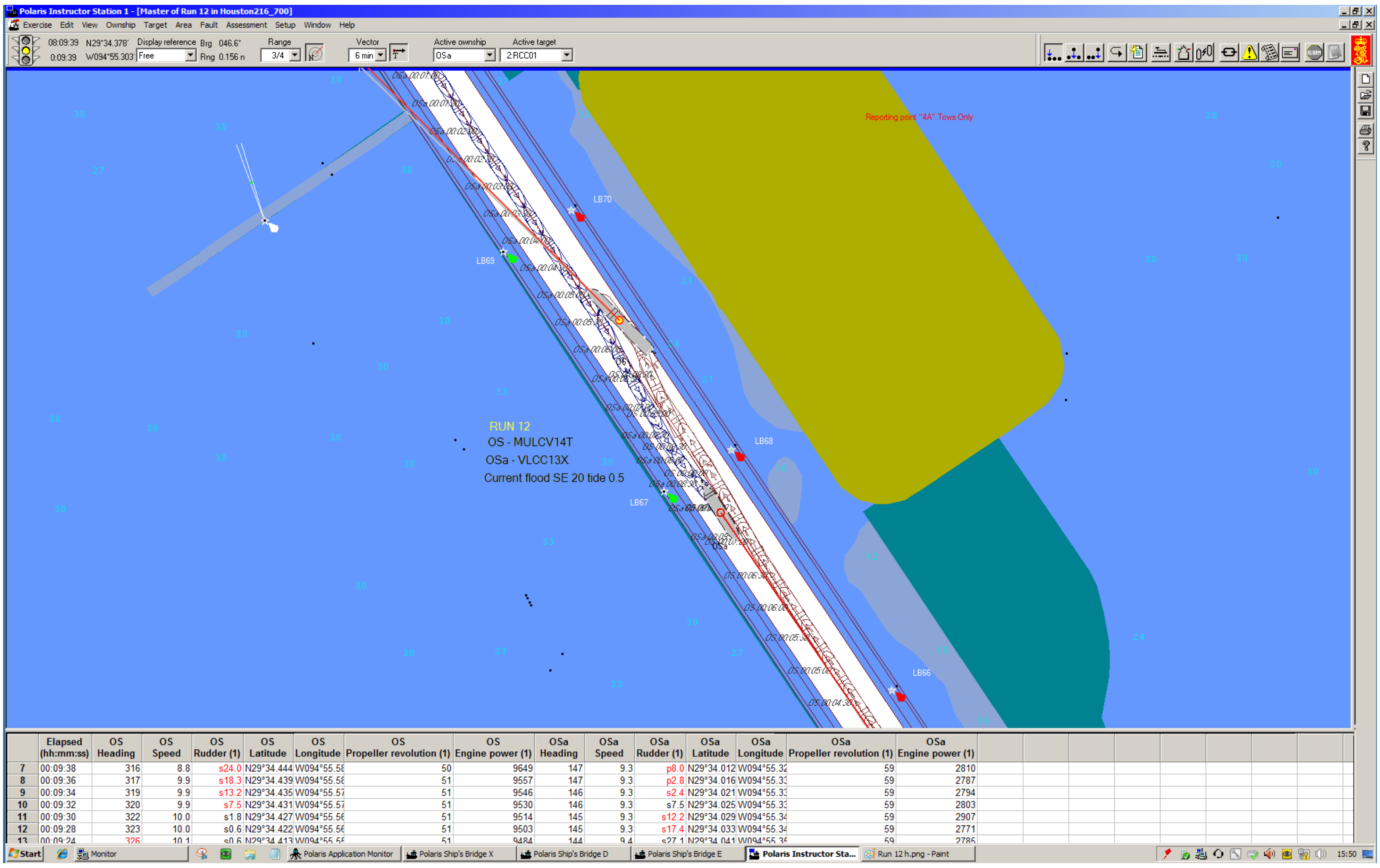
RUN 12

OS - MULCV14T

OSa - VLCC13X

Current flood SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:09:34	319	9.9	s13.2	N29°34.435	W094°55.57	51	9546	146	9.3	s2.4	N29°34.021	W094°55.33	59	2794
8	00:09:32	320	9.9	s7.5	N29°34.431	W094°55.57	51	9530	146	9.3	s7.5	N29°34.025	W094°55.33	59	2803
9	00:09:30	322	10.0	s1.8	N29°34.427	W094°55.56	51	9514	145	9.3	s12.2	N29°34.029	W094°55.34	59	2907
10	00:09:28	323	10.0	s0.6	N29°34.422	W094°55.56	51	9503	145	9.3	s17.4	N29°34.033	W094°55.34	59	2771
11	00:09:24	326	10.1	s0.6	N29°34.413	W094°55.55	51	9484	144	9.4	s27.1	N29°34.041	W094°55.35	59	2785
12	00:09:14	331	10.2	p2.7	N29°34.390	W094°55.54	51	9442	142	9.4	s26.1	N29°34.062	W094°55.37	59	2758
13	00:09:12	332	10.2	p8.4	N29°34.385	W094°55.53	51	9434	142	9.4	s21.1	N29°34.066	W094°55.37	59	2781



Polaris Instructor Station 1 - [Master of Run 12 in Houston216_700]

08:09:39 N29°34.378′ Display reference: Free Brg 046.6° Rng 0.156 n Range 3/4 Vector 6 min Active ownship OSa Active target 2:RCC01

RUN 12

OS - MULCV14T

OSa - VLCC13X

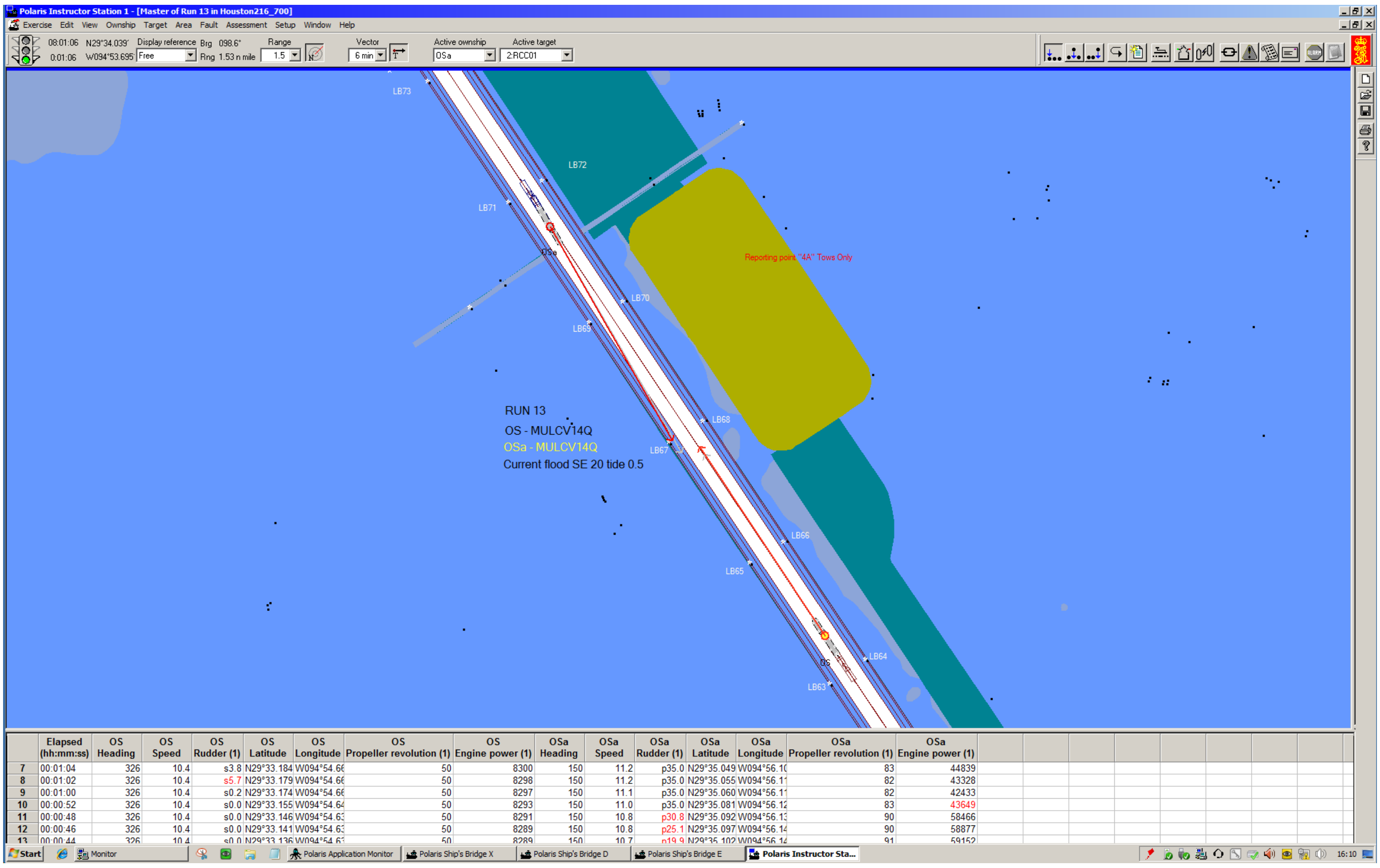
Current flood SE 20 tide 0.5

Reporting point "4A" Tows Only

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:09:38	316	8.8	s24.0	N29°34.444	W094°55.58	50	9649	147	9.3	p8.0	N29°34.012	W094°55.32	59	2810
8	00:09:36	317	9.9	s18.3	N29°34.439	W094°55.58	51	9557	147	9.3	p2.8	N29°34.016	W094°55.33	59	2787
9	00:09:34	319	9.9	s13.2	N29°34.435	W094°55.57	51	9546	146	9.3	s2.4	N29°34.021	W094°55.33	59	2794
10	00:09:32	320	9.9	s7.5	N29°34.431	W094°55.57	51	9530	146	9.3	s7.5	N29°34.025	W094°55.33	59	2803
11	00:09:30	322	10.0	s1.8	N29°34.427	W094°55.56	51	9514	145	9.3	s12.2	N29°34.029	W094°55.34	59	2907
12	00:09:28	323	10.0	s0.6	N29°34.422	W094°55.56	51	9503	145	9.3	s17.4	N29°34.033	W094°55.34	59	2771
13	00:09:24	326	10.1	s0.6	N29°34.413	W094°55.55	51	9484	144	9.4	s27.1	N29°34.041	W094°55.35	59	2785

June 26, 2019

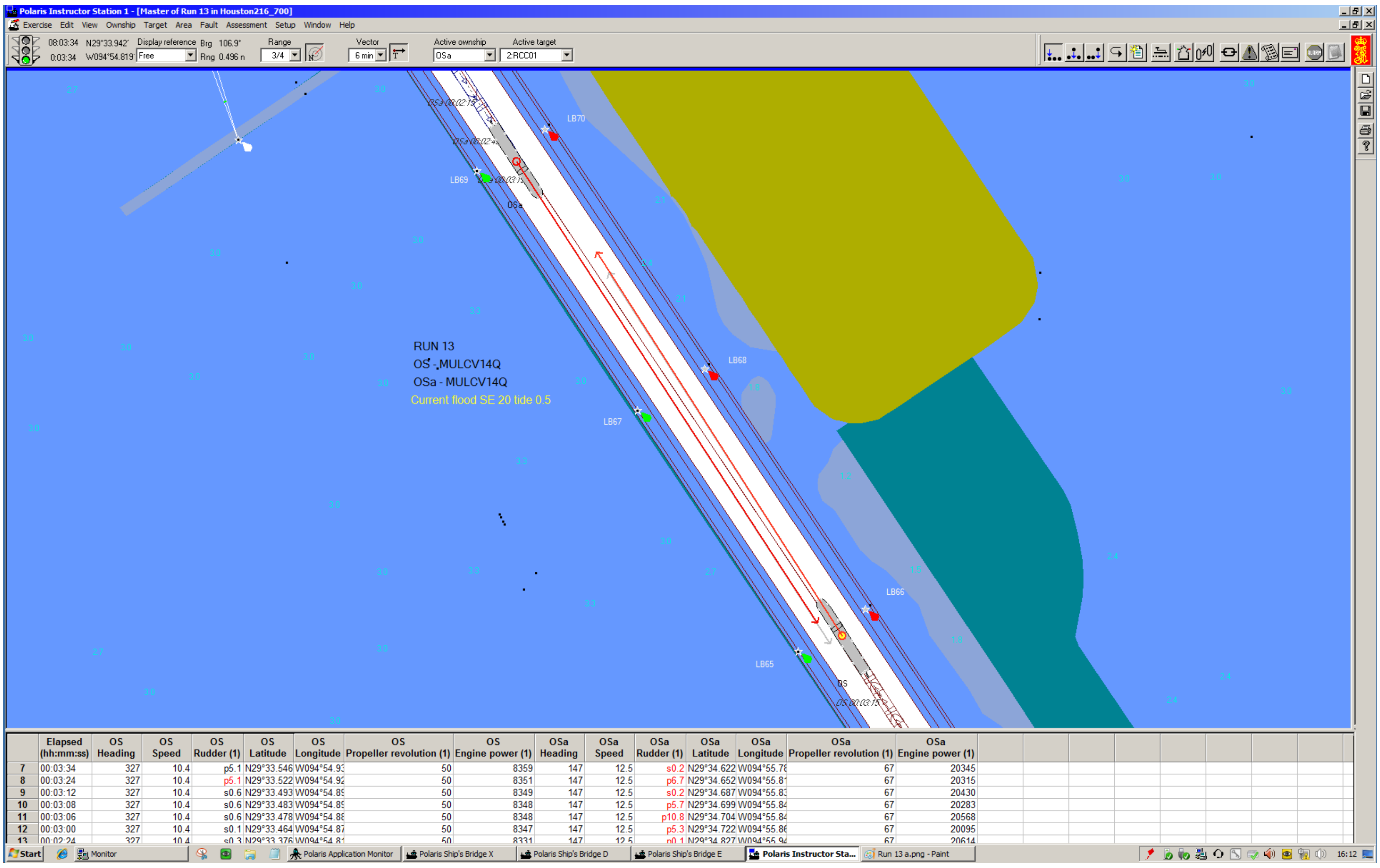
Run 13


Polaris Instructor Station 1 - [Master of Run 13 in Houston216_700]

08:01:06 N29°34.039'
0:01:06 W094°53.695'
Display reference: Free
Brg 098.6°
Rng 1.53 n mile
Range: 1.5
Vector: 6 min
Active ownship: OSa
Active target: 2:RCC01

RUN 13
OS - MULCV14Q
OSa - MULCV14Q
Current flood SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:01:04	326	10.4	s3.8	N29°33.184	W094°54.66	50	8300	150	11.2	p35.0	N29°35.049	W094°56.10	83	44839
8	00:01:02	326	10.4	s5.7	N29°33.179	W094°54.66	50	8298	150	11.2	p35.0	N29°35.055	W094°56.11	82	43328
9	00:01:00	326	10.4	s0.2	N29°33.174	W094°54.66	50	8297	150	11.1	p35.0	N29°35.060	W094°56.11	82	42433
10	00:00:52	326	10.4	s0.0	N29°33.155	W094°54.64	50	8293	150	11.0	p35.0	N29°35.081	W094°56.12	83	43649
11	00:00:48	326	10.4	s0.0	N29°33.146	W094°54.63	50	8291	150	10.8	p30.8	N29°35.092	W094°56.13	90	58466
12	00:00:46	326	10.4	s0.0	N29°33.141	W094°54.63	50	8289	150	10.8	p25.1	N29°35.097	W094°56.14	90	58877
13	00:00:44	326	10.4	s0.0	N29°33.136	W094°54.63	50	8289	150	10.7	p19.9	N29°35.102	W094°56.14	91	59152

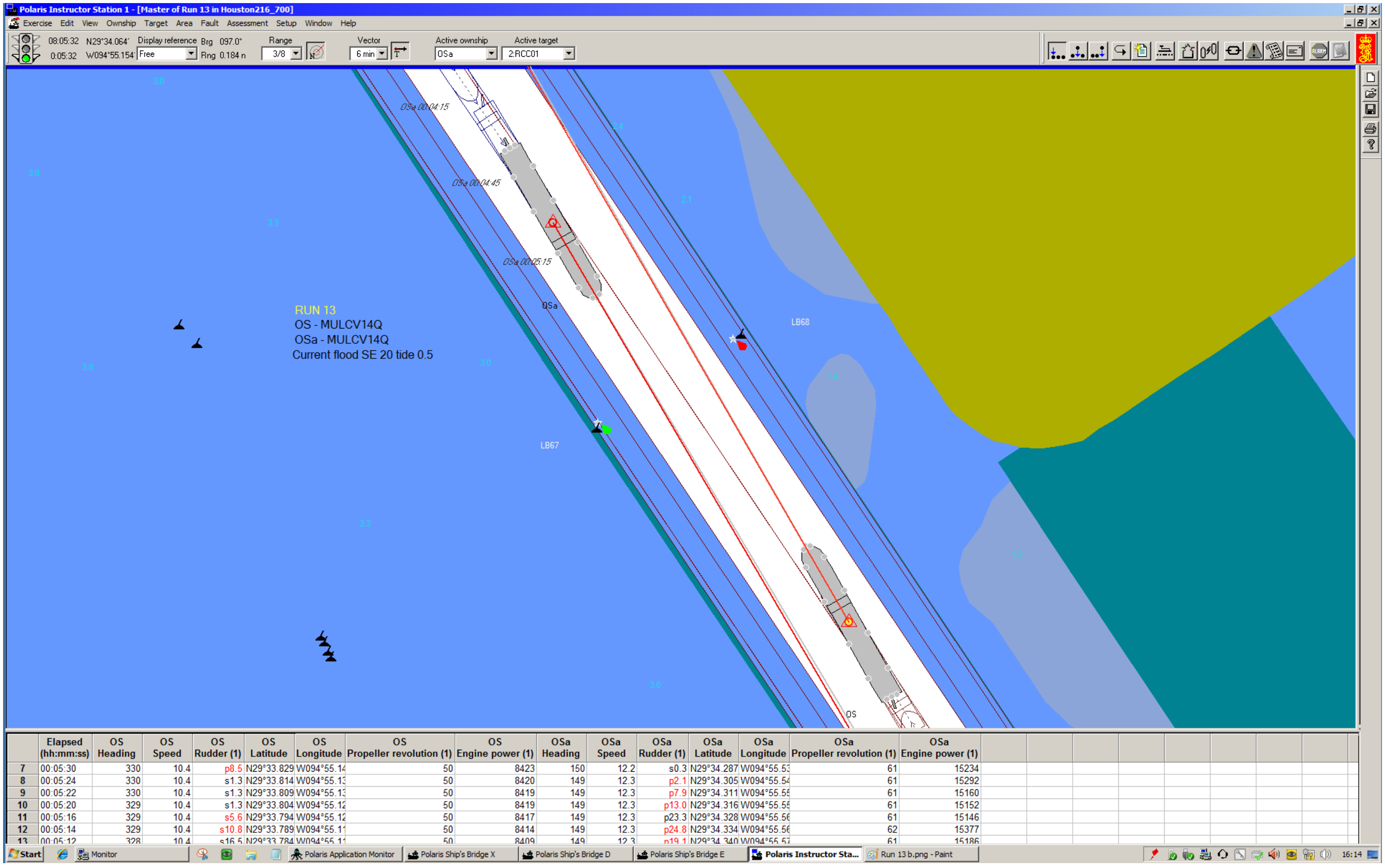

Polaris Instructor Station 1 - [Master of Run 13 in Houston216_700]

08:03:34 N29°33.942'
0:03:34 W094°54.819'
Display reference: Free
Brg 106.9°
Rng 0.496 n
Range: 3/4
Vector: 6 min
Active ownship: OSa
Active target: 2:RCC01

RUN 13
OS - MULCV14Q
OSa - MULCV14Q
Current flood SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:03:34	327	10.4	p5.1	N29°33.546	W094°54.93	50	8359	147	12.5	s0.2	N29°34.622	W094°55.78	67	20345
8	00:03:24	327	10.4	p5.1	N29°33.522	W094°54.92	50	8351	147	12.5	p6.7	N29°34.652	W094°55.81	67	20315
9	00:03:12	327	10.4	s0.6	N29°33.493	W094°54.89	50	8349	147	12.5	s0.2	N29°34.687	W094°55.83	67	20430
10	00:03:08	327	10.4	s0.6	N29°33.483	W094°54.89	50	8348	147	12.5	p5.7	N29°34.699	W094°55.84	67	20283
11	00:03:06	327	10.4	s0.6	N29°33.478	W094°54.88	50	8348	147	12.5	p10.8	N29°34.704	W094°55.84	67	20568
12	00:03:00	327	10.4	s0.1	N29°33.464	W094°54.87	50	8347	147	12.5	p5.3	N29°34.722	W094°55.86	67	20095
13	00:02:24	327	10.4	s0.3	N29°33.376	W094°54.81	50	8331	147	12.5	p0.1	N29°34.827	W094°55.94	67	20614

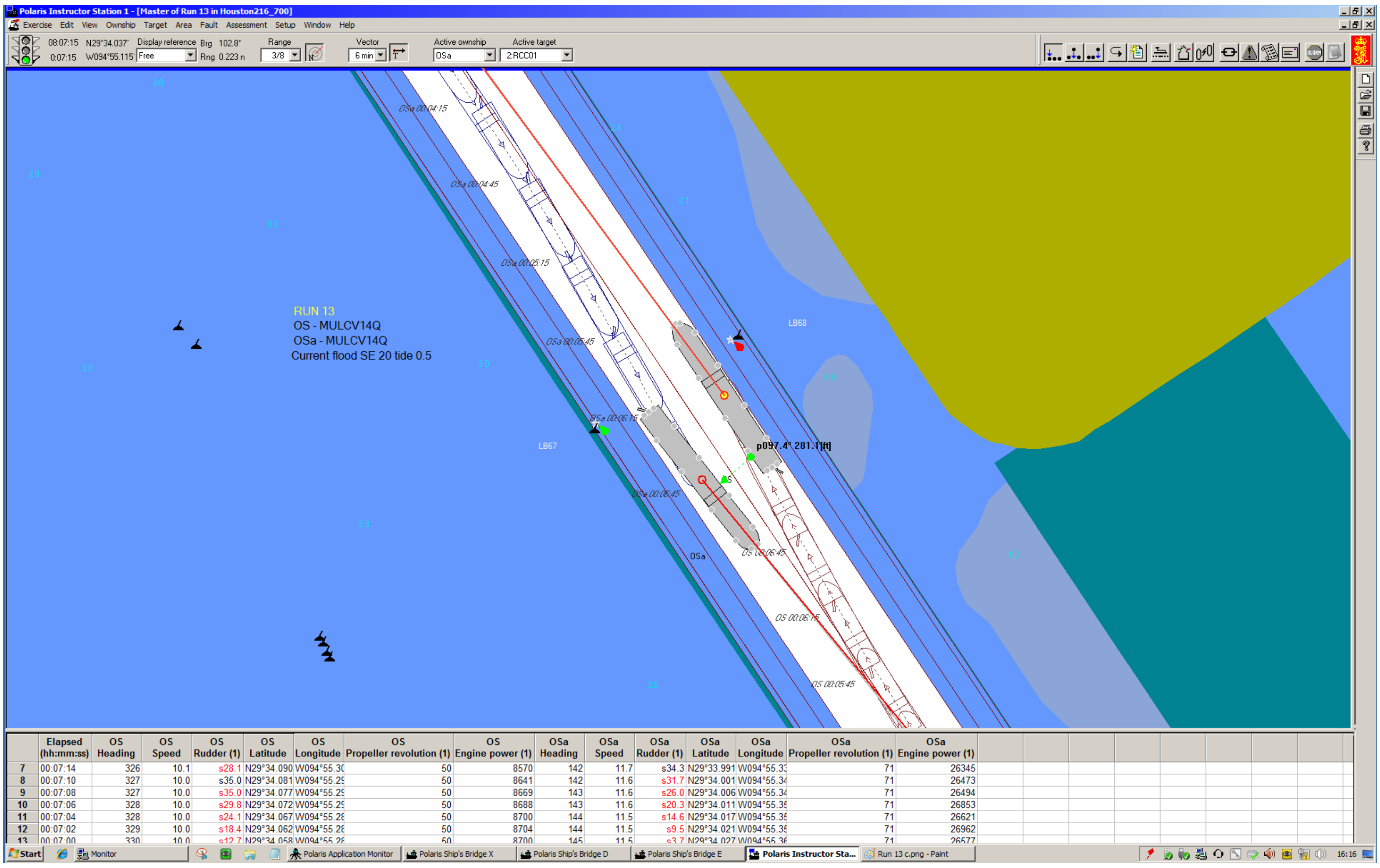
June 26, 2019



Polaris Instructor Station 1 - [Master of Run 13 in Houston216_700]

08:05:32 N29°34.064' Display reference Free Brg 097.0° Rng 0.184 n Range 3/8 Vector 6 min Active ownship OSa Active target 2:RCC01
0:05:32 W094°55.154'

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:05:30	330	10.4	p8.5	N29°33.829	W094°55.14	50	8423	150	12.2	s0.3	N29°34.287	W094°55.53	61	15234
8	00:05:24	330	10.4	s1.3	N29°33.814	W094°55.13	50	8420	149	12.3	p2.1	N29°34.305	W094°55.54	61	15292
9	00:05:22	330	10.4	s1.3	N29°33.809	W094°55.13	50	8419	149	12.3	p7.9	N29°34.311	W094°55.55	61	15160
10	00:05:20	329	10.4	s1.3	N29°33.804	W094°55.12	50	8419	149	12.3	p13.0	N29°34.316	W094°55.55	61	15152
11	00:05:16	329	10.4	s5.6	N29°33.794	W094°55.12	50	8417	149	12.3	p23.3	N29°34.328	W094°55.56	61	15146
12	00:05:14	329	10.4	s10.8	N29°33.789	W094°55.11	50	8414	149	12.3	p24.8	N29°34.334	W094°55.56	62	15377
13	00:05:12	328	10.4	s16.5	N29°33.784	W094°55.11	50	8409	149	12.3	p19.1	N29°34.340	W094°55.57	61	15186

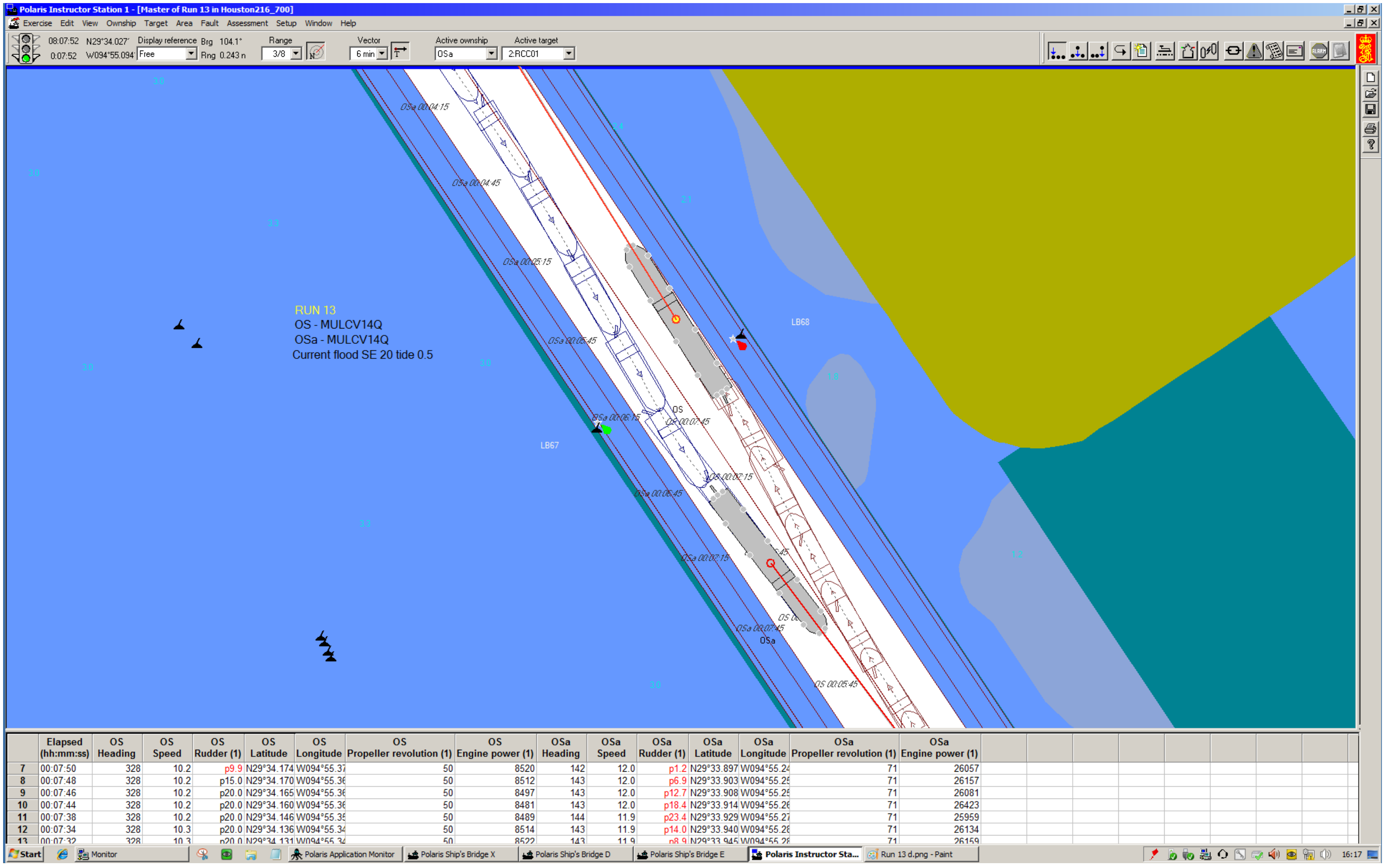


Polaris Instructor Station 1 - [Master of Run 13 in Houston216_700]

08:07:15 N29°34.037' Display reference Free Brg 102.8° Rng 0.223 n Range 3/8 Vector 6 min Active ownship OSa Active target 2:RCC01
0:07:15 W094°55.115'

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:07:14	326	10.1	s28.1	N29°34.090	W094°55.30	50	8570	142	11.7	s34.3	N29°33.991	W094°55.33	71	26345
8	00:07:10	327	10.0	s35.0	N29°34.081	W094°55.29	50	8641	142	11.6	s31.7	N29°34.001	W094°55.34	71	26473
9	00:07:08	327	10.0	s35.0	N29°34.077	W094°55.29	50	8669	143	11.6	s26.0	N29°34.006	W094°55.34	71	26494
10	00:07:06	328	10.0	s29.8	N29°34.072	W094°55.29	50	8688	143	11.6	s20.3	N29°34.011	W094°55.35	71	26853
11	00:07:04	328	10.0	s24.1	N29°34.067	W094°55.28	50	8700	144	11.5	s14.6	N29°34.017	W094°55.35	71	26621
12	00:07:02	329	10.0	s18.4	N29°34.062	W094°55.28	50	8704	144	11.5	s9.5	N29°34.021	W094°55.35	71	26962
13	00:07:00	330	10.0	s12.7	N29°34.058	W094°55.28	50	8700	145	11.5	s3.7	N29°34.027	W094°55.36	71	26577

June 26, 2019

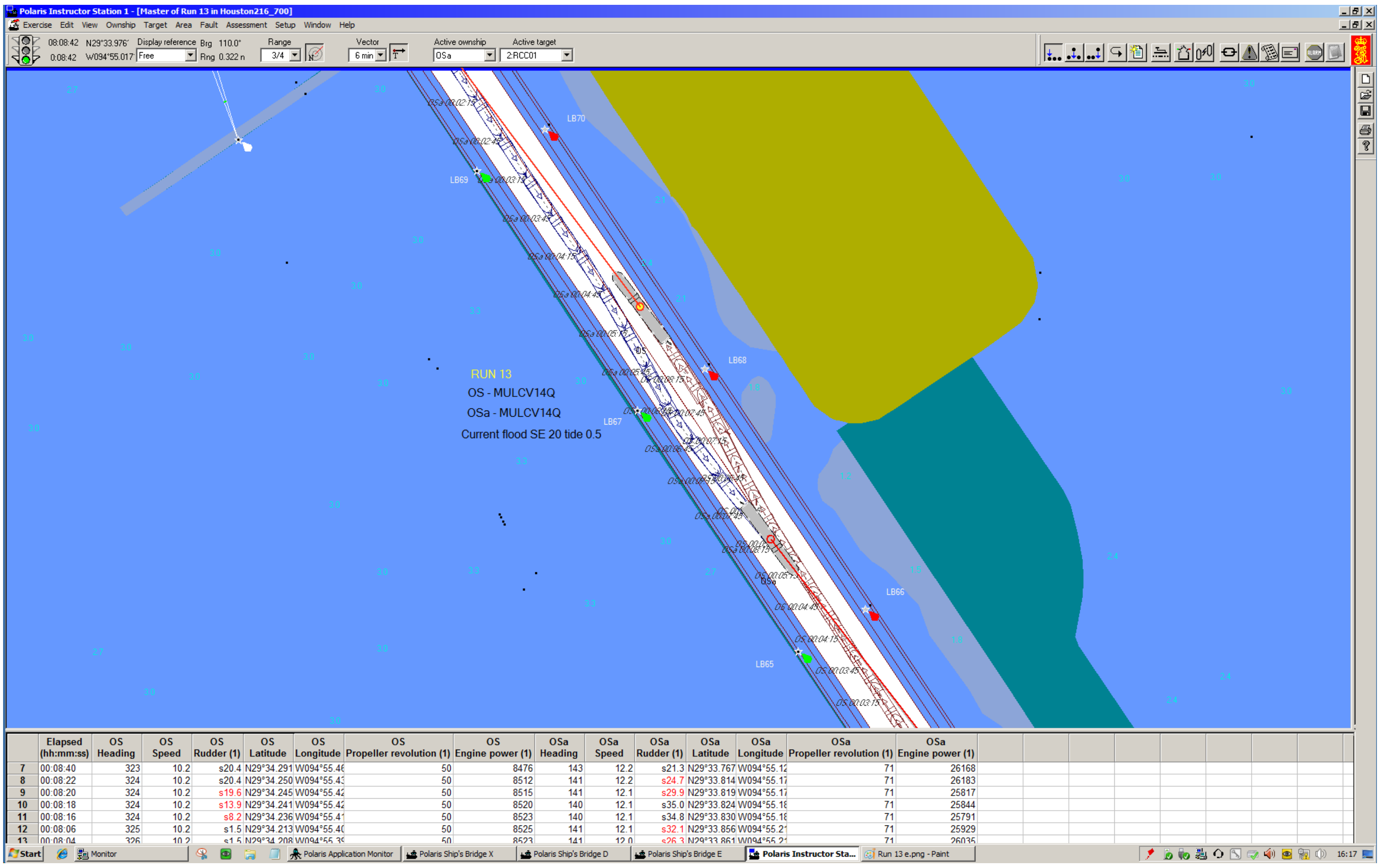

Polaris Instructor Station 1 - [Master of Run 13 in Houston216_700]

08:07:52 N29°34.027′ Display reference Free Brg 104.1° Rng 0.243 n Range 3/8 Vector 6 min Active ownship OSa Active target 2:RCC01

0:07:52 W094°55.094′

RUN 13
OS - MULCV14Q
OSa - MULCV14Q
Current flood SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:07:50	328	10.2	p9.9	N29°34.174	W094°55.37	50	8520	142	12.0	p1.2	N29°33.897	W094°55.24	71	26057
8	00:07:48	328	10.2	p15.0	N29°34.170	W094°55.36	50	8512	143	12.0	p6.9	N29°33.903	W094°55.25	71	26157
9	00:07:46	328	10.2	p20.0	N29°34.165	W094°55.36	50	8497	143	12.0	p12.7	N29°33.908	W094°55.25	71	26081
10	00:07:44	328	10.2	p20.0	N29°34.160	W094°55.36	50	8481	143	12.0	p18.4	N29°33.914	W094°55.26	71	26423
11	00:07:38	328	10.2	p20.0	N29°34.146	W094°55.35	50	8489	144	11.9	p23.4	N29°33.929	W094°55.27	71	25959
12	00:07:34	328	10.3	p20.0	N29°34.136	W094°55.34	50	8514	143	11.9	p14.0	N29°33.940	W094°55.28	71	26134
13	00:07:32	328	10.3	p20.0	N29°34.131	W094°55.34	50	8522	143	11.9	p8.9	N29°33.945	W094°55.28	71	26159

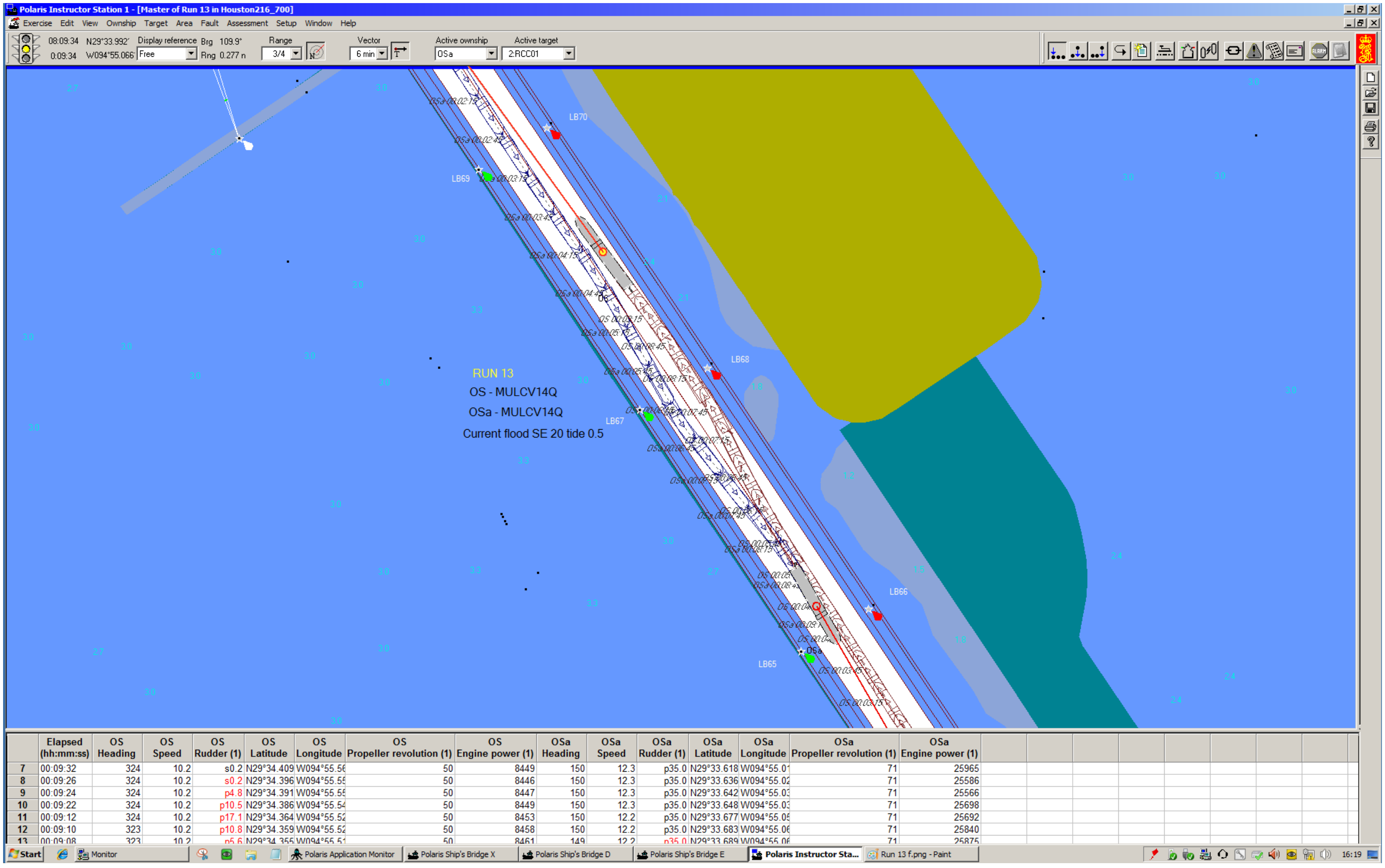

Polaris Instructor Station 1 - [Master of Run 13 in Houston216_700]

08:08:42 N29°33.976′ Display reference Free Brg 110.0° Rng 0.322 n Range 3/4 Vector 6 min Active ownship OSa Active target 2:RCC01

0:08:42 W094°55.017′

RUN 13
OS - MULCV14Q
OSa - MULCV14Q
Current flood SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:08:40	323	10.2	s20.4	N29°34.291	W094°55.46	50	8476	143	12.2	s21.3	N29°33.767	W094°55.12	71	26168
8	00:08:22	324	10.2	s20.4	N29°34.250	W094°55.43	50	8512	141	12.2	s24.7	N29°33.814	W094°55.17	71	26183
9	00:08:20	324	10.2	s19.6	N29°34.245	W094°55.42	50	8515	141	12.1	s29.9	N29°33.819	W094°55.17	71	25817
10	00:08:18	324	10.2	s13.9	N29°34.241	W094°55.42	50	8520	140	12.1	s35.0	N29°33.824	W094°55.18	71	25844
11	00:08:16	324	10.2	s8.2	N29°34.236	W094°55.41	50	8523	140	12.1	s34.8	N29°33.830	W094°55.18	71	25791
12	00:08:06	325	10.2	s1.5	N29°34.213	W094°55.40	50	8525	141	12.1	s32.1	N29°33.856	W094°55.21	71	25929
13	00:08:04	326	10.2	s1.5	N29°34.208	W094°55.39	50	8523	141	12.0	s26.3	N29°33.861	W094°55.21	71	26035



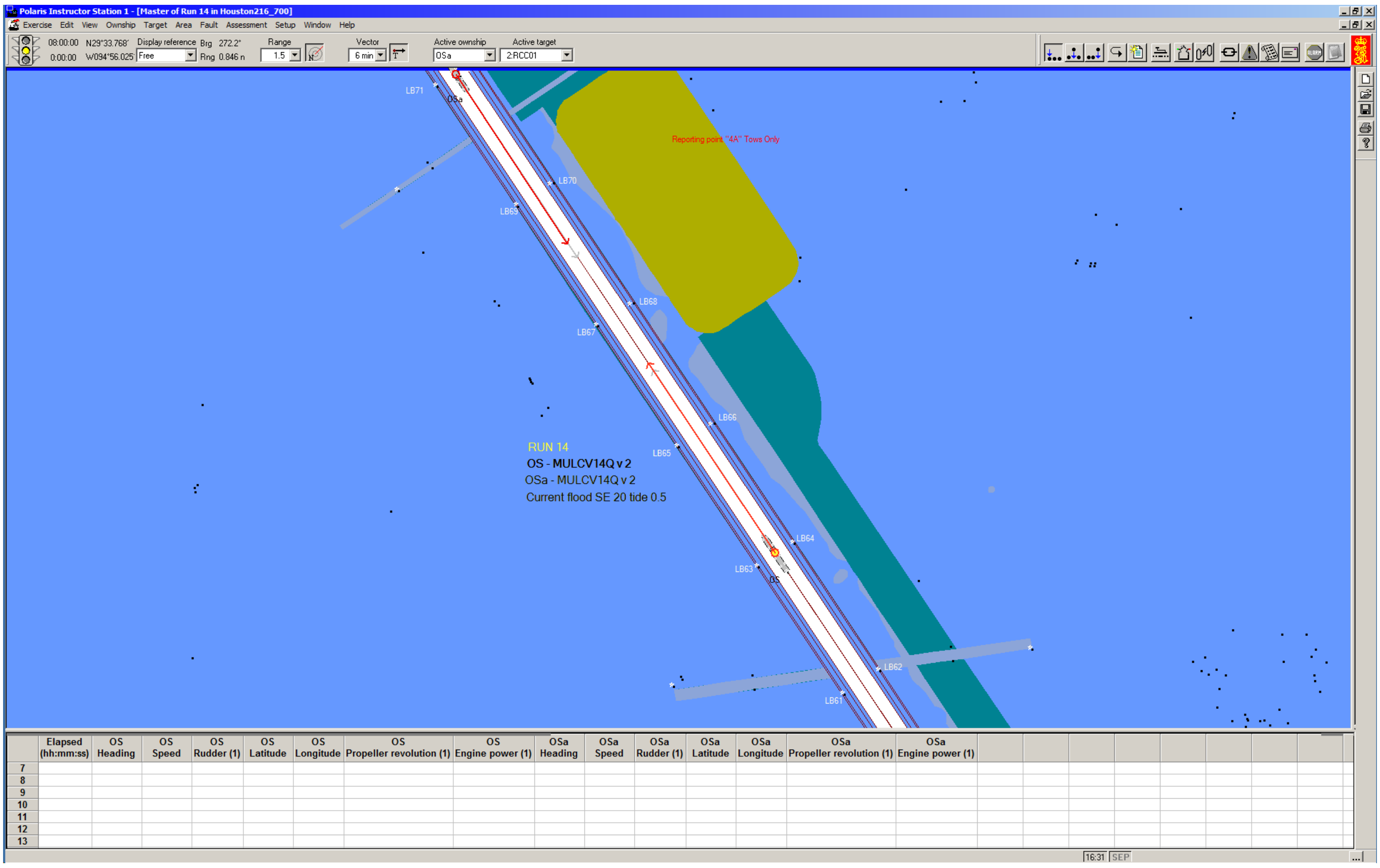
08:09:34 N29°33.992' Display reference Brg 109.9°
0:09:34 W094°55.066 Free Rng 0.277 n
Range 3/4
Vector 6 min
Active ownship OSa
Active target 2:RCC01

RUN 13
OS - MULCV14Q
OSa - MULCV14Q
Current flood SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:09:32	324	10.2	s0.2	N29°34.409	W094°55.56	50	8449	150	12.3	p35.0	N29°33.618	W094°55.01	71	25965
8	00:09:26	324	10.2	s0.2	N29°34.396	W094°55.55	50	8446	150	12.3	p35.0	N29°33.636	W094°55.02	71	25586
9	00:09:24	324	10.2	p4.8	N29°34.391	W094°55.55	50	8447	150	12.3	p35.0	N29°33.642	W094°55.03	71	25566
10	00:09:22	324	10.2	p10.5	N29°34.386	W094°55.54	50	8449	150	12.3	p35.0	N29°33.648	W094°55.03	71	25698
11	00:09:12	324	10.2	p17.1	N29°34.364	W094°55.52	50	8453	150	12.2	p35.0	N29°33.677	W094°55.05	71	25692
12	00:09:10	323	10.2	p10.8	N29°34.359	W094°55.52	50	8458	150	12.2	p35.0	N29°33.683	W094°55.06	71	25840
13	00:09:08	323	10.2	p5.6	N29°34.355	W094°55.51	50	8461	149	12.2	p35.0	N29°33.689	W094°55.06	71	25875

June 26, 2019

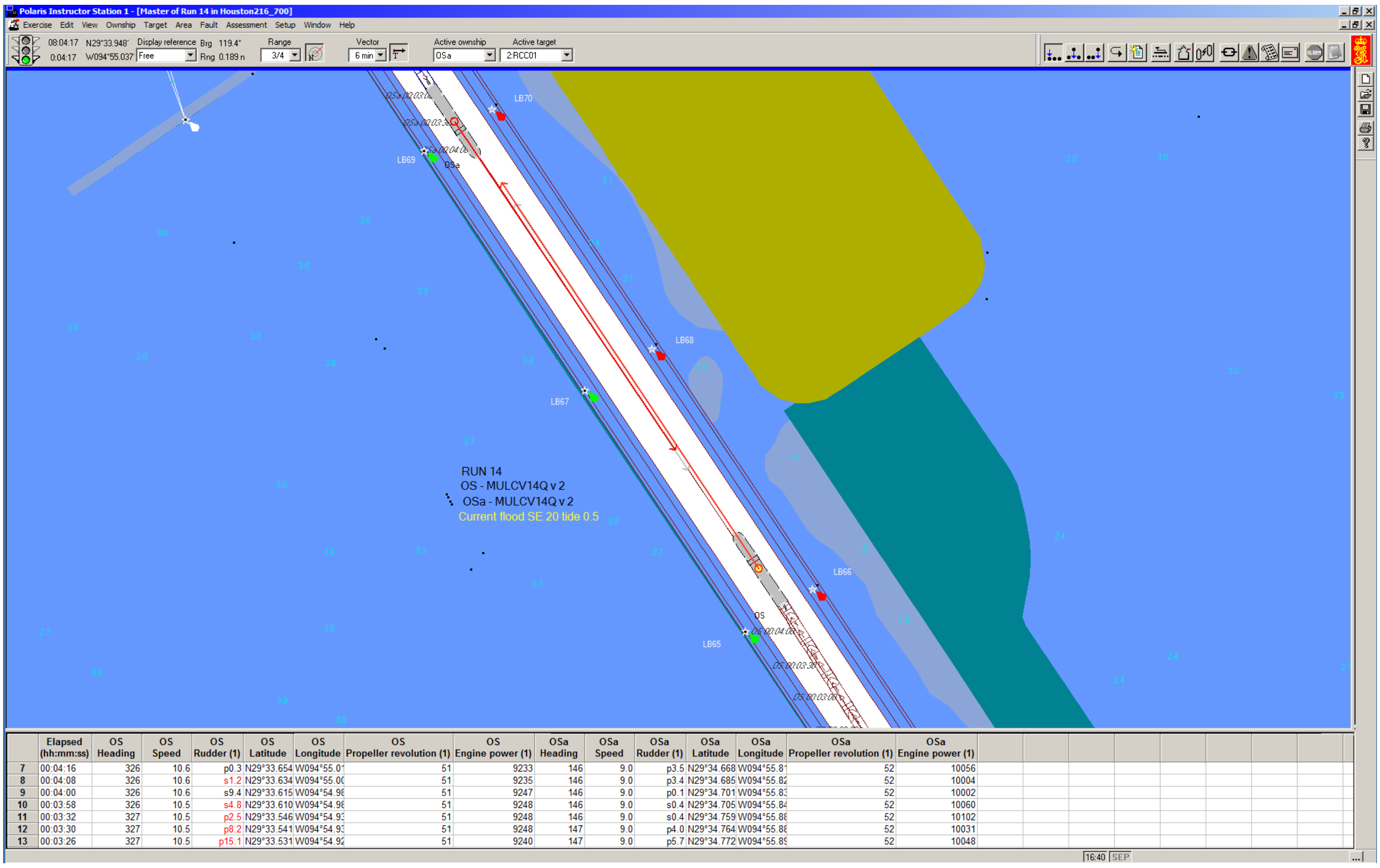
Run 14



Polaris Instructor Station 1 - [Master of Run 14 in Houston216_700]

08:00:00 N29°33.768' W094°56.025'
0:00:00
Display reference: Free
Brg 272.2°
Rng 0.846 n
Range: 1.5
Vector: 6 min
Active ownship: OSa
Active target: 2:RCC01

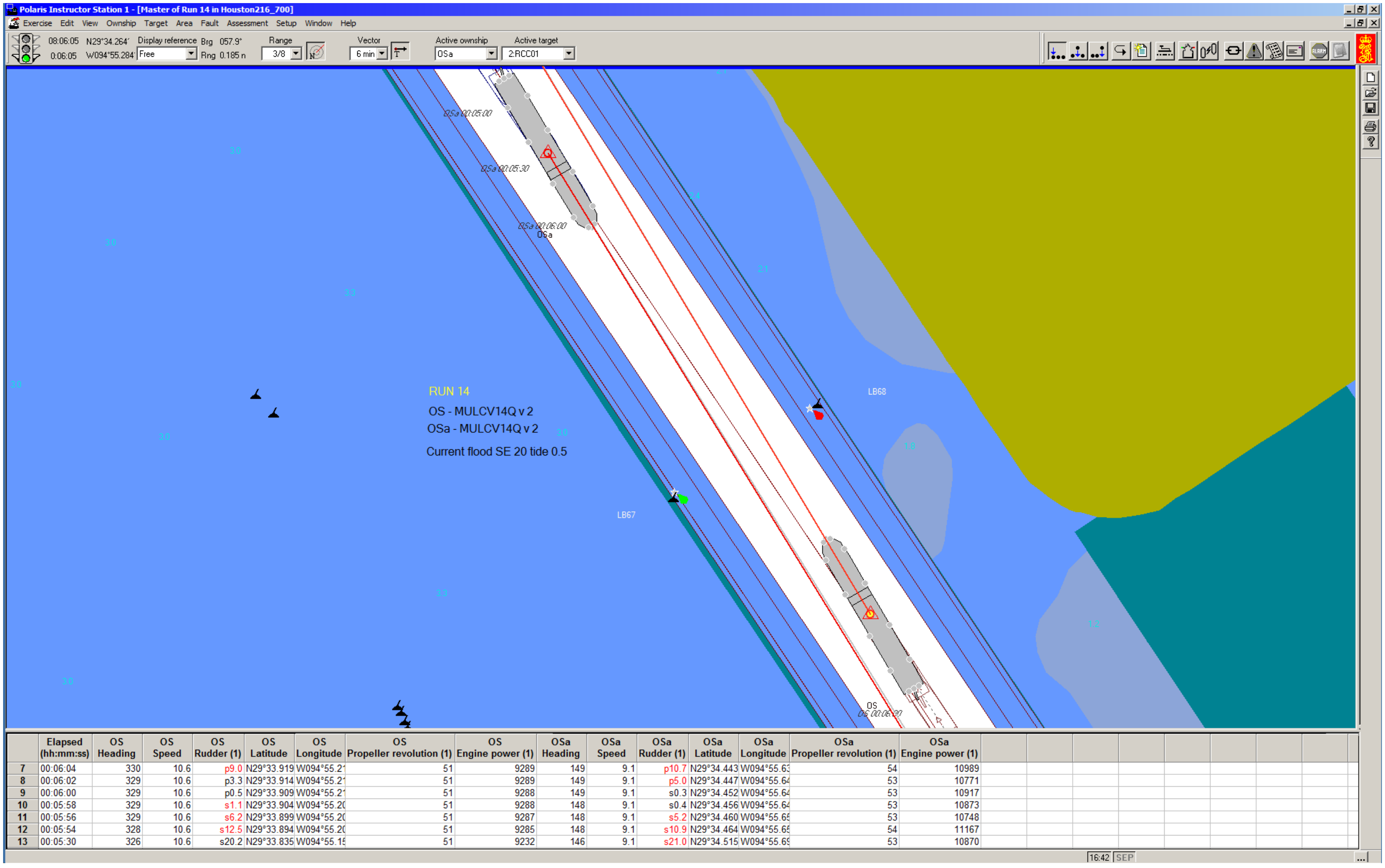
	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7															
8															
9															
10															
11															
12															
13															



Polaris Instructor Station 1 - [Master of Run 14 in Houston216_700]

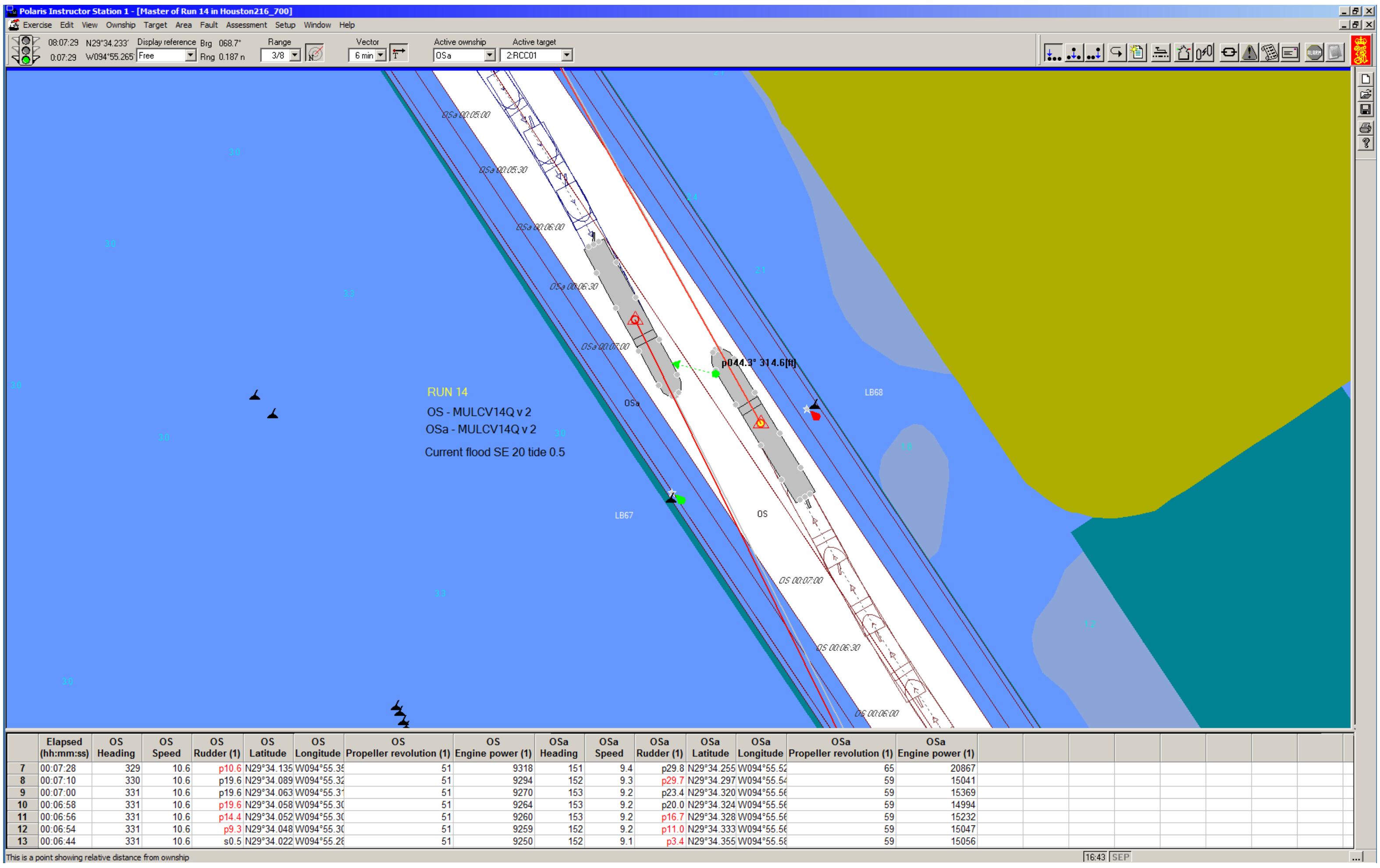
08:04:17 N29°33.948' W094°55.037'
0:04:17
Display reference: Free
Brg 119.4°
Rng 0.189 n
Range: 3/4
Vector: 6 min
Active ownship: OSa
Active target: 2:RCC01

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:04:16	326	10.6	p0.3	N29°33.654	W094°55.0	51	9233	146	9.0	p3.5	N29°34.668	W094°55.8	52	10056
8	00:04:08	326	10.6	s1.2	N29°33.634	W094°55.0	51	9235	146	9.0	p3.4	N29°34.685	W094°55.8	52	10004
9	00:04:00	326	10.6	s9.4	N29°33.615	W094°54.9	51	9247	146	9.0	p0.1	N29°34.701	W094°55.8	52	10002
10	00:03:58	326	10.5	s4.8	N29°33.610	W094°54.9	51	9248	146	9.0	s0.4	N29°34.705	W094°55.8	52	10060
11	00:03:32	327	10.5	p2.5	N29°33.546	W094°54.9	51	9248	146	9.0	s0.4	N29°34.759	W094°55.8	52	10102
12	00:03:30	327	10.5	p8.2	N29°33.541	W094°54.9	51	9248	147	9.0	p4.0	N29°34.764	W094°55.8	52	10031
13	00:03:26	327	10.5	p15.1	N29°33.531	W094°54.9	51	9240	147	9.0	p5.7	N29°34.772	W094°55.8	52	10048



Polaris Instructor Station 1 - [Master of Run 14 in Houston216_700]

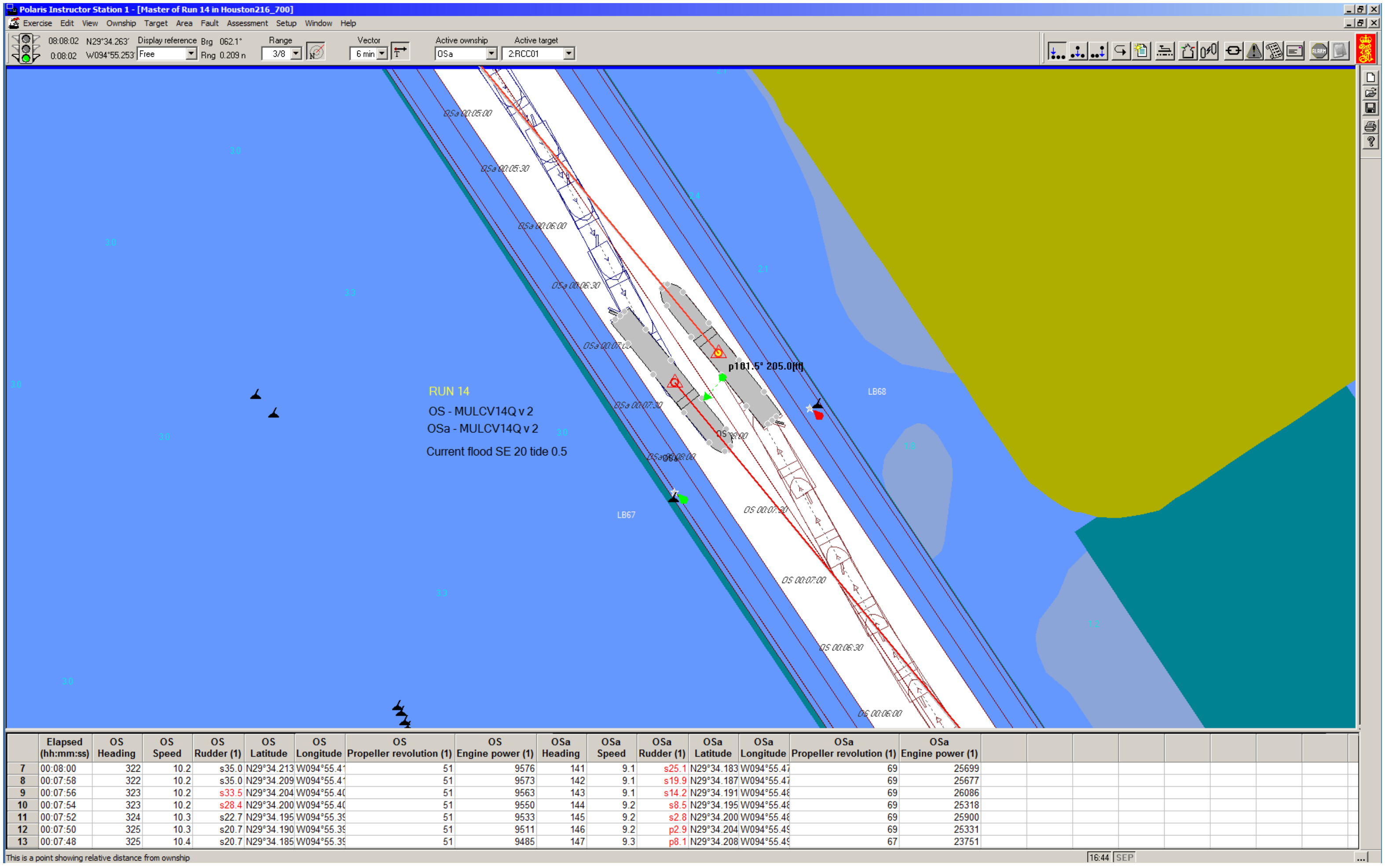
	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:06:04	330	10.6	p9.0	N29°33.919	W094°55.2	51	9289	149	9.1	p10.7	N29°34.443	W094°55.6	54	10989
8	00:06:02	329	10.6	p3.3	N29°33.914	W094°55.2	51	9289	149	9.1	p5.0	N29°34.447	W094°55.6	53	10771
9	00:06:00	329	10.6	p0.5	N29°33.909	W094°55.2	51	9288	149	9.1	s0.3	N29°34.452	W094°55.6	53	10917
10	00:05:58	329	10.6	s1.1	N29°33.904	W094°55.2	51	9288	148	9.1	s0.4	N29°34.456	W094°55.6	53	10873
11	00:05:56	329	10.6	s6.2	N29°33.899	W094°55.2	51	9287	148	9.1	s5.2	N29°34.460	W094°55.6	53	10748
12	00:05:54	328	10.6	s12.5	N29°33.894	W094°55.2	51	9285	148	9.1	s10.9	N29°34.464	W094°55.6	54	11167
13	00:05:30	326	10.6	s20.2	N29°33.835	W094°55.1	51	9232	146	9.1	s21.0	N29°34.515	W094°55.6	53	10870



Polaris Instructor Station 1 - [Master of Run 14 in Houston216_700]

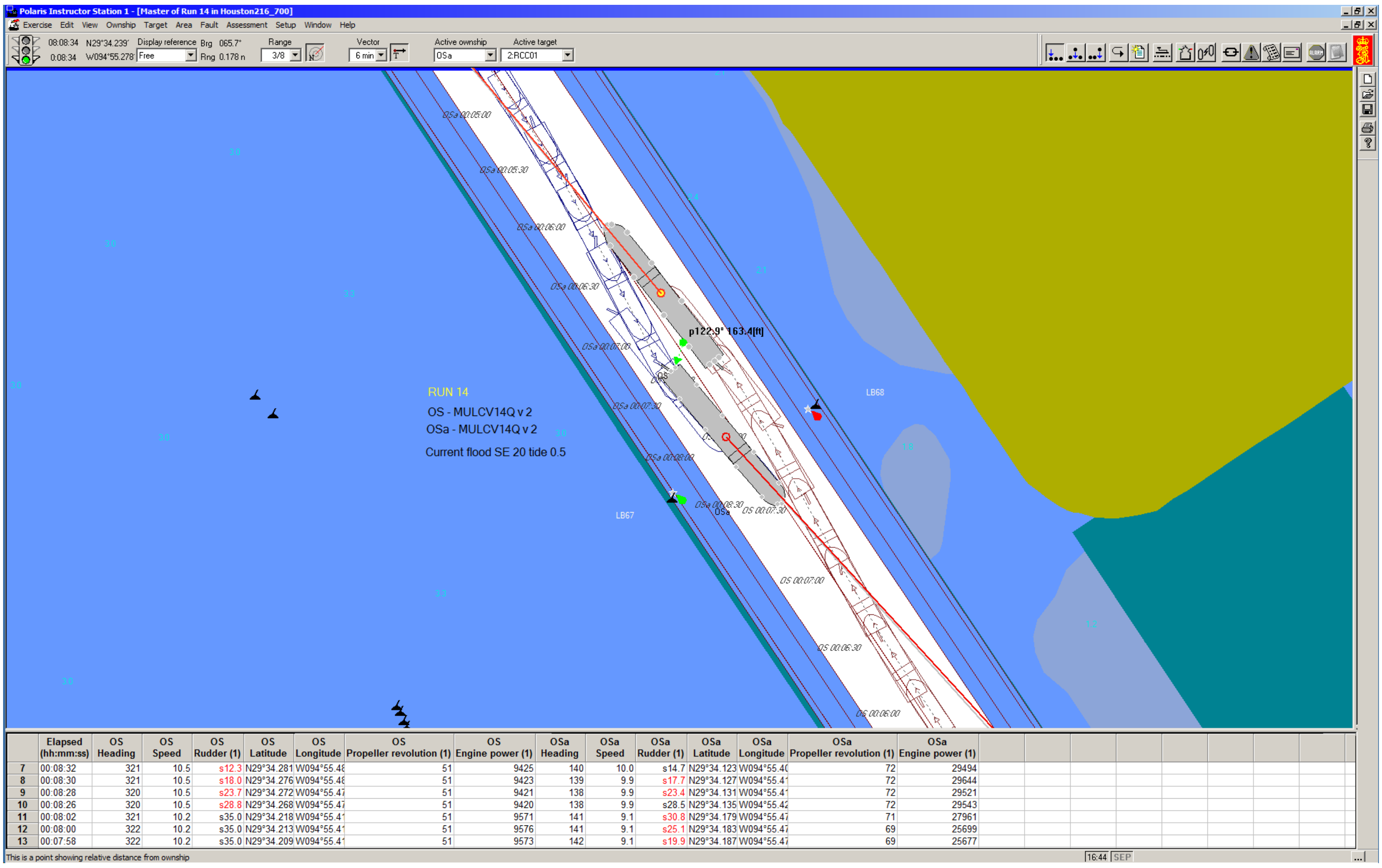
	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:07:28	329	10.6	p10.6	N29°34.135	W094°55.3	51	9318	151	9.4	p29.8	N29°34.255	W094°55.5	65	20867
8	00:07:10	330	10.6	p19.6	N29°34.089	W094°55.3	51	9294	152	9.3	p29.7	N29°34.297	W094°55.5	59	15041
9	00:07:00	331	10.6	p19.6	N29°34.063	W094°55.3	51	9270	153	9.2	p23.4	N29°34.320	W094°55.5	59	15369
10	00:06:58	331	10.6	p19.6	N29°34.058	W094°55.3	51	9264	153	9.2	p20.0	N29°34.324	W094°55.5	59	14994
11	00:06:56	331	10.6	p14.4	N29°34.052	W094°55.3	51	9260	153	9.2	p16.7	N29°34.328	W094°55.5	59	15232
12	00:06:54	331	10.6	p9.3	N29°34.048	W094°55.3	51	9259	152	9.2	p11.0	N29°34.333	W094°55.5	59	15047
13	00:06:44	331	10.6	s0.5	N29°34.022	W094°55.2	51	9250	152	9.1	p3.4	N29°34.355	W094°55.5	59	15056

This is a point showing relative distance from ownship



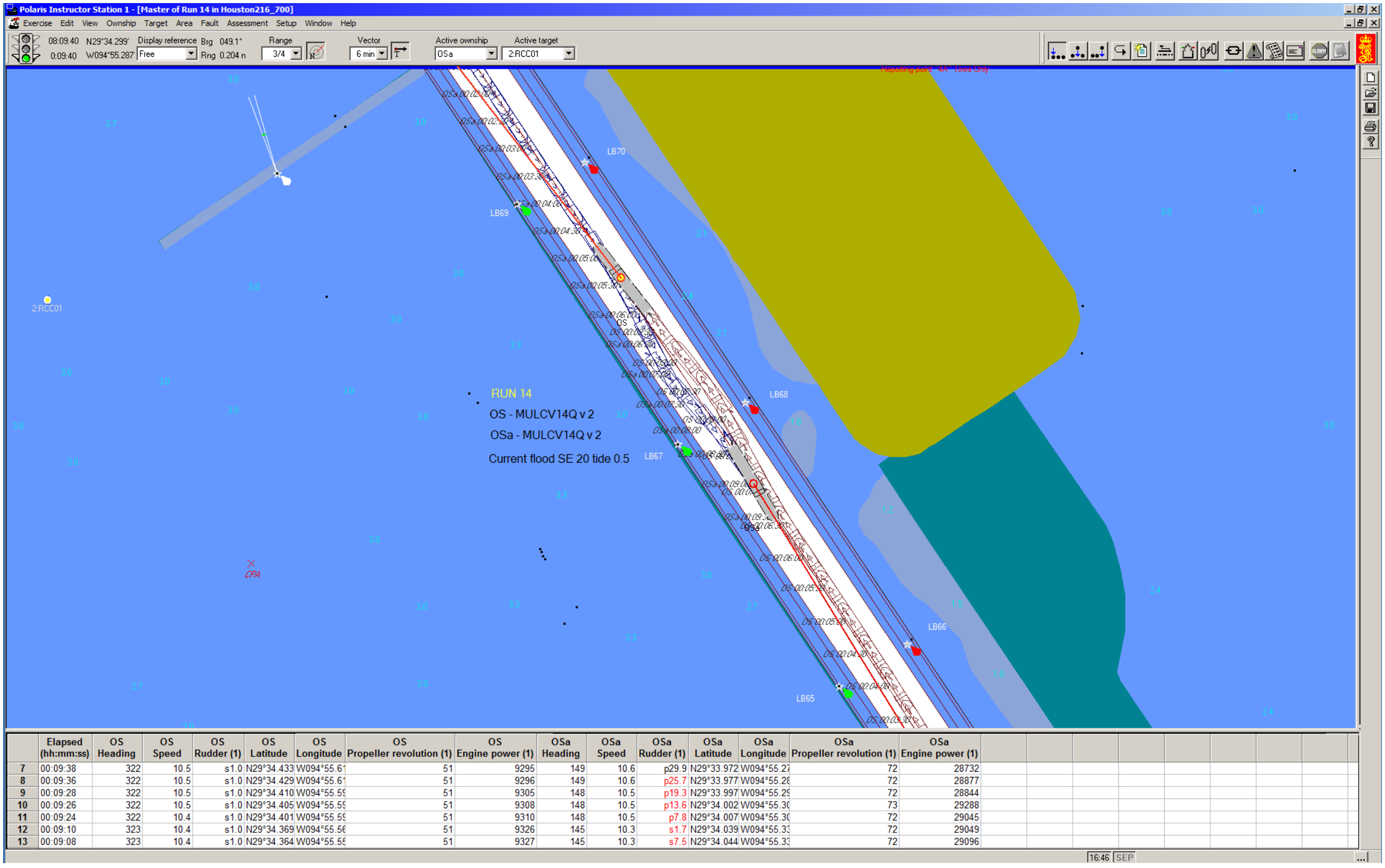
	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:08:00	322	10.2	s35.0	N29°34.213	W094°55.41	51	9576	141	9.1	s25.1	N29°34.183	W094°55.47	69	25699
8	00:07:58	322	10.2	s35.0	N29°34.209	W094°55.41	51	9573	142	9.1	s19.9	N29°34.187	W094°55.47	69	25677
9	00:07:56	323	10.2	s33.5	N29°34.204	W094°55.40	51	9563	143	9.1	s14.2	N29°34.191	W094°55.48	69	26086
10	00:07:54	323	10.2	s28.4	N29°34.200	W094°55.40	51	9550	144	9.2	s8.5	N29°34.195	W094°55.48	69	25318
11	00:07:52	324	10.3	s22.7	N29°34.195	W094°55.39	51	9533	145	9.2	s2.8	N29°34.200	W094°55.48	69	25900
12	00:07:50	325	10.3	s20.7	N29°34.190	W094°55.39	51	9511	146	9.2	p2.9	N29°34.204	W094°55.49	69	25331
13	00:07:48	325	10.4	s20.7	N29°34.185	W094°55.39	51	9485	147	9.3	p8.1	N29°34.208	W094°55.49	67	23751

This is a point showing relative distance from ownship



	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:08:32	321	10.5	s12.3	N29°34.281	W094°55.48	51	9425	140	10.0	s14.7	N29°34.123	W094°55.40	72	29494
8	00:08:30	321	10.5	s18.0	N29°34.276	W094°55.48	51	9423	139	9.9	s17.7	N29°34.127	W094°55.41	72	29644
9	00:08:28	320	10.5	s23.7	N29°34.272	W094°55.47	51	9421	138	9.9	s23.4	N29°34.131	W094°55.41	72	29521
10	00:08:26	320	10.5	s28.8	N29°34.268	W094°55.47	51	9420	138	9.9	s28.5	N29°34.135	W094°55.42	72	29543
11	00:08:02	321	10.2	s35.0	N29°34.218	W094°55.41	51	9571	141	9.1	s30.8	N29°34.179	W094°55.47	71	27961
12	00:08:00	322	10.2	s35.0	N29°34.213	W094°55.41	51	9576	141	9.1	s25.1	N29°34.183	W094°55.47	69	25699
13	00:07:58	322	10.2	s35.0	N29°34.209	W094°55.41	51	9573	142	9.1	s19.9	N29°34.187	W094°55.47	69	25677

This is a point showing relative distance from ownship



Polaris Instructor Station 1 - [Master of Run 14 in Houston216_700]

08:09:40 N29°34.299′ Display reference: Free Brg 049.1°

0:09:40 W094°55.287′ Rng 0.204 n

Range: 3/4

Vector: 6 min

Active ownship: OSa

Active target: 2:RCC01

RUN 14

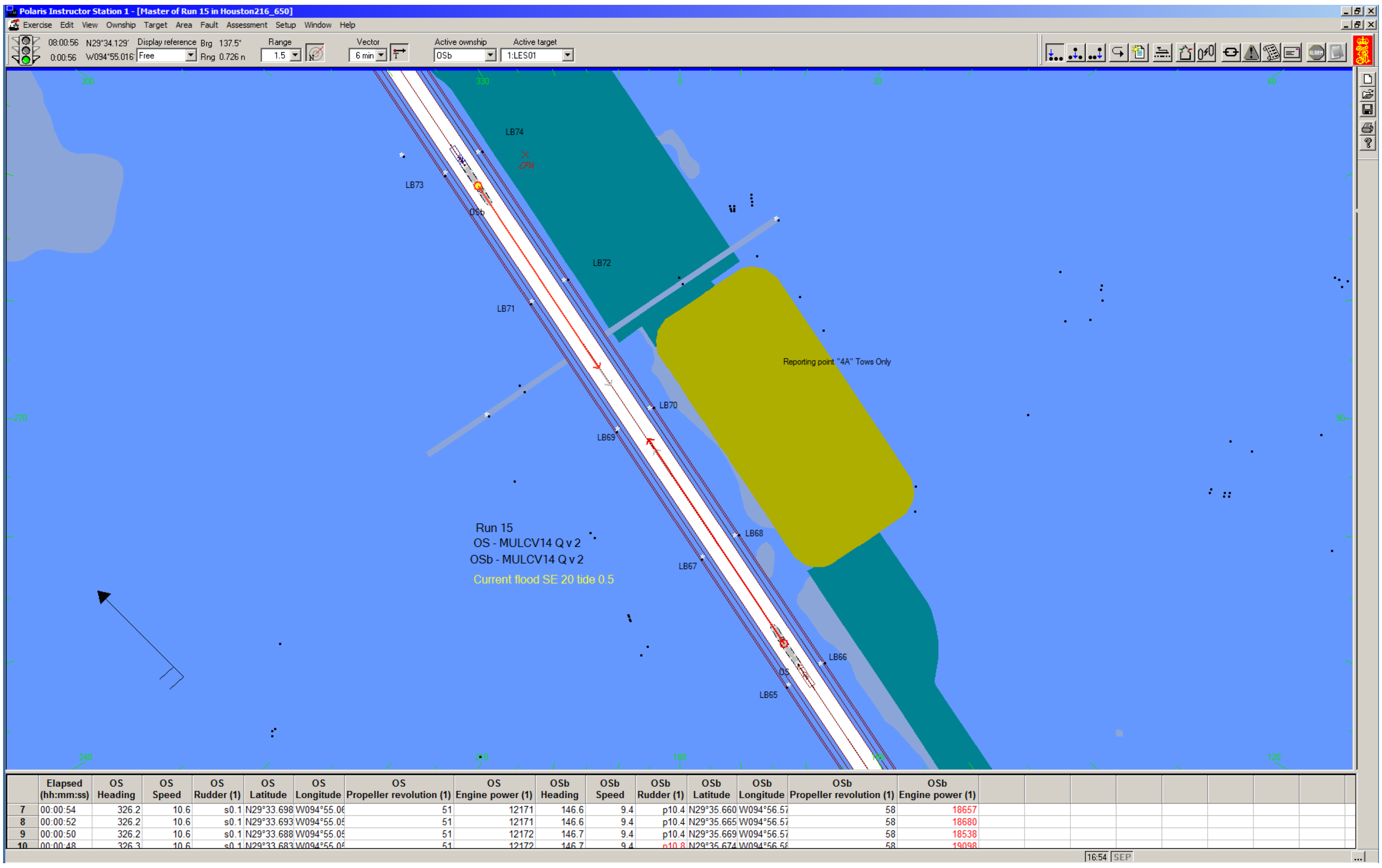
OS - MULCV14Q v 2

OSa - MULCV14Q v 2

Current flood SE 20 tide 0.5

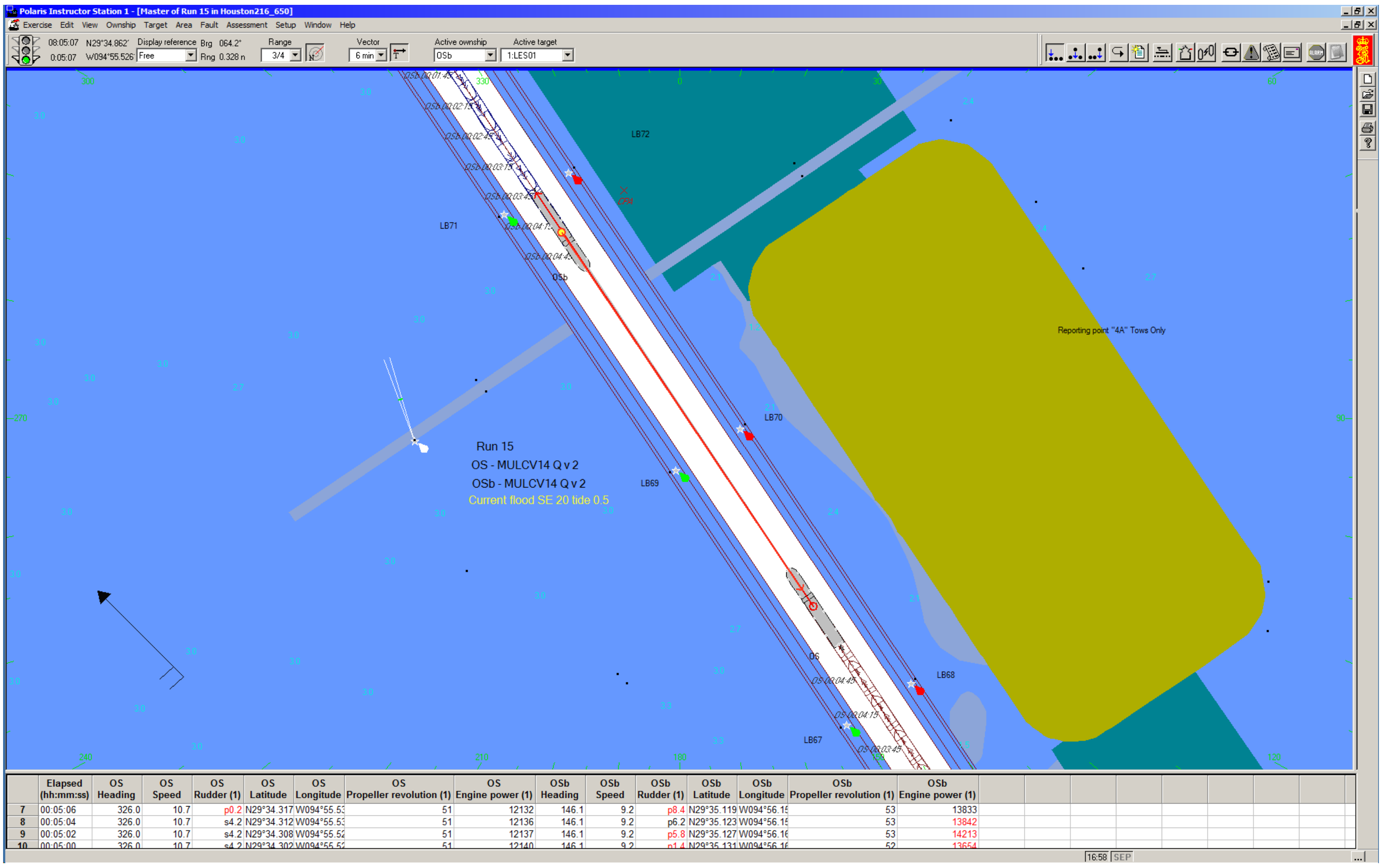
	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:09:38	322	10.5	s1.0	N29°34.433	W094°55.61	51	9295	149	10.6	p29.9	N29°33.972	W094°55.27	72	28732
8	00:09:36	322	10.5	s1.0	N29°34.429	W094°55.61	51	9296	149	10.6	p25.7	N29°33.977	W094°55.28	72	28877
9	00:09:28	322	10.5	s1.0	N29°34.410	W094°55.59	51	9305	148	10.5	p19.3	N29°33.997	W094°55.29	72	28844
10	00:09:26	322	10.5	s1.0	N29°34.405	W094°55.59	51	9308	148	10.5	p13.6	N29°34.002	W094°55.30	73	29288
11	00:09:24	322	10.4	s1.0	N29°34.401	W094°55.59	51	9310	148	10.5	p7.8	N29°34.007	W094°55.30	72	29045
12	00:09:10	323	10.4	s1.0	N29°34.369	W094°55.56	51	9326	145	10.3	s1.7	N29°34.039	W094°55.33	72	29049
13	00:09:08	323	10.4	s1.0	N29°34.364	W094°55.55	51	9327	145	10.3	s7.5	N29°34.044	W094°55.33	72	29096

Run 15



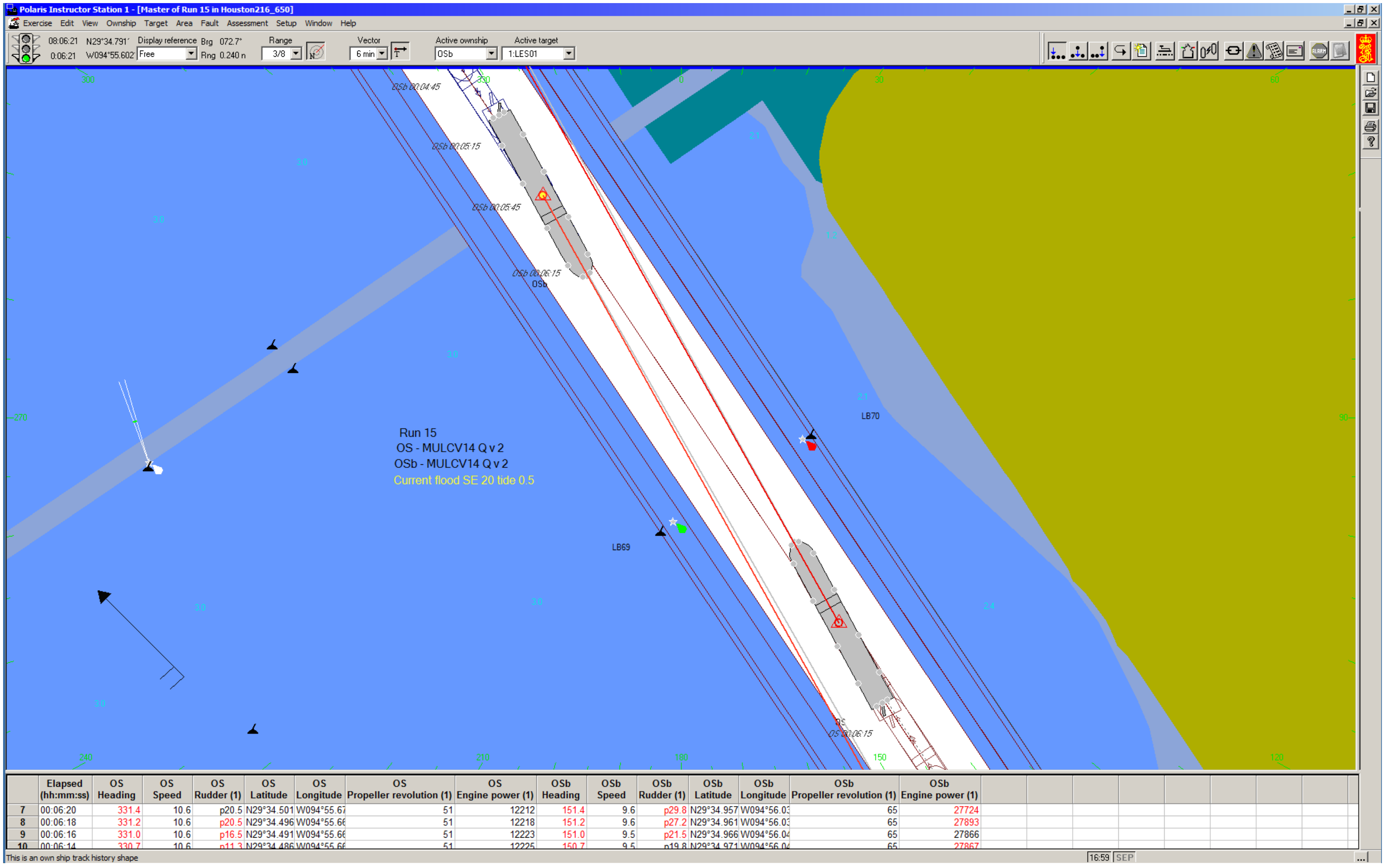
Run 15
OS - MULCV14 Q v 2
OSb - MULCV14 Q v 2
Current flood SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:00:54	326.2	10.6	s0.1	N29°33.698	W094°55.06	51	12171	146.6	9.4	p10.4	N29°35.660	W094°56.57	58	18657
8	00:00:52	326.2	10.6	s0.1	N29°33.693	W094°55.05	51	12171	146.6	9.4	p10.4	N29°35.665	W094°56.57	58	18680
9	00:00:50	326.2	10.6	s0.1	N29°33.688	W094°55.05	51	12172	146.7	9.4	p10.4	N29°35.669	W094°56.57	58	18538
10	00:00:48	326.3	10.6	s0.1	N29°33.683	W094°55.0	51	12172	146.7	9.4	p10.8	N29°35.674	W094°56.5	58	19098



Run 15
OS - MULCV14 Q v 2
OSb - MULCV14 Q v 2
Current flood SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:05:06	326.0	10.7	p0.2	N29°34.317	W094°55.53	51	12132	146.1	9.2	p8.4	N29°35.119	W094°56.15	53	13833
8	00:05:04	326.0	10.7	s4.2	N29°34.312	W094°55.53	51	12136	146.1	9.2	p6.2	N29°35.123	W094°56.15	53	13842
9	00:05:02	326.0	10.7	s4.2	N29°34.308	W094°55.52	51	12137	146.1	9.2	p5.8	N29°35.127	W094°56.16	53	14213
10	00:05:00	326.0	10.7	s4.2	N29°34.302	W094°55.52	51	12140	146.1	9.2	p1.4	N29°35.131	W094°56.16	52	13654



Polaris Instructor Station 1 - [Master of Run 15 in Houston216_650]

08:06:21 N29°34.791´ Display reference Free Brg 072.7° Rng 0.240 n

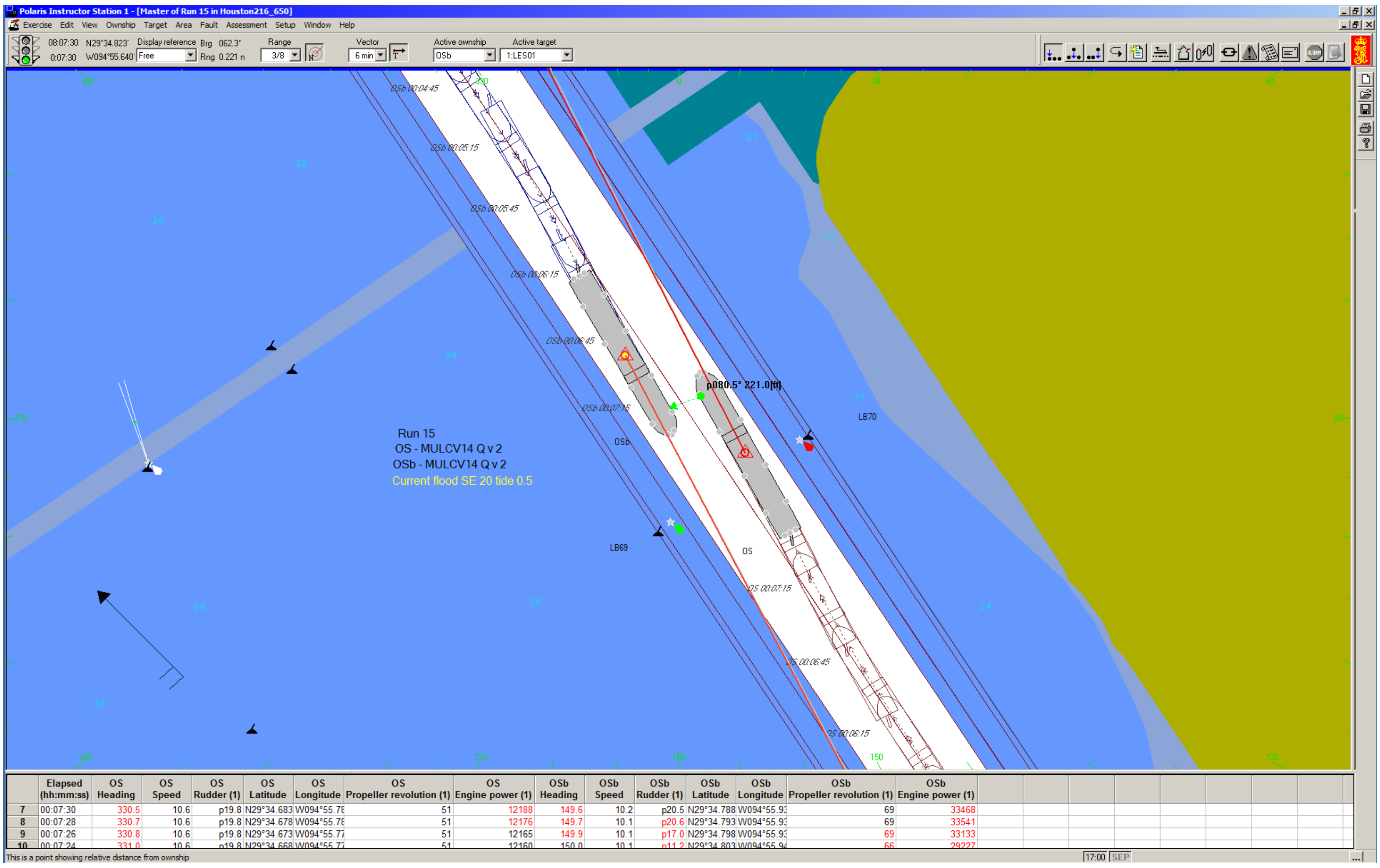
0:06:21 W094°55.602´

Range 3/8 Vector 6 min Active ownship OSb Active target 1:LES01

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:06:20	331.4	10.6	p20.5	N29°34.501	W094°55.67	51	12212	151.4	9.6	p29.8	N29°34.957	W094°56.0	65	27724
8	00:06:18	331.2	10.6	p20.5	N29°34.496	W094°55.6	51	12218	151.2	9.6	p27.2	N29°34.961	W094°56.0	65	27893
9	00:06:16	331.0	10.6	p16.5	N29°34.491	W094°55.6	51	12223	151.0	9.5	p21.5	N29°34.966	W094°56.0	65	27866
10	00:06:14	330.7	10.6	p11.3	N29°34.486	W094°55.6	51	12225	150.7	9.5	p19.8	N29°34.971	W094°56.0	65	27867

This is an own ship track history shape

16:59 SEP



Polaris Instructor Station 1 - [Master of Run 15 in Houston216_650]

08:07:30 N29°34.823´ Display reference Free Brg 062.3° Rng 0.221 n

0:07:30 W094°55.640´

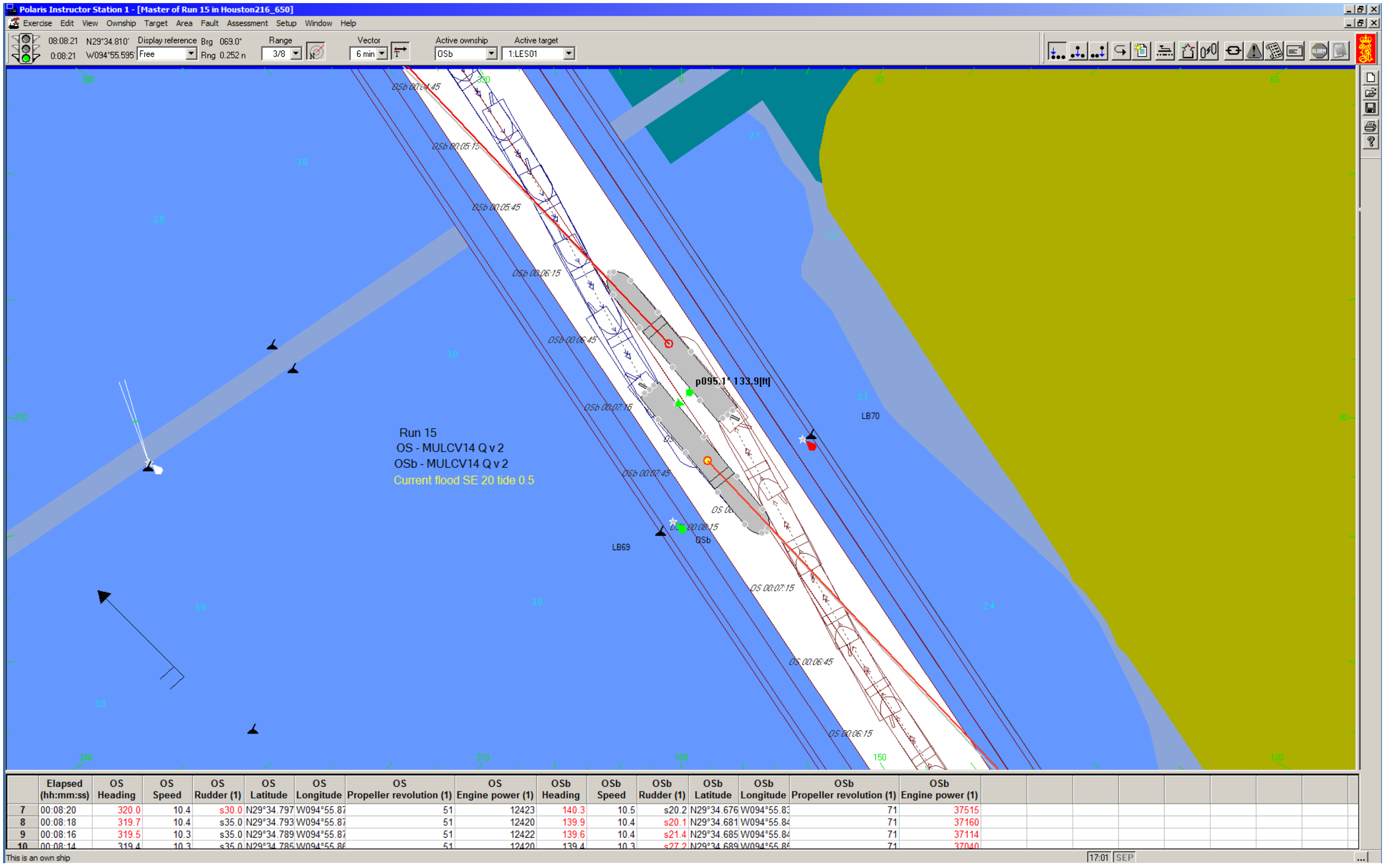
Range 3/8 Vector 6 min Active ownship OSb Active target 1:LES01

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:07:30	330.5	10.6	p19.8	N29°34.683	W094°55.7	51	12188	149.6	10.2	p20.5	N29°34.788	W094°55.9	69	33468
8	00:07:28	330.7	10.6	p19.8	N29°34.678	W094°55.7	51	12176	149.7	10.1	p20.6	N29°34.793	W094°55.9	69	33541
9	00:07:26	330.8	10.6	p19.8	N29°34.673	W094°55.7	51	12165	149.9	10.1	p17.0	N29°34.798	W094°55.9	69	33133
10	00:07:24	331.0	10.6	p19.8	N29°34.668	W094°55.7	51	12160	150.0	10.1	p11.2	N29°34.803	W094°55.9	66	29227

This is a point showing relative distance from ownship

17:00 SEP

June 26, 2019



Polaris Instructor Station 1 - [Master of Run 15 in Houston216_650]

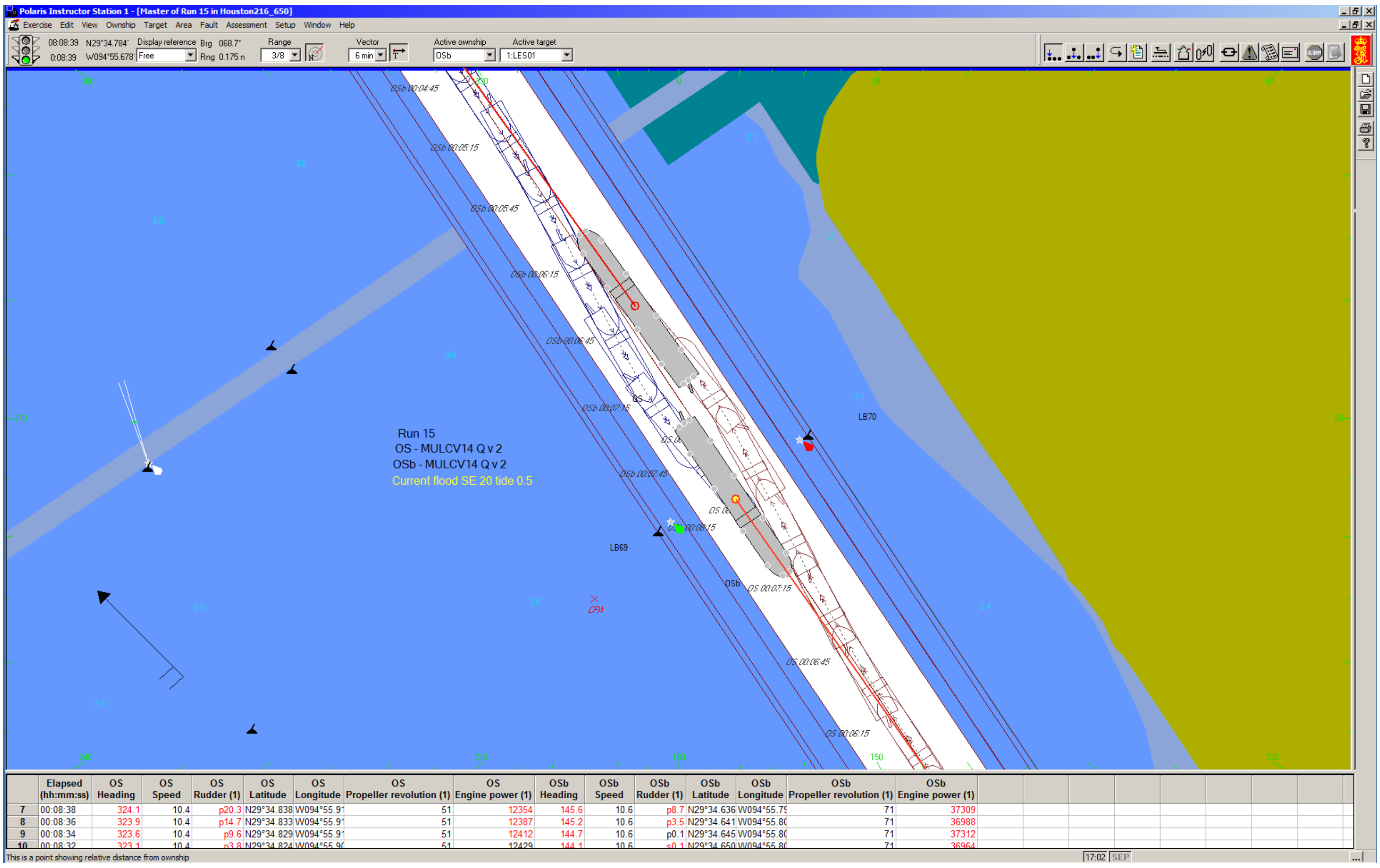
08:08:21 N29°34.810′ Display reference Brg 069.0°
0:08:21 W094°55.595′ Free Rng 0.252 n
Range 3/8
Vector 6 min
Active ownship OSb
Active target 1:LES01

Run 15
OS - MULCV14 Q v 2
OSb - MULCV14 Q v 2
Current flood SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:08:20	320.0	10.4	s30.0	N29°34.797	W094°55.87	51	12423	140.3	10.5	s20.2	N29°34.676	W094°55.83	71	37515
8	00:08:18	319.7	10.4	s35.0	N29°34.793	W094°55.87	51	12420	139.9	10.4	s20.1	N29°34.681	W094°55.84	71	37160
9	00:08:16	319.5	10.3	s35.0	N29°34.789	W094°55.87	51	12422	139.6	10.4	s21.4	N29°34.685	W094°55.84	71	37114
10	00:08:14	319.4	10.3	s35.0	N29°34.785	W094°55.86	51	12420	139.4	10.3	s27.2	N29°34.689	W094°55.85	71	37040

This is an own ship

17:01 SEP



Polaris Instructor Station 1 - [Master of Run 15 in Houston216_650]

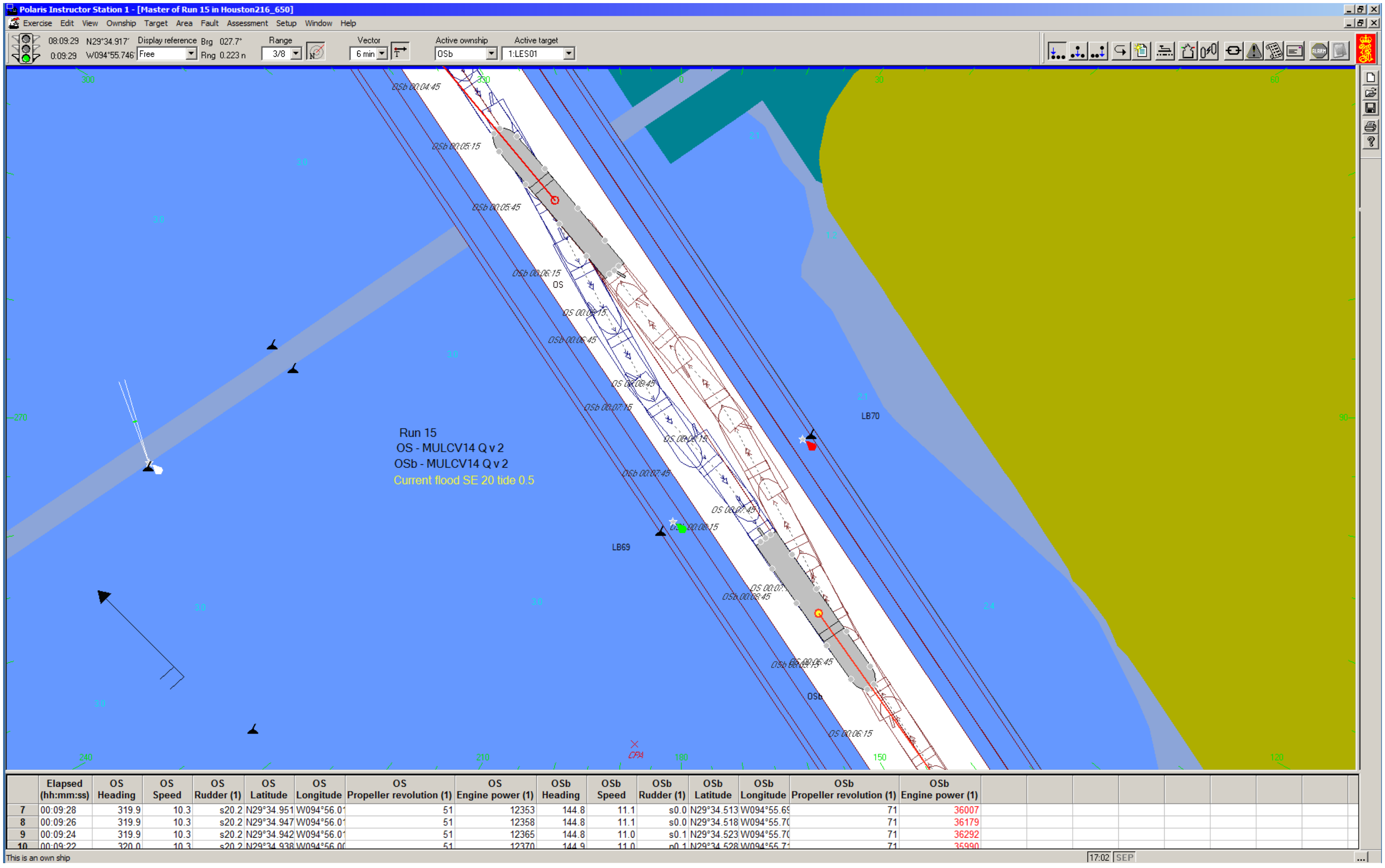
08:08:39 N29°34.784′ Display reference Brg 068.7°
0:08:39 W094°55.678′ Free Rng 0.175 n
Range 3/8
Vector 6 min
Active ownship OSb
Active target 1:LES01

Run 15
OS - MULCV14 Q v 2
OSb - MULCV14 Q v 2
Current flood SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:08:38	324.1	10.4	p20.3	N29°34.838	W094°55.91	51	12354	145.6	10.6	p8.7	N29°34.636	W094°55.79	71	37309
8	00:08:36	323.9	10.4	p14.7	N29°34.833	W094°55.91	51	12387	145.2	10.6	p3.5	N29°34.641	W094°55.80	71	36988
9	00:08:34	323.6	10.4	p9.6	N29°34.829	W094°55.91	51	12412	144.7	10.6	p0.1	N29°34.645	W094°55.80	71	37312
10	00:08:32	323.1	10.4	p3.8	N29°34.824	W094°55.90	51	12429	144.1	10.6	s0.1	N29°34.650	W094°55.80	71	36964

This is a point showing relative distance from ownship

17:02 SEP



Polaris Instructor Station 1 - [Master of Run 15 in Houston216_650]

08:09:29 N29°34.917′ 0:09:29 W094°55.746′

Display reference: Free

Brg 027.7° Rng 0.223 n

Range: 3/8

Vector: 6 min

Active ownship: OSb

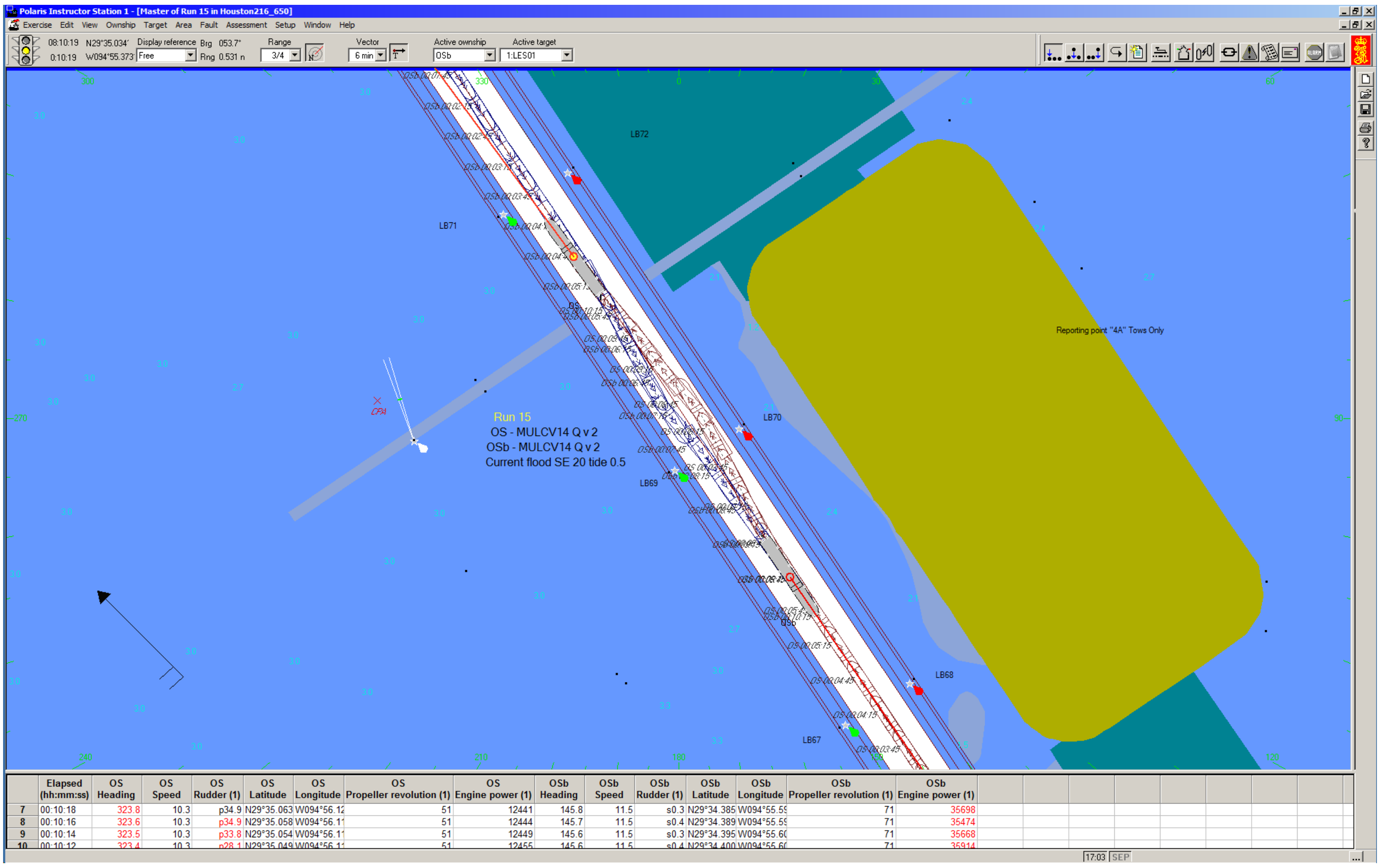
Active target: 1:LES01

Run 15
OS - MULCV14 Q v 2
OSb - MULCV14 Q v 2
Current flood SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:09:28	319.9	10.3	s20.2	N29°34.951	W094°56.0	51	12353	144.8	11.1	s0.0	N29°34.513	W094°55.6	71	36007
8	00:09:26	319.9	10.3	s20.2	N29°34.947	W094°56.0	51	12358	144.8	11.1	s0.0	N29°34.518	W094°55.7	71	36179
9	00:09:24	319.9	10.3	s20.2	N29°34.942	W094°56.0	51	12365	144.8	11.0	s0.1	N29°34.523	W094°55.7	71	36292
10	00:09:22	320.0	10.3	s20.2	N29°34.938	W094°56.0	51	12370	144.9	11.0	p0.1	N29°34.528	W094°55.7	71	35990

This is an own ship

17:02 SEP



Polaris Instructor Station 1 - [Master of Run 15 in Houston216_650]

08:10:19 N29°35.034′ 0:10:19 W094°55.373′

Display reference: Free

Brg 053.7° Rng 0.531 n

Range: 3/4

Vector: 6 min

Active ownship: OSb

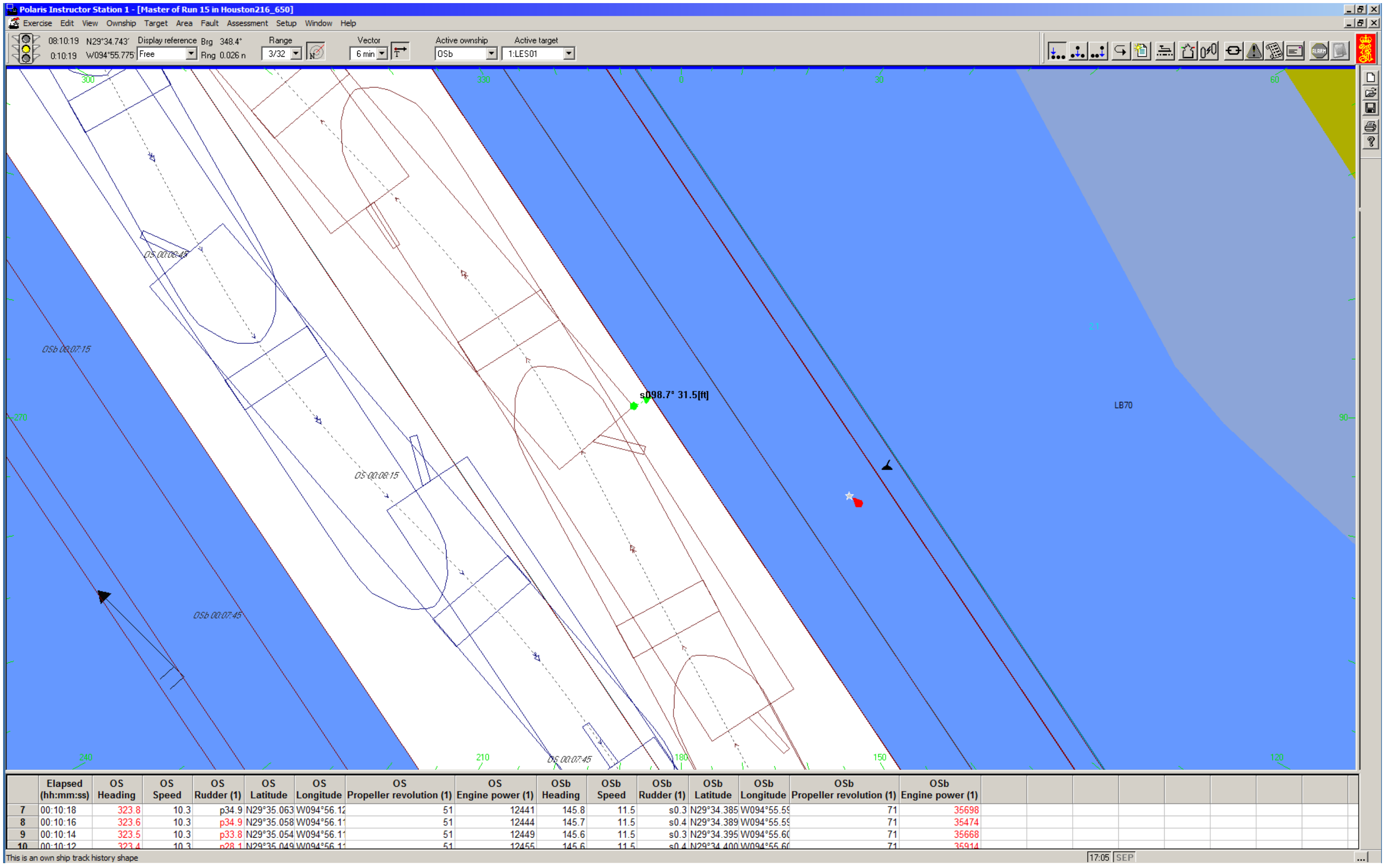
Active target: 1:LES01

Run 15
OS - MULCV14 Q v 2
OSb - MULCV14 Q v 2
Current flood SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:10:18	323.8	10.3	p34.9	N29°35.063	W094°56.1	51	12441	145.8	11.5	s0.3	N29°34.385	W094°55.5	71	35698
8	00:10:16	323.6	10.3	p34.9	N29°35.058	W094°56.1	51	12444	145.7	11.5	s0.4	N29°34.389	W094°55.5	71	35474
9	00:10:14	323.5	10.3	p33.8	N29°35.054	W094°56.1	51	12449	145.6	11.5	s0.3	N29°34.395	W094°55.6	71	35668
10	00:10:12	323.4	10.3	p28.1	N29°35.049	W094°56.1	51	12455	145.6	11.5	s0.4	N29°34.400	W094°55.6	71	35914

17:03 SEP

June 26, 2019



Polaris Instructor Station 1 - [Master of Run 15 in Houston216_650]

08:10:19 N29°34.743′
0:10:19 W094°55.775′
Display reference: Free
Brg 348.4°
Rng 0.026 n
Range: 3/32
Vector: 6 min
Active ownship: OSb
Active target: 1:LES01

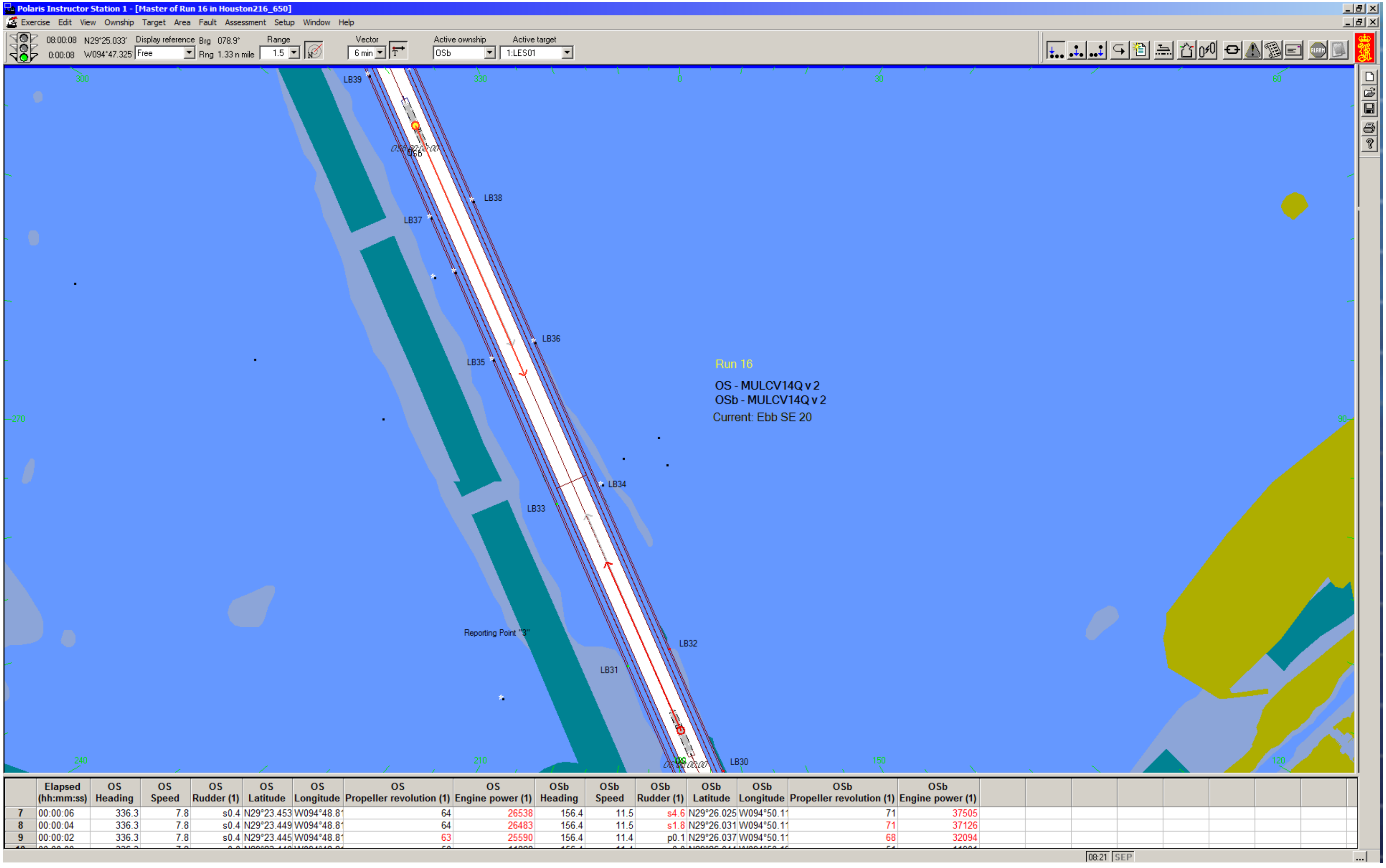
	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:10:18	323.8	10.3	p34.9	N29°35.063	W094°56.12	51	12441	145.8	11.5	s0.3	N29°34.385	W094°55.59	71	35698
8	00:10:16	323.6	10.3	p34.9	N29°35.058	W094°56.1	51	12444	145.7	11.5	s0.4	N29°34.389	W094°55.59	71	35474
9	00:10:14	323.5	10.3	p33.8	N29°35.054	W094°56.1	51	12449	145.6	11.5	s0.3	N29°34.395	W094°55.60	71	35668
10	00:10:12	323.4	10.3	p28.1	N29°35.049	W094°56.1	51	12455	145.6	11.5	s0.4	N29°34.400	W094°55.60	71	35914

This is an own ship track history shape

17:05 SEP

Appendix L: Houston Ship Channel Bay Sections Simulations

Run 16 – Begin 650 ft HSC Widening with Bend Widening



Polaris Instructor Station 1 - [Master of Run 16 in Houston216_650]

08:00:08 N29°25.033' Display reference Free Brg 078.9° Range 1.5 Vector 6 min Active ownship OSb Active target 1:LES01

0:00:08 W094°47.325' Rng 1.33 n mile

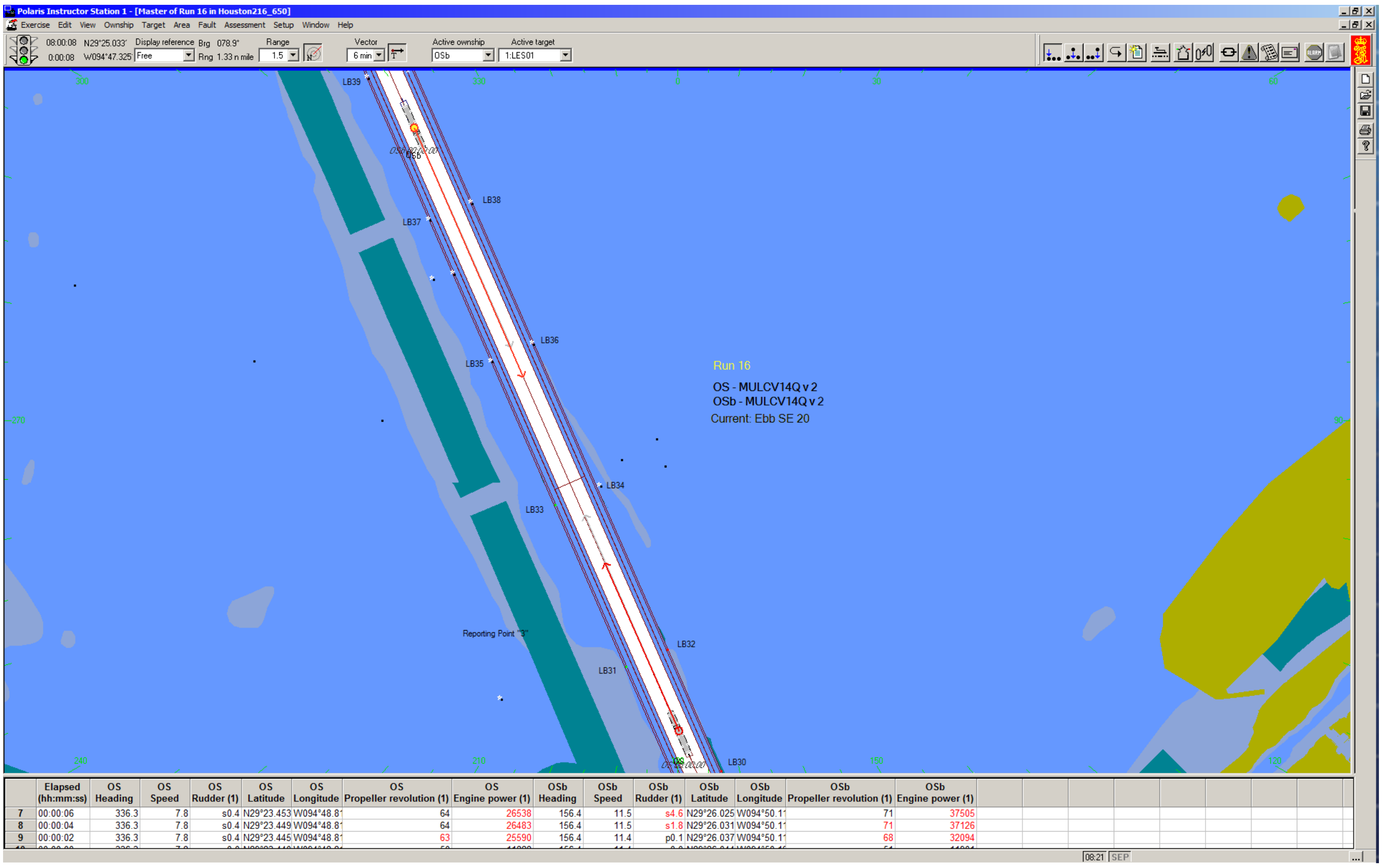
Run 16

OS - MULCV14Q v 2

OSb - MULCV14Q v 2

Current: Ebb SE 20

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:00:06	336.3	7.8	s0.4	N29°23.453	W094°48.8	64	26538	156.4	11.5	s4.6	N29°26.025	W094°50.1	71	37505
8	00:00:04	336.3	7.8	s0.4	N29°23.449	W094°48.8	64	26483	156.4	11.5	s1.8	N29°26.031	W094°50.1	71	37126
9	00:00:02	336.3	7.8	s0.4	N29°23.445	W094°48.8	63	25590	156.4	11.4	p0.1	N29°26.037	W094°50.1	68	32094



Polaris Instructor Station 1 - [Master of Run 16 in Houston216_650]

08:00:08 N29°25.033' Display reference Free Brg 078.9° Range 1.5 Vector 6 min Active ownship OSb Active target 1:LES01

0:00:08 W094°47.325' Rng 1.33 n mile

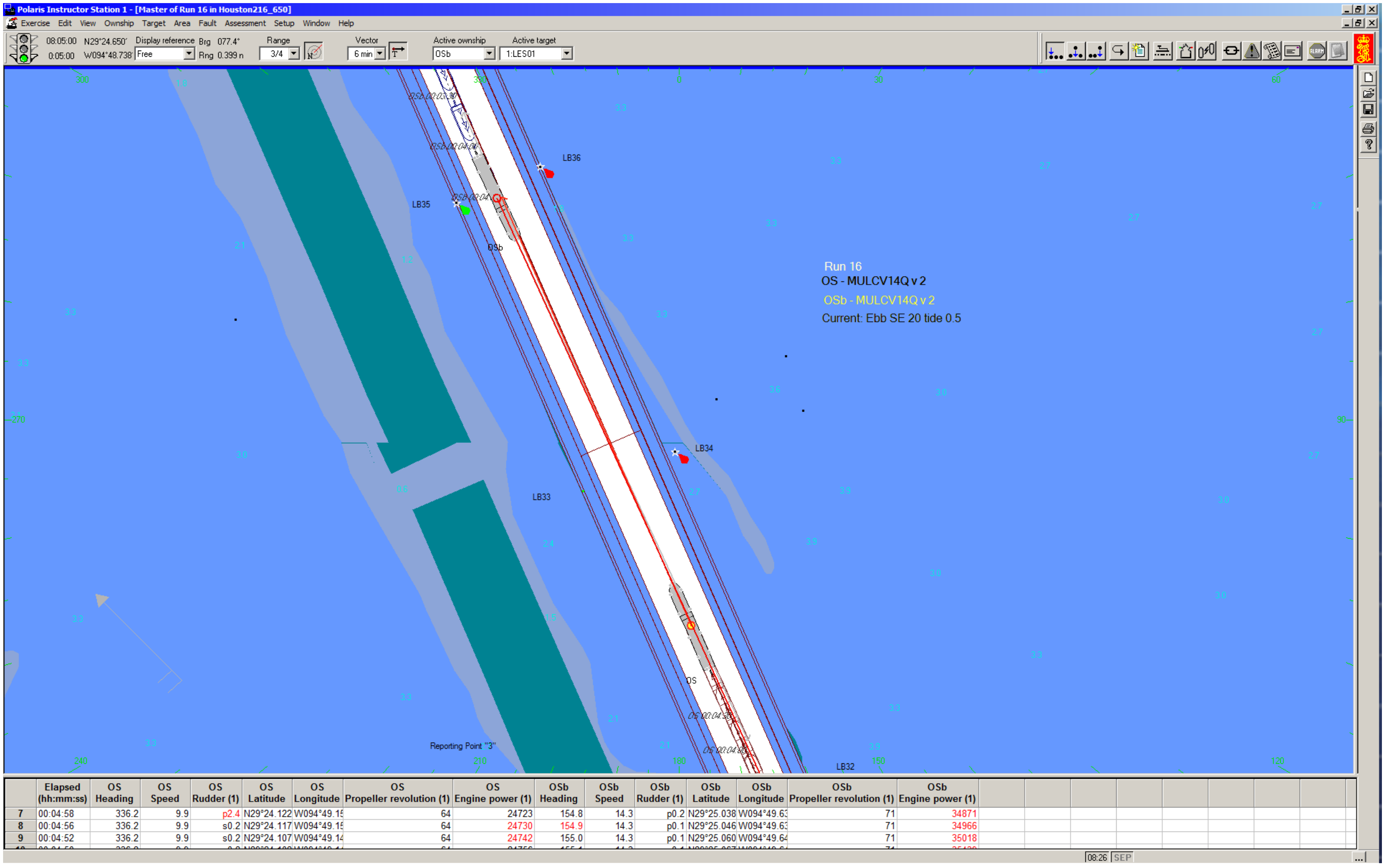
Run 16

OS - MULCV14Q v 2

OSb - MULCV14Q v 2

Current: Ebb SE 20

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:00:06	336.3	7.8	s0.4	N29°23.453	W094°48.8	64	26538	156.4	11.5	s4.6	N29°26.025	W094°50.1	71	37505
8	00:00:04	336.3	7.8	s0.4	N29°23.449	W094°48.8	64	26483	156.4	11.5	s1.8	N29°26.031	W094°50.1	71	37126
9	00:00:02	336.3	7.8	s0.4	N29°23.445	W094°48.8	63	25590	156.4	11.4	p0.1	N29°26.037	W094°50.1	68	32094



Polaris Instructor Station 1 - [Master of Run 16 in Houston216_650]

08:05:00 N29°24.650'
0:05:00 W094°48.738'

Display reference: Free

Brg 077.4°
Rng 0.399 n

Range: 3/4

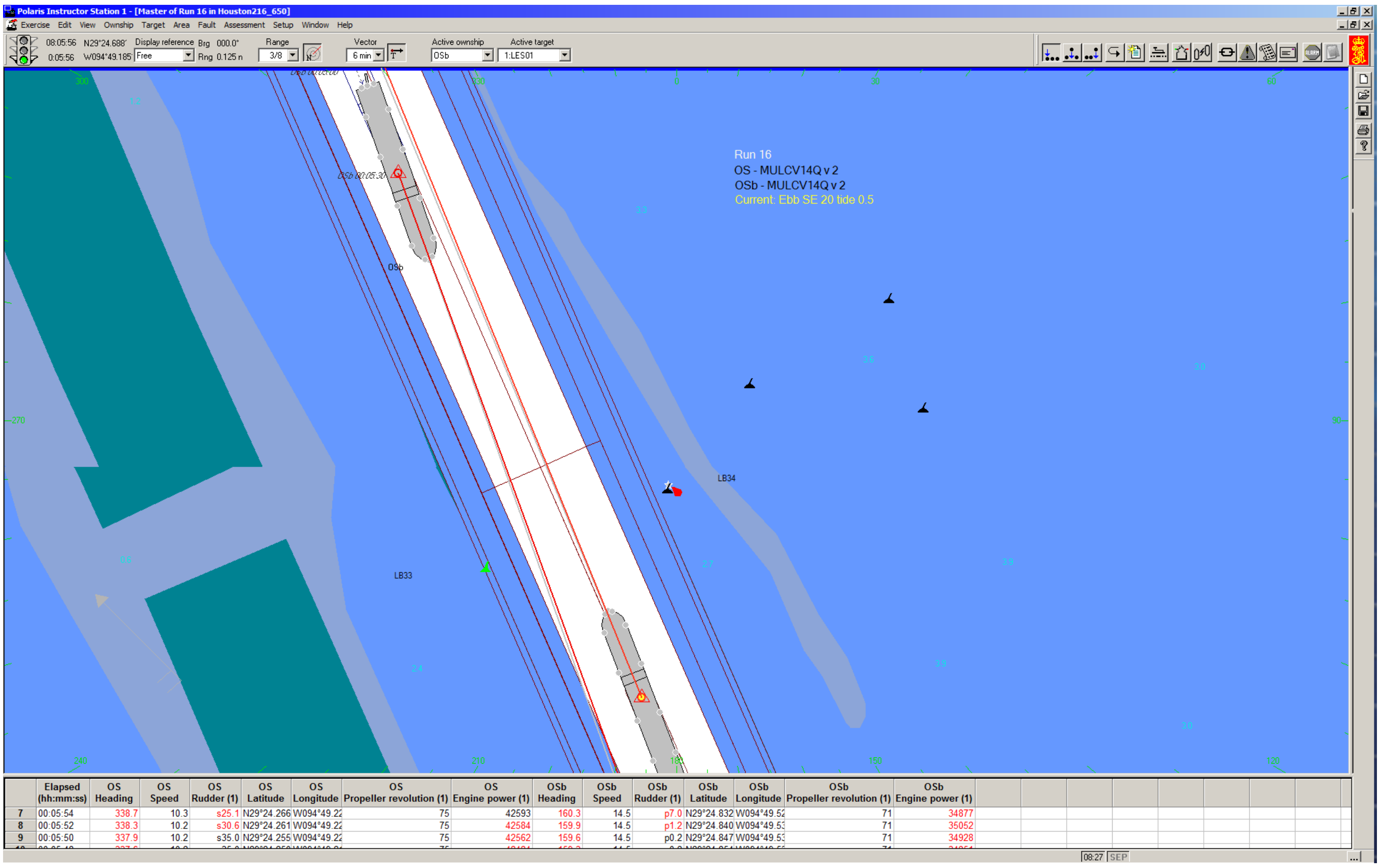
Vector: 6 min

Active ownship: OSb

Active target: 1:LES01

Run 16
OS - MULCV14Q v 2
OSb - MULCV14Q v 2
Current: Ebb SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:04:58	336.2	9.9	p2.4	N29°24.122	W094°49.15	64	24723	154.8	14.3	p0.2	N29°25.038	W094°49.63	71	34871
8	00:04:56	336.2	9.9	s0.2	N29°24.117	W094°49.15	64	24730	154.9	14.3	p0.1	N29°25.046	W094°49.63	71	34966
9	00:04:52	336.2	9.9	s0.2	N29°24.107	W094°49.14	64	24742	155.0	14.3	p0.1	N29°25.060	W094°49.64	71	35018



Polaris Instructor Station 1 - [Master of Run 16 in Houston216_650]

08:05:56 N29°24.688'
0:05:56 W094°49.185'

Display reference: Free

Brg 000.0°
Rng 0.125 n

Range: 3/8

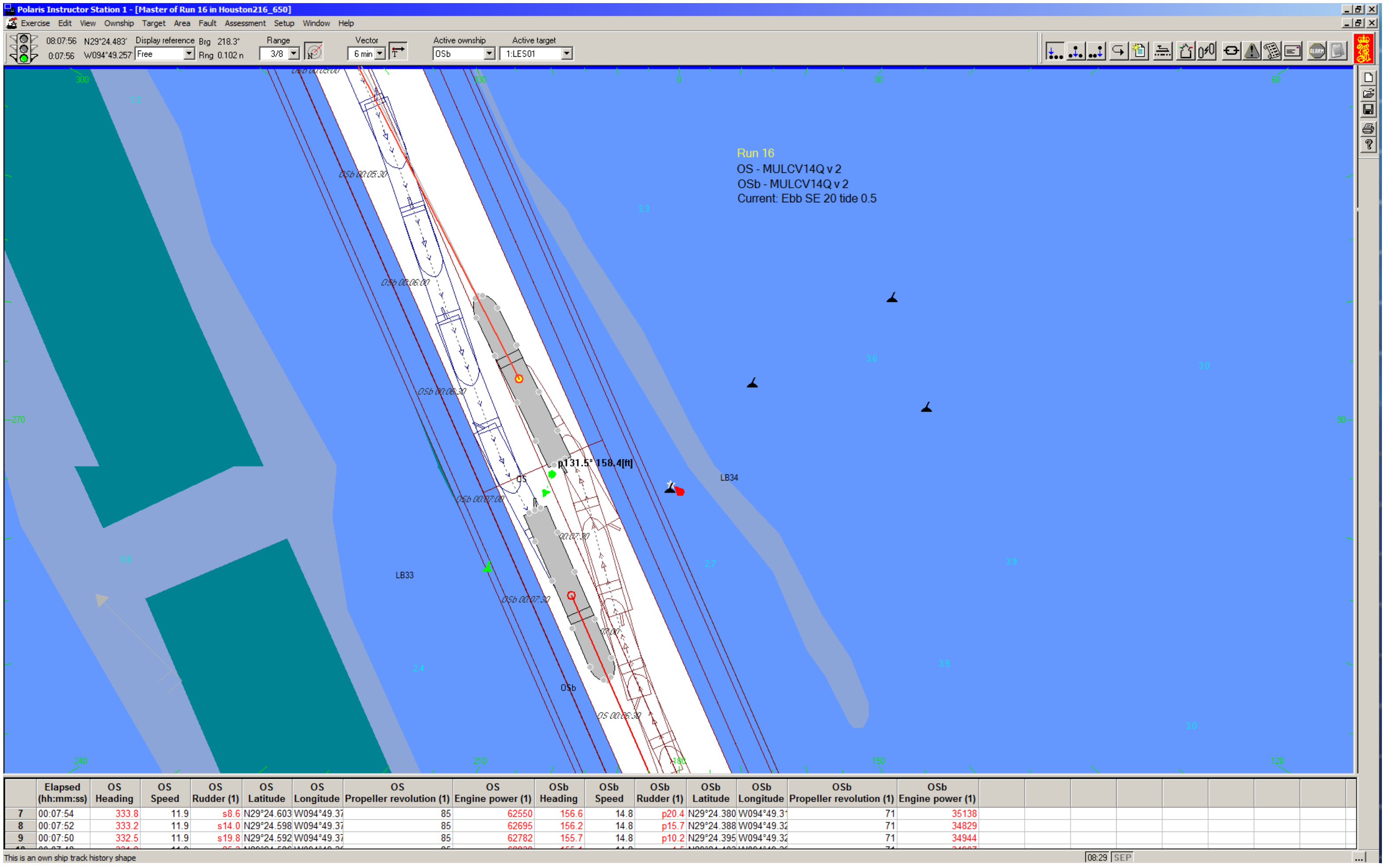
Vector: 6 min

Active ownship: OSb

Active target: 1:LES01

Run 16
OS - MULCV14Q v 2
OSb - MULCV14Q v 2
Current: Ebb SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:05:54	338.7	10.3	s25.1	N29°24.266	W094°49.22	75	42593	160.3	14.5	p7.0	N29°24.832	W094°49.52	71	34877
8	00:05:52	338.3	10.2	s30.6	N29°24.261	W094°49.22	75	42584	159.9	14.5	p1.2	N29°24.840	W094°49.53	71	35052
9	00:05:50	337.9	10.2	s35.0	N29°24.255	W094°49.22	75	42562	159.6	14.5	p0.2	N29°24.847	W094°49.53	71	34928



Polaris Instructor Station 1 - [Master of Run 16 in Houston216_650]

08:07:56 N29°24.483' Display reference: Free Brg 218.3° Rng 0.102 n Range 3/8 Vector 6 min Active ownship OSb Active target 1:LES01

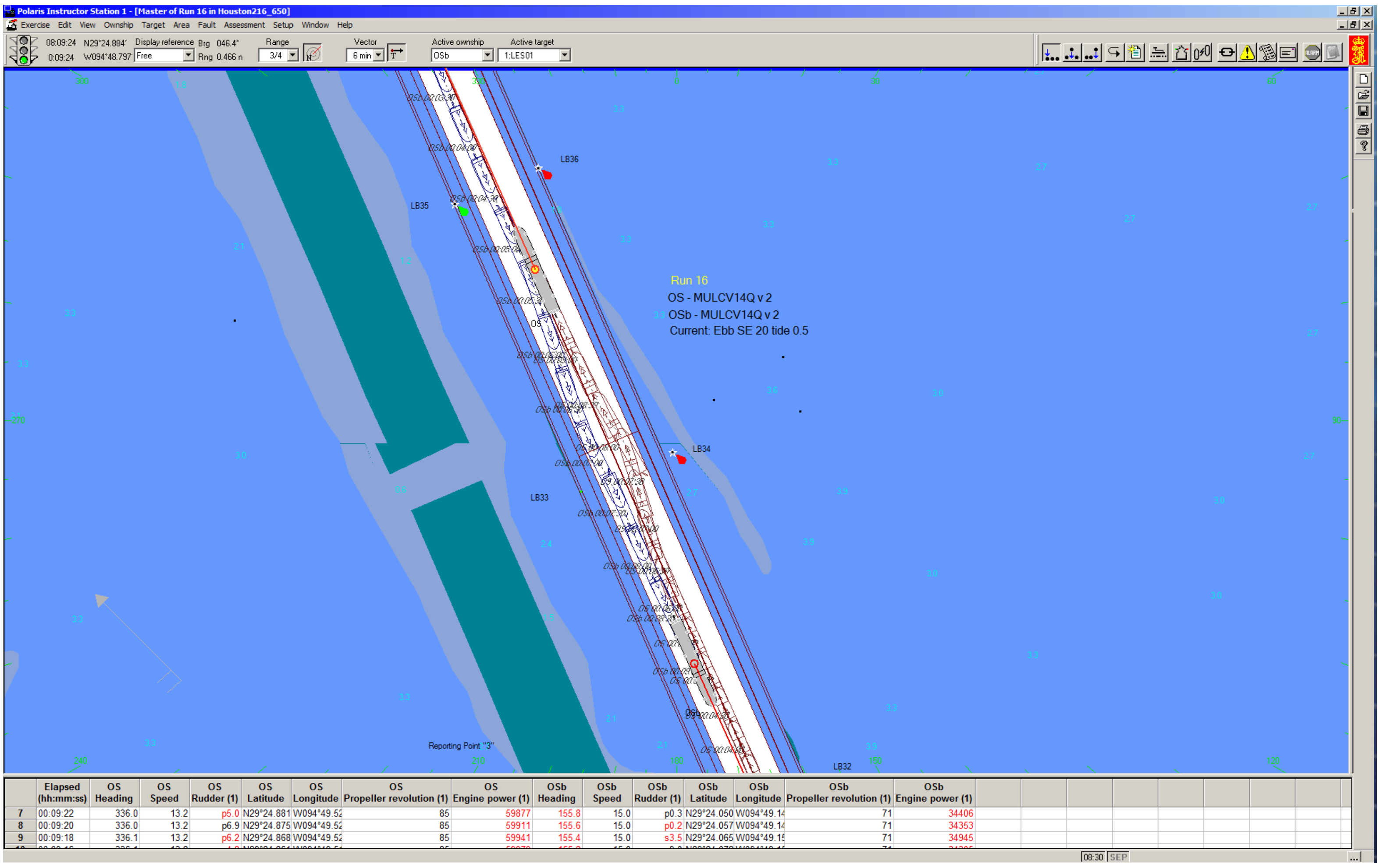
0:07:56 W094°49.257'

Run 16
OS - MULCV14Q v 2
OSb - MULCV14Q v 2
Current: Ebb SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:07:54	333.8	11.9	s8.6	N29°24.603	W094°49.37	85	62550	156.6	14.8	p20.4	N29°24.380	W094°49.31	71	35138
8	00:07:52	333.2	11.9	s14.0	N29°24.598	W094°49.37	85	62695	156.2	14.8	p15.7	N29°24.388	W094°49.32	71	34829
9	00:07:50	332.5	11.9	s19.8	N29°24.592	W094°49.37	85	62782	155.7	14.8	p10.2	N29°24.395	W094°49.32	71	34944

This is an own ship track history shape

08:29 SEP



Polaris Instructor Station 1 - [Master of Run 16 in Houston216_650]

08:09:24 N29°24.884' Display reference: Free Brg 046.4° Rng 0.466 n Range 3/4 Vector 6 min Active ownship OSb Active target 1:LES01

0:09:24 W094°48.797'

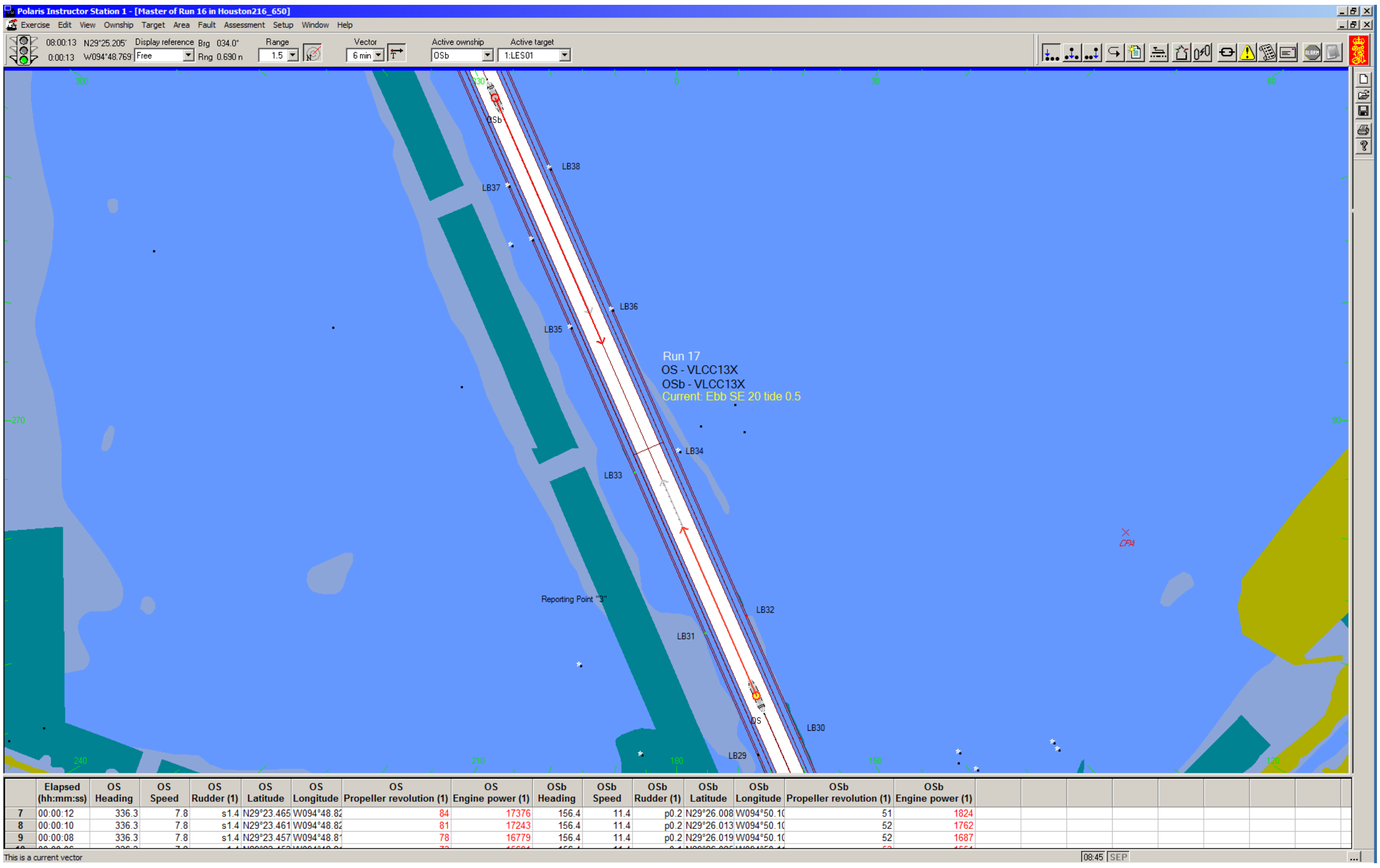
Run 16
OS - MULCV14Q v 2
OSb - MULCV14Q v 2
Current: Ebb SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:09:22	336.0	13.2	p5.0	N29°24.881	W094°49.52	85	59877	155.8	15.0	p0.3	N29°24.050	W094°49.14	71	34406
8	00:09:20	336.0	13.2	p6.9	N29°24.875	W094°49.52	85	59911	155.6	15.0	p0.2	N29°24.057	W094°49.14	71	34353
9	00:09:18	336.1	13.2	p6.2	N29°24.868	W094°49.52	85	59941	155.4	15.0	s3.5	N29°24.065	W094°49.15	71	34945

08:30 SEP

June 26, 2019

Run 17



Polaris Instructor Station 1 - [Master of Run 16 in Houston216_650]

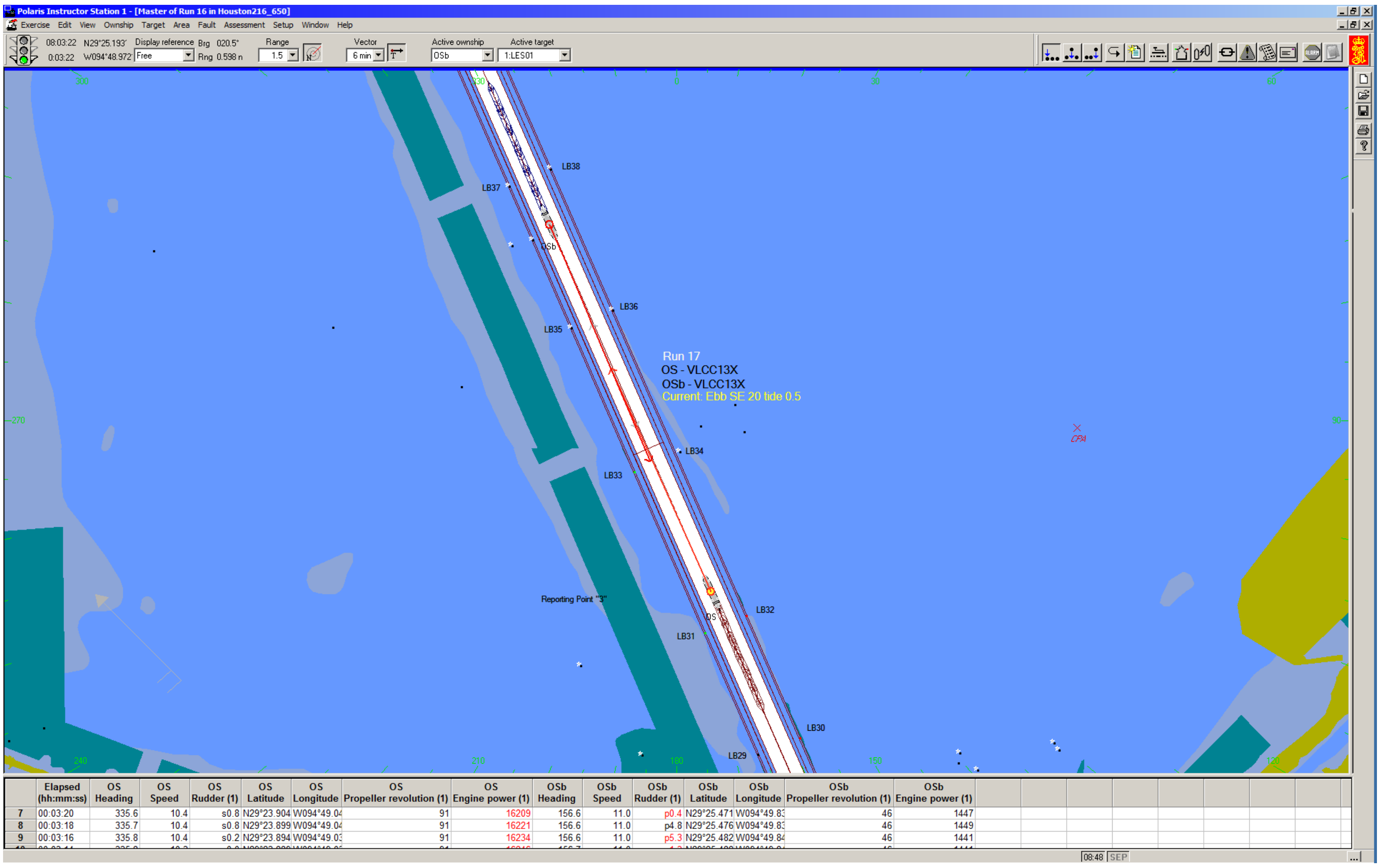
08:00:13 N29°25.205′ Display reference Free Brg 034.0° Rng 0.690 n Range 1.5 Vector 6 min Active ownship OSb Active target 1:LES01

0:00:13 W094°48.769′

Run 17
OS - VLCC13X
OSb - VLCC13X
Current: Ebb SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:00:12	336.3	7.8	s1.4	N29°23.465	W094°48.82	84	17376	156.4	11.4	p0.2	N29°26.008	W094°50.10	51	1824
8	00:00:10	336.3	7.8	s1.4	N29°23.461	W094°48.82	81	17243	156.4	11.4	p0.2	N29°26.013	W094°50.10	52	1762
9	00:00:08	336.3	7.8	s1.4	N29°23.457	W094°48.81	78	16779	156.4	11.4	p0.2	N29°26.019	W094°50.10	52	1687

This is a current vector



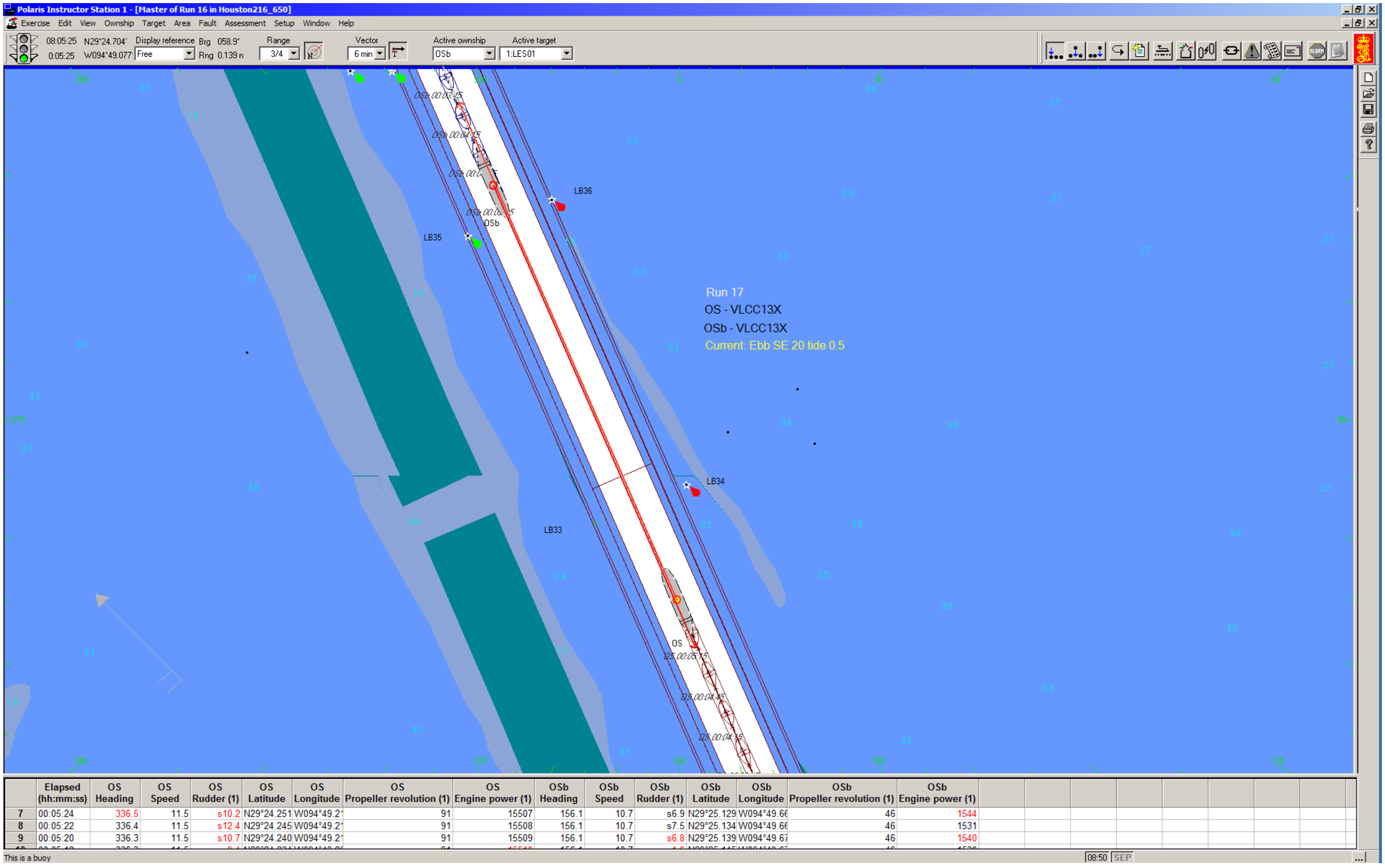
Polaris Instructor Station 1 - [Master of Run 16 in Houston216_650]

08:03:22 N29°25.193′ Display reference Free Brg 020.5° Rng 0.598 n Range 1.5 Vector 6 min Active ownship OSb Active target 1:LES01

0:03:22 W094°48.972′

Run 17
OS - VLCC13X
OSb - VLCC13X
Current: Ebb SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:03:20	335.6	10.4	s0.8	N29°23.904	W094°49.04	91	16209	156.6	11.0	p0.4	N29°25.471	W094°49.83	46	1447
8	00:03:18	335.7	10.4	s0.8	N29°23.899	W094°49.04	91	16221	156.6	11.0	p4.8	N29°25.476	W094°49.83	46	1449
9	00:03:16	335.8	10.4	s0.2	N29°23.894	W094°49.03	91	16234	156.6	11.0	p5.3	N29°25.482	W094°49.84	46	1441



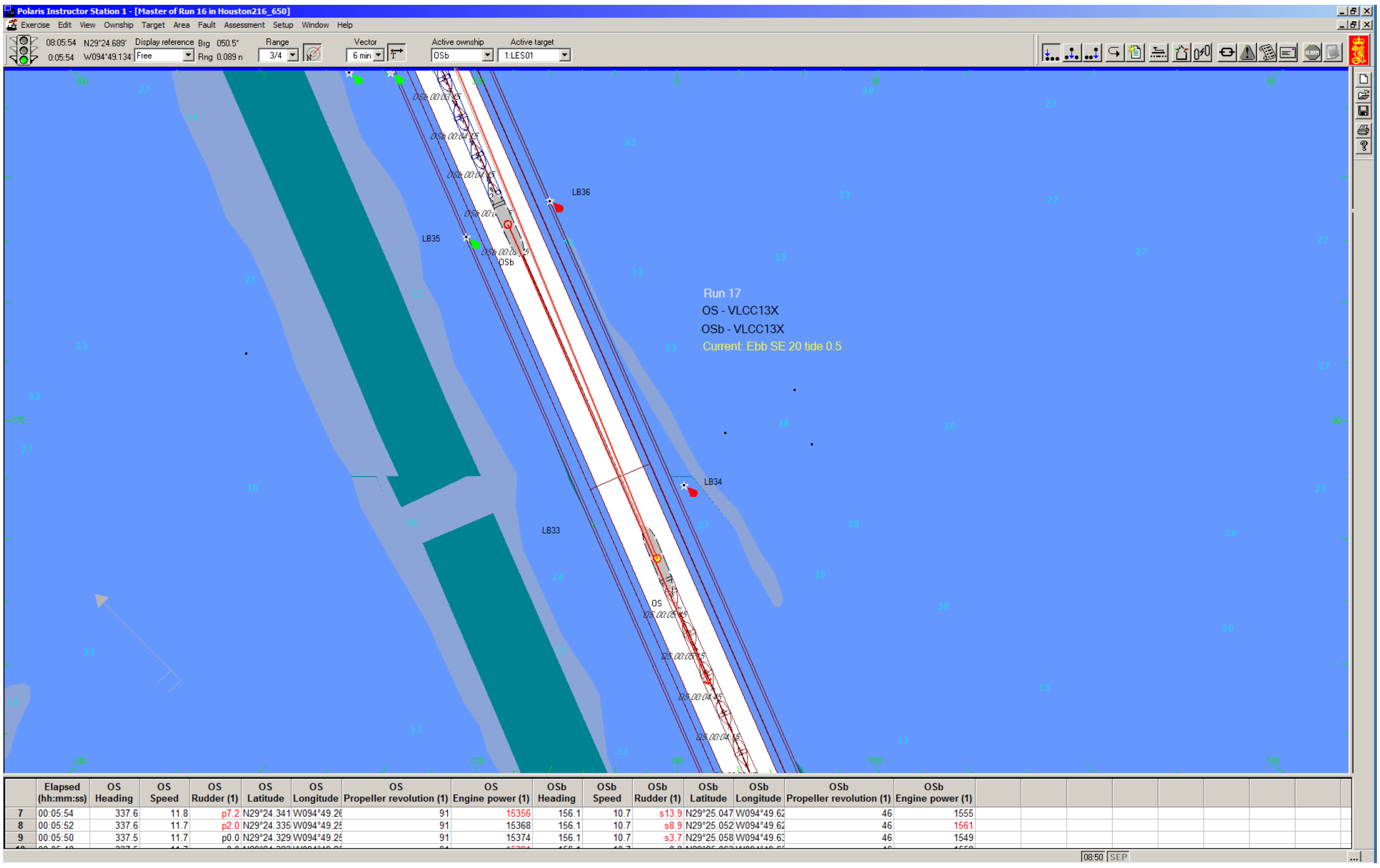
Polaris Instructor Station 1 - [Master of Run 16 in Houston216_650]

08:05:25 N29°24.704′ Display reference Free Brg 058.9° Rng 0.139 n Range 3/4 Vector 6 min Active ownship OSb Active target 1:LES01

0:05:25 W094°49.077′

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:05:24	336.5	11.5	s10.2	N29°24.251	W094°49.21	91	15507	156.1	10.7	s6.9	N29°25.129	W094°49.66	46	1544
8	00:05:22	336.4	11.5	s12.4	N29°24.245	W094°49.21	91	15508	156.1	10.7	s7.5	N29°25.134	W094°49.66	46	1531
9	00:05:20	336.3	11.5	s10.7	N29°24.240	W094°49.21	91	15509	156.1	10.7	s6.8	N29°25.139	W094°49.67	46	1540

This is a buoy

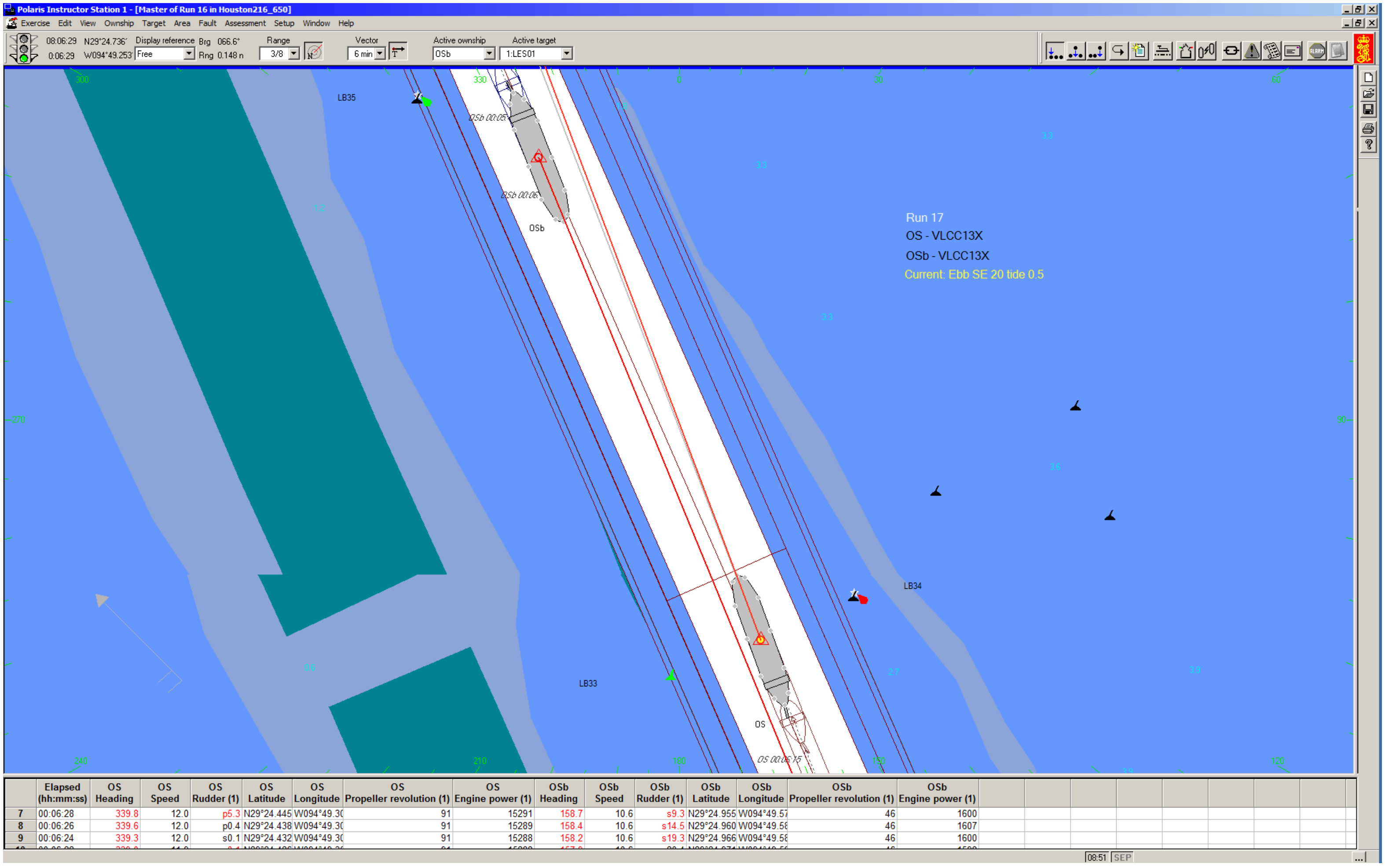


Polaris Instructor Station 1 - [Master of Run 16 in Houston216_650]

08:05:54 N29°24.689′ Display reference Free Brg 050.5° Rng 0.089 n Range 3/4 Vector 6 min Active ownship OSb Active target 1:LES01

0:05:54 W094°49.134′

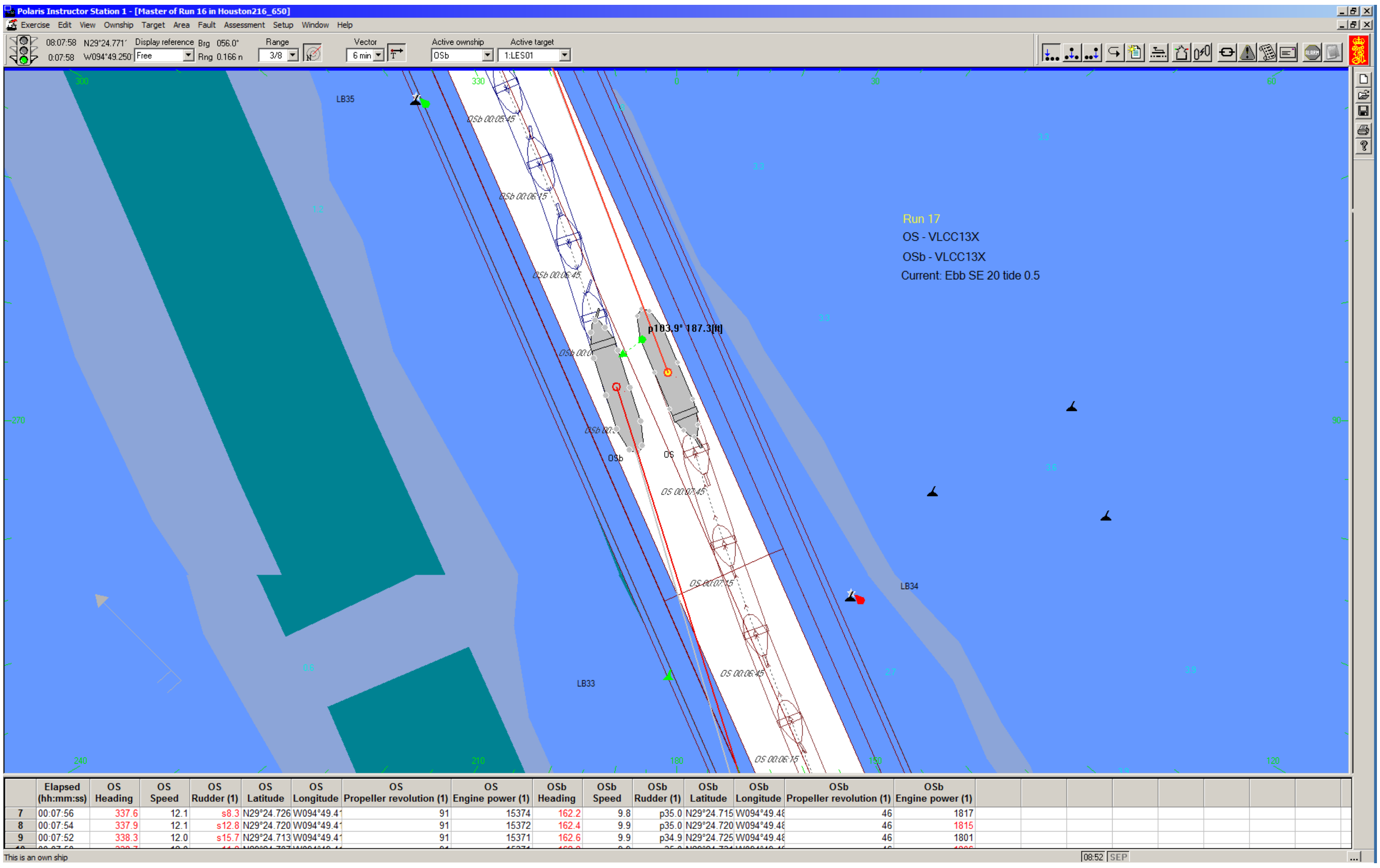
	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:05:54	337.6	11.8	p7.2	N29°24.341	W094°49.26	91	15356	156.1	10.7	s13.9	N29°25.047	W094°49.62	46	1555
8	00:05:52	337.6	11.7	p2.0	N29°24.335	W094°49.25	91	15368	156.1	10.7	s8.9	N29°25.052	W094°49.62	46	1561
9	00:05:50	337.5	11.7	p0.0	N29°24.329	W094°49.25	91	15374	156.1	10.7	s3.7	N29°25.058	W094°49.63	46	1549



08:06:29 N29°24.736' Display reference Free Brg 066.6° Rng 0.148 n Range 3/8 Vector 6 min Active ownship OSb Active target 1:LES01
0:06:29 W094°49.253'

Run 17
OS - VLCC13X
OSb - VLCC13X
Current: Ebb SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:06:28	339.8	12.0	p5.3	N29°24.445	W094°49.30	91	15291	158.7	10.6	s9.3	N29°24.955	W094°49.57	46	1600
8	00:06:26	339.6	12.0	p0.4	N29°24.438	W094°49.30	91	15289	158.4	10.6	s14.5	N29°24.960	W094°49.58	46	1607
9	00:06:24	339.3	12.0	s0.1	N29°24.432	W094°49.30	91	15288	158.2	10.6	s19.3	N29°24.966	W094°49.58	46	1600



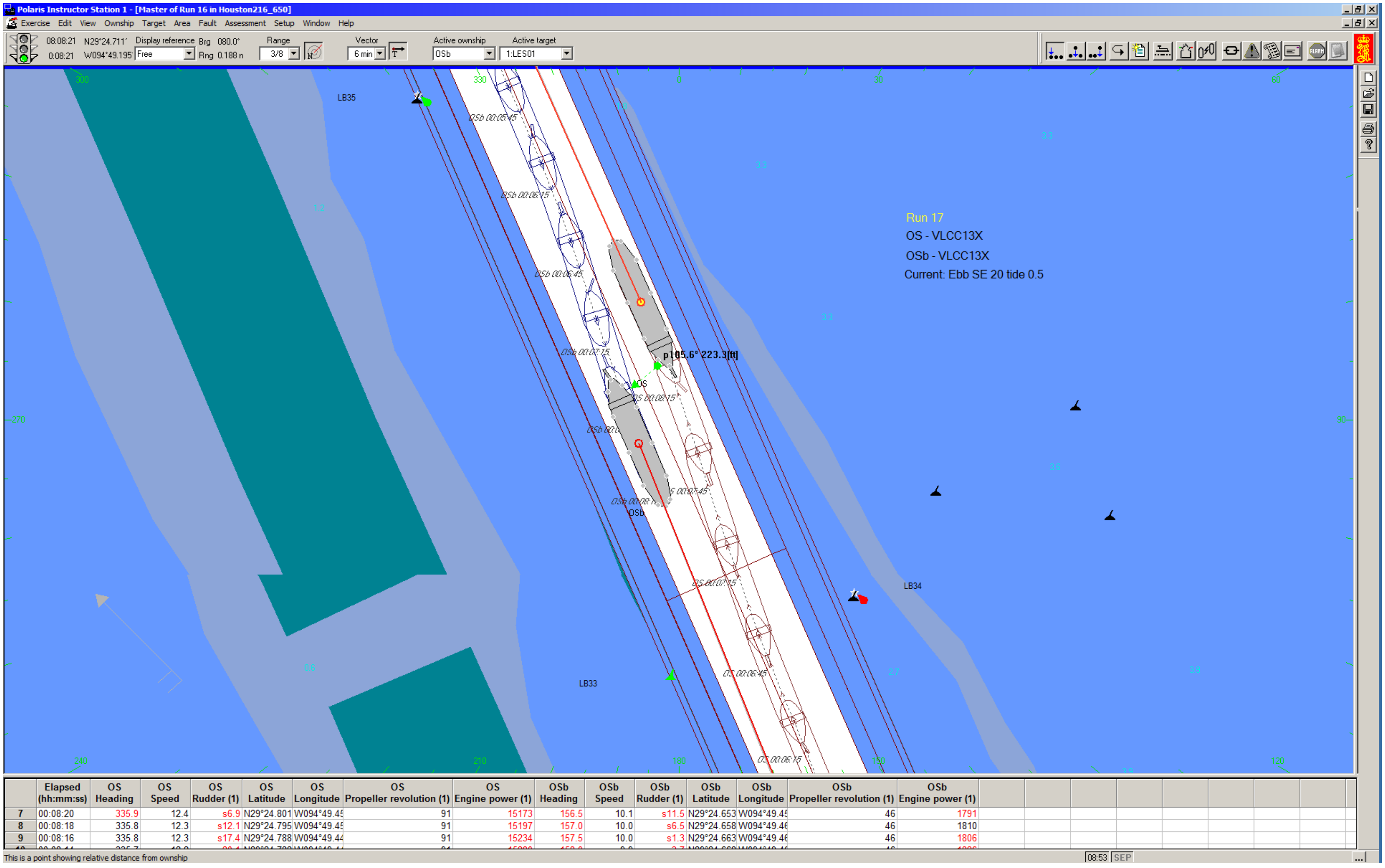
08:07:58 N29°24.771' Display reference Free Brg 056.0° Rng 0.166 n Range 3/8 Vector 6 min Active ownship OSb Active target 1:LES01
0:07:58 W094°49.250'

Run 17
OS - VLCC13X
OSb - VLCC13X
Current: Ebb SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:07:56	337.6	12.1	s8.3	N29°24.726	W094°49.41	91	15374	162.2	9.8	p35.0	N29°24.715	W094°49.48	46	1817
8	00:07:54	337.9	12.1	s12.8	N29°24.720	W094°49.41	91	15372	162.4	9.9	p35.0	N29°24.720	W094°49.48	46	1815
9	00:07:52	338.3	12.0	s15.7	N29°24.713	W094°49.41	91	15371	162.6	9.9	p34.9	N29°24.725	W094°49.48	46	1801

This is an own ship

June 26, 2019

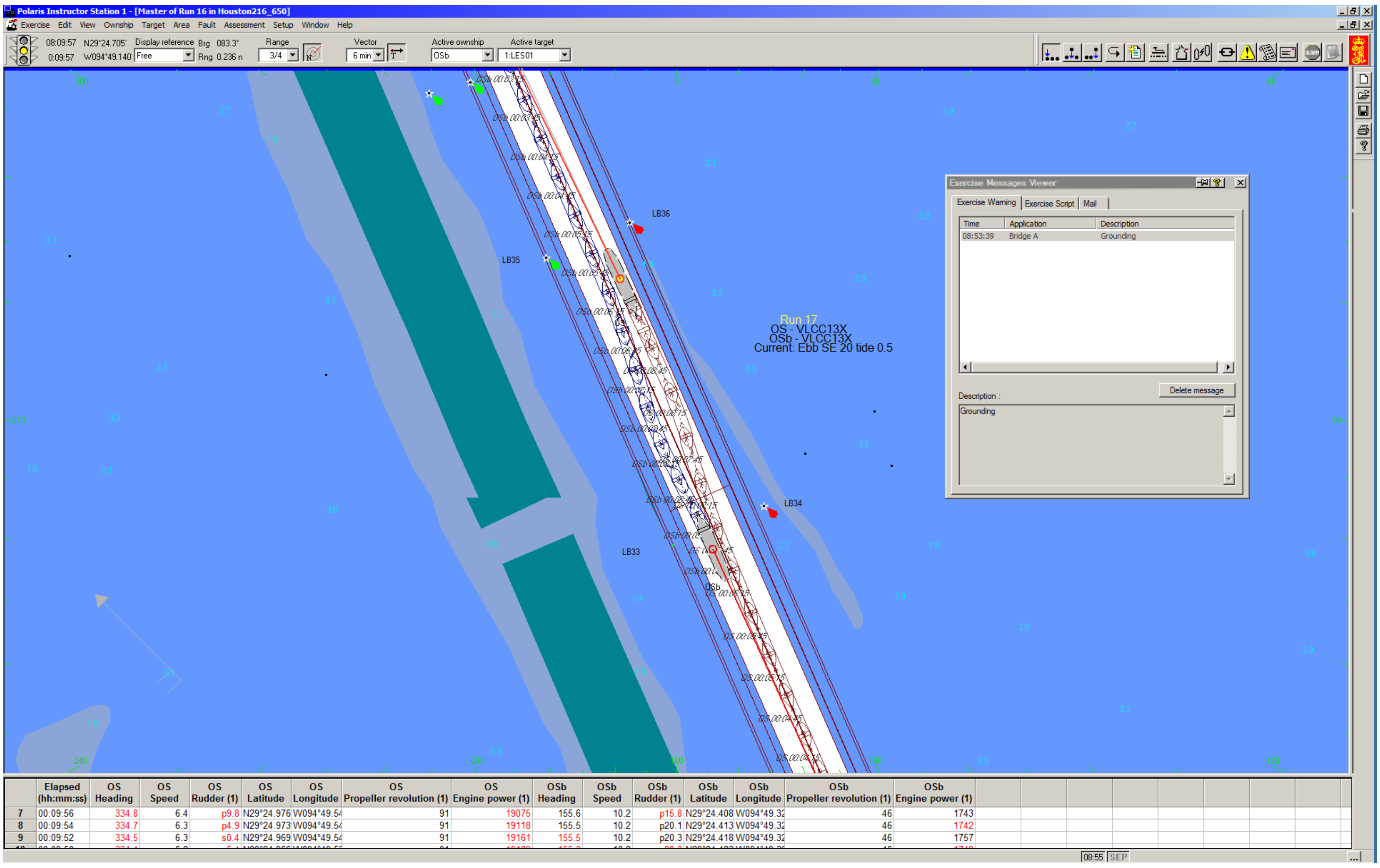


Polaris Instructor Station 1 - [Master of Run 16 in Houston216_650]

08:08:21 N29°24.711′ Display reference Free Brg 080.0° Range 3/8 Vector 6 min Active ownship OSb Active target 1:LES01
0:08:21 W094°49.195′ Rng 0.188 n

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:08:20	335.9	12.4	s6.9	N29°24.801	W094°49.45	91	15173	156.5	10.1	s11.5	N29°24.653	W094°49.45	46	1791
8	00:08:18	335.8	12.3	s12.1	N29°24.795	W094°49.45	91	15197	157.0	10.0	s6.5	N29°24.658	W094°49.46	46	1810
9	00:08:16	335.8	12.3	s17.4	N29°24.788	W094°49.44	91	15234	157.5	10.0	s1.3	N29°24.663	W094°49.46	46	1806

This is a point showing relative distance from ownship



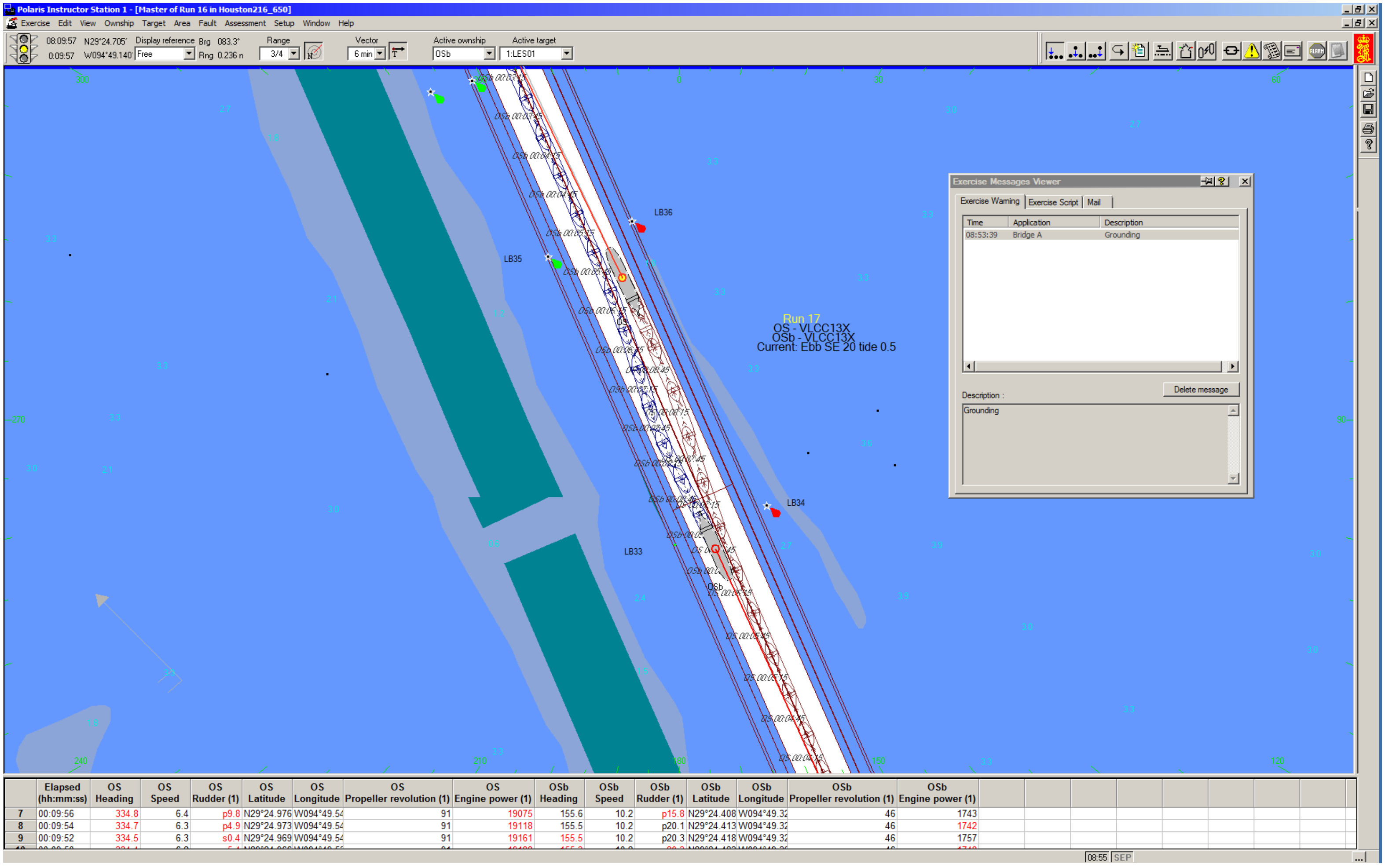
Polaris Instructor Station 1 - [Master of Run 16 in Houston216_650]

08:09:57 N29°24.705′ Display reference Free Brg 083.3° Range 3/4 Vector 6 min Active ownship OSb Active target 1:LES01
0:09:57 W094°49.140′ Rng 0.236 n

Time	Application	Description
08:53:39	Bridge A	Grounding

Description : Grounding

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:09:56	334.8	6.4	p9.8	N29°24.976	W094°49.54	91	19075	155.6	10.2	p15.8	N29°24.408	W094°49.32	46	1743
8	00:09:54	334.7	6.3	p4.9	N29°24.973	W094°49.54	91	19118	155.5	10.2	p20.1	N29°24.413	W094°49.32	46	1742
9	00:09:52	334.5	6.3	s0.4	N29°24.969	W094°49.54	91	19161	155.5	10.2	p20.3	N29°24.418	W094°49.32	46	1757



Polaris Instructor Station 1 - [Master of Run 16 in Houston216_650]

08:09:57 N29°24.705′
0:09:57 W094°49.140′
Display reference: Free
Brg 083.3°
Rng 0.236 n
Range: 3/4
Vector: 6 min
Active ownship: OSb
Active target: 1:LES01

Run 17
OS - VLCC13X
OSb - VLCC13X
Current: Ebb SE 20 tide 0.5

Exercise Messages Viewer

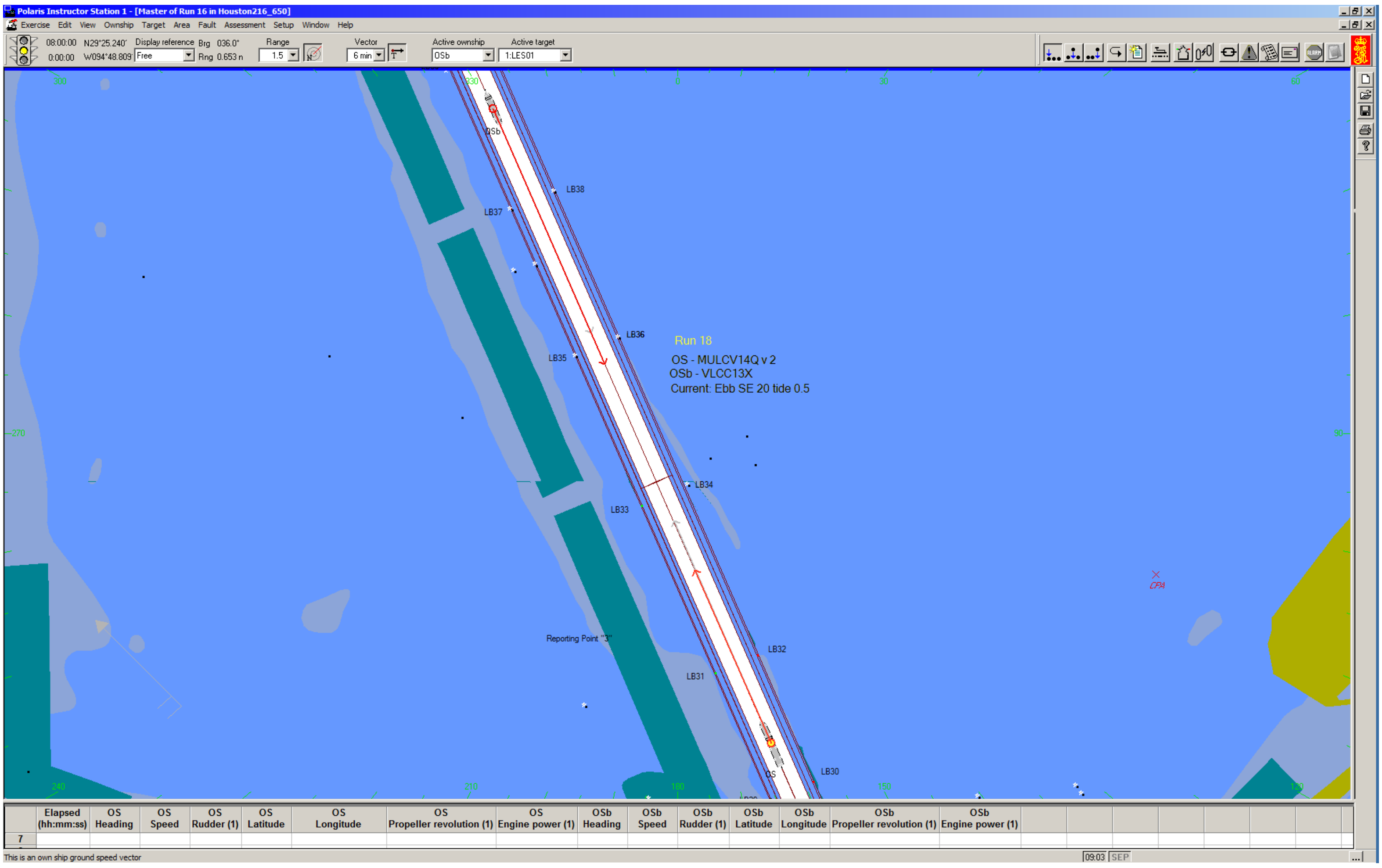
Time	Application	Description
08:53:39	Bridge A	Grounding

Description :
Grounding

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:09:56	334.8	6.4	p9.8	N29°24.976	W094°49.54	91	19075	155.6	10.2	p15.8	N29°24.408	W094°49.32	46	1743
8	00:09:54	334.7	6.3	p4.9	N29°24.973	W094°49.54	91	19118	155.5	10.2	p20.1	N29°24.413	W094°49.32	46	1742
9	00:09:52	334.5	6.3	s0.4	N29°24.969	W094°49.54	91	19161	155.5	10.2	p20.3	N29°24.418	W094°49.32	46	1757

June 26, 2019

Run 18



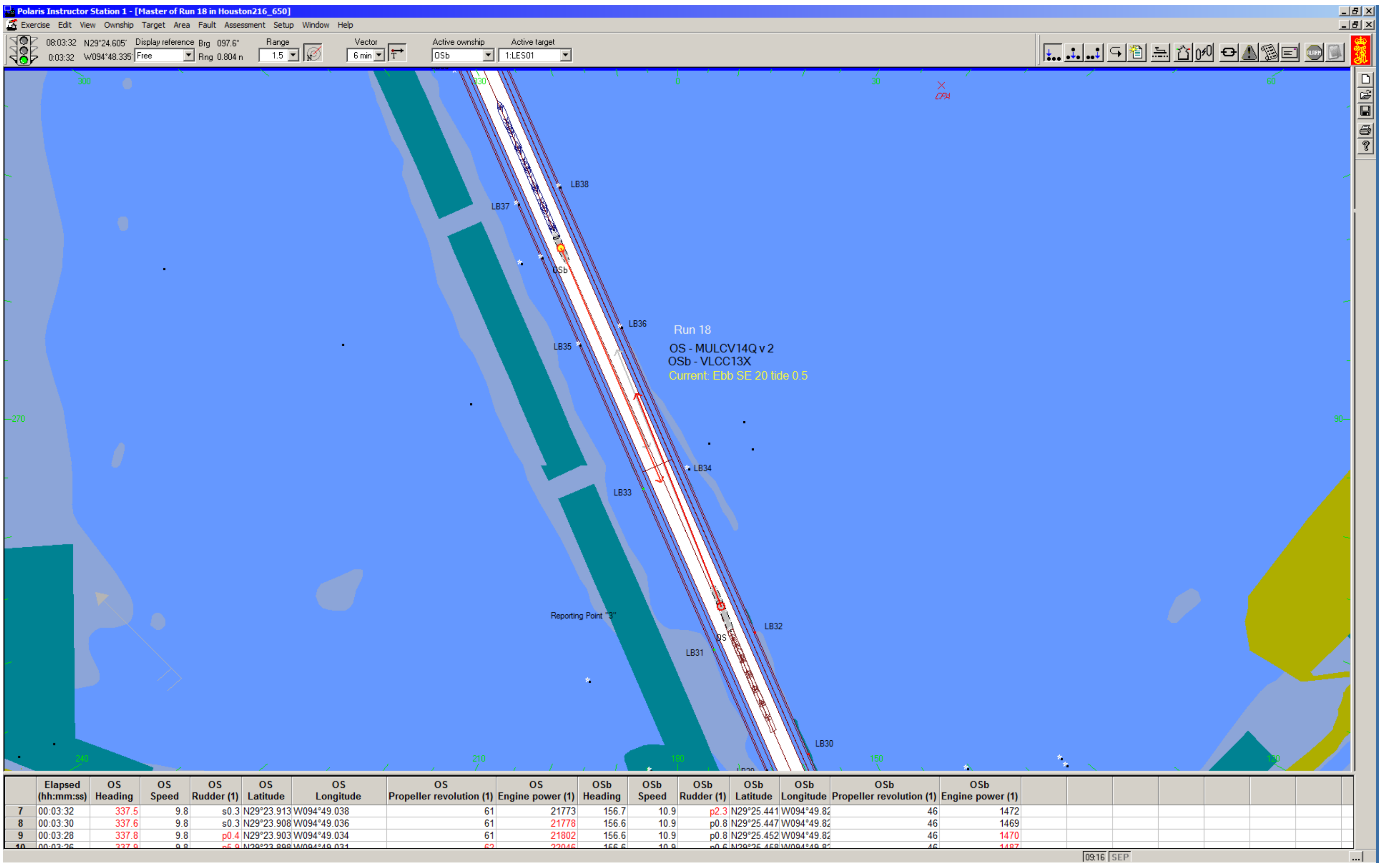
Polaris Instructor Station 1 - [Master of Run 16 in Houston216_650]

Run 18

OS - MULCV14Q v 2
OSb - VLCC13X
Current: Ebb SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7															

This is an own ship ground speed vector

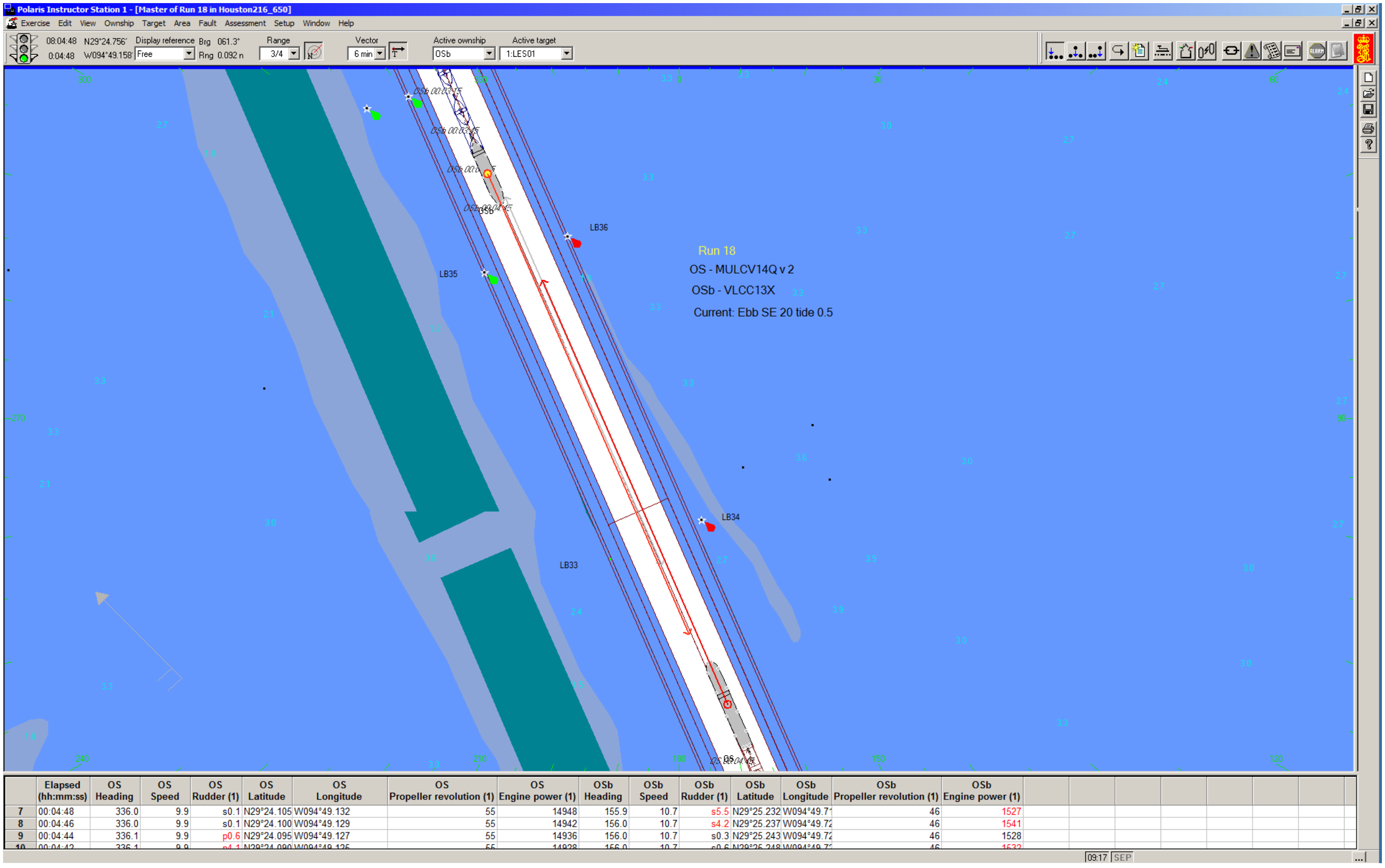


Polaris Instructor Station 1 - [Master of Run 18 in Houston216_650]

Run 18

OS - MULCV14Q v 2
OSb - VLCC13X
Current: Ebb SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:03:32	337.5	9.8	s0.3	N29°23.913	W094°49.038	61	21773	156.7	10.9	p2.3	N29°25.441	W094°49.82	46	1472
8	00:03:30	337.6	9.8	s0.3	N29°23.908	W094°49.036	61	21778	156.6	10.9	p0.8	N29°25.447	W094°49.82	46	1469
9	00:03:28	337.8	9.8	p0.4	N29°23.903	W094°49.034	61	21802	156.6	10.9	p0.8	N29°25.452	W094°49.82	46	1470
10	00:03:26	337.9	9.8	p5.9	N29°23.898	W094°49.031	62	22046	156.6	10.9	p0.6	N29°25.458	W094°49.82	46	1487



Polaris Instructor Station 1 - [Master of Run 18 in Houston216_650]

08:04:48 N29°24.756′ Display reference: Free Brg 061.3° Rng 0.092 n Range 3/4 Vector 6 min Active ownship OSb Active target 1:LES01

0:04:48 W094°49.158′

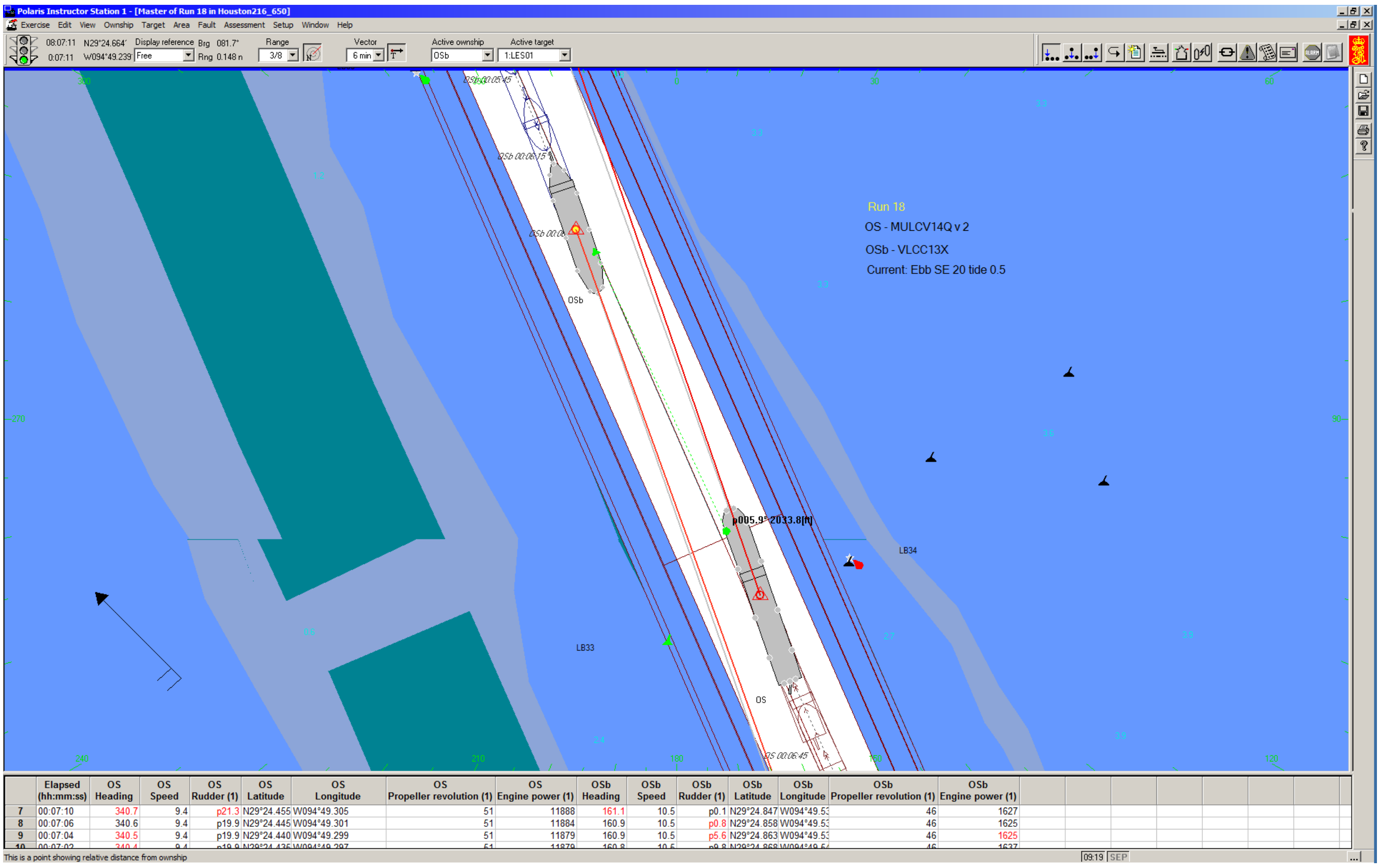
Run 18

OS - MULCV14Q v 2

OSb - VLCC13X

Current: Ebb SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:04:48	336.0	9.9	s0.1	N29°24.105	W094°49.132	55	14948	155.9	10.7	s5.5	N29°25.232	W094°49.71	46	1527
8	00:04:46	336.0	9.9	s0.1	N29°24.100	W094°49.129	55	14942	156.0	10.7	s4.2	N29°25.237	W094°49.72	46	1541
9	00:04:44	336.1	9.9	p0.6	N29°24.095	W094°49.127	55	14936	156.0	10.7	s0.3	N29°25.243	W094°49.72	46	1528



Polaris Instructor Station 1 - [Master of Run 18 in Houston216_650]

08:07:11 N29°24.664′ Display reference: Free Brg 081.7° Rng 0.148 n Range 3/8 Vector 6 min Active ownship OSb Active target 1:LES01

0:07:11 W094°49.239′

Run 18

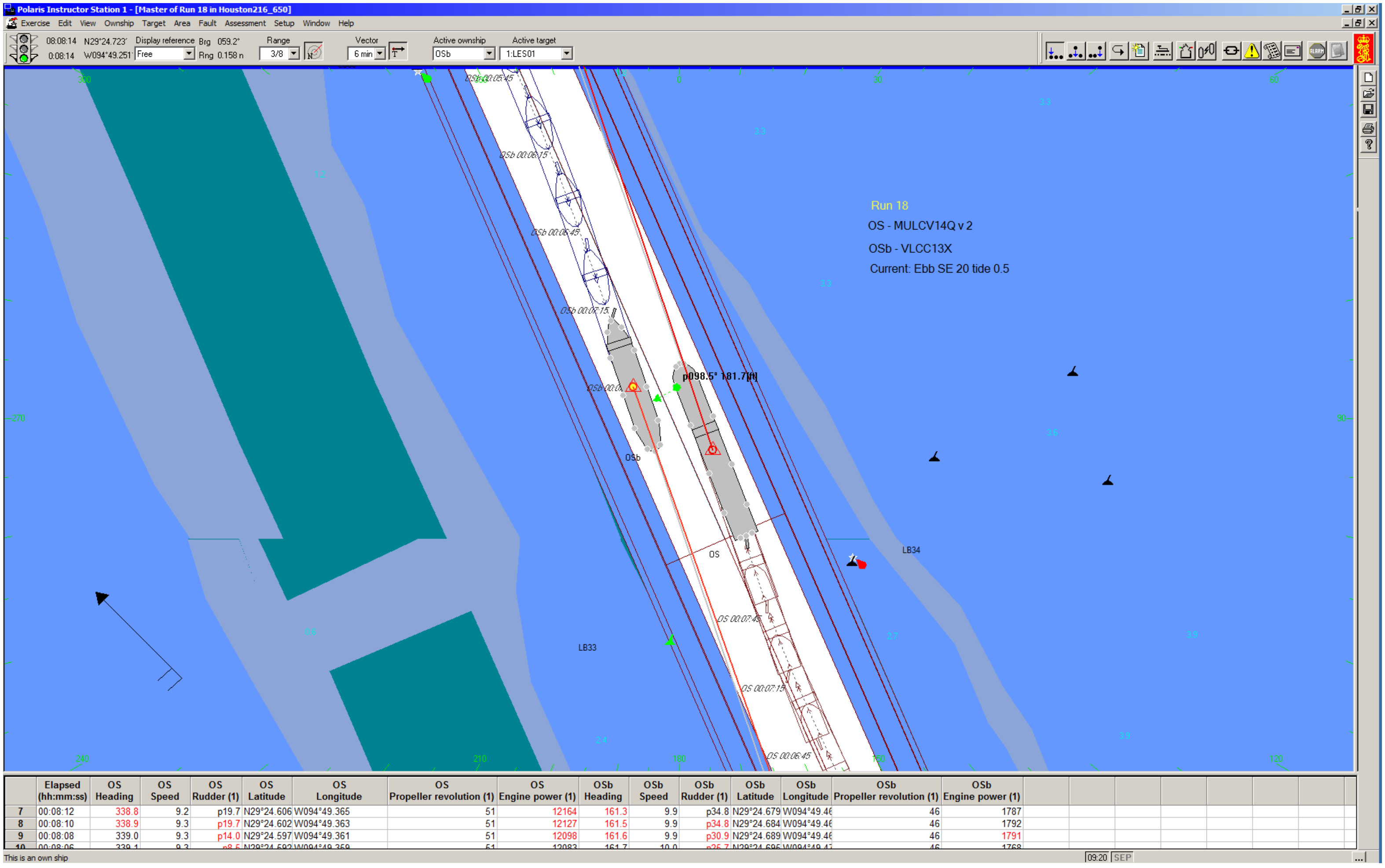
OS - MULCV14Q v 2

OSb - VLCC13X

Current: Ebb SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:07:10	340.7	9.4	p21.3	N29°24.455	W094°49.305	51	11888	161.1	10.5	p0.1	N29°24.847	W094°49.53	46	1627
8	00:07:06	340.6	9.4	p19.9	N29°24.445	W094°49.301	51	11884	160.9	10.5	p0.8	N29°24.858	W094°49.53	46	1625
9	00:07:04	340.5	9.4	p19.9	N29°24.440	W094°49.299	51	11879	160.9	10.5	p5.6	N29°24.863	W094°49.53	46	1625

This is a point showing relative distance from ownship



08:08:14 N29°24.723′ Display reference Free Brg 059.2° Rng 0.158 n Range 3/8 Vector 6 min Active ownship OSb Active target 1:LES01
0:08:14 W094°49.251′

Run 18

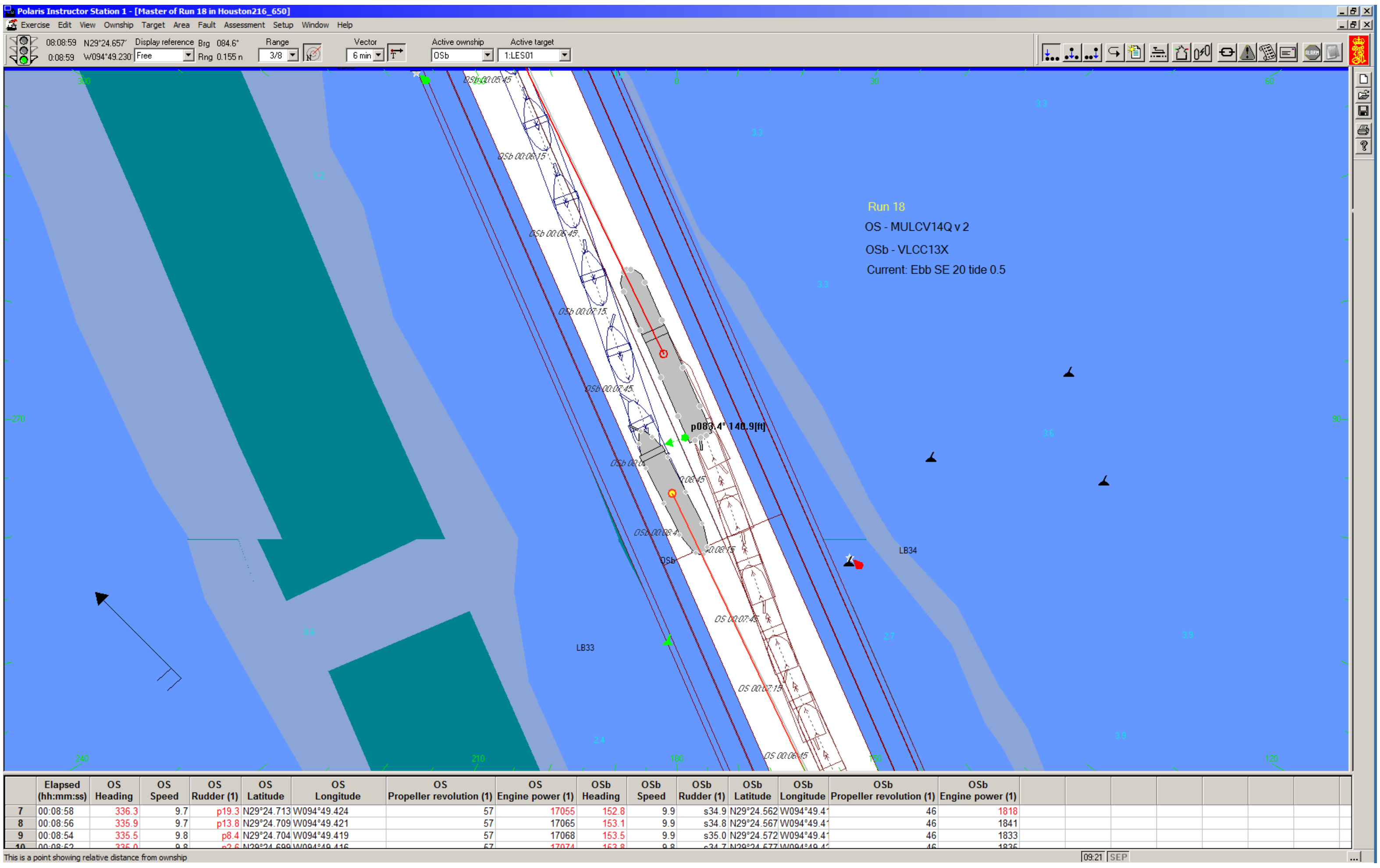
OS - MULCV14Q v 2

OSb - VLCC13X

Current: Ebb SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:08:12	338.8	9.2	p19.7	N29°24.606	W094°49.365	51	12164	161.3	9.9	p34.8	N29°24.679	W094°49.46	46	1787
8	00:08:10	338.9	9.3	p19.7	N29°24.602	W094°49.363	51	12127	161.5	9.9	p34.8	N29°24.684	W094°49.46	46	1792
9	00:08:08	339.0	9.3	p14.0	N29°24.597	W094°49.361	51	12098	161.6	9.9	p30.9	N29°24.689	W094°49.46	46	1791

This is an own ship



08:08:59 N29°24.657′ Display reference Free Brg 084.6° Rng 0.155 n Range 3/8 Vector 6 min Active ownship OSb Active target 1:LES01
0:08:59 W094°49.230′

Run 18

OS - MULCV14Q v 2

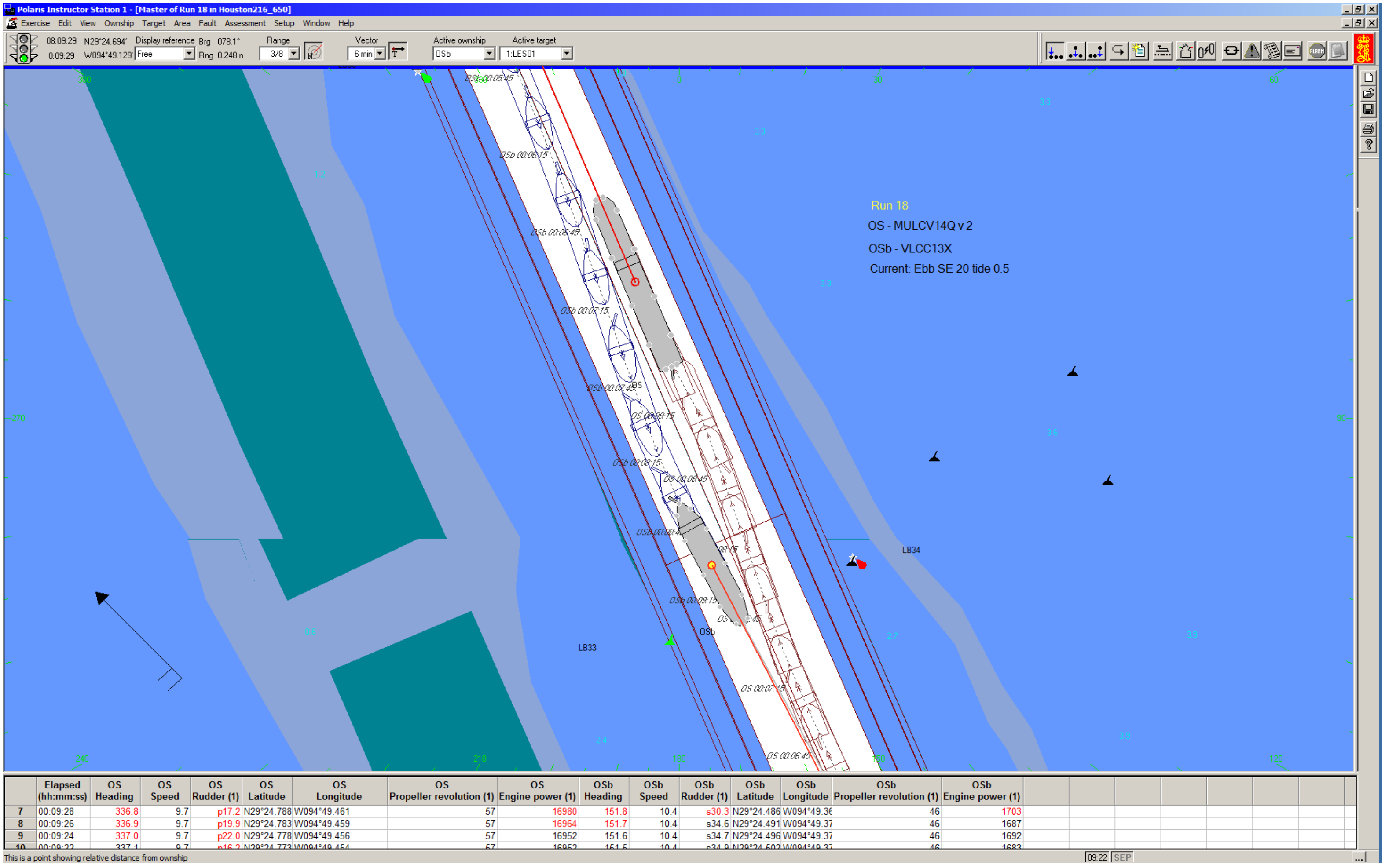
OSb - VLCC13X

Current: Ebb SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:08:58	336.3	9.7	p19.3	N29°24.713	W094°49.424	57	17055	152.8	9.9	s34.9	N29°24.562	W094°49.41	46	1818
8	00:08:56	335.9	9.7	p13.8	N29°24.709	W094°49.421	57	17065	153.1	9.9	s34.8	N29°24.567	W094°49.41	46	1841
9	00:08:54	335.5	9.8	p8.4	N29°24.704	W094°49.419	57	17068	153.5	9.9	s35.0	N29°24.572	W094°49.41	46	1833

This is a point showing relative distance from ownship

June 26, 2019



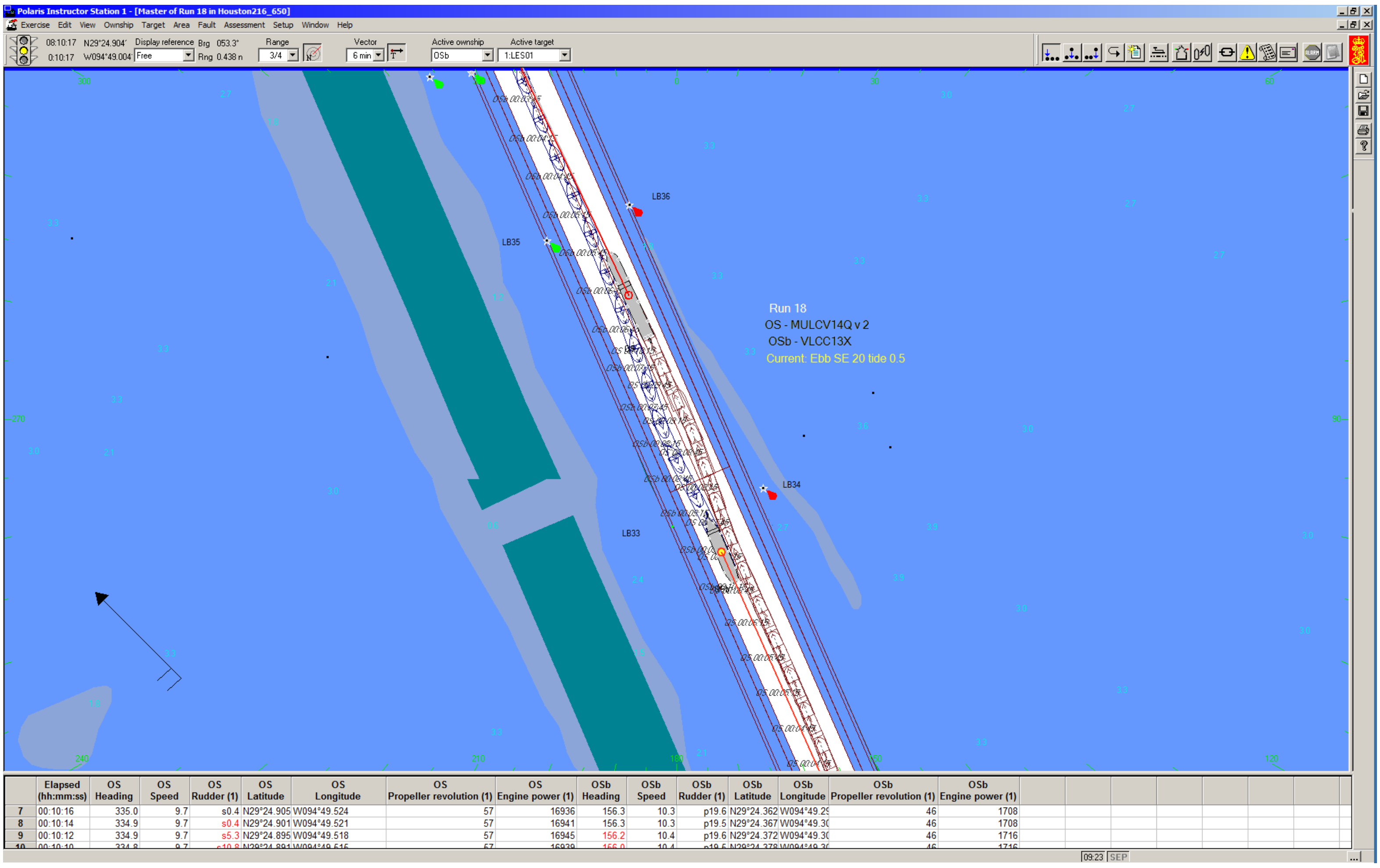
Polaris Instructor Station 1 - [Master of Run 18 in Houston216_650]

08:09:29 N29°24.694′ Display reference: Free Brg 078.1°
0:09:29 W094°49.129 Rng 0.248 n
Range: 3/8
Vector: 6 min
Active ownship: OSb
Active target: 1:LES01

Run 18
OS - MULCV14Q v 2
OSb - VLCC13X
Current: Ebb SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:09:28	336.8	9.7	p17.2	N29°24.788	W094°49.461	57	16980	151.8	10.4	s30.3	N29°24.486	W094°49.36	46	1703
8	00:09:26	336.9	9.7	p19.9	N29°24.783	W094°49.459	57	16964	151.7	10.4	s34.6	N29°24.491	W094°49.37	46	1687
9	00:09:24	337.0	9.7	p22.0	N29°24.778	W094°49.456	57	16952	151.6	10.4	s34.7	N29°24.496	W094°49.37	46	1692
10	00:09:22	337.1	9.7	p16.2	N29°24.773	W094°49.454	57	16952	151.5	10.4	s34.9	N29°24.502	W094°49.37	46	1683

This is a point showing relative distance from ownship



Polaris Instructor Station 1 - [Master of Run 18 in Houston216_650]

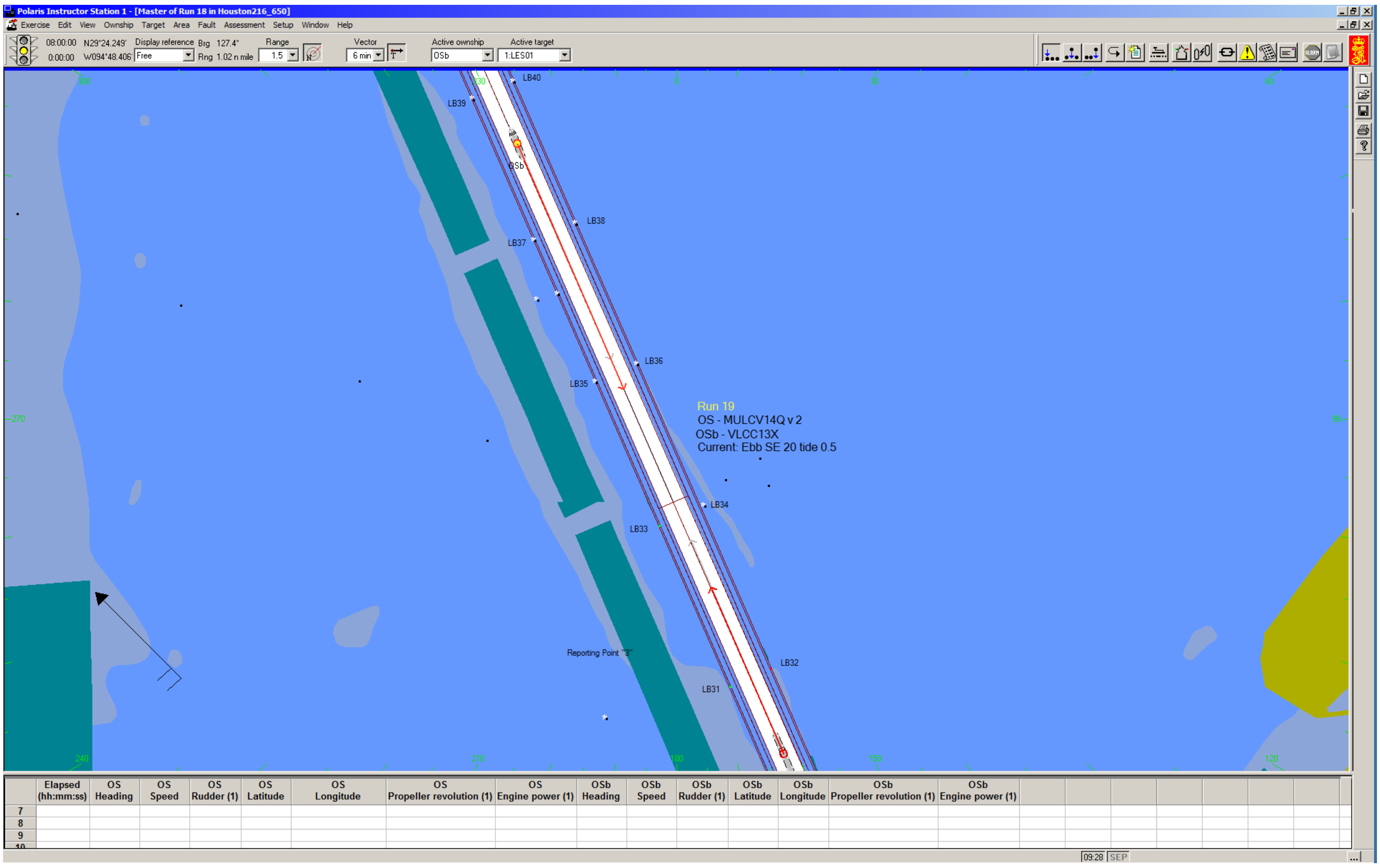
08:10:17 N29°24.904′ Display reference: Free Brg 053.3°
0:10:17 W094°49.004′ Rng 0.438 n
Range: 3/4
Vector: 6 min
Active ownship: OSb
Active target: 1:LES01

Run 18
OS - MULCV14Q v 2
OSb - VLCC13X
Current: Ebb SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:10:16	335.0	9.7	s0.4	N29°24.905	W094°49.524	57	16936	156.3	10.3	p19.6	N29°24.362	W094°49.29	46	1708
8	00:10:14	334.9	9.7	s0.4	N29°24.901	W094°49.521	57	16941	156.3	10.3	p19.5	N29°24.367	W094°49.30	46	1708
9	00:10:12	334.9	9.7	s5.3	N29°24.895	W094°49.518	57	16945	156.2	10.4	p19.6	N29°24.372	W094°49.30	46	1716
10	00:10:10	334.8	9.7	s10.8	N29°24.891	W094°49.515	57	16939	156.0	10.4	p19.5	N29°24.378	W094°49.30	46	1716

June 26, 2019

Run 19



Polaris Instructor Station 1 - [Master of Run 18 in Houston216_650]

08:00:00 N29°24.249' Display reference Free Brg 127.4° Rng 1.02 n mile Range 1.5 Vector 6 min Active ownship OSb Active target 1:LES01

0:00:00 W094°48.406

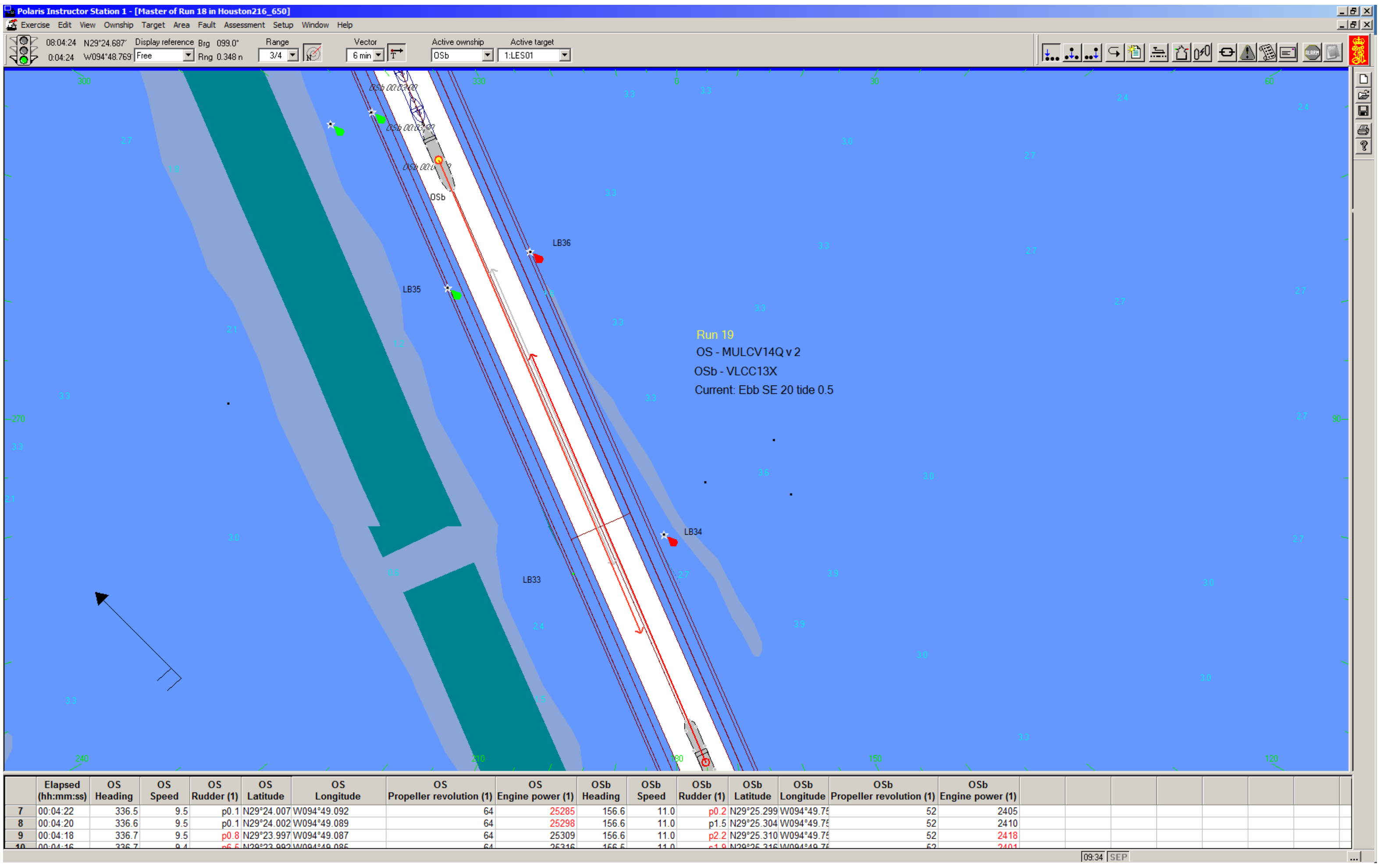
Run 19

OS - MULCV14Q v 2

OSb - VLCC13X

Current: Ebb SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7															
8															
9															



Polaris Instructor Station 1 - [Master of Run 18 in Houston216_650]

08:04:24 N29°24.687' Display reference Free Brg 099.0° Rng 0.348 n Range 3/4 Vector 6 min Active ownship OSb Active target 1:LES01

0:04:24 W094°48.769'

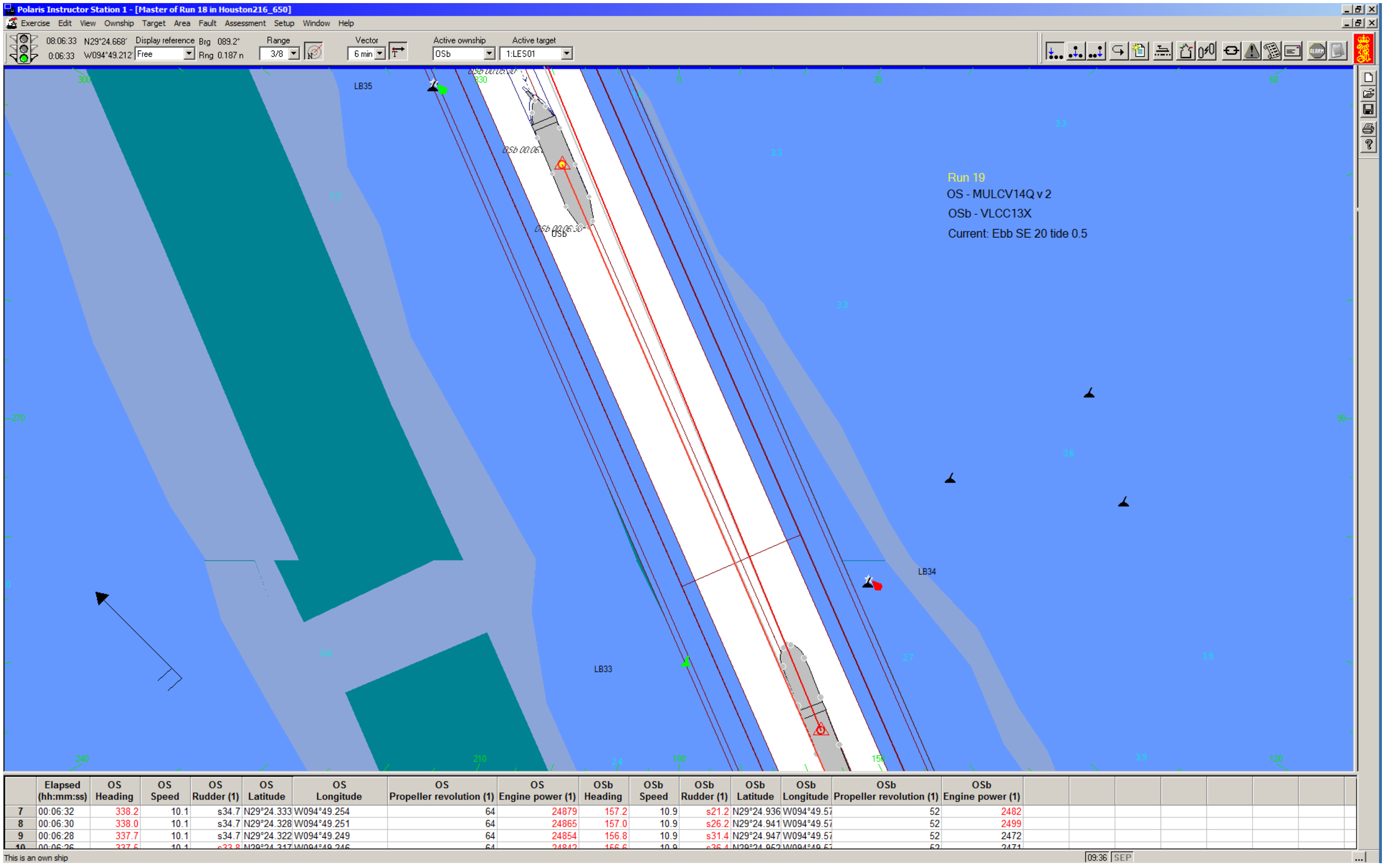
Run 19

OS - MULCV14Q v 2

OSb - VLCC13X

Current: Ebb SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:04:22	336.5	9.5	p0.1	N29°24.007	W094°49.092	64	25285	156.6	11.0	p0.2	N29°25.299	W094°49.75	52	2405
8	00:04:20	336.6	9.5	p0.1	N29°24.002	W094°49.089	64	25298	156.6	11.0	p1.5	N29°25.304	W094°49.75	52	2410
9	00:04:18	336.7	9.5	p0.8	N29°23.997	W094°49.087	64	25309	156.6	11.0	p2.2	N29°25.310	W094°49.75	52	2418
10	00:04:16	336.7	9.4	p6.5	N29°23.992	W094°49.085	64	25316	156.5	11.0	s1.9	N29°25.316	W094°49.7	52	2401



Polaris Instructor Station 1 - [Master of Run 18 in Houston216_650]

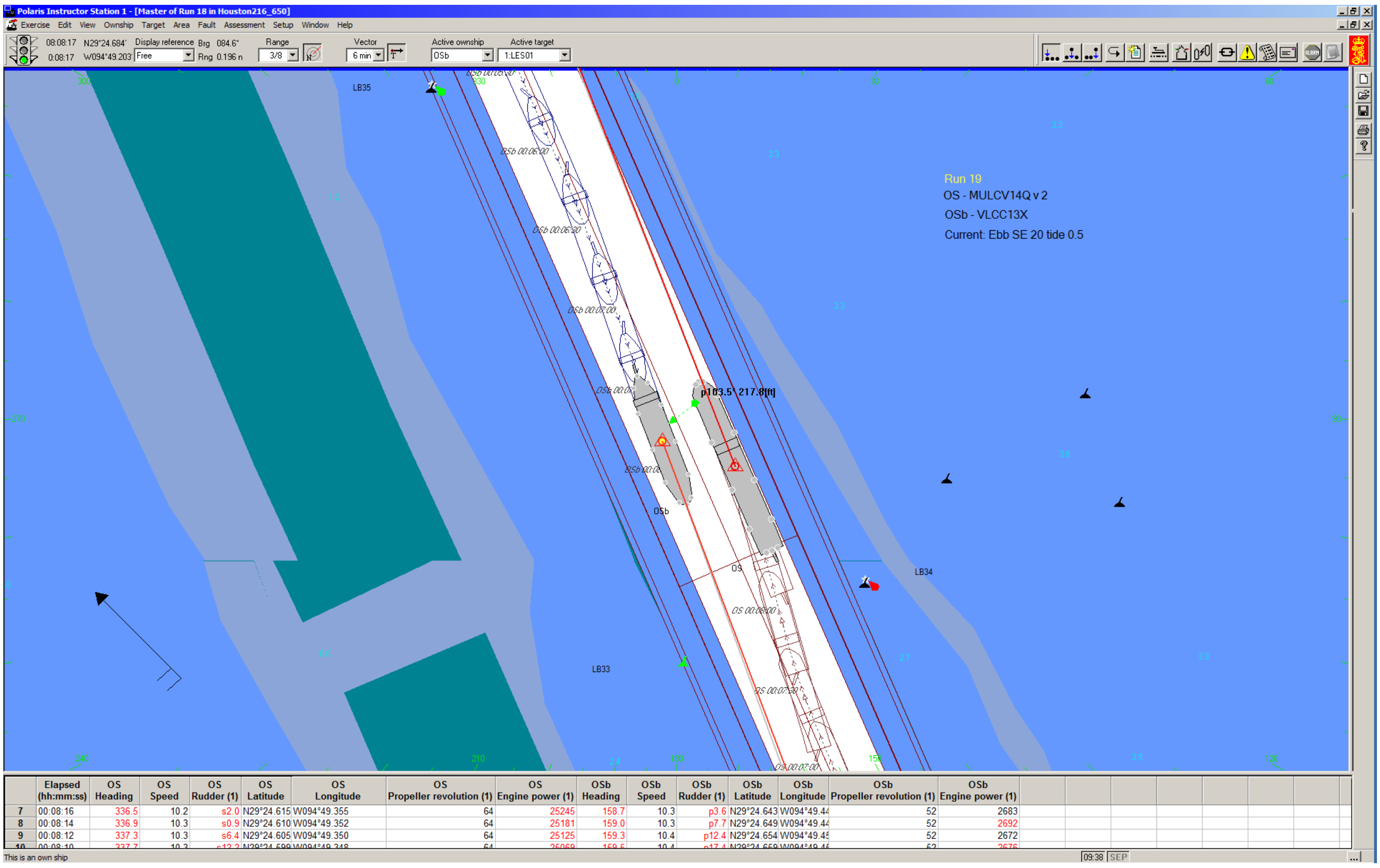
08:06:33 N29°24.668′ Display reference Brg 089.2°
0:06:33 W094°49.212′ Free Rng 0.187 n
Range 3/8
Vector 6 min
Active ownship OSb
Active target 1:LES01

Run 19
OS - MULCV14Q v 2
OSb - VLCC13X
Current: Ebb SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:06:32	338.2	10.1	s34.7	N29°24.333	W094°49.254	64	24879	157.2	10.9	s21.2	N29°24.936	W094°49.57	52	2482
8	00:06:30	338.0	10.1	s34.7	N29°24.328	W094°49.251	64	24865	157.0	10.9	s26.2	N29°24.941	W094°49.57	52	2499
9	00:06:28	337.7	10.1	s34.7	N29°24.322	W094°49.249	64	24854	156.8	10.9	s31.4	N29°24.947	W094°49.57	52	2472
10	00:06:26	337.5	10.1	s33.8	N29°24.317	W094°49.246	64	24842	156.6	10.9	s36.4	N29°24.952	W094°49.57	52	2471

This is an own ship

09:36 SEP



Polaris Instructor Station 1 - [Master of Run 18 in Houston216_650]

08:08:17 N29°24.684′ Display reference Brg 084.6°
0:08:17 W094°49.203′ Free Rng 0.196 n
Range 3/8
Vector 6 min
Active ownship OSb
Active target 1:LES01

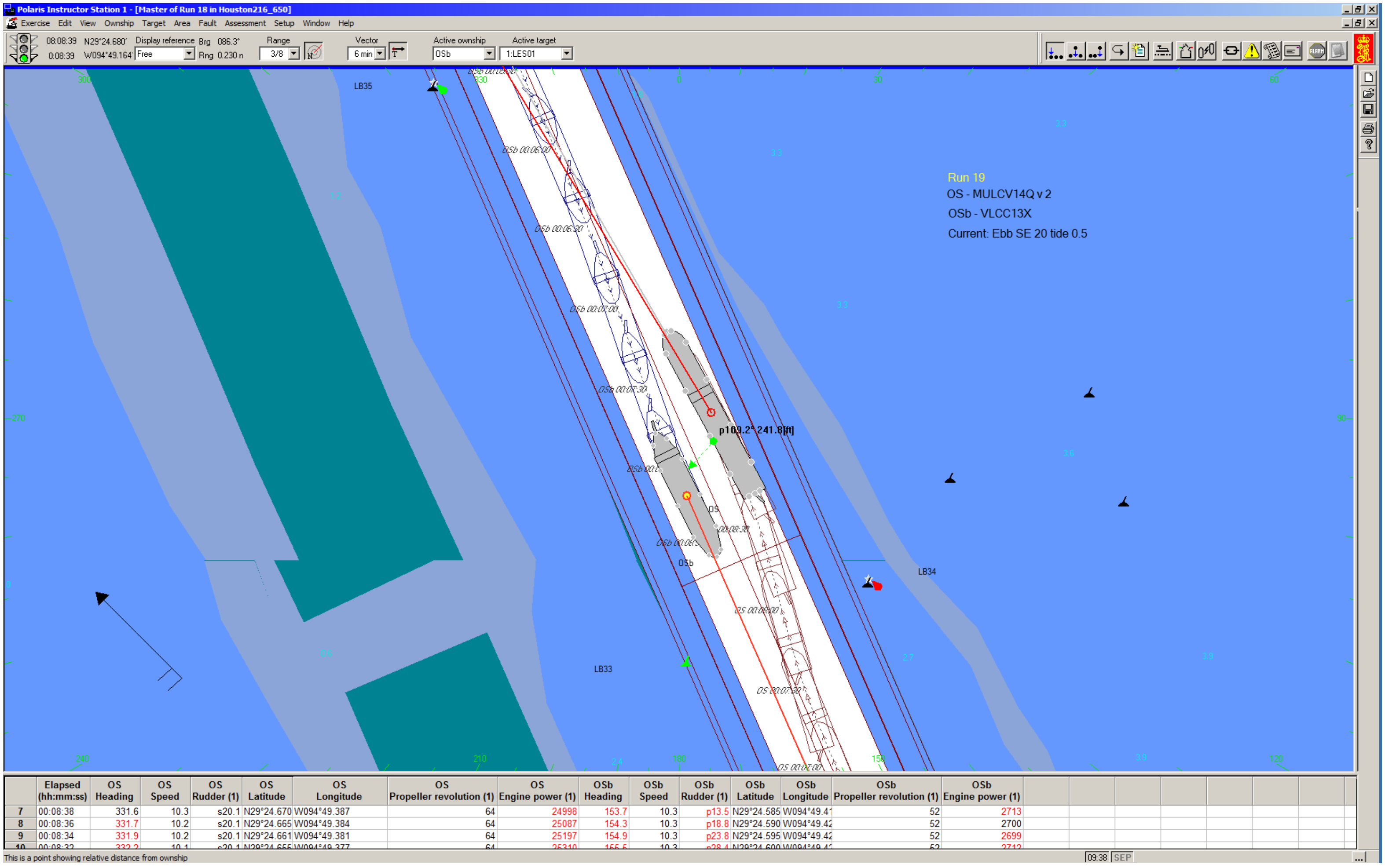
Run 19
OS - MULCV14Q v 2
OSb - VLCC13X
Current: Ebb SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:08:16	336.5	10.2	s2.0	N29°24.615	W094°49.355	64	25245	158.7	10.3	p3.6	N29°24.643	W094°49.44	52	2683
8	00:08:14	336.9	10.3	s0.9	N29°24.610	W094°49.352	64	25181	159.0	10.3	p7.7	N29°24.649	W094°49.44	52	2692
9	00:08:12	337.3	10.3	s6.4	N29°24.605	W094°49.350	64	25125	159.3	10.4	p12.4	N29°24.654	W094°49.45	52	2672
10	00:08:10	337.7	10.3	s12.2	N29°24.599	W094°49.348	64	25069	159.5	10.4	p17.4	N29°24.659	W094°49.46	52	2676

This is an own ship

09:38 SEP

June 26, 2019

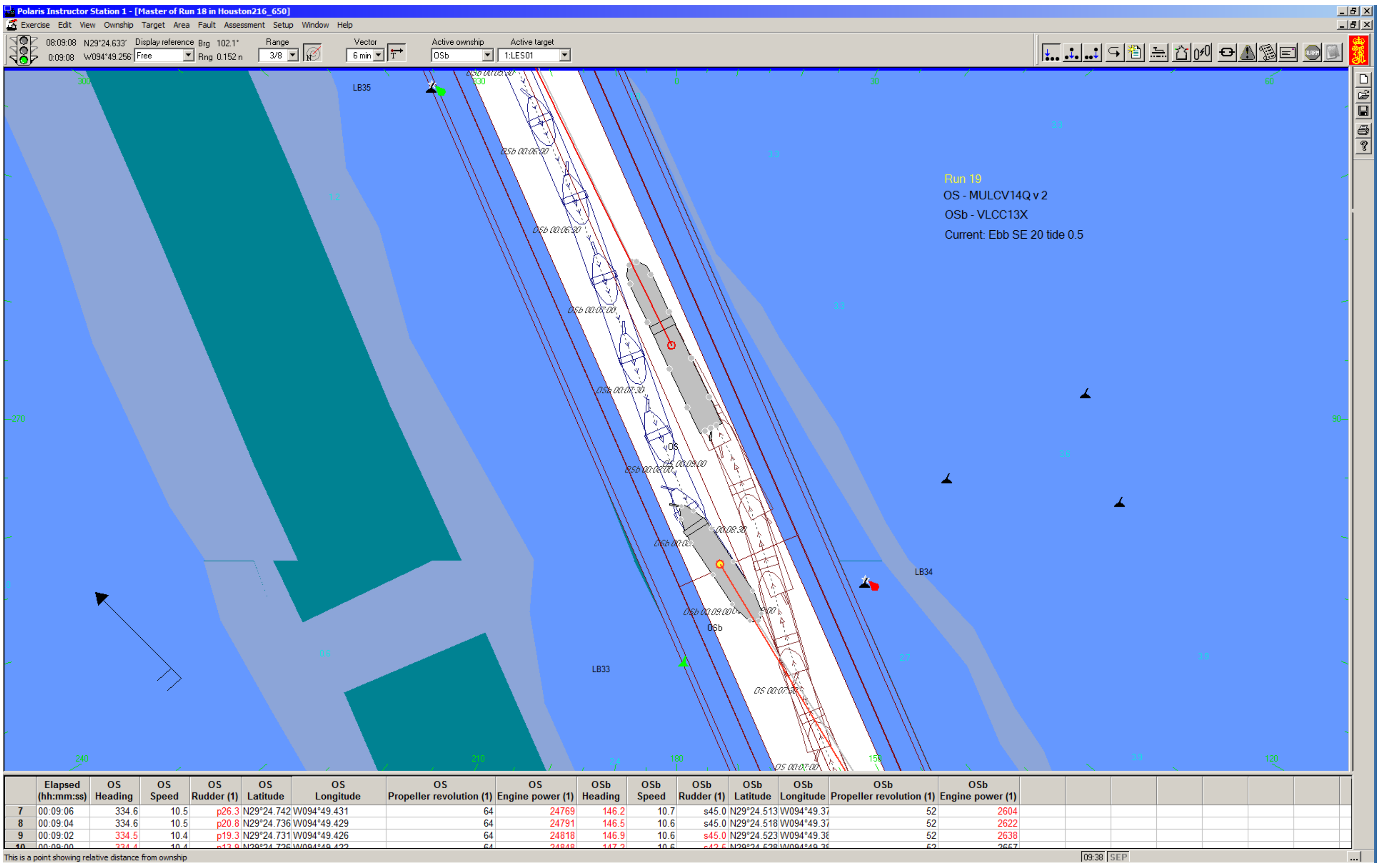


08:08:39 N29°24.680′ Display reference Free Brg 086.3° Rng 0.230 n
0:08:39 W094°49.164′
Range 3/8
Vector 6 min
Active ownship OSb
Active target 1:LES01

Run 19
OS - MULCV14Q v 2
OSb - VLCC13X
Current: Ebb SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:08:38	331.6	10.3	s20.1	N29°24.670	W094°49.387	64	24998	153.7	10.3	p13.5	N29°24.585	W094°49.41	52	2713
8	00:08:36	331.7	10.2	s20.1	N29°24.665	W094°49.384	64	25087	154.3	10.3	p18.8	N29°24.590	W094°49.42	52	2700
9	00:08:34	331.9	10.2	s20.1	N29°24.661	W094°49.381	64	25197	154.9	10.3	p23.8	N29°24.595	W094°49.42	52	2699

This is a point showing relative distance from ownship



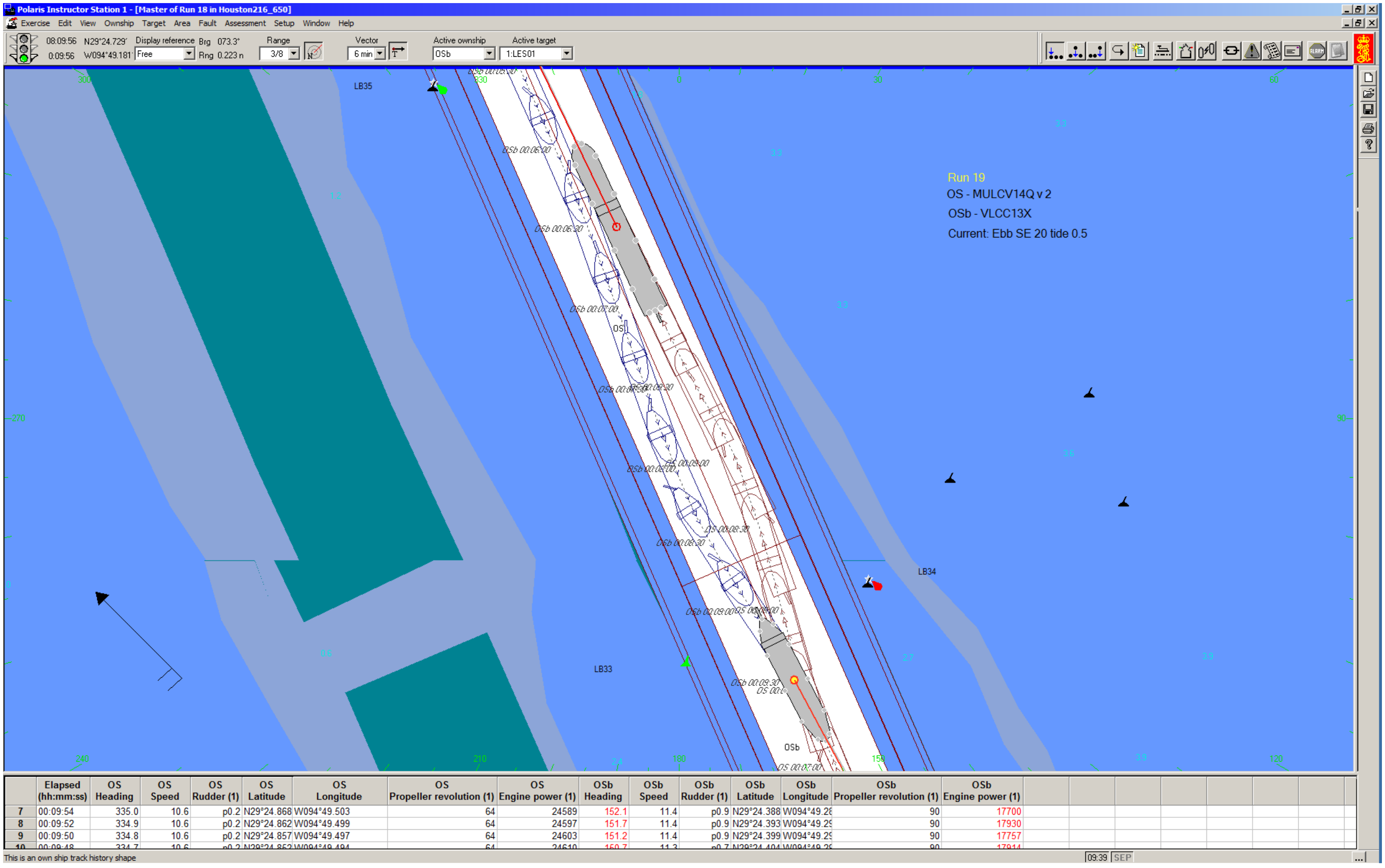
08:09:08 N29°24.633′ Display reference Free Brg 102.1° Rng 0.152 n
0:09:08 W094°49.256′
Range 3/8
Vector 6 min
Active ownship OSb
Active target 1:LES01

Run 19
OS - MULCV14Q v 2
OSb - VLCC13X
Current: Ebb SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:09:06	334.6	10.5	p26.3	N29°24.742	W094°49.431	64	24769	146.2	10.7	s45.0	N29°24.513	W094°49.37	52	2604
8	00:09:04	334.6	10.5	p20.8	N29°24.736	W094°49.429	64	24791	146.5	10.6	s45.0	N29°24.518	W094°49.37	52	2622
9	00:09:02	334.5	10.4	p19.3	N29°24.731	W094°49.426	64	24818	146.9	10.6	s45.0	N29°24.523	W094°49.38	52	2638

This is a point showing relative distance from ownship

June 26, 2019



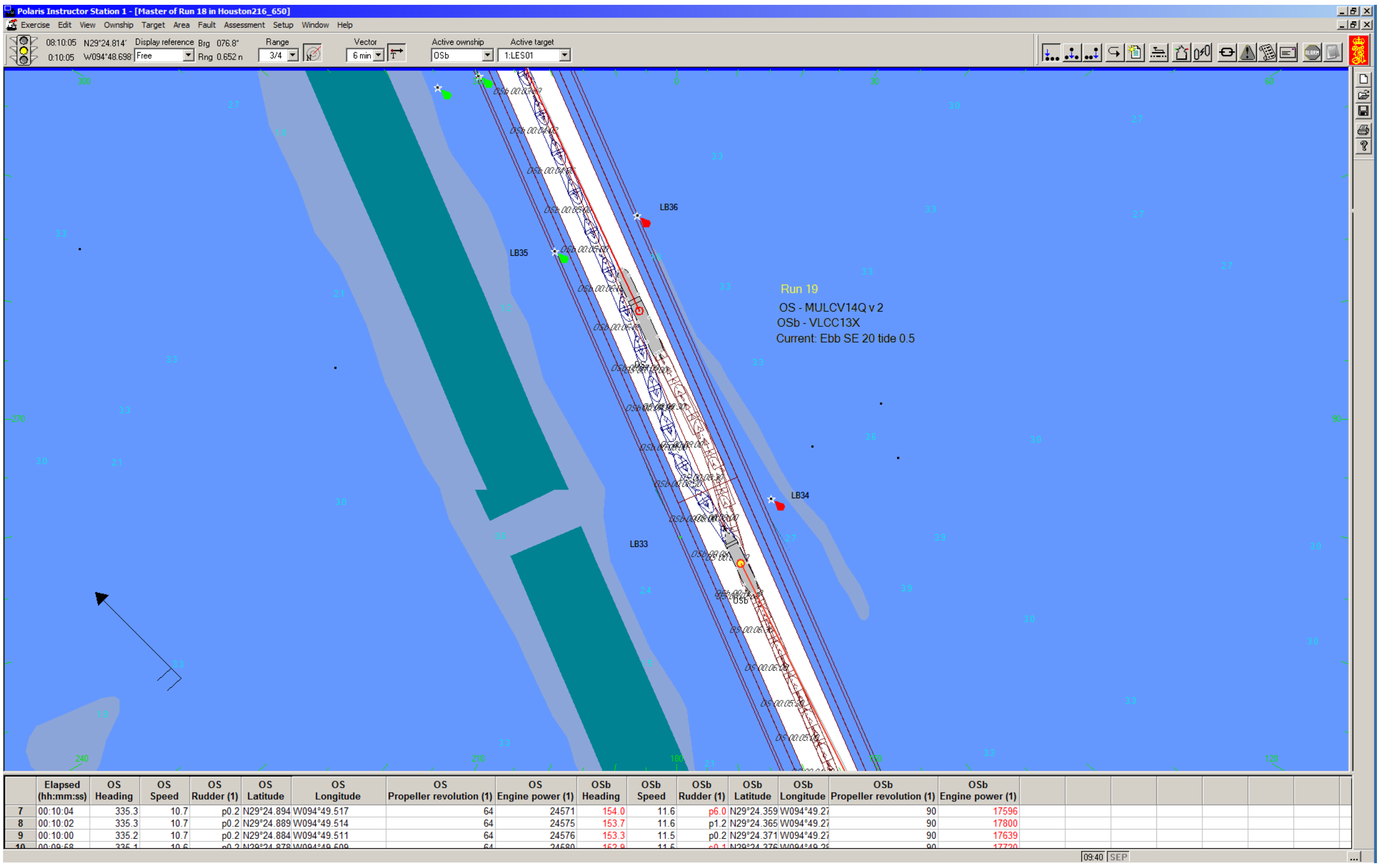
Polaris Instructor Station 1 - [Master of Run 18 in Houston216_650]

08:09:56 N29°24.729' Display reference Free Brg 073.3° Range 3/8 Vector 6 min Active ownship OSb Active target 1:LES01
0:09:56 W094°49.181' Rng 0.223 n

Run 19
OS - MULCV14Q v 2
OSb - VLCC13X
Current: Ebb SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:09:54	335.0	10.6	p0.2	N29°24.868	W094°49.503	64	24589	152.1	11.4	p0.9	N29°24.388	W094°49.28	90	17700
8	00:09:52	334.9	10.6	p0.2	N29°24.862	W094°49.499	64	24597	151.7	11.4	p0.9	N29°24.393	W094°49.29	90	17930
9	00:09:50	334.8	10.6	p0.2	N29°24.857	W094°49.497	64	24603	151.2	11.4	p0.9	N29°24.399	W094°49.29	90	17757
10	00:09:48	334.7	10.6	p0.2	N29°24.852	W094°49.494	64	24610	150.7	11.3	p0.7	N29°24.404	W094°49.29	90	17914

This is an own ship track history shape



Polaris Instructor Station 1 - [Master of Run 18 in Houston216_650]

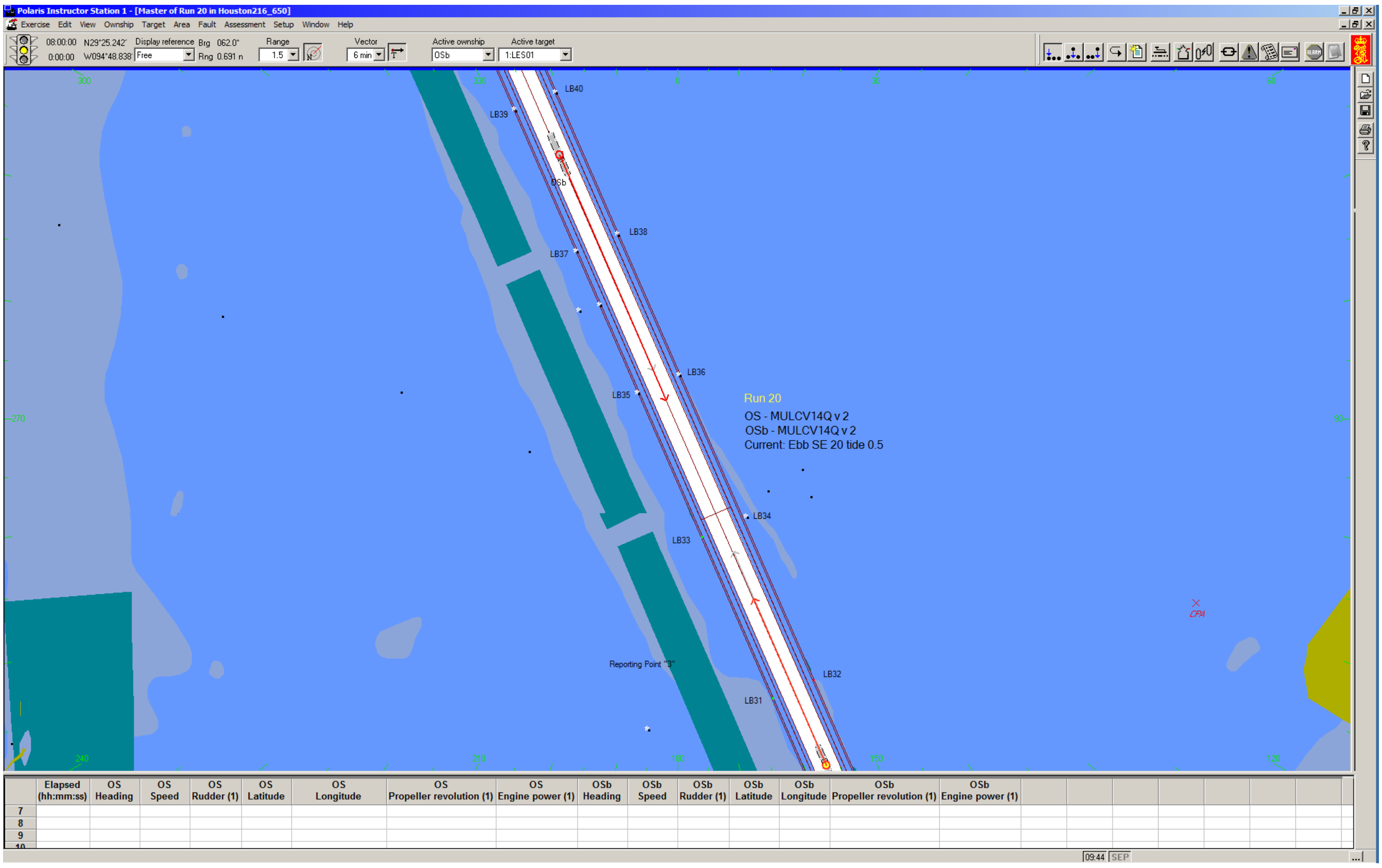
08:10:05 N29°24.814' Display reference Free Brg 076.8° Range 3/4 Vector 6 min Active ownship OSb Active target 1:LES01
0:10:05 W094°48.698' Rng 0.652 n

Run 19
OS - MULCV14Q v 2
OSb - VLCC13X
Current: Ebb SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:10:04	335.3	10.7	p0.2	N29°24.894	W094°49.517	64	24571	154.0	11.6	p6.0	N29°24.359	W094°49.27	90	17596
8	00:10:02	335.3	10.7	p0.2	N29°24.889	W094°49.514	64	24575	153.7	11.6	p1.2	N29°24.365	W094°49.27	90	17800
9	00:10:00	335.2	10.7	p0.2	N29°24.884	W094°49.511	64	24576	153.3	11.5	p0.2	N29°24.371	W094°49.27	90	17639
10	00:09:58	335.1	10.6	p0.2	N29°24.878	W094°49.509	64	24580	152.9	11.5	s0.1	N29°24.376	W094°49.28	90	17720

June 26, 2019

Run 20



08:00:00 N29°25.242′ Display reference Free Brg 062.0° Rng 0.691 n Range 1.5 Vector 6 min Active ownship OSb Active target 1:LES01

0:00:00 W094°48.838′

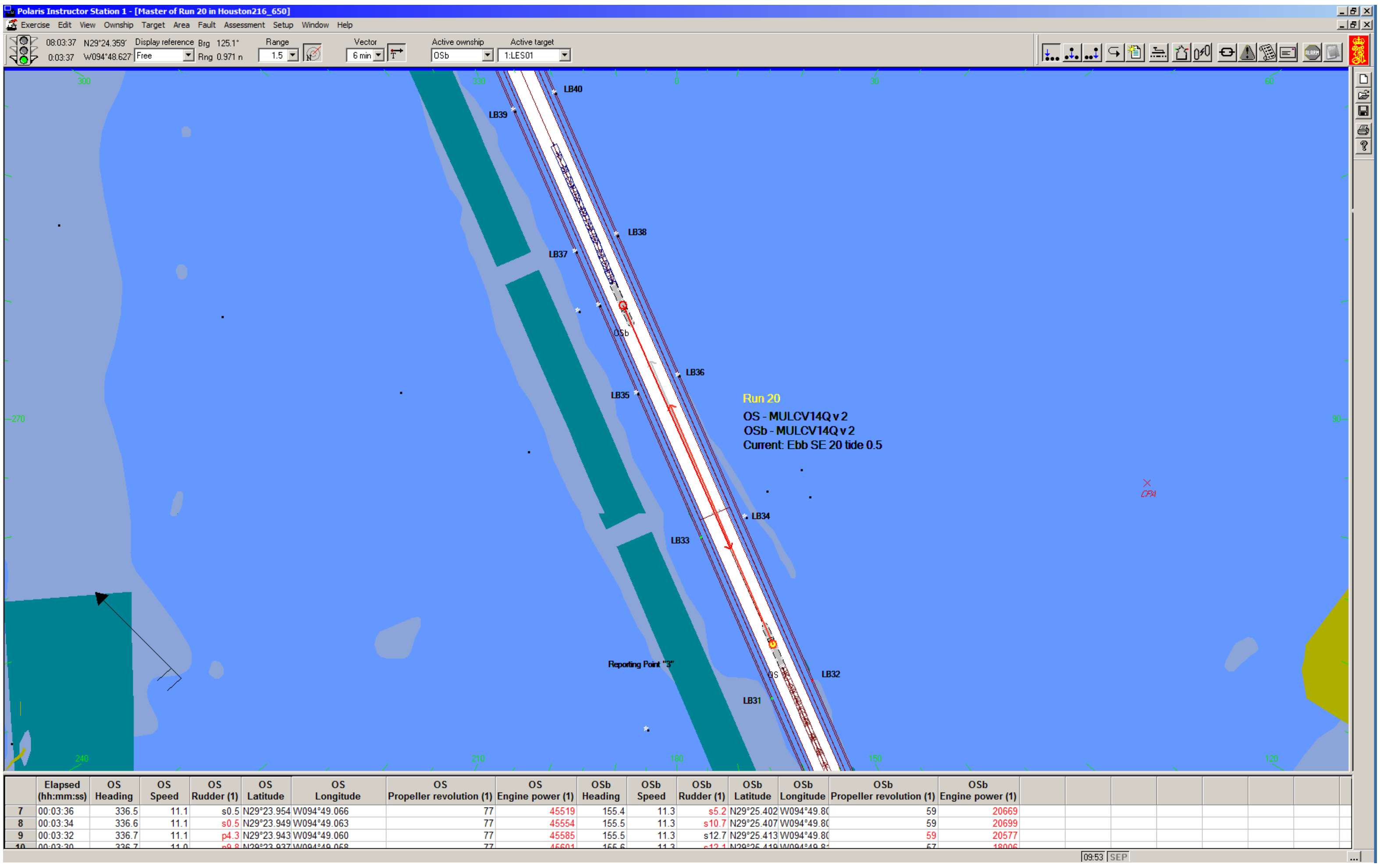
Run 20

OS - MULCV14Q v 2

OSb - MULCV14Q v 2

Current: Ebb SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7															
8															
9															



08:03:37 N29°24.359′ Display reference Free Brg 125.1° Rng 0.971 n Range 1.5 Vector 6 min Active ownship OSb Active target 1:LES01

0:03:37 W094°48.627′

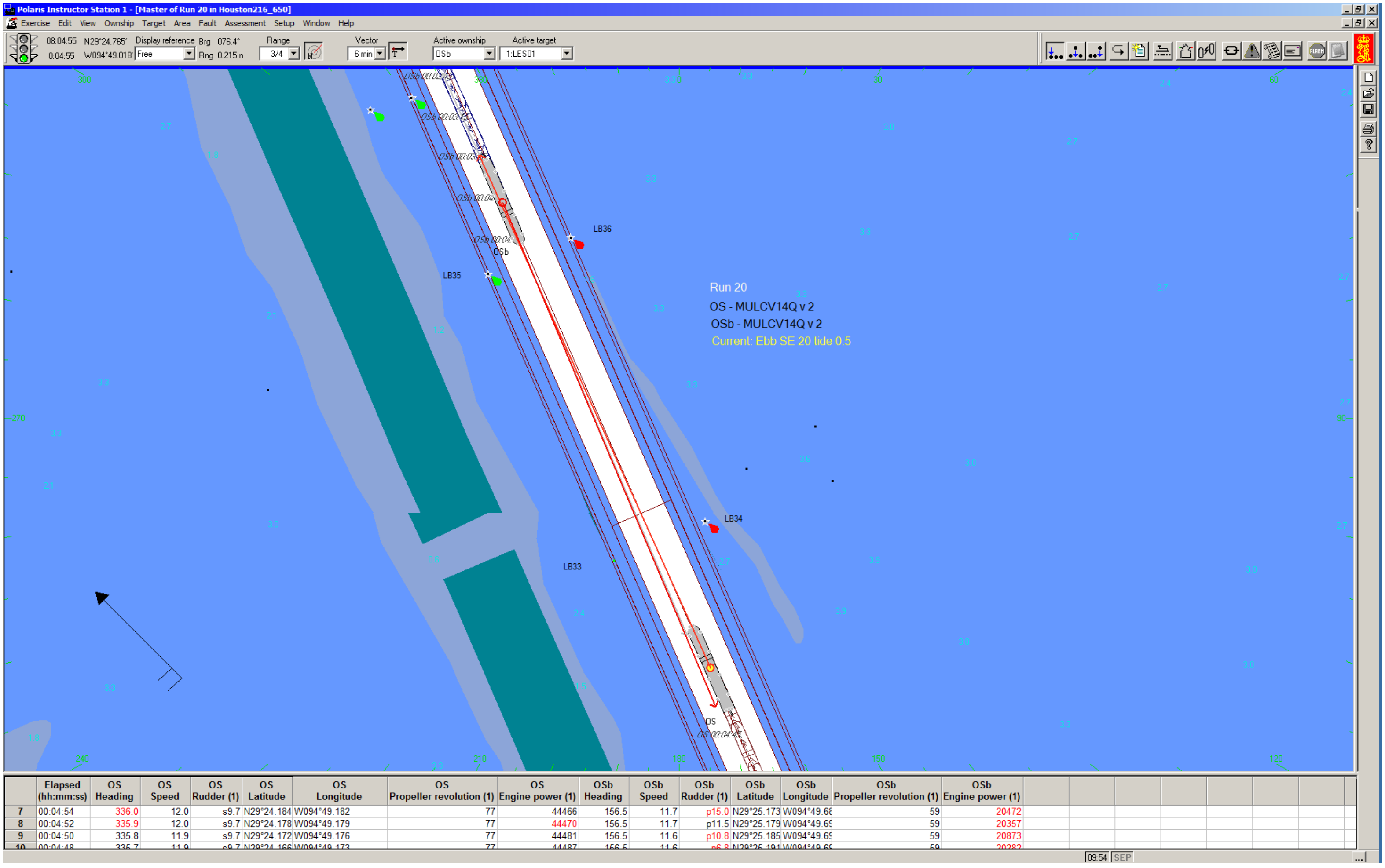
Run 20

OS - MULCV14Q v 2

OSb - MULCV14Q v 2

Current: Ebb SE 20 tide 0.5

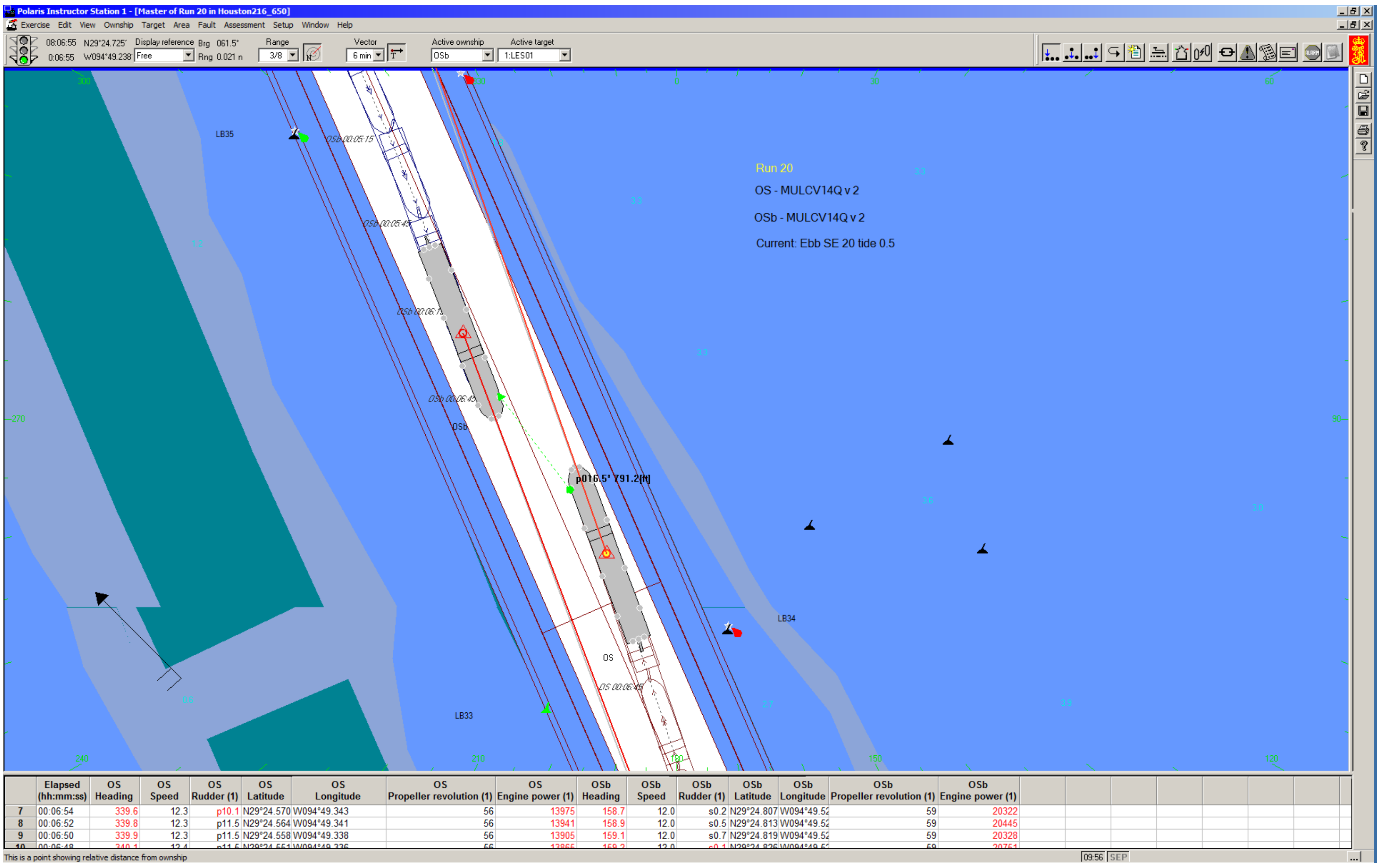
	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:03:36	336.5	11.1	s0.5	N29°23.954	W094°49.066	77	45519	155.4	11.3	s5.2	N29°25.402	W094°49.8	59	20669
8	00:03:34	336.6	11.1	s0.5	N29°23.949	W094°49.063	77	45554	155.5	11.3	s10.7	N29°25.407	W094°49.8	59	20699
9	00:03:32	336.7	11.1	p4.3	N29°23.943	W094°49.060	77	45585	155.5	11.3	s12.7	N29°25.413	W094°49.8	59	20577



08:04:55 N29°24.765' Display reference Brg 076.4°
0:04:55 W094°49.018' Free Rng 0.215 n
Range 3/4
Vector 6 min
Active ownship OSb
Active target 1:LES01

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:04:54	336.0	12.0	s9.7	N29°24.184	W094°49.182	77	44466	156.5	11.7	p15.0	N29°25.173	W094°49.68	59	20472
8	00:04:52	335.9	12.0	s9.7	N29°24.178	W094°49.179	77	44470	156.5	11.7	p11.5	N29°25.179	W094°49.69	59	20357
9	00:04:50	335.8	11.9	s9.7	N29°24.172	W094°49.176	77	44481	156.5	11.6	p10.8	N29°25.185	W094°49.69	59	20873
10	00:04:48	335.7	11.9	s9.7	N29°24.166	W094°49.173	77	44487	156.5	11.6	p6.8	N29°25.191	W094°49.69	59	20282

09:54 SEP



08:06:55 N29°24.725' Display reference Brg 061.5°
0:06:55 W094°49.238' Free Rng 0.021 n
Range 3/8
Vector 6 min
Active ownship OSb
Active target 1:LES01

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:06:54	339.6	12.3	p10.1	N29°24.570	W094°49.343	56	13975	158.7	12.0	s0.2	N29°24.807	W094°49.52	59	20322
8	00:06:52	339.8	12.3	p11.5	N29°24.564	W094°49.341	56	13941	158.9	12.0	s0.5	N29°24.813	W094°49.52	59	20445
9	00:06:50	339.9	12.3	p11.5	N29°24.558	W094°49.338	56	13905	159.1	12.0	s0.7	N29°24.819	W094°49.52	59	20328
10	00:06:48	340.1	12.4	p11.5	N29°24.551	W094°49.336	56	13865	159.2	12.0	s0.1	N29°24.826	W094°49.5	59	20751

This is a point showing relative distance from ownship

09:56 SEP

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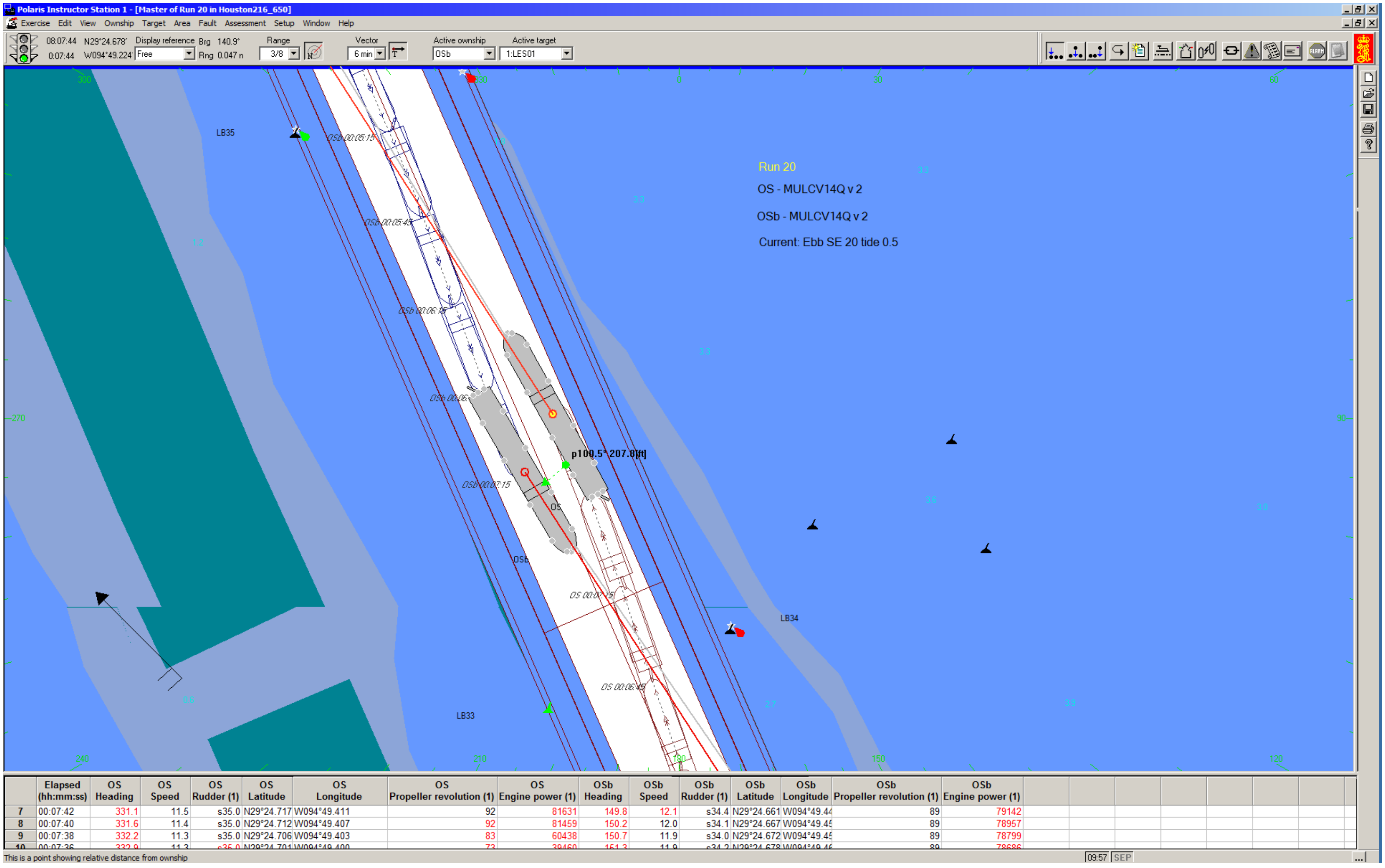


Polaris Instructor Station 1 - [Master of Run 20 in Houston216_650]

08:07:44 N29°24.678' Display reference: Free Brg 140.9° Rng 0.047 n

0:07:44 W094°49.224'

Range: 3/8 Vector: 6 min Active ownship: OSb Active target: 1:LES01

Run 20

OS - MULCV14Q v 2

OSb - MULCV14Q v 2

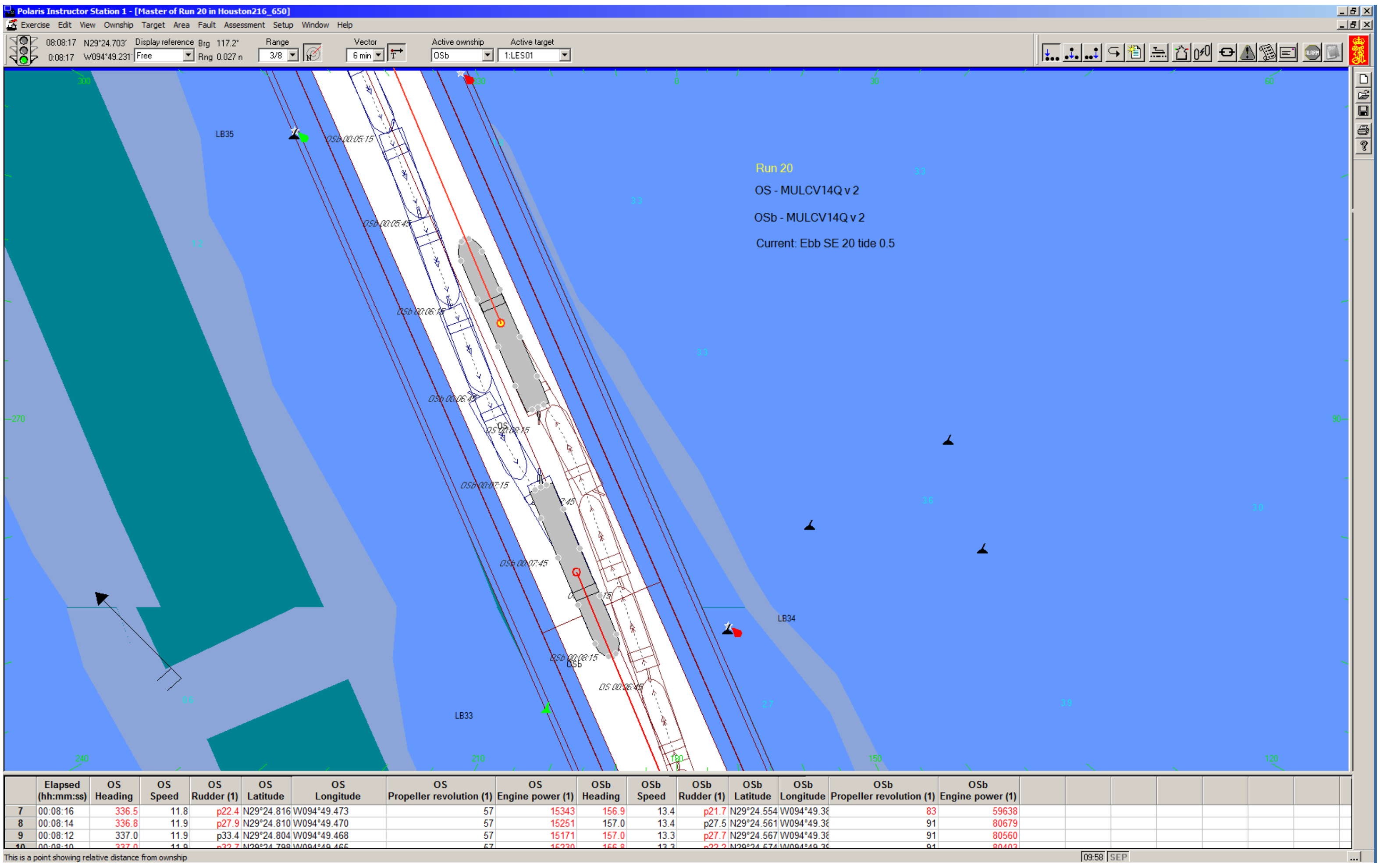
Current: Ebb SE 20 tide 0.5

p100.5° 207.8[ft]

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:07:42	331.1	11.5	s35.0	N29°24.717	W094°49.411	92	81631	149.8	12.1	s34.4	N29°24.661	W094°49.44	89	79142
8	00:07:40	331.6	11.4	s35.0	N29°24.712	W094°49.407	92	81459	150.2	12.0	s34.1	N29°24.667	W094°49.4	89	78957
9	00:07:38	332.2	11.3	s35.0	N29°24.706	W094°49.403	83	60438	150.7	11.9	s34.0	N29°24.672	W094°49.4	89	78799
10	00:07:36	332.9	11.3	s35.0	N29°24.701	W094°49.400	73	39460	151.3	11.9	s34.2	N29°24.678	W094°49.4	89	78686

This is a point showing relative distance from ownship

09:57 SEP



Polaris Instructor Station 1 - [Master of Run 20 in Houston216_650]

08:08:17 N29°24.703' Display reference: Free Brg 117.2° Rng 0.027 n

0:08:17 W094°49.231'

Range: 3/8 Vector: 6 min Active ownship: OSb Active target: 1:LES01

Run 20

OS - MULCV14Q v 2

OSb - MULCV14Q v 2

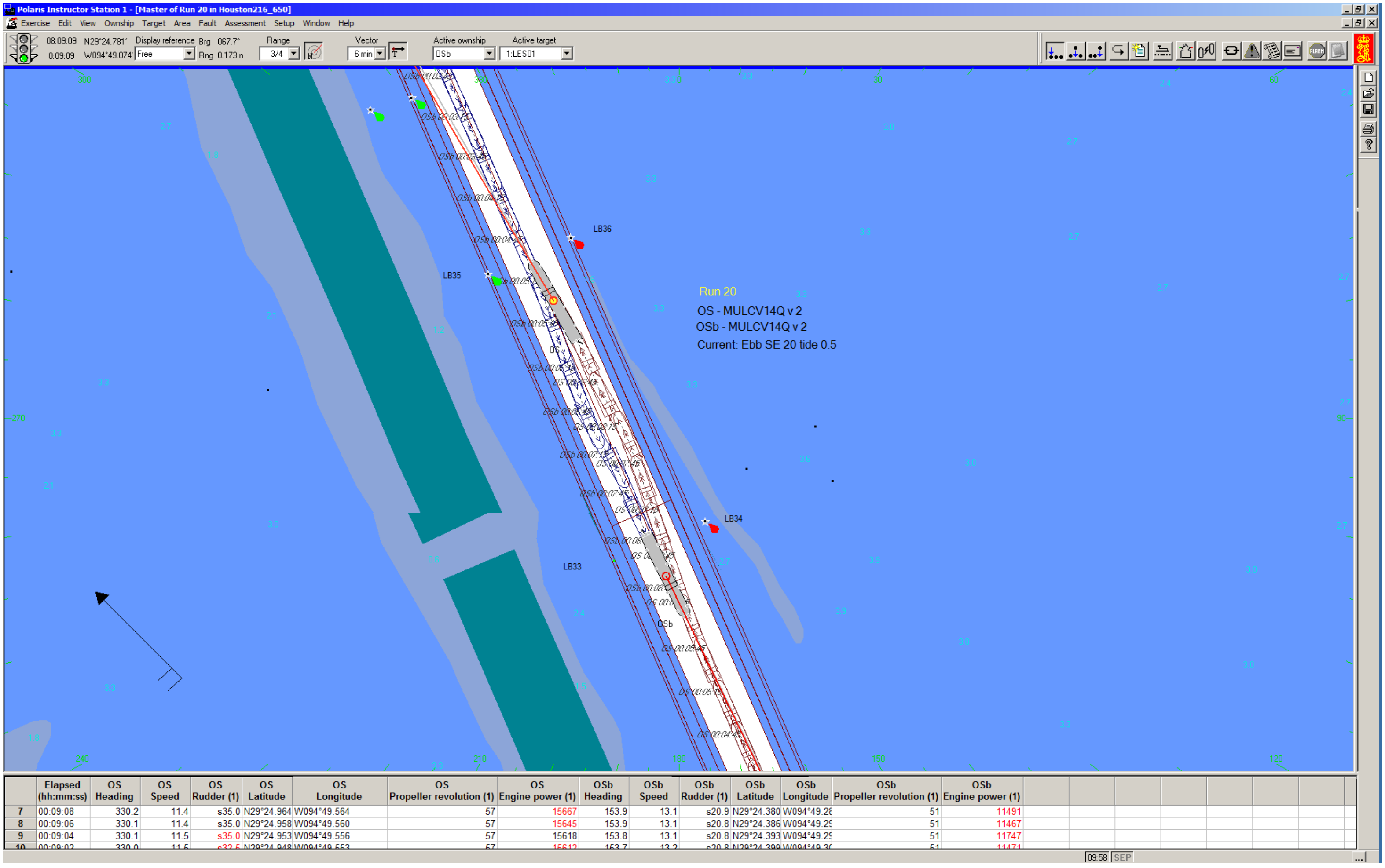
Current: Ebb SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:08:16	336.5	11.8	p22.4	N29°24.816	W094°49.473	57	15343	156.9	13.4	p21.7	N29°24.554	W094°49.3	83	59638
8	00:08:14	336.8	11.9	p27.9	N29°24.810	W094°49.470	57	15251	157.0	13.4	p27.5	N29°24.561	W094°49.3	91	80679
9	00:08:12	337.0	11.9	p33.4	N29°24.804	W094°49.468	57	15171	157.0	13.3	p27.7	N29°24.567	W094°49.3	91	80560
10	00:08:10	337.0	11.9	p32.7	N29°24.798	W094°49.466	57	15230	156.8	13.3	p22.2	N29°24.574	W094°49.3	91	80403

This is a point showing relative distance from ownship

09:58 SEP

June 26, 2019



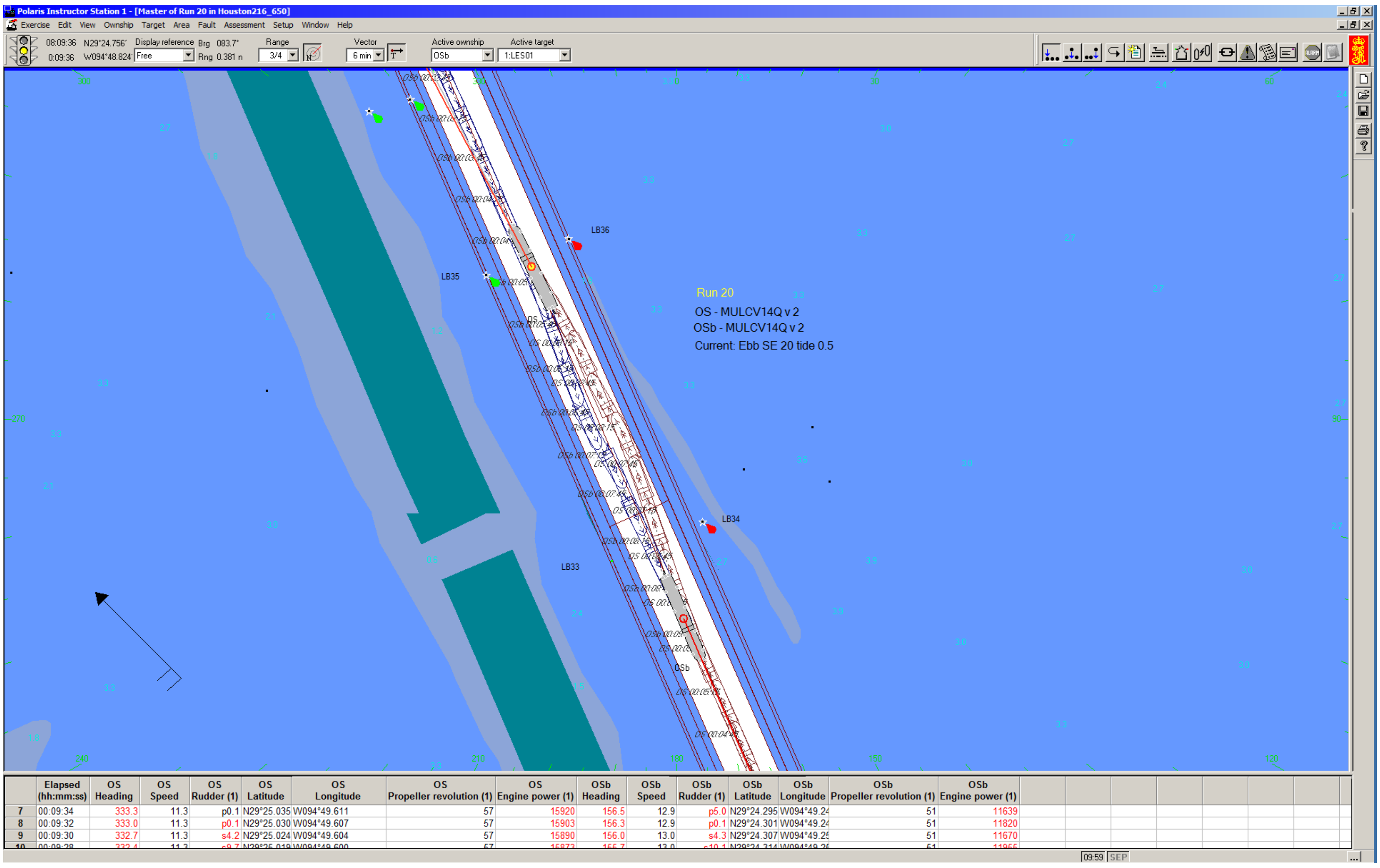
Polaris Instructor Station 1 - [Master of Run 20 in Houston216_650]

08:09:09 N29°24.781' Display reference: Free Brg 067.7° Rng 0.173 n
0:09:09 W094°49.074'
Range: 3/4
Vector: 6 min
Active ownship: OSb
Active target: 1:LES01

Run 20
OS - MULCV14Q v 2
OSb - MULCV14Q v 2
Current: Ebb SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:09:08	330.2	11.4	s35.0	N29°24.964	W094°49.564	57	15667	153.9	13.1	s20.9	N29°24.380	W094°49.28	51	11491
8	00:09:06	330.1	11.4	s35.0	N29°24.958	W094°49.560	57	15645	153.9	13.1	s20.8	N29°24.386	W094°49.29	51	11467
9	00:09:04	330.1	11.5	s35.0	N29°24.953	W094°49.556	57	15618	153.8	13.1	s20.8	N29°24.393	W094°49.29	51	11747
10	00:09:02	330.0	11.5	s32.5	N29°24.948	W094°49.553	57	15612	153.7	13.2	s20.8	N29°24.399	W094°49.30	51	11471

09:58 SEP



Polaris Instructor Station 1 - [Master of Run 20 in Houston216_650]

08:09:36 N29°24.756' Display reference: Free Brg 083.7° Rng 0.381 n
0:09:36 W094°48.824'
Range: 3/4
Vector: 6 min
Active ownship: OSb
Active target: 1:LES01

Run 20
OS - MULCV14Q v 2
OSb - MULCV14Q v 2
Current: Ebb SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	OSb Engine power (1)
7	00:09:34	333.3	11.3	p0.1	N29°25.035	W094°49.611	57	15920	156.5	12.9	p5.0	N29°24.295	W094°49.24	51	11639
8	00:09:32	333.0	11.3	p0.1	N29°25.030	W094°49.607	57	15903	156.3	12.9	p0.1	N29°24.301	W094°49.24	51	11820
9	00:09:30	332.7	11.3	s4.2	N29°25.024	W094°49.604	57	15890	156.0	13.0	s4.3	N29°24.307	W094°49.25	51	11670
10	00:09:28	332.4	11.3	s9.7	N29°25.019	W094°49.600	57	15873	155.7	13.0	s10.1	N29°24.314	W094°49.26	51	11955

09:59 SEP

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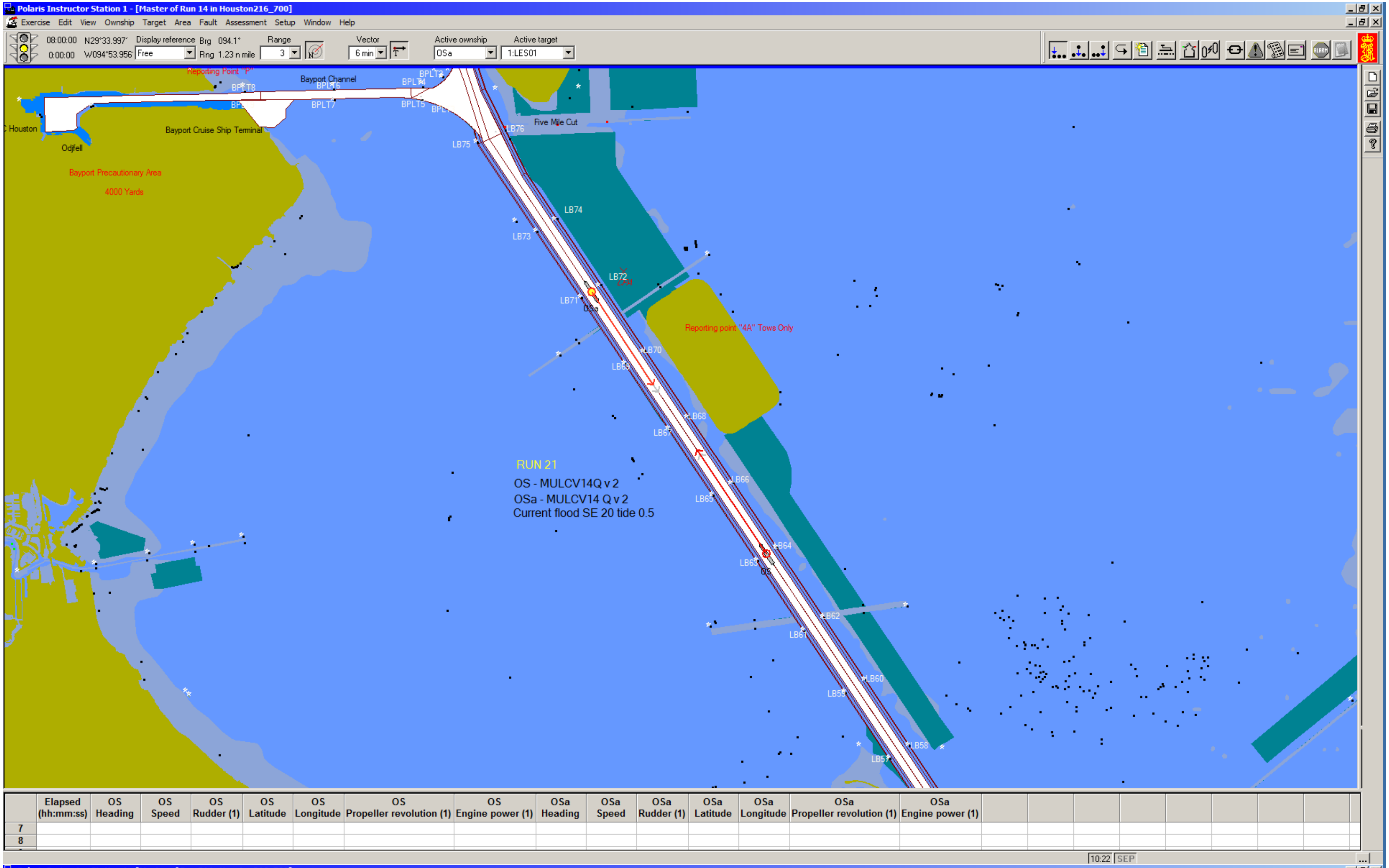
Run 21 – Begin 700 ft HSC Widening with Bend Widening

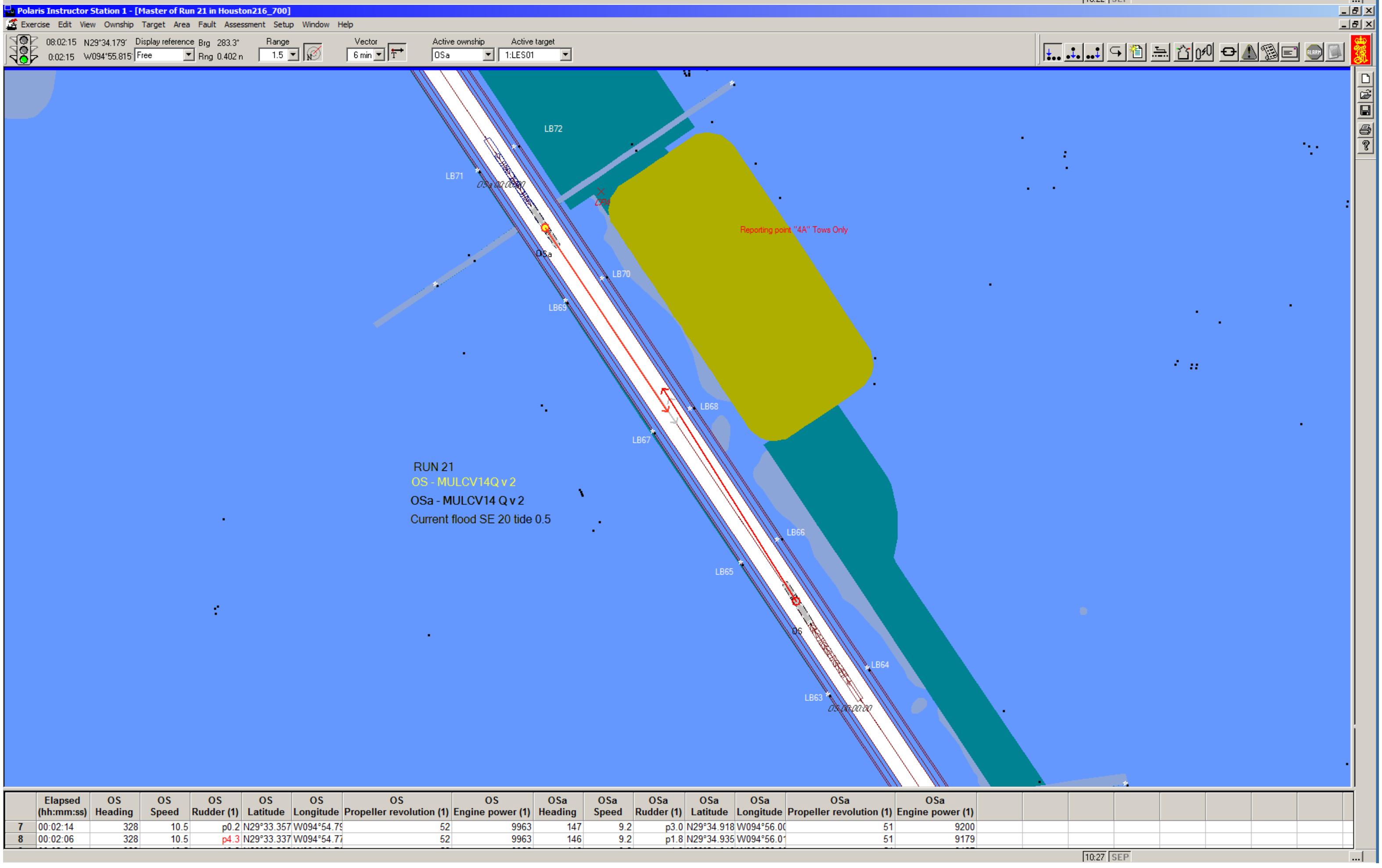


Polaris Instructor Station 1 - [Master of Run 14 in Houston216_700]

08:00:00 N29°33.997′ Display reference Brg 094.1°
0:00:00 W094°53.956′ Free Rng 1.23 n mile Range 3 Vector 6 min Active ownship OSa Active target 1:LES01

RUN 21
OS - MULCV14Q v 2
OSa - MULCV14 Q v 2
Current flood SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7															
8															



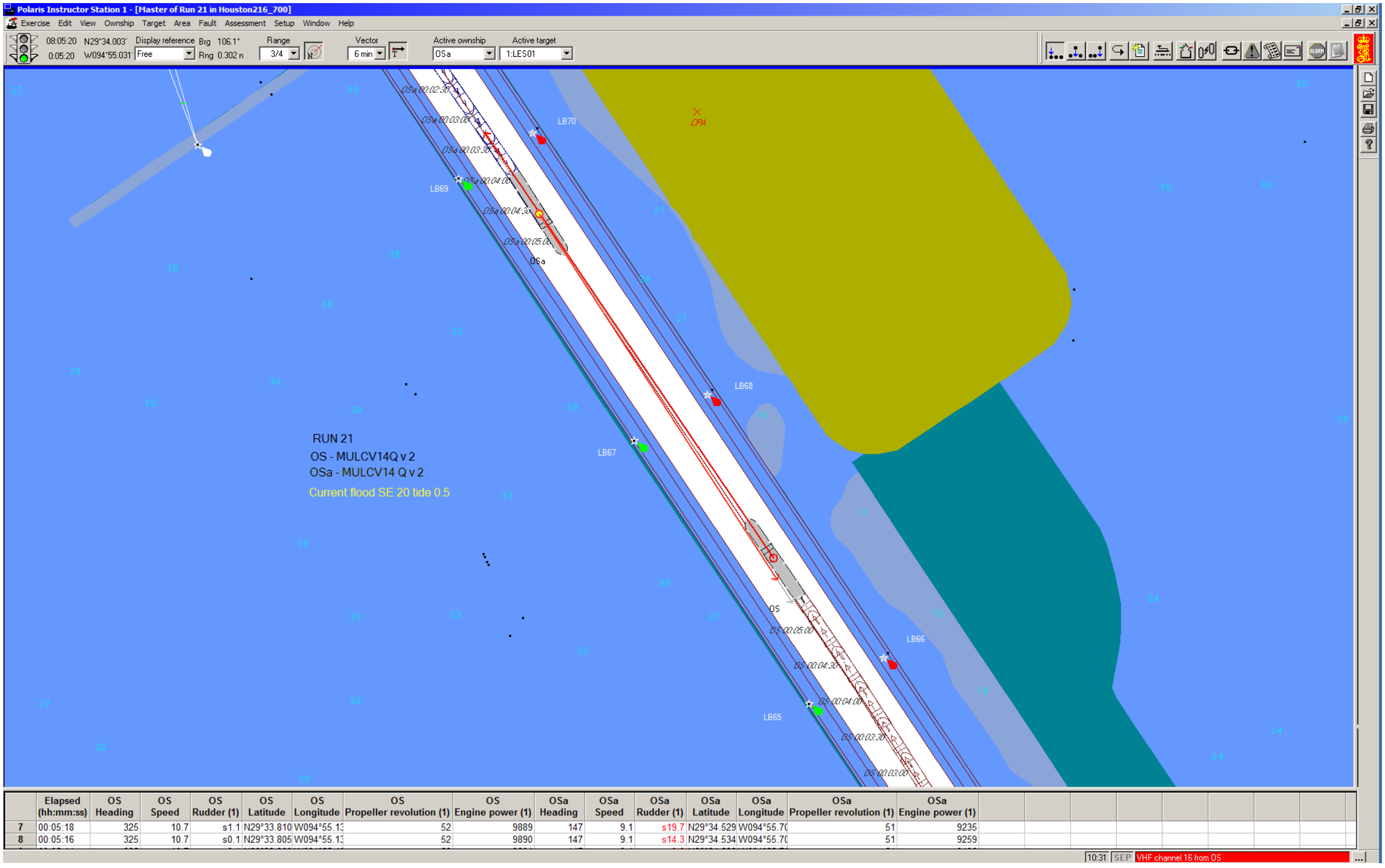
Polaris Instructor Station 1 - [Master of Run 21 in Houston216_700]

08:02:15 N29°34.179′ Display reference Brg 283.3°
0:02:15 W094°55.815′ Free Rng 0.402 n Range 1.5 Vector 6 min Active ownship OSa Active target 1:LES01

RUN 21
OS - MULCV14Q v 2
OSa - MULCV14 Q v 2
Current flood SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:02:14	328	10.5	p0.2	N29°33.357	W094°54.7	52	9963	147	9.2	p3.0	N29°34.918	W094°56.0	51	9200
8	00:02:06	328	10.5	p4.3	N29°33.337	W094°54.7	52	9963	146	9.2	p1.8	N29°34.935	W094°56.0	51	9179

June 26, 2019

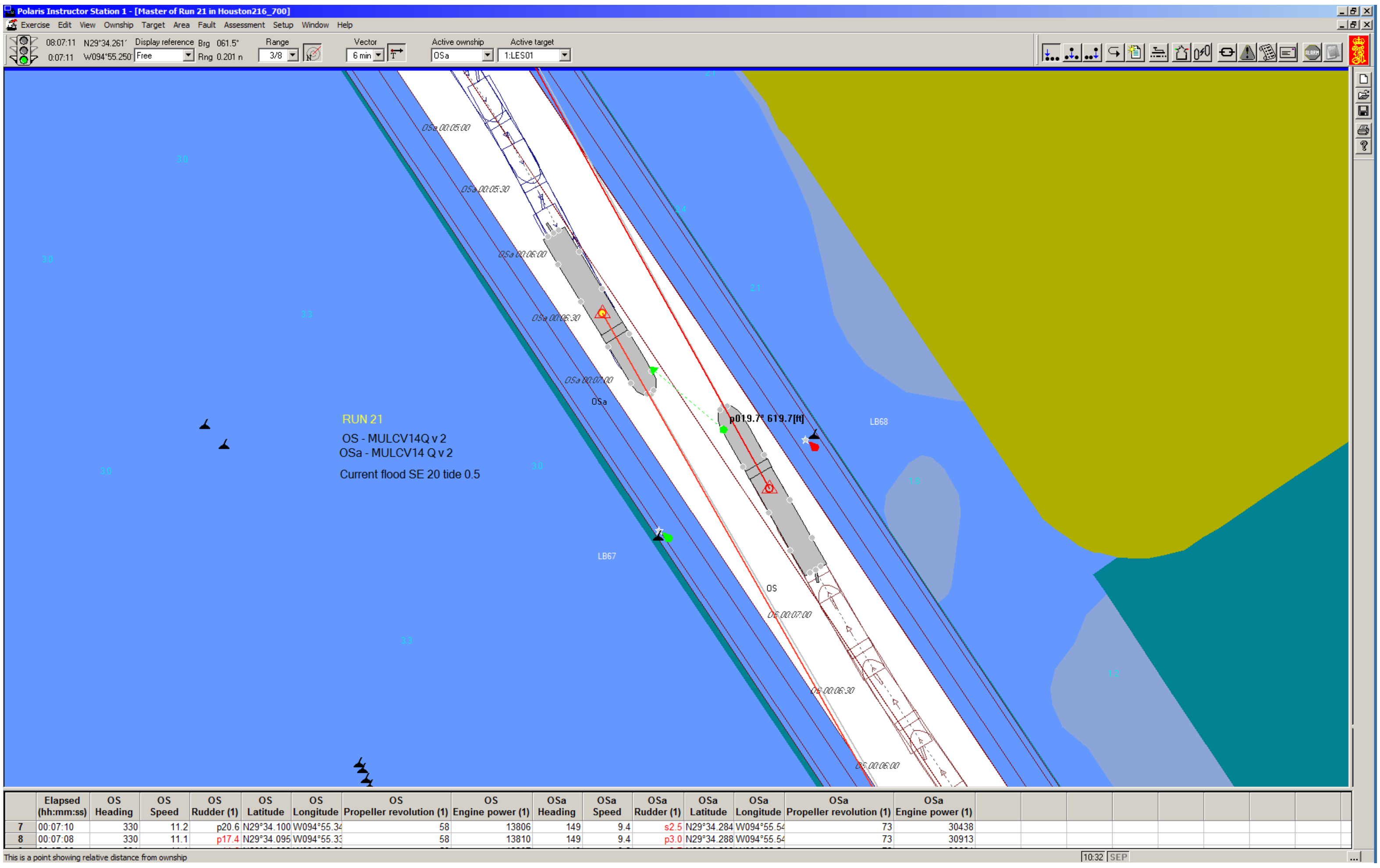


Polaris Instructor Station 1 - [Master of Run 21 in Houston216_700]

08:05:20 N29°34.003' Display reference Free Brg 106.1° Rng 0.302 n Range 3/4 Vector 6 min Active ownship OSa Active target 1:LES01
0:05:20 W094°55.031'

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:05:18	325	10.7	s1.1	N29°33.810	W094°55.13	52	9889	147	9.1	s19.7	N29°34.529	W094°55.70	51	9235
8	00:05:16	325	10.7	s0.1	N29°33.805	W094°55.13	52	9890	147	9.1	s14.3	N29°34.534	W094°55.70	51	9259

10:31 SEP VHF channel 16 from OS

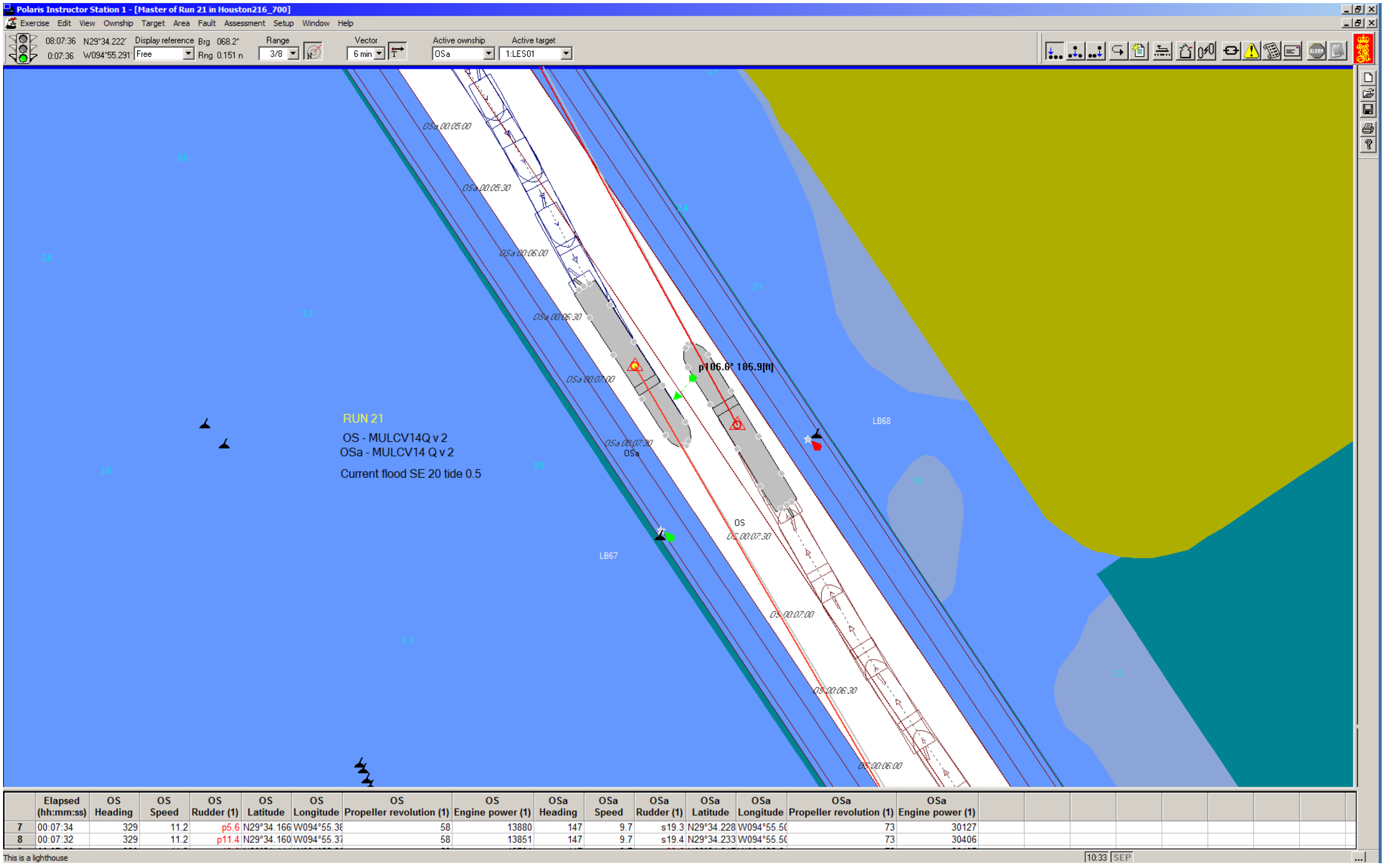


Polaris Instructor Station 1 - [Master of Run 21 in Houston216_700]

08:07:11 N29°34.261' Display reference Free Brg 061.5° Rng 0.201 n Range 3/8 Vector 6 min Active ownship OSa Active target 1:LES01
0:07:11 W094°55.250'

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:07:10	330	11.2	p20.6	N29°34.100	W094°55.34	58	13806	149	9.4	s2.5	N29°34.284	W094°55.54	73	30438
8	00:07:08	330	11.1	p17.4	N29°34.095	W094°55.33	58	13810	149	9.4	p3.0	N29°34.288	W094°55.54	73	30913

This is a point showing relative distance from ownship 10:32 SEP



Polaris Instructor Station 1 - [Master of Run 21 in Houston216_700]

08:07:36 N29°34.222'
0:07:36 W094°55.291'

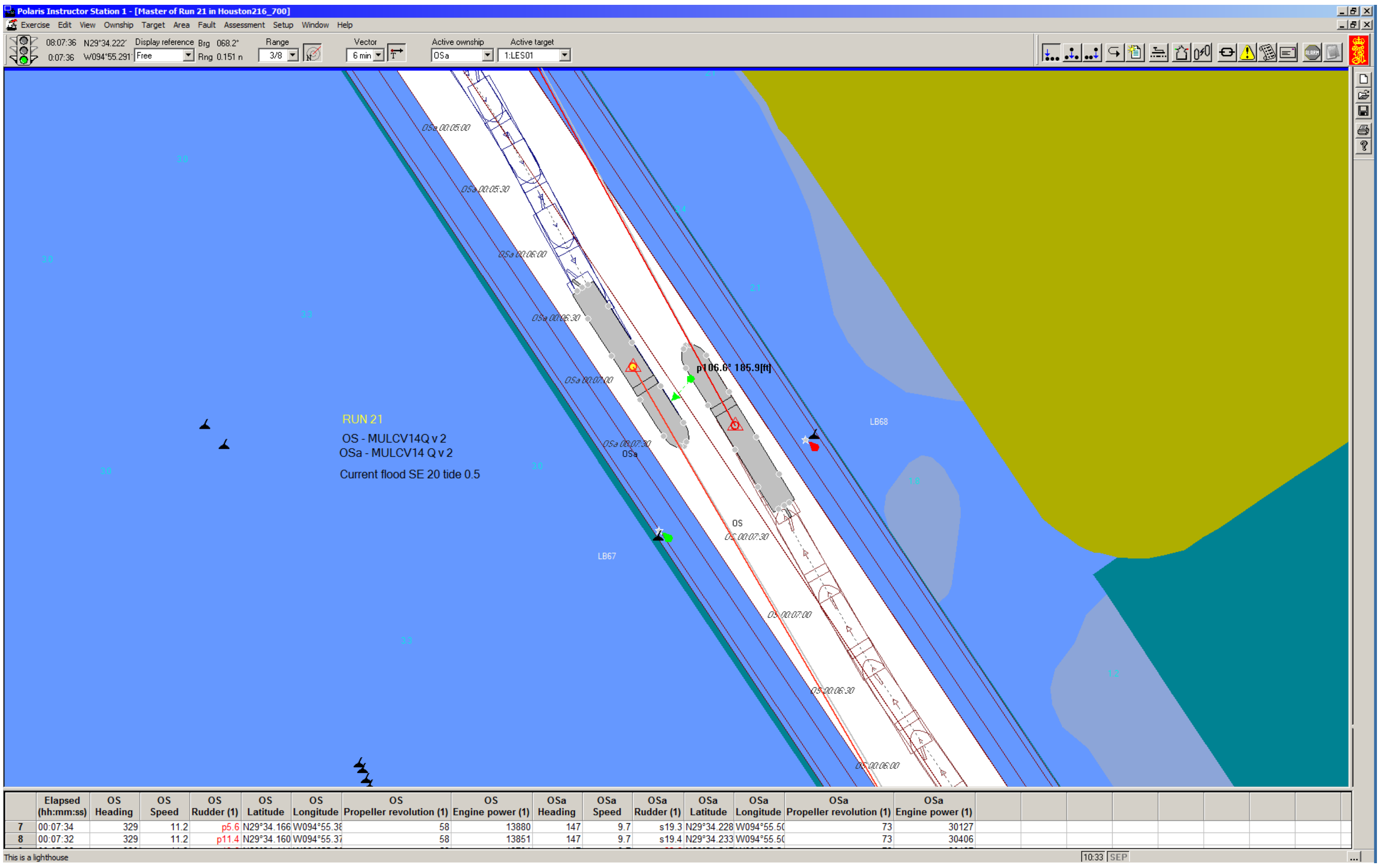
Display reference: Free
Brg 068.2°
Rng 0.151 n
Range: 3/8
Vector: 6 min
Active ownship: OSa
Active target: 1:LES01

RUN 21
OS - MULCV14Q v 2
OSa - MULCV14 Q v 2
Current flood SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:07:34	329	11.2	p5.6	N29°34.166	W094°55.38	58	13880	147	9.7	s19.3	N29°34.228	W094°55.50	73	30127
8	00:07:32	329	11.2	p11.4	N29°34.160	W094°55.37	58	13851	147	9.7	s19.4	N29°34.233	W094°55.50	73	30406

This is a lighthouse

10:33 SEP



Polaris Instructor Station 1 - [Master of Run 21 in Houston216_700]

08:07:36 N29°34.222'
0:07:36 W094°55.291'

Display reference: Free
Brg 068.2°
Rng 0.151 n
Range: 3/8
Vector: 6 min
Active ownship: OSa
Active target: 1:LES01

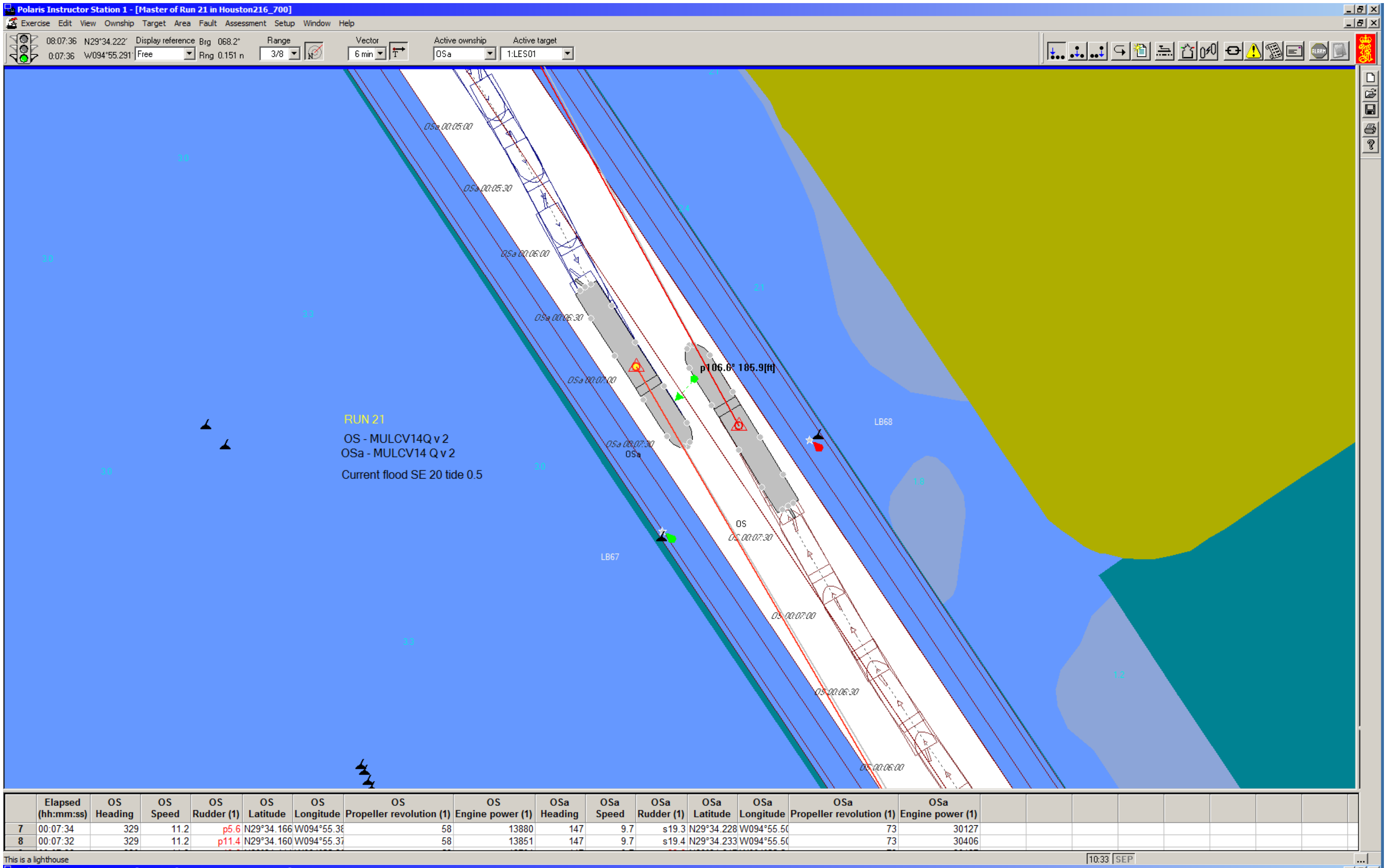
RUN 21
OS - MULCV14Q v 2
OSa - MULCV14 Q v 2
Current flood SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:07:34	329	11.2	p5.6	N29°34.166	W094°55.38	58	13880	147	9.7	s19.3	N29°34.228	W094°55.50	73	30127
8	00:07:32	329	11.2	p11.4	N29°34.160	W094°55.37	58	13851	147	9.7	s19.4	N29°34.233	W094°55.50	73	30406

This is a lighthouse

10:33 SEP

June 26, 2019



Polaris Instructor Station 1 - [Master of Run 21 in Houston216_700]

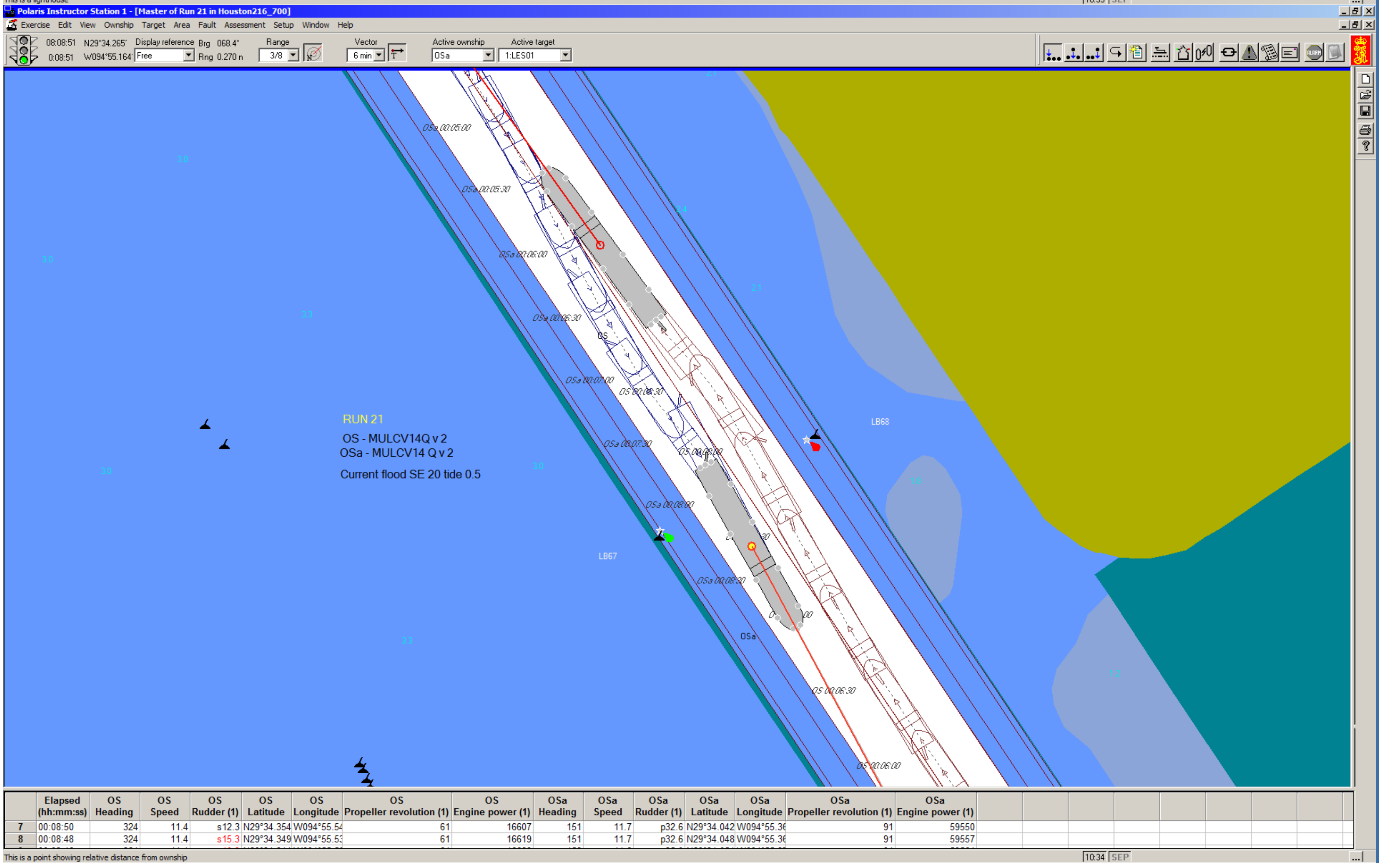
08:07:36 N29°34.222' Display reference Brg 068.2°
0:07:36 W094°55.291' Free Rng 0.151 n

Range: 3/8
Vector: 6 min
Active ownship: OSa
Active target: 1:LES01

RUN 21
OS - MULCV14Q v 2
OSa - MULCV14 Q v 2
Current flood SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:07:34	329	11.2	p5.6	N29°34.166	W094°55.38	58	13880	147	9.7	s19.3	N29°34.228	W094°55.50	73	30127
8	00:07:32	329	11.2	p11.4	N29°34.160	W094°55.37	58	13851	147	9.7	s19.4	N29°34.233	W094°55.50	73	30406

This is a lighthouse



Polaris Instructor Station 1 - [Master of Run 21 in Houston216_700]

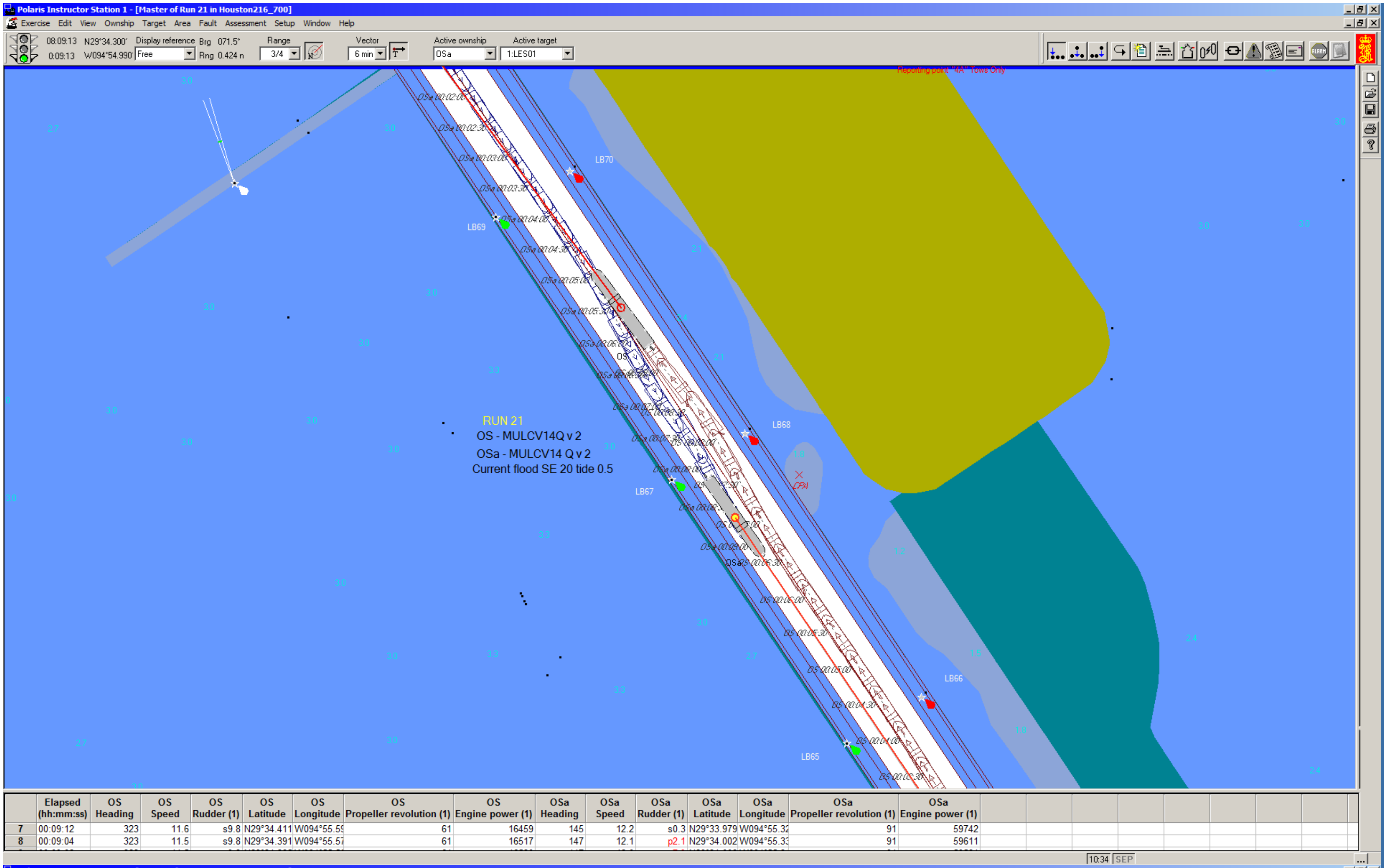
08:08:51 N29°34.265' Display reference Brg 068.4°
0:08:51 W094°55.164' Free Rng 0.270 n

Range: 3/8
Vector: 6 min
Active ownship: OSa
Active target: 1:LES01

RUN 21
OS - MULCV14Q v 2
OSa - MULCV14 Q v 2
Current flood SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:08:50	324	11.4	s12.3	N29°34.354	W094°55.54	61	16607	151	11.7	p32.6	N29°34.042	W094°55.36	91	59550
8	00:08:48	324	11.4	s15.3	N29°34.349	W094°55.53	61	16619	151	11.7	p32.6	N29°34.048	W094°55.36	91	59557

This is a point showing relative distance from ownship



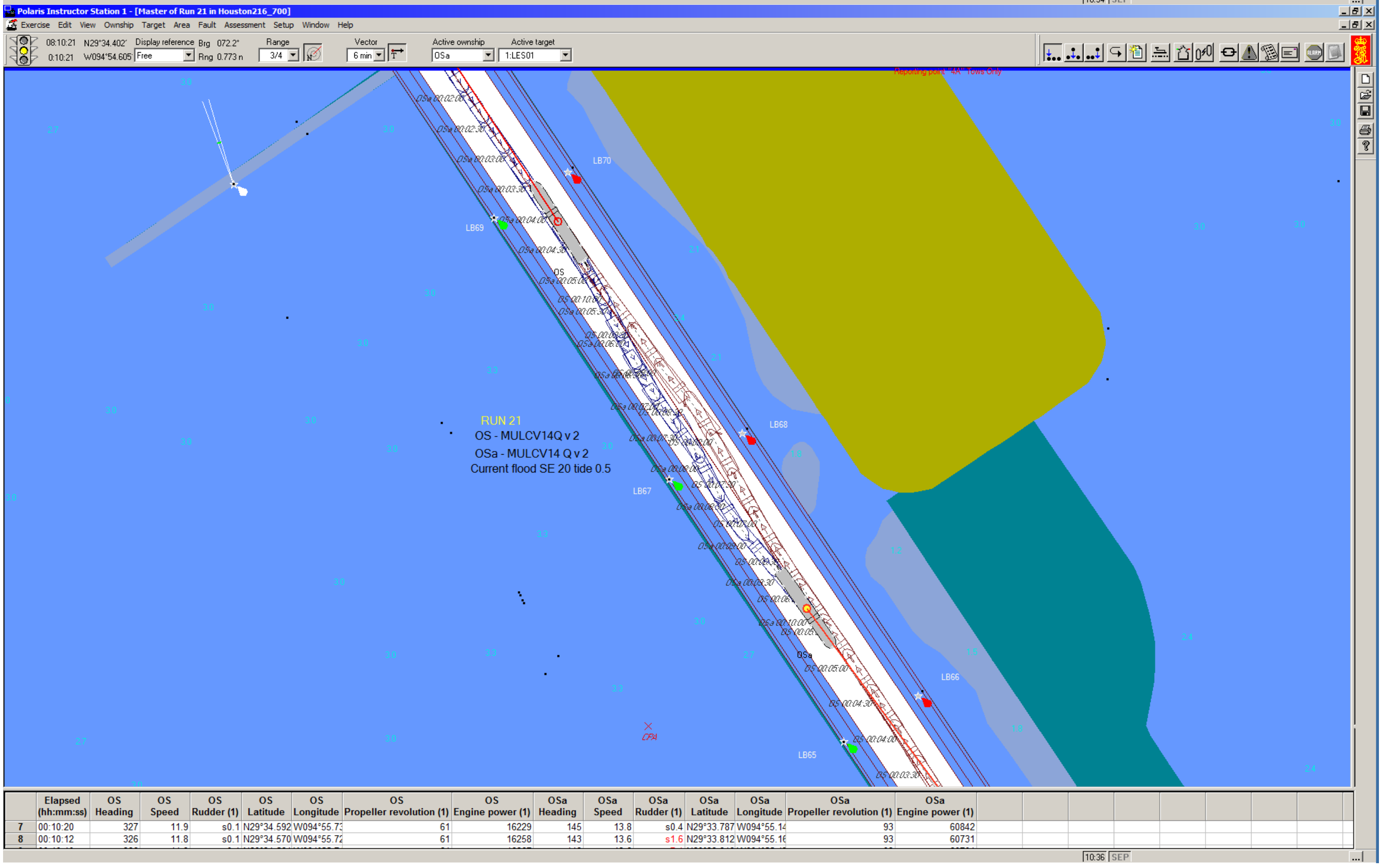
Polaris Instructor Station 1 - [Master of Run 21 in Houston216_700]

08:09:13 N29°34.300′ Display reference Free Brg 071.5° Range 3/4 Vector 6 min Active ownship OSa Active target 1:LES01
0:09:13 W094°54.990′ Rng 0.424 n

RUN 21
OS - MULCV14Q v 2
OSa - MULCV14 Q v 2
Current flood SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:09:12	323	11.6	s9.8	N29°34.411	W094°55.5	61	16459	145	12.2	s0.3	N29°33.979	W094°55.3	91	59742
8	00:09:04	323	11.5	s9.8	N29°34.391	W094°55.5	61	16517	147	12.1	p2.1	N29°34.002	W094°55.3	91	59611

10:34 SEP



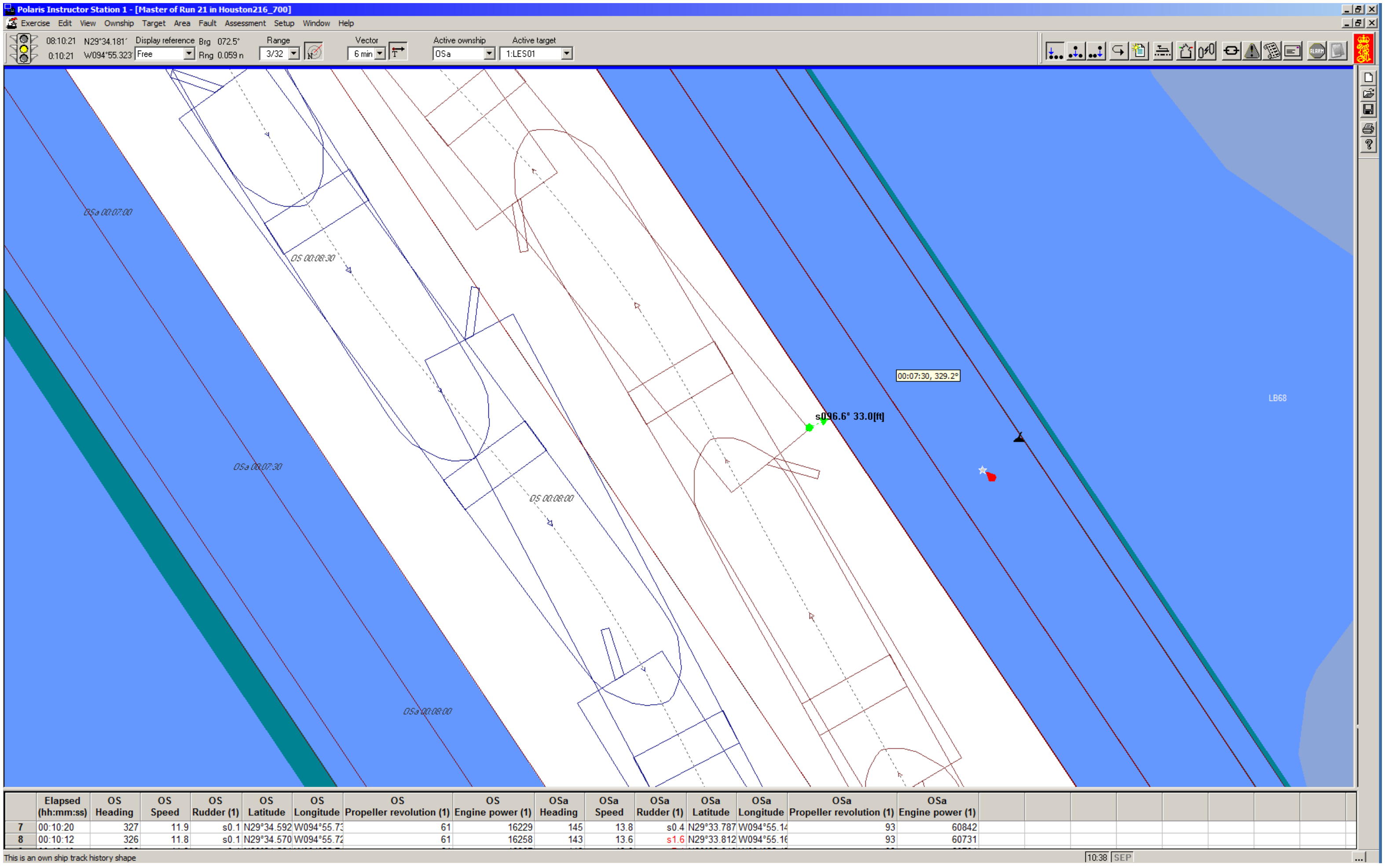
Polaris Instructor Station 1 - [Master of Run 21 in Houston216_700]

08:10:21 N29°34.402′ Display reference Free Brg 072.2° Range 3/4 Vector 6 min Active ownship OSa Active target 1:LES01
0:10:21 W094°54.605′ Rng 0.773 n

RUN 21
OS - MULCV14Q v 2
OSa - MULCV14 Q v 2
Current flood SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:10:20	327	11.9	s0.1	N29°34.592	W094°55.7	61	16229	145	13.8	s0.4	N29°33.787	W094°55.1	93	60842
8	00:10:12	326	11.8	s0.1	N29°34.570	W094°55.7	61	16258	143	13.6	s1.6	N29°33.812	W094°55.1	93	60731

10:36 SEP



Polaris Instructor Station 1 - [Master of Run 21 in Houston216_700]

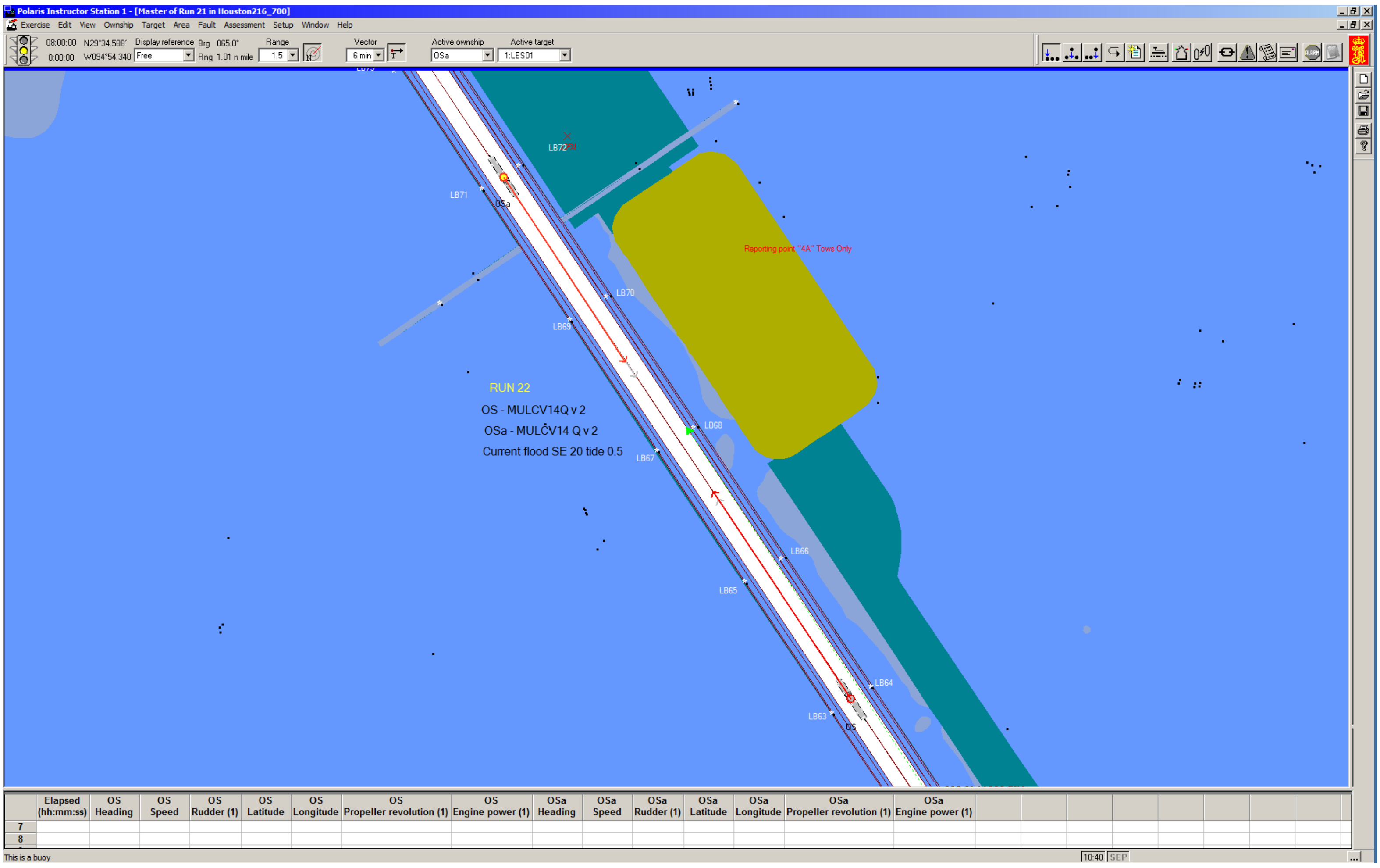
08:10:21 N29°34.181´ Display reference Free Brg 072.5° Range 3/32 Vector 6 min Active ownship OSa Active target 1:LES01

0:10:21 W094°55.323´ Rng 0.059 n

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:10:20	327	11.9	s0.1	N29°34.592	W094°55.73	61	16229	145	13.8	s0.4	N29°33.787	W094°55.14	93	60842
8	00:10:12	326	11.8	s0.1	N29°34.570	W094°55.72	61	16258	143	13.6	s1.6	N29°33.812	W094°55.16	93	60731

This is an own ship track history shape

Run 22



08:00:00 N29°34.588′ Display reference Free Brg 065.0° Range 1.5 Vector 6 min Active ownship OSa Active target 1:LES01

0:00:00 W094°54.340′ Rng 1.01 n mile

RUN 22

OS - MULCV14Q v 2

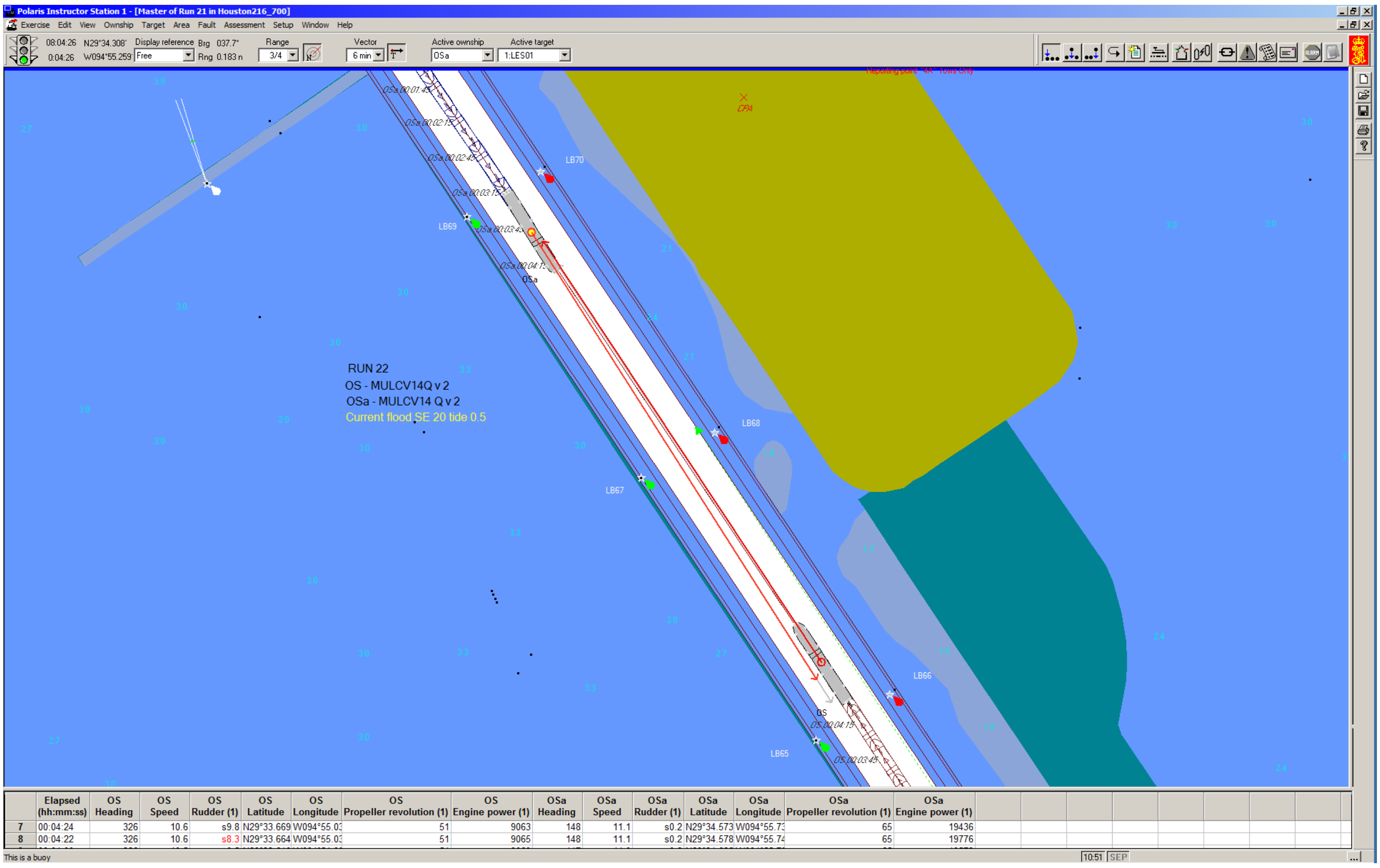
OSa - MULCV14 Q v 2

Current flood SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7															
8															

This is a buoy

10:40 SEP



08:04:26 N29°34.308′ Display reference Free Brg 037.7° Range 3/4 Vector 6 min Active ownship OSa Active target 1:LES01

0:04:26 W094°55.259′ Rng 0.183 n

RUN 22

OS - MULCV14Q v 2

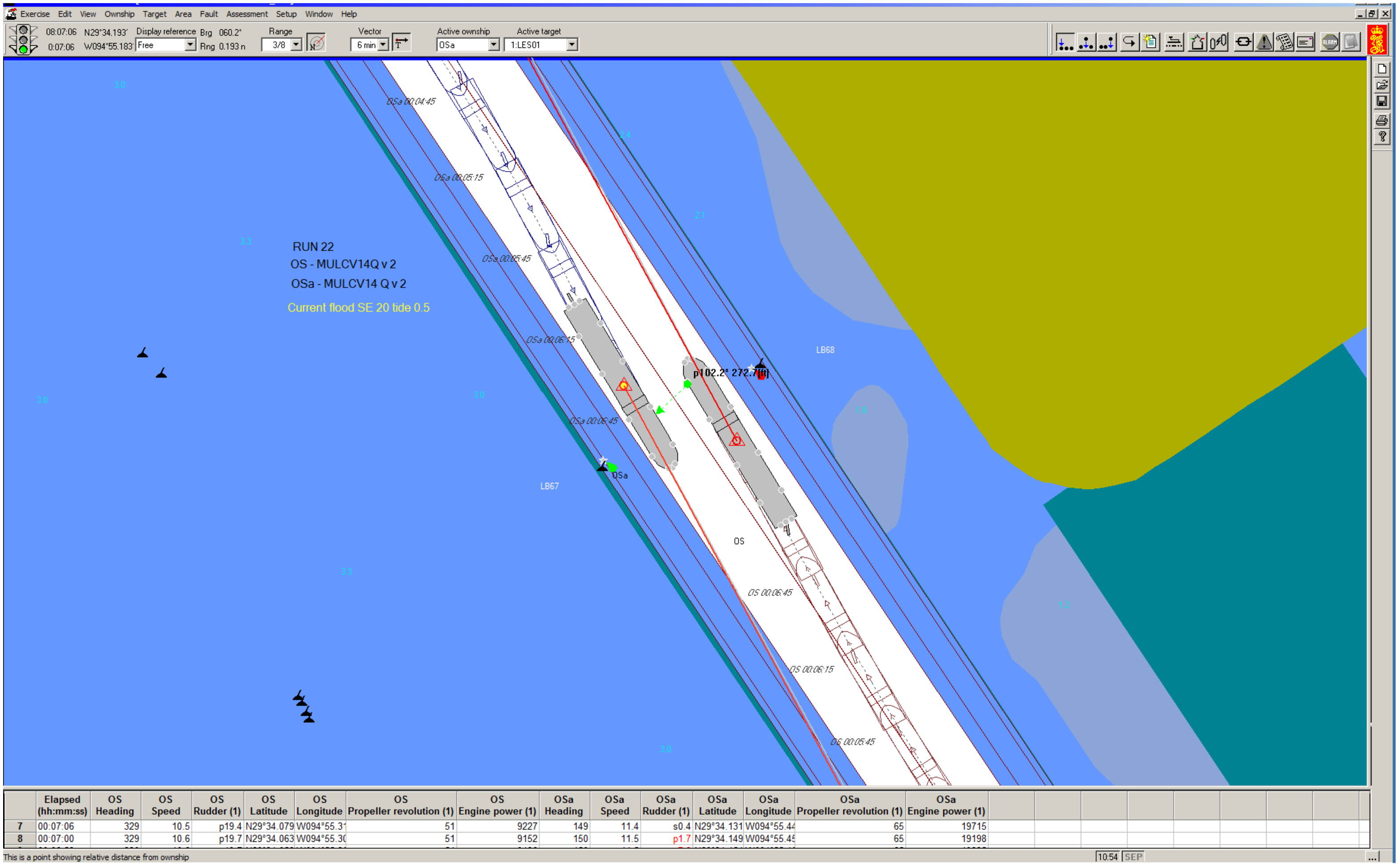
OSa - MULCV14 Q v 2

Current flood SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:04:24	326	10.6	s9.8	N29°33.669	W094°55.03	51	9063	148	11.1	s0.2	N29°34.573	W094°55.73	65	19436
8	00:04:22	326	10.6	s8.3	N29°33.664	W094°55.03	51	9065	148	11.1	s0.2	N29°34.578	W094°55.74	65	19776

This is a buoy

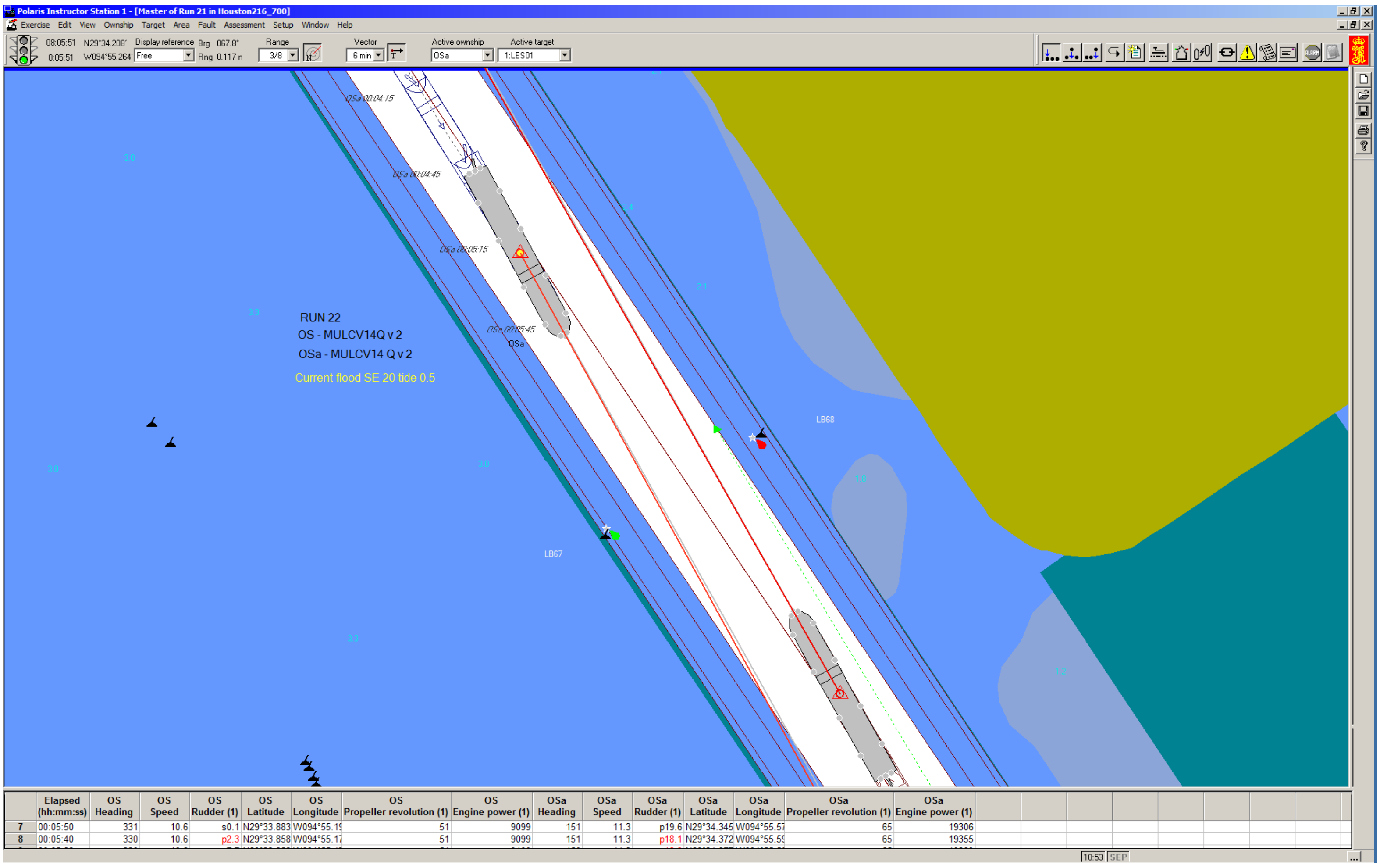
10:51 SEP



RUN 22
OS - MULCV14Q v 2
OSa - MULCV14 Q v 2
Current flood SE 20 tide 0.5

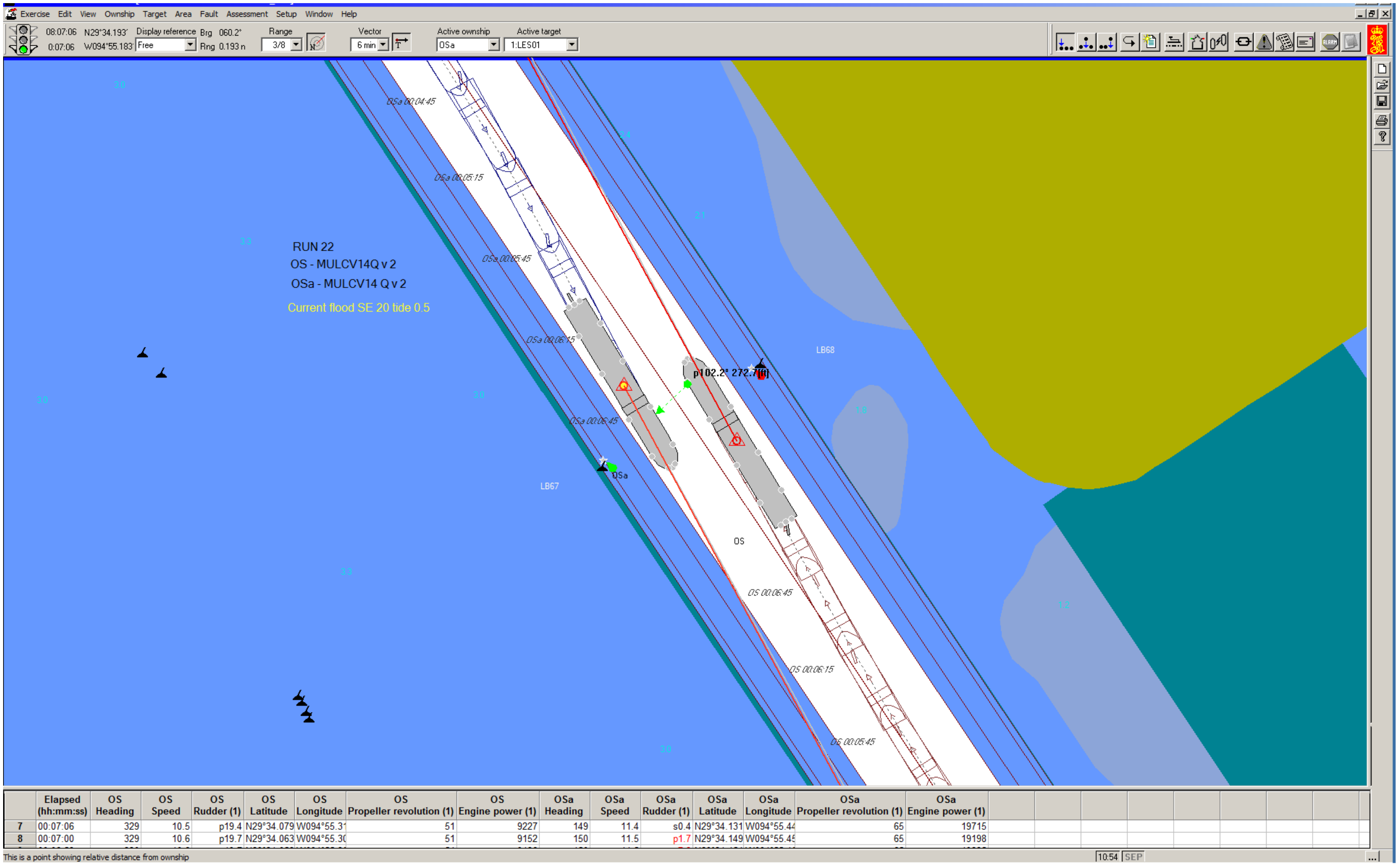
	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:07:06	329	10.5	p19.4	N29°34.079	W094°55.31	51	9227	149	11.4	s0.4	N29°34.131	W094°55.44	65	19715
8	00:07:00	329	10.6	p19.7	N29°34.063	W094°55.30	51	9152	150	11.5	p1.7	N29°34.149	W094°55.45	65	19198

This is a point showing relative distance from ownship



RUN 22
OS - MULCV14Q v 2
OSa - MULCV14 Q v 2
Current flood SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:05:50	331	10.6	s0.1	N29°33.883	W094°55.19	51	9099	151	11.3	p19.6	N29°34.345	W094°55.57	65	19306
8	00:05:40	330	10.6	p2.3	N29°33.858	W094°55.17	51	9099	151	11.3	p18.1	N29°34.372	W094°55.59	65	19355



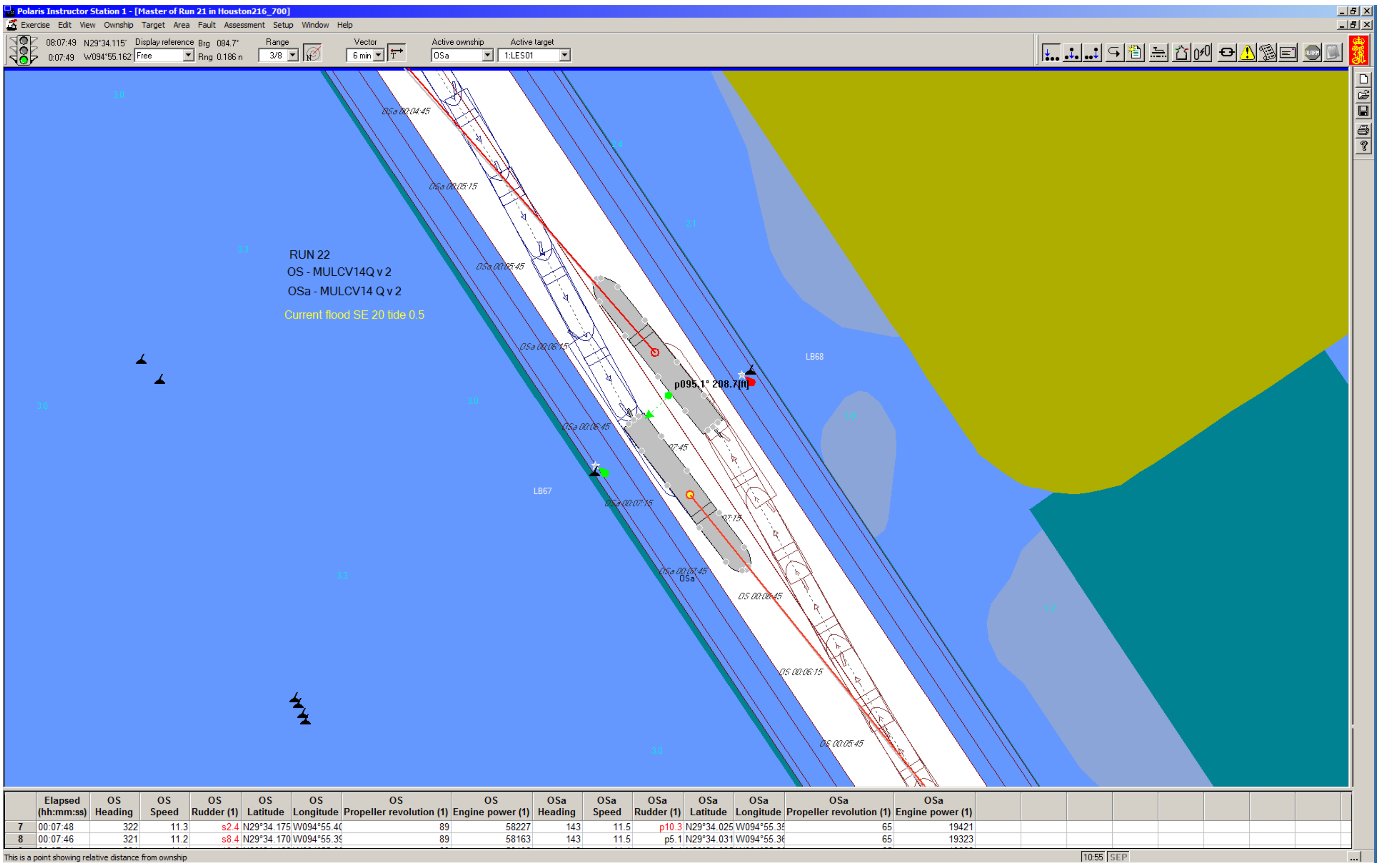
08:07:06 N29°34.193′ Display reference Brg 060.2°
0:07:06 W094°55.183′ Free Rng 0.193 n
Range 3/8
Vector 6 min
Active ownship OSa
Active target 1:LES01

RUN 22
OS - MULCV14Q v 2
OSa - MULCV14 Q v 2
Current flood SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:07:06	329	10.5	p19.4	N29°34.079	W094°55.3	51	9227	149	11.4	s0.4	N29°34.131	W094°55.4	65	19715
8	00:07:00	329	10.6	p19.7	N29°34.063	W094°55.3	51	9152	150	11.5	p1.7	N29°34.149	W094°55.4	65	19198

This is a point showing relative distance from ownship

10:54 SEP



Polaris Instructor Station 1 - [Master of Run 21 in Houston216_700]

08:07:49 N29°34.115′ Display reference Brg 084.7°
0:07:49 W094°55.162′ Free Rng 0.186 n
Range 3/8
Vector 6 min
Active ownship OSa
Active target 1:LES01

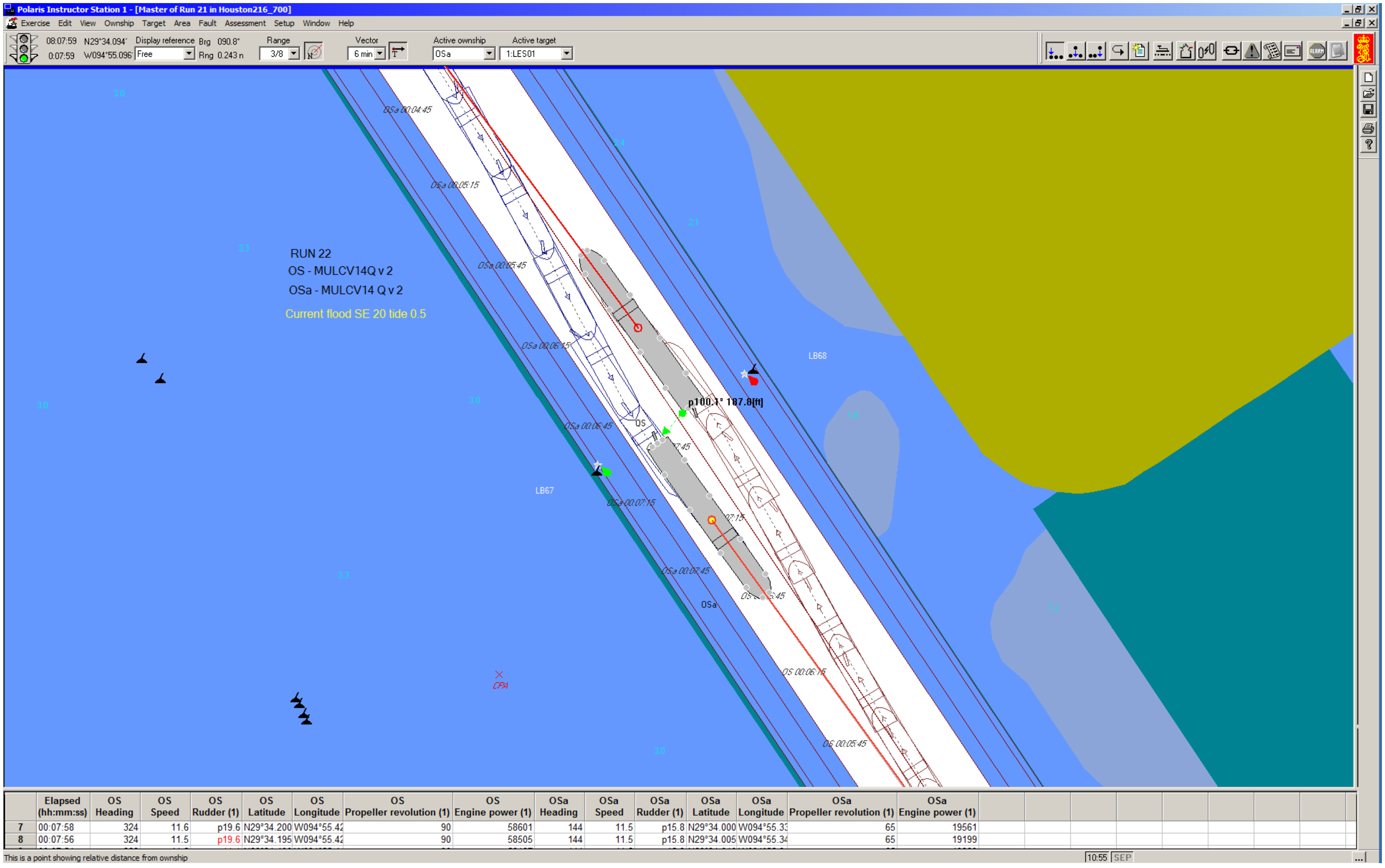
RUN 22
OS - MULCV14Q v 2
OSa - MULCV14 Q v 2
Current flood SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:07:48	322	11.3	s2.4	N29°34.175	W094°55.4	89	58227	143	11.5	p10.3	N29°34.025	W094°55.3	65	19421
8	00:07:46	321	11.2	s8.4	N29°34.170	W094°55.3	89	58163	143	11.5	p5.1	N29°34.031	W094°55.3	65	19323

This is a point showing relative distance from ownship

10:55 SEP

June 26, 2019



Polaris Instructor Station 1 - [Master of Run 21 in Houston216_700]

08:07:59 N29°34.094' Display reference Free Brg 090.8° Rng 0.243 n Range 3/8 Vector 6 min Active ownship OSa Active target 1:LES01

0:07:59 W094°55.096'

RUN 22

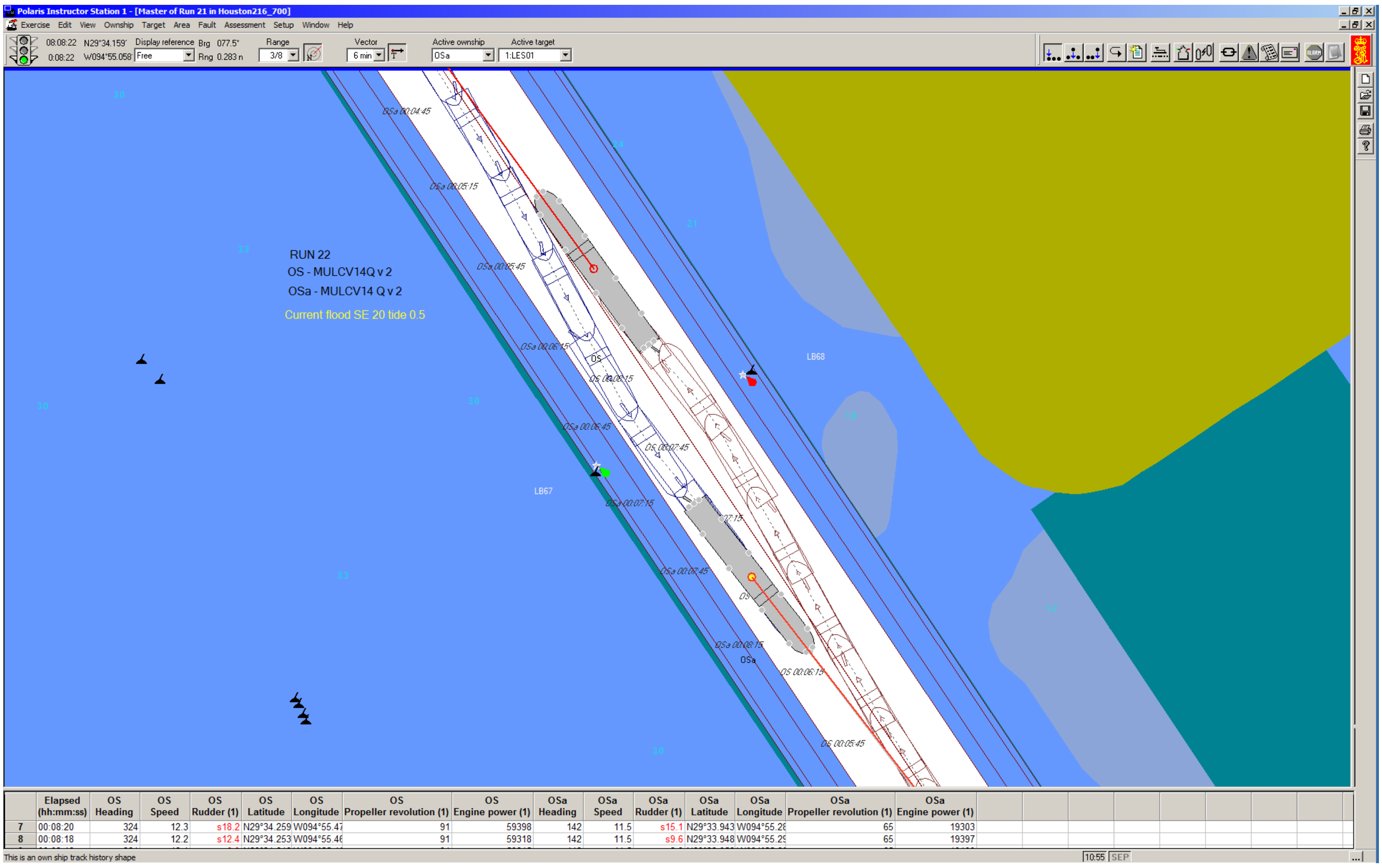
OS - MULCV14Q v 2

OSa - MULCV14 Q v 2

Current flood SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:07:58	324	11.6	p19.6	N29°34.200	W094°55.42	90	58601	144	11.5	p15.8	N29°34.000	W094°55.33	65	19561
8	00:07:56	324	11.5	p19.6	N29°34.195	W094°55.42	90	58505	144	11.5	p15.8	N29°34.005	W094°55.34	65	19199

This is a point showing relative distance from ownship



Polaris Instructor Station 1 - [Master of Run 21 in Houston216_700]

08:08:22 N29°34.159' Display reference Free Brg 077.5° Rng 0.283 n Range 3/8 Vector 6 min Active ownship OSa Active target 1:LES01

0:08:22 W094°55.058'

RUN 22

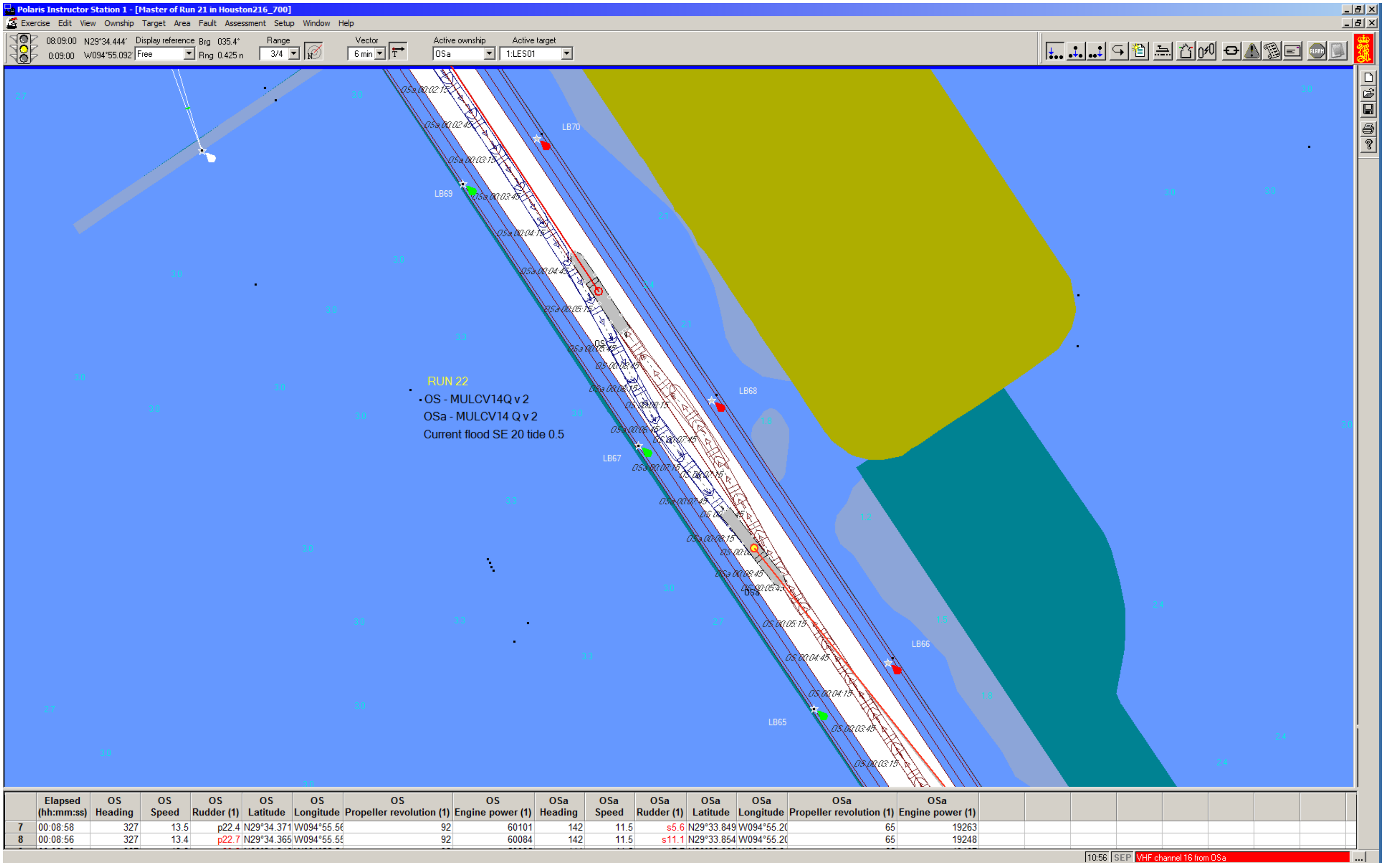
OS - MULCV14Q v 2

OSa - MULCV14 Q v 2

Current flood SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:08:20	324	12.3	s18.2	N29°34.259	W094°55.47	91	59398	142	11.5	s15.1	N29°33.943	W094°55.28	65	19303
8	00:08:18	324	12.2	s12.4	N29°34.253	W094°55.46	91	59318	142	11.5	s9.6	N29°33.948	W094°55.29	65	19397

This is an own ship track history shape



08:09:00 N29°34.444′
0:09:00 W094°55.092′
Display reference: Free
Brg 035.4°
Rng 0.425 n
Range: 3/4
Vector: 6 min
Active ownship: OSa
Active target: 1:LES01

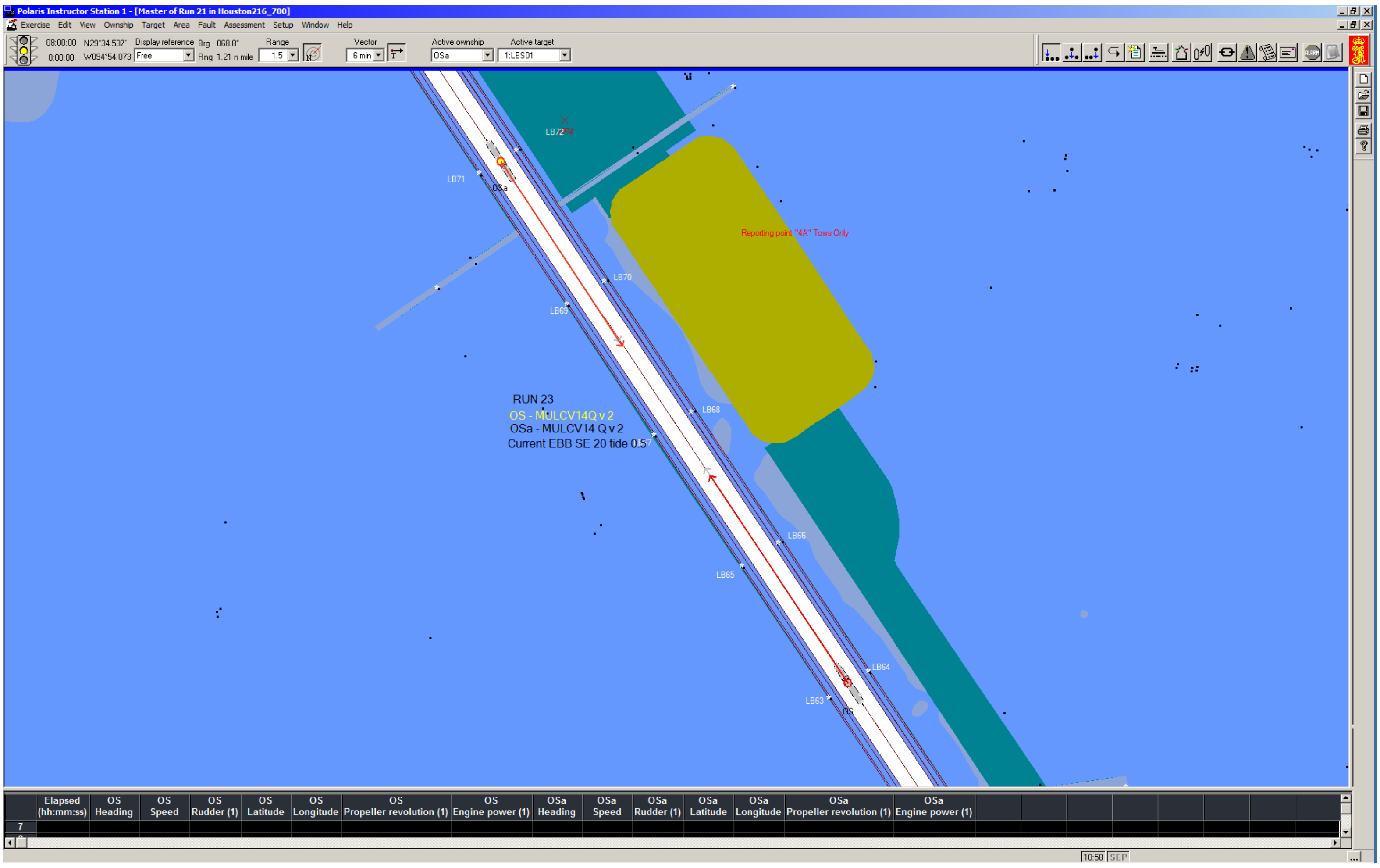
RUN 22
- OS - MULCV14Q v 2
OSa - MULCV14 Q v 2
Current flood SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:08:58	327	13.5	p22.4	N29°34.371	W094°55.56	92	60101	142	11.5	s5.6	N29°33.849	W094°55.20	65	19263
8	00:08:56	327	13.4	p22.7	N29°34.365	W094°55.55	92	60084	142	11.5	s11.1	N29°33.854	W094°55.20	65	19248

10:56 SEP VHF channel 16 from OSa

June 26, 2019

Run 23

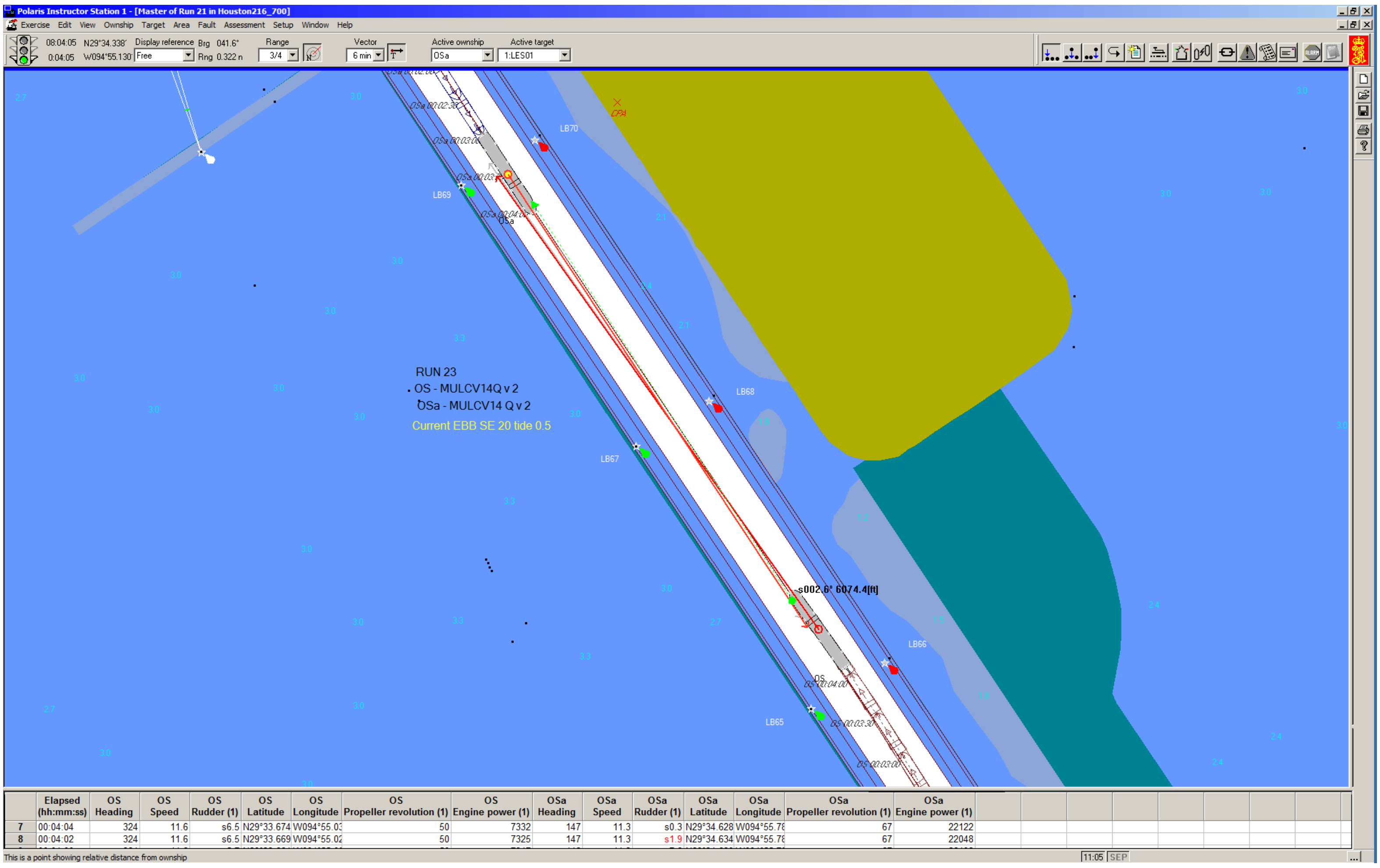


Polaris Instructor Station 1 - [Master of Run 21 in Houston216_700]

08:00:00 N29°34.537′ Display reference: Free Brg 068.8° Rng 1.21 n mile Range 1.5 Vector 6 min Active ownship OSa Active target 1:LES01
0:00:00 W094°54.073′

RUN 23
OS - MULCV14Q v 2
OSa - MULCV14 Q v 2
Current EBB SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7															



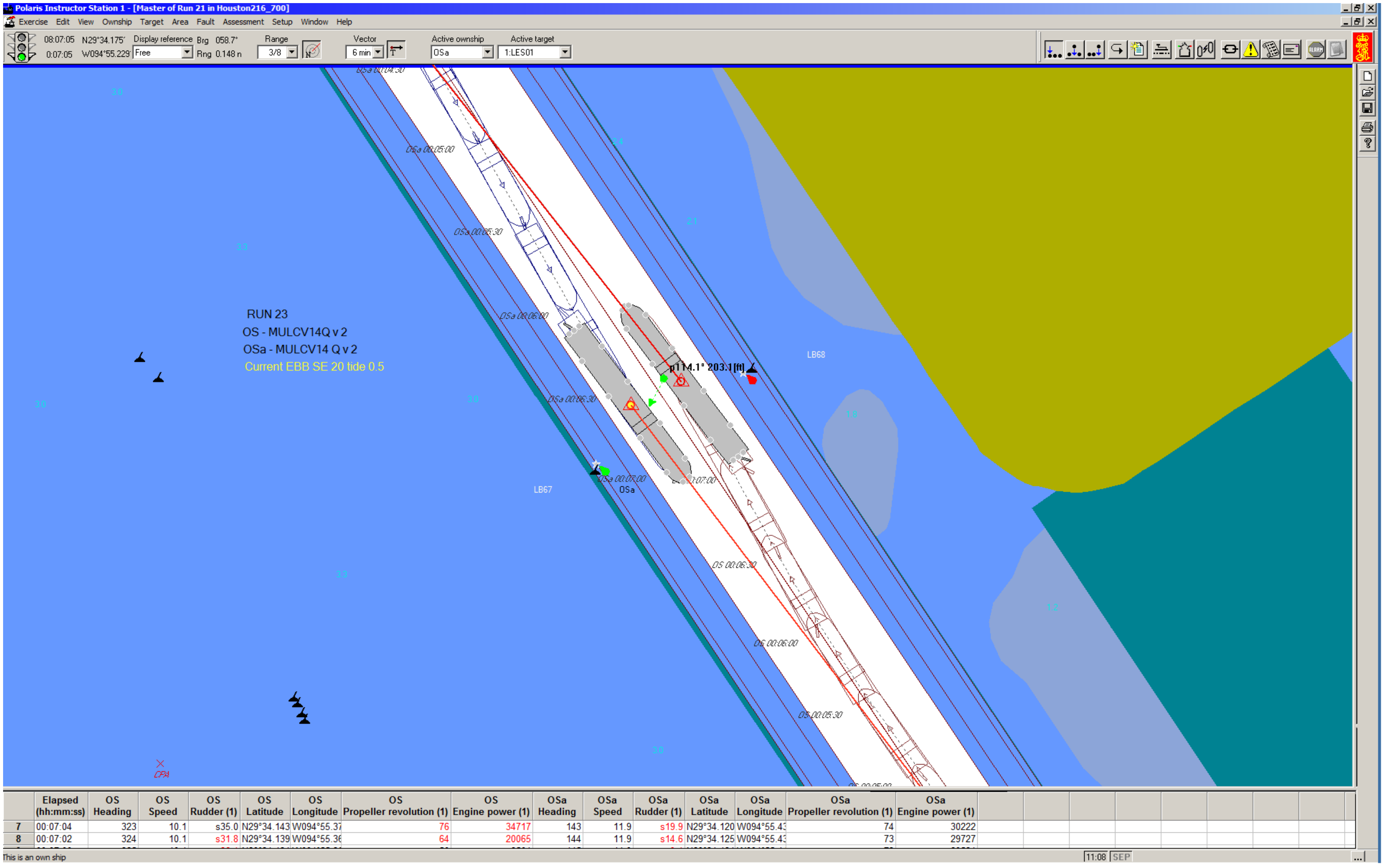
Polaris Instructor Station 1 - [Master of Run 21 in Houston216_700]

08:04:05 N29°34.338′ Display reference: Free Brg 041.6° Rng 0.322 n Range 3/4 Vector 6 min Active ownship OSa Active target 1:LES01
0:04:05 W094°55.130′

RUN 23
OS - MULCV14Q v 2
OSa - MULCV14 Q v 2
Current EBB SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:04:04	324	11.6	s6.5	N29°33.674	W094°55.03	50	7332	147	11.3	s0.3	N29°34.628	W094°55.78	67	22122
8	00:04:02	324	11.6	s6.5	N29°33.669	W094°55.02	50	7325	147	11.3	s1.9	N29°34.634	W094°55.78	67	22048

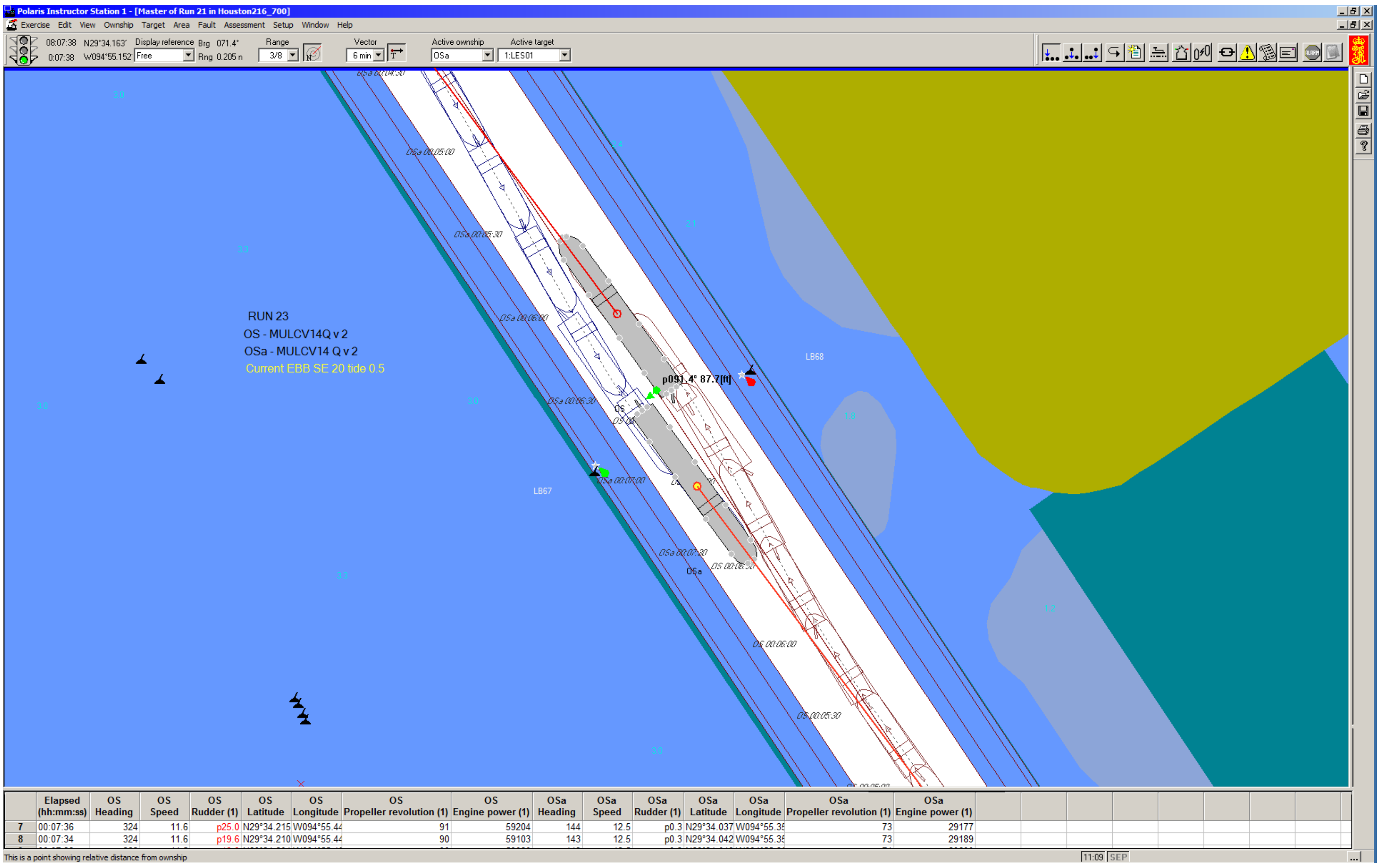
This is a point showing relative distance from ownship



08:07:05 N29°34.175′ Display reference: Free Brg 058.7° Rng 0.148 n
0:07:05 W094°55.229′ Range: 3/8 Vector: 6 min Active ownship: OSa Active target: 1:LES01

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:07:04	323	10.1	s35.0	N29°34.143	W094°55.37	76	34717	143	11.9	s19.9	N29°34.120	W094°55.43	74	30222
8	00:07:02	324	10.1	s31.8	N29°34.139	W094°55.36	64	20065	144	11.9	s14.6	N29°34.125	W094°55.43	73	29727

This is an own ship

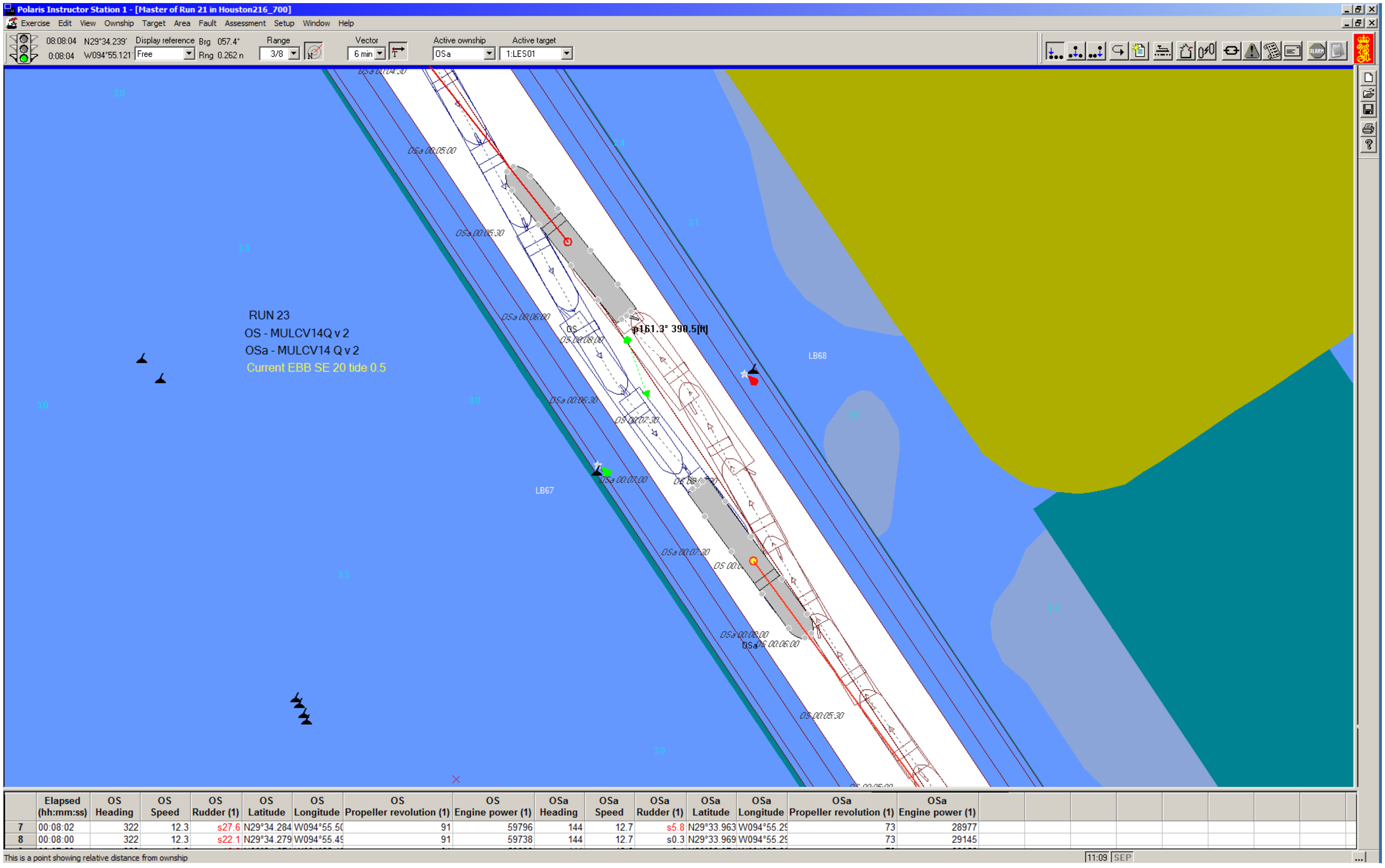


08:07:38 N29°34.163′ Display reference: Free Brg 071.4° Rng 0.205 n
0:07:38 W094°55.152′ Range: 3/8 Vector: 6 min Active ownship: OSa Active target: 1:LES01

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:07:36	324	11.6	p25.0	N29°34.215	W094°55.44	91	59204	144	12.5	p0.3	N29°34.037	W094°55.35	73	29177
8	00:07:34	324	11.6	p19.6	N29°34.210	W094°55.44	90	59103	143	12.5	p0.3	N29°34.042	W094°55.35	73	29189

This is a point showing relative distance from ownship

June 26, 2019

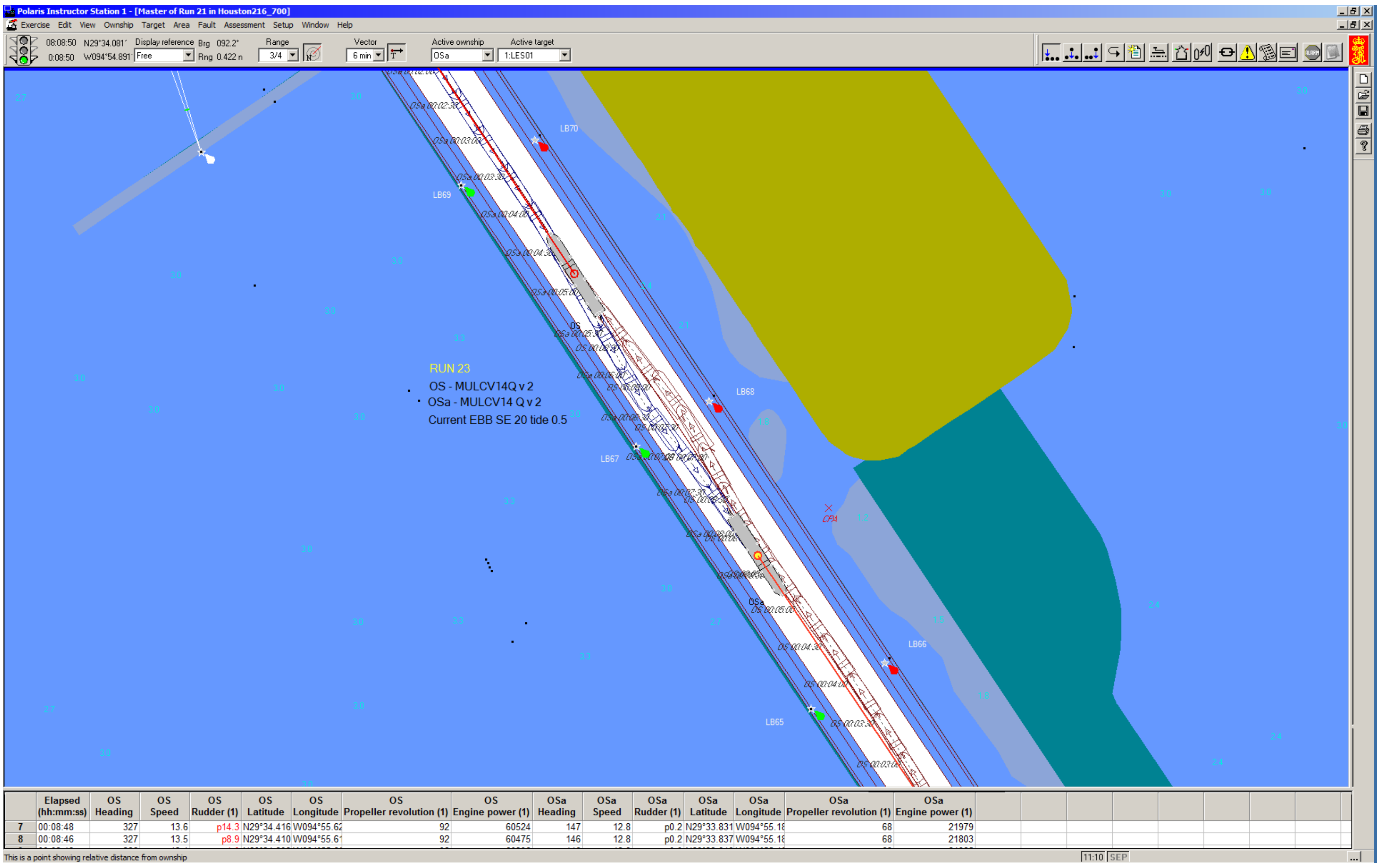


Polaris Instructor Station 1 - [Master of Run 21 in Houston216_700]

08:08:04 N29°34.239' Display reference Free Brg 057.4° Range 3/8 Vector 6 min Active ownship OSa Active target 1:LES01
0:08:04 W094°55.121' Rng 0.262 n

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:08:02	322	12.3	s27.6	N29°34.284	W094°55.50	91	59796	144	12.7	s5.8	N29°33.963	W094°55.29	73	28977
8	00:08:00	322	12.3	s22.1	N29°34.279	W094°55.49	91	59738	144	12.7	s0.3	N29°33.969	W094°55.29	73	29145

This is a point showing relative distance from ownship

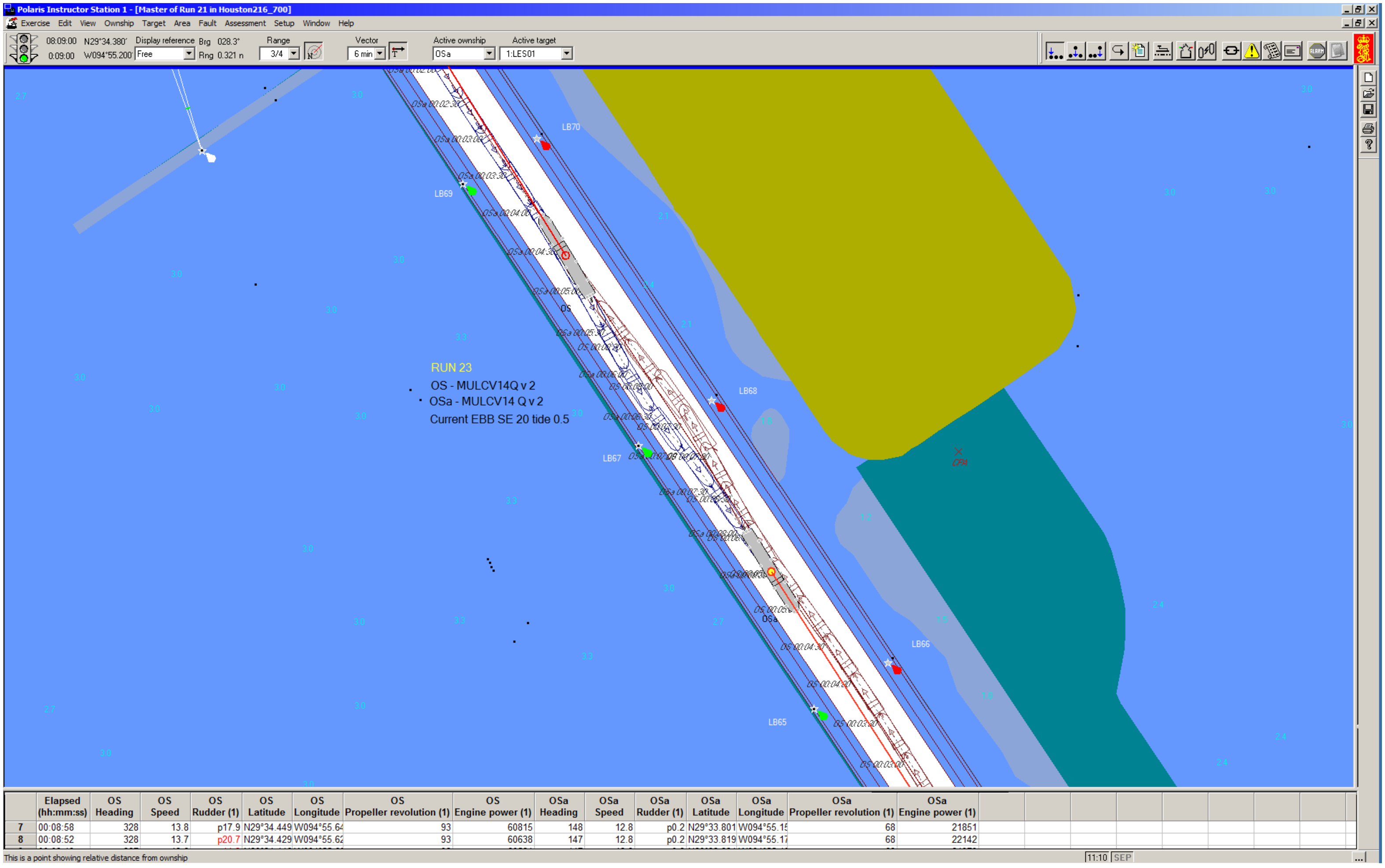


Polaris Instructor Station 1 - [Master of Run 21 in Houston216_700]

08:08:50 N29°34.081' Display reference Free Brg 092.2° Range 3/4 Vector 6 min Active ownship OSa Active target 1:LES01
0:08:50 W094°54.891' Rng 0.422 n

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:08:48	327	13.6	p14.3	N29°34.416	W094°55.62	92	60524	147	12.8	p0.2	N29°33.831	W094°55.18	68	21979
8	00:08:46	327	13.5	p8.9	N29°34.410	W094°55.61	92	60475	146	12.8	p0.2	N29°33.837	W094°55.18	68	21803

This is a point showing relative distance from ownship



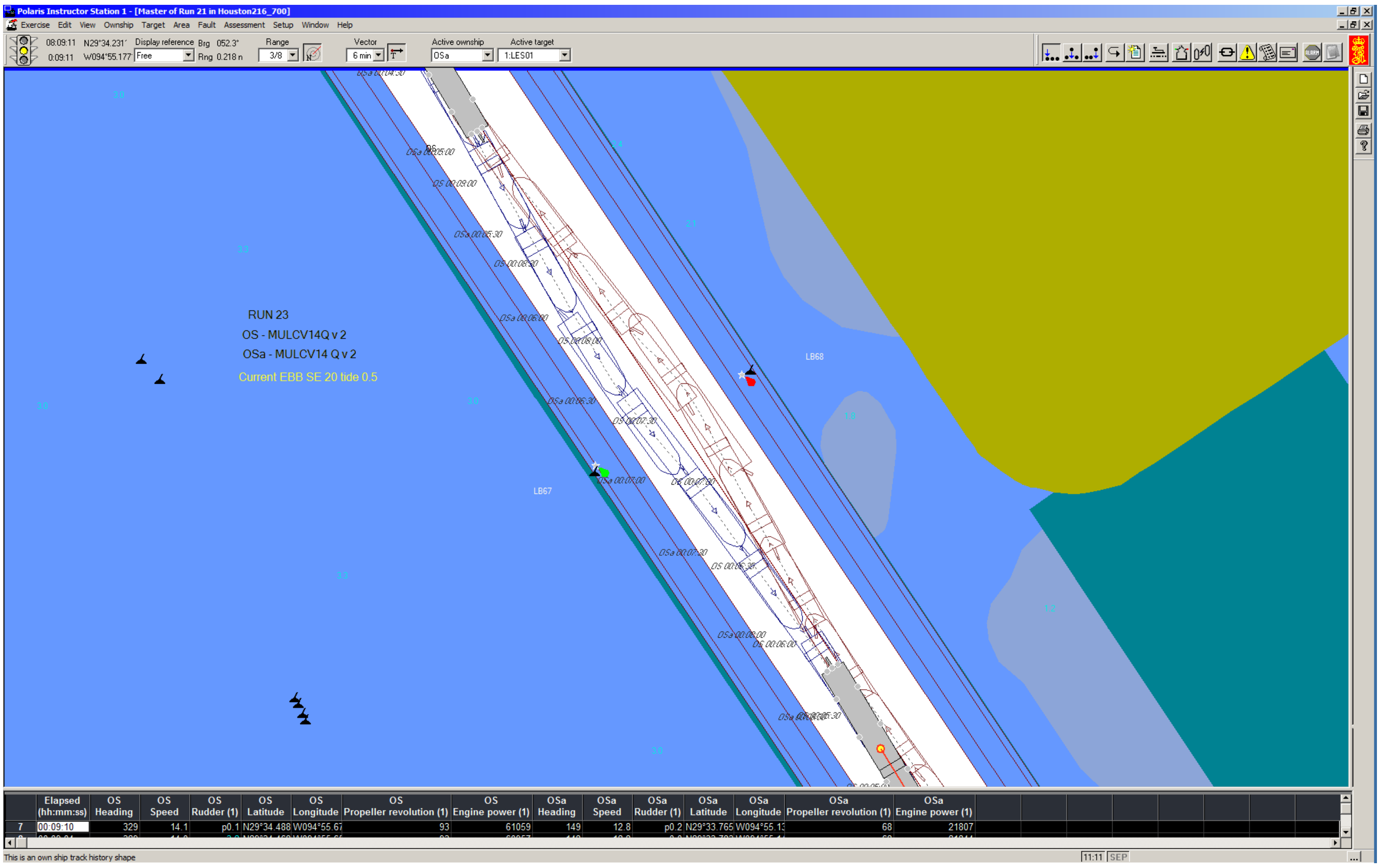
Polaris Instructor Station 1 - [Master of Run 21 in Houston216_700]

08:09:00 N29°34.380′
0:09:00 W094°55.200′
Display reference: Free
Brg 028.3°
Rng 0.321 n
Range: 3/4
Vector: 6 min
Active ownship: OSa
Active target: 1:LES01

RUN 23
OS - MULCV14Q v 2
OSa - MULCV14 Q v 2
Current EBB SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:08:58	328	13.8	p17.9	N29°34.449	W094°55.64	93	60815	148	12.8	p0.2	N29°33.801	W094°55.15	68	21851
8	00:08:52	328	13.7	p20.7	N29°34.429	W094°55.62	93	60638	147	12.8	p0.2	N29°33.819	W094°55.17	68	22142

This is a point showing relative distance from ownship



Polaris Instructor Station 1 - [Master of Run 21 in Houston216_700]

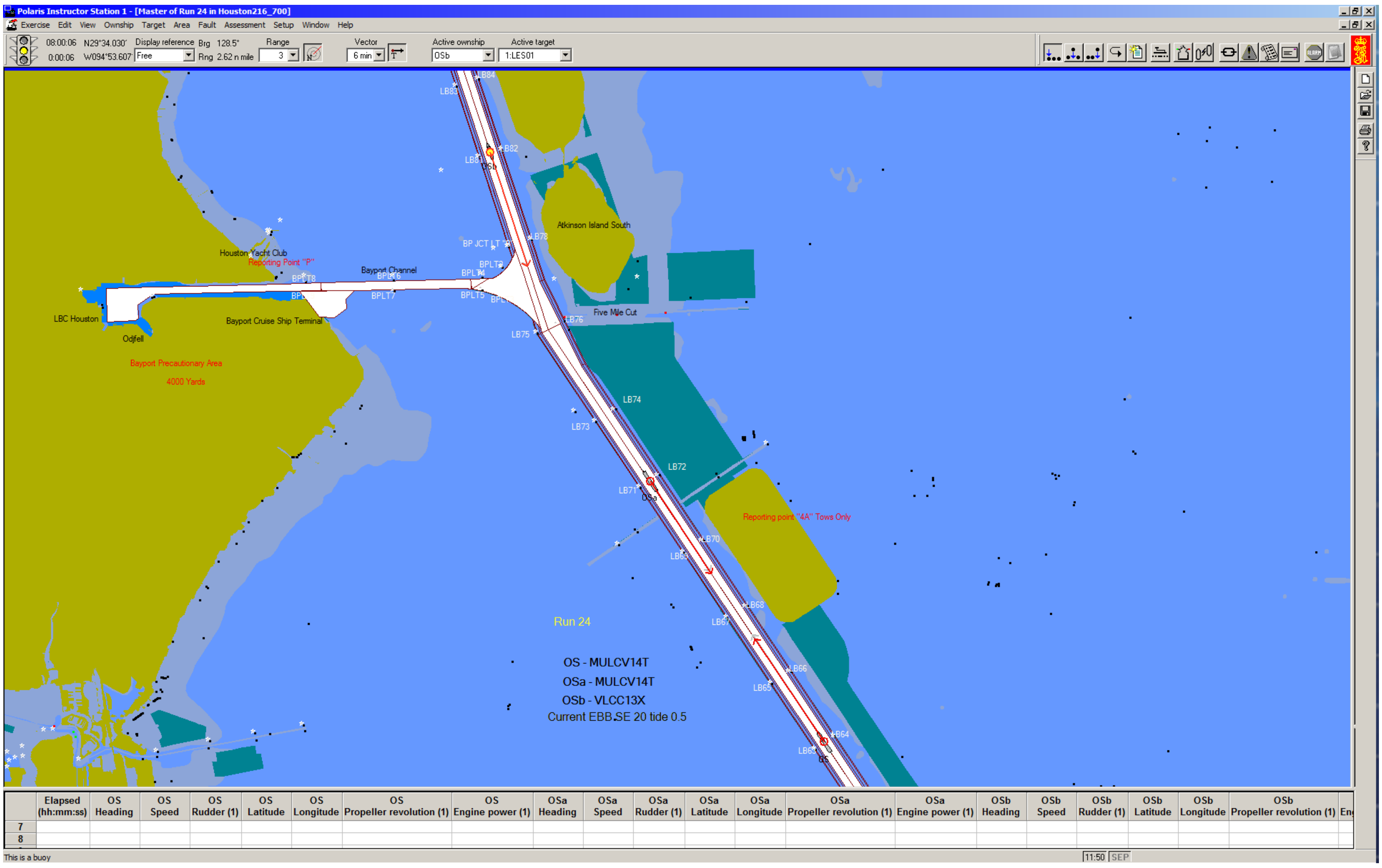
08:09:11 N29°34.231′
0:09:11 W094°55.177′
Display reference: Free
Brg 052.3°
Rng 0.218 n
Range: 3/8
Vector: 6 min
Active ownship: OSa
Active target: 1:LES01

RUN 23
OS - MULCV14Q v 2
OSa - MULCV14 Q v 2
Current EBB SE 20 tide 0.5

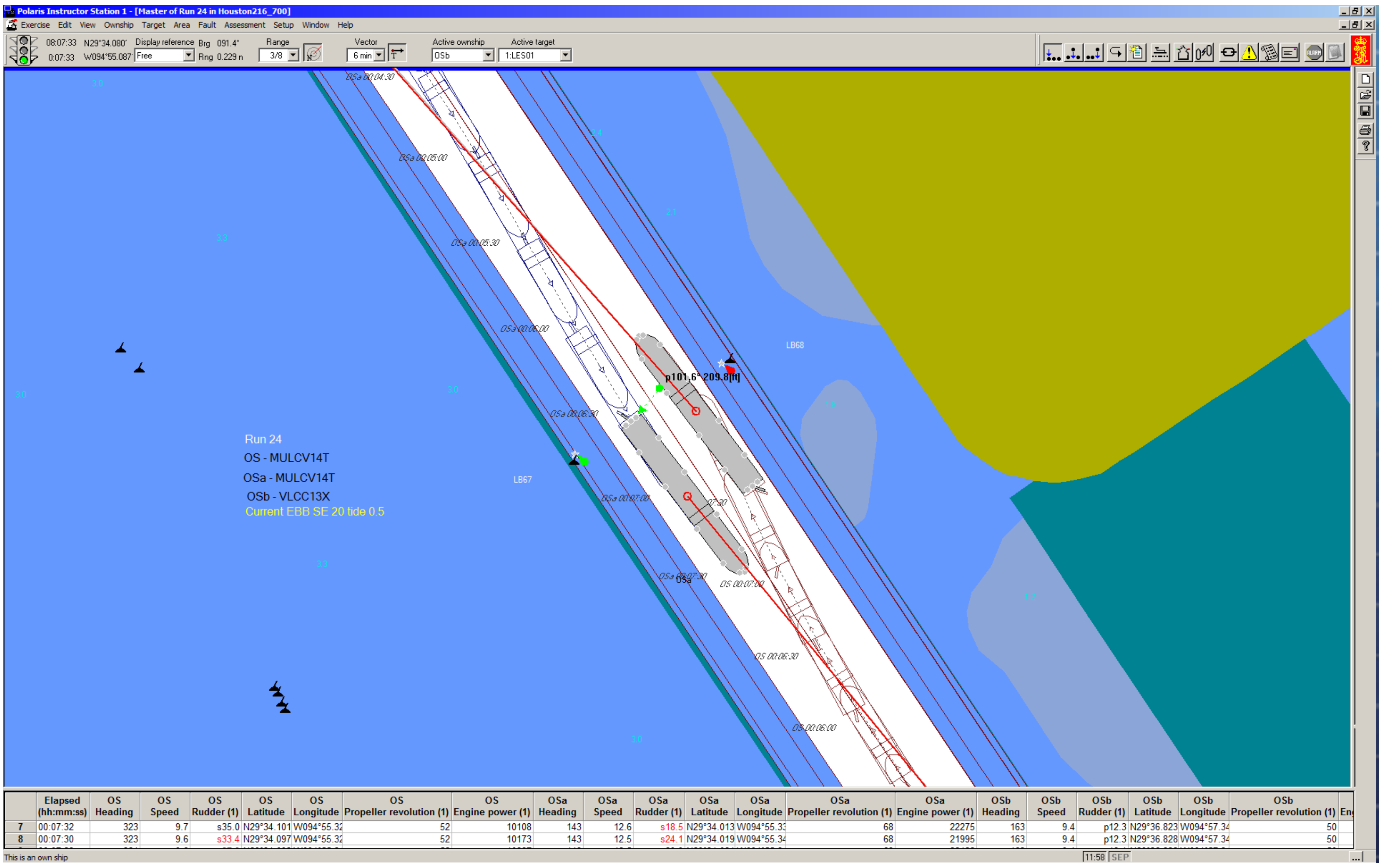
	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)
7	00:09:10	329	14.1	p0.1	N29°34.488	W094°55.67	93	61059	149	12.8	p0.2	N29°33.765	W094°55.13	68	21807

This is an own ship track history shape

Run 24

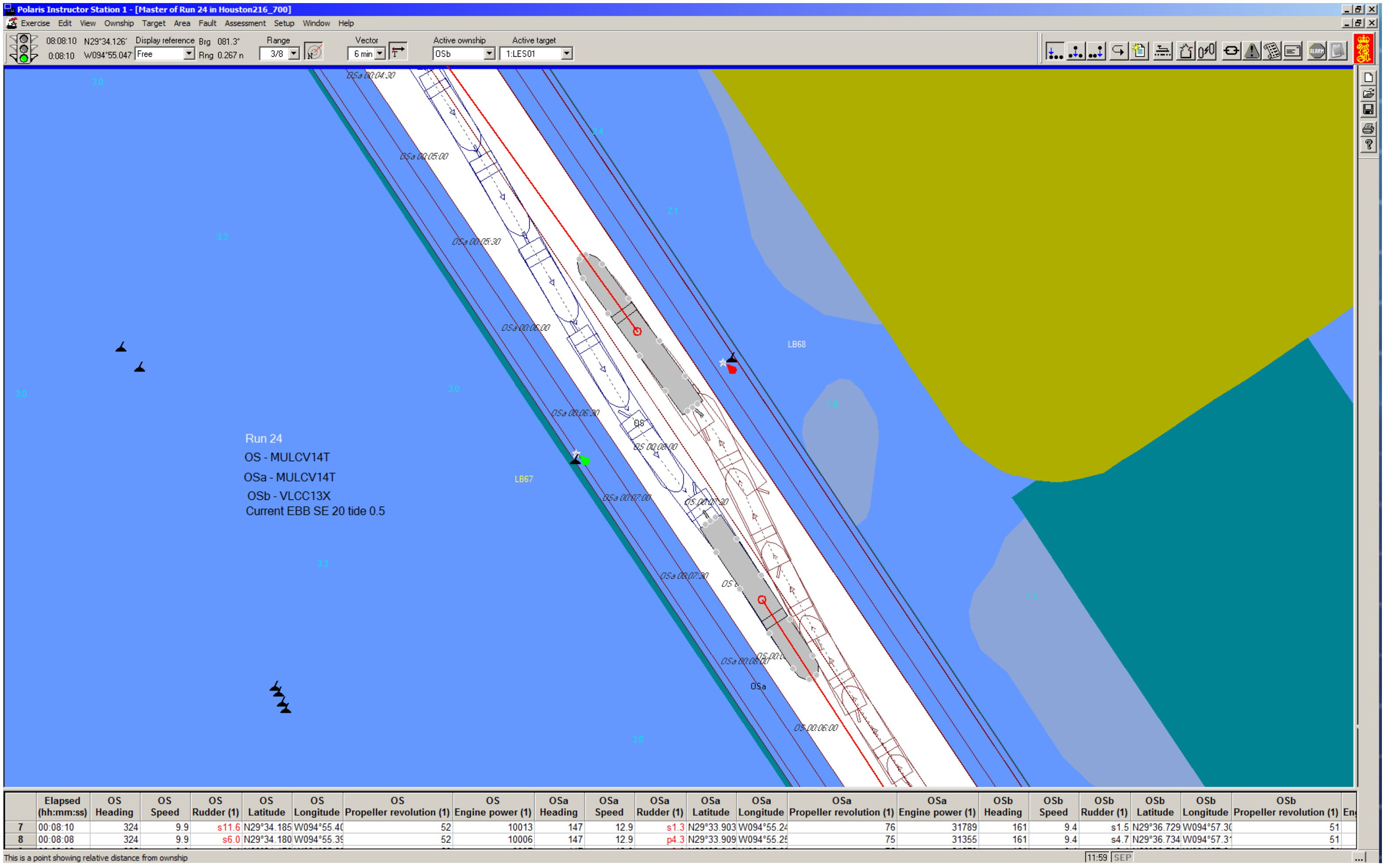


	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	En
7																						
8																						



	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	En
7	00:07:32	323	9.7	s35.0	N29°34.101	W094°55.32	52	10108	143	12.6	s18.5	N29°34.013	W094°55.33	68	22275	163	9.4	p12.3	N29°36.823	W094°57.34	50	
8	00:07:30	323	9.6	s33.4	N29°34.097	W094°55.32	52	10173	143	12.5	s24.1	N29°34.019	W094°55.34	68	21995	163	9.4	p12.3	N29°36.828	W094°57.34	50	

June 26, 2019



Polaris Instructor Station 1 - [Master of Run 24 in Houston216_700]

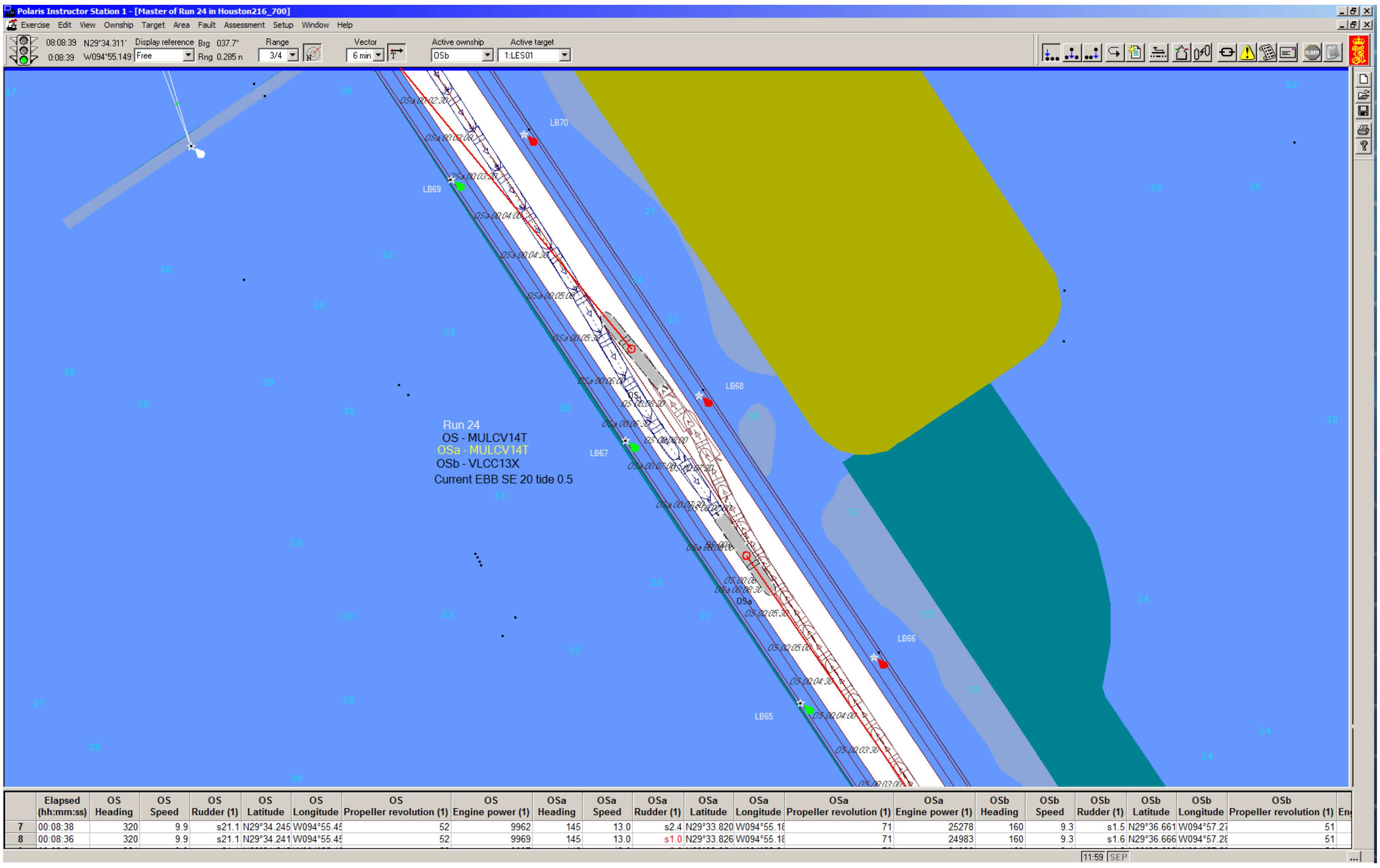
08:08:10 N29°34.126′ Display reference: Free Brg 081.3° Rng 0.267 n Range 3/8 Vector 6 min Active ownship OSb Active target 1:LES01
0:08:10 W094°55.047′

Run 24
OS - MULCV14T
OSa - MULCV14T
OSb - VLCC13X
Current EBB SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	En
7	00:08:10	324	9.9	s11.6	N29°34.185	W094°55.4	52	10013	147	12.9	s1.3	N29°33.903	W094°55.24	76	31789	161	9.4	s1.5	N29°36.729	W094°57.30	51	
8	00:08:08	324	9.9	s6.0	N29°34.180	W094°55.3	52	10006	147	12.9	p4.3	N29°33.909	W094°55.25	75	31355	161	9.4	s4.7	N29°36.734	W094°57.31	51	

This is a point showing relative distance from ownship

11:59 SEP



Polaris Instructor Station 1 - [Master of Run 24 in Houston216_700]

08:08:39 N29°34.311′ Display reference: Free Brg 037.7° Rng 0.285 n Range 3/4 Vector 6 min Active ownship OSb Active target 1:LES01
0:08:39 W094°55.149′

Run 24
OS - MULCV14T
OSa - MULCV14T
OSb - VLCC13X
Current EBB SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	En
7	00:08:38	320	9.9	s21.1	N29°34.245	W094°55.45	52	9962	145	13.0	s2.4	N29°33.820	W094°55.18	71	25278	160	9.3	s1.5	N29°36.661	W094°57.27	51	
8	00:08:36	320	9.9	s21.1	N29°34.241	W094°55.45	52	9969	145	13.0	s1.0	N29°33.826	W094°55.18	71	24983	160	9.3	s1.6	N29°36.666	W094°57.28	51	

11:59 SEP

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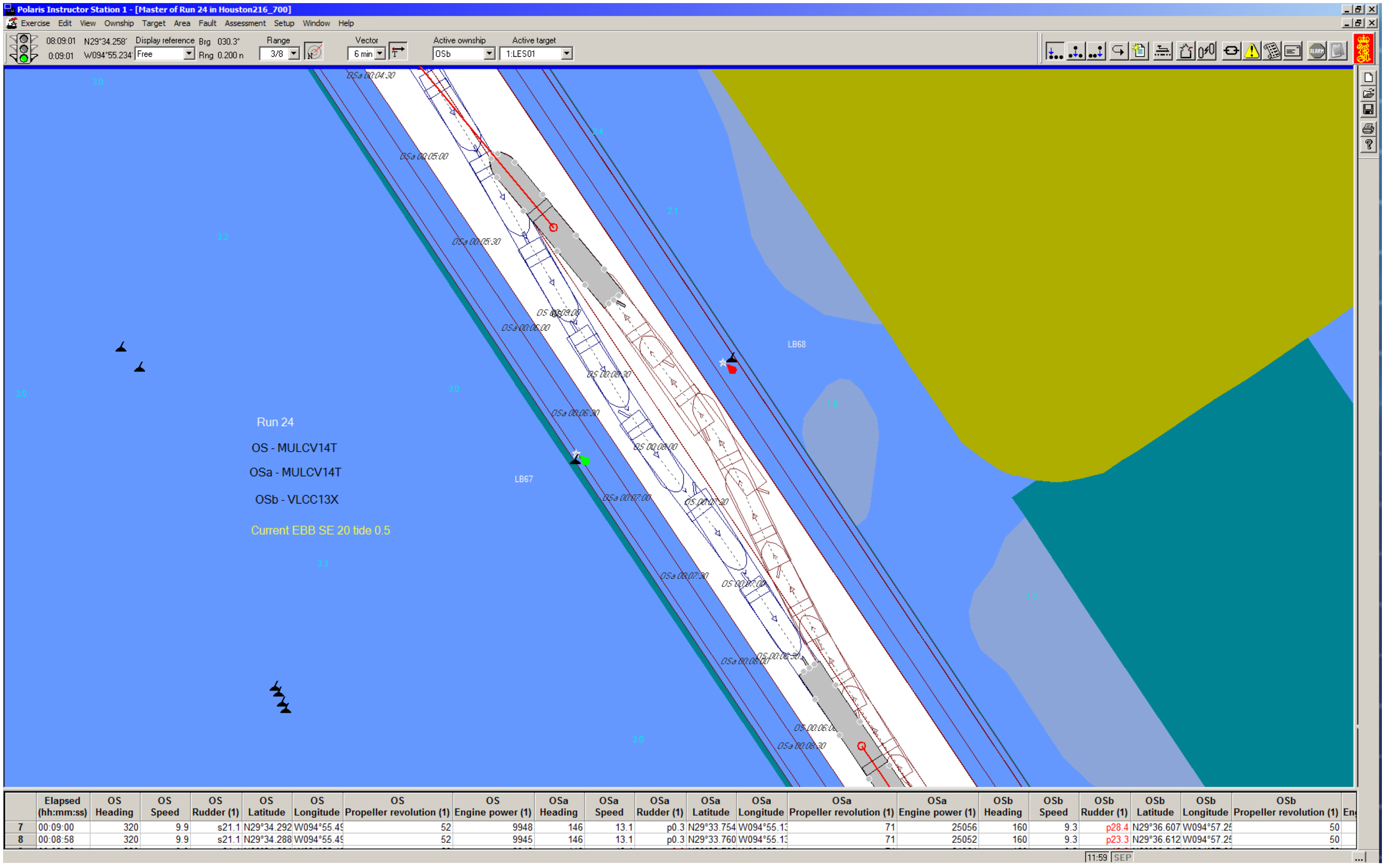
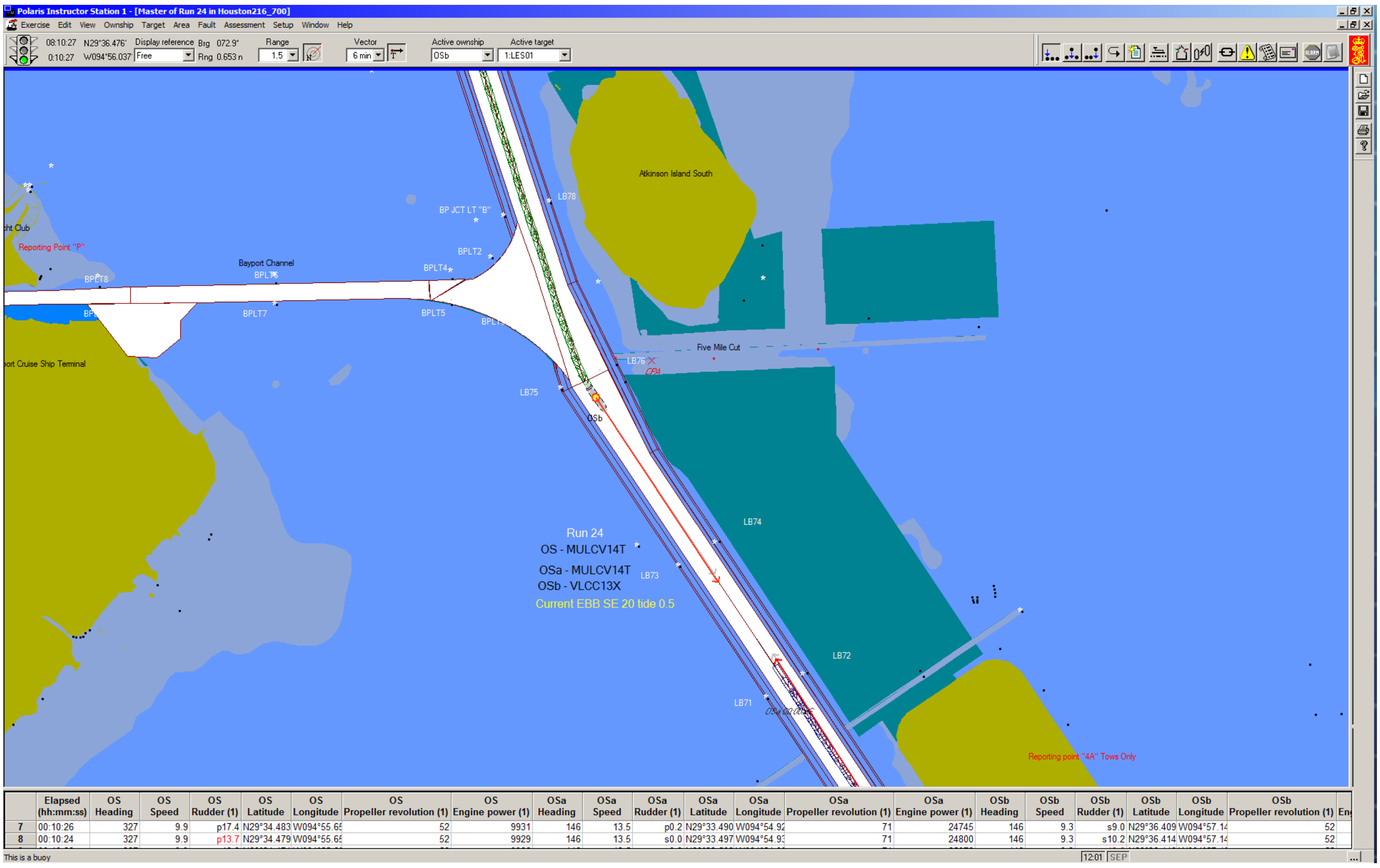


08:09:01 N29°34.258' Display reference Brg 030.3°
0:09:01 W094°55.234' Free Rng 0.200 n
Range 3/8
Vector 6 min
Active ownship OSb
Active target 1:LES01

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	En
7	00:09:00	320	9.9	s21.1	N29°34.292	W094°55.49	52	9948	146	13.1	p0.3	N29°33.754	W094°55.13	71	25056	160	9.3	p28.4	N29°36.607	W094°57.25	50	
8	00:08:58	320	9.9	s21.1	N29°34.288	W094°55.49	52	9945	146	13.1	p0.3	N29°33.760	W094°55.13	71	25052	160	9.3	p23.3	N29°36.612	W094°57.25	50	

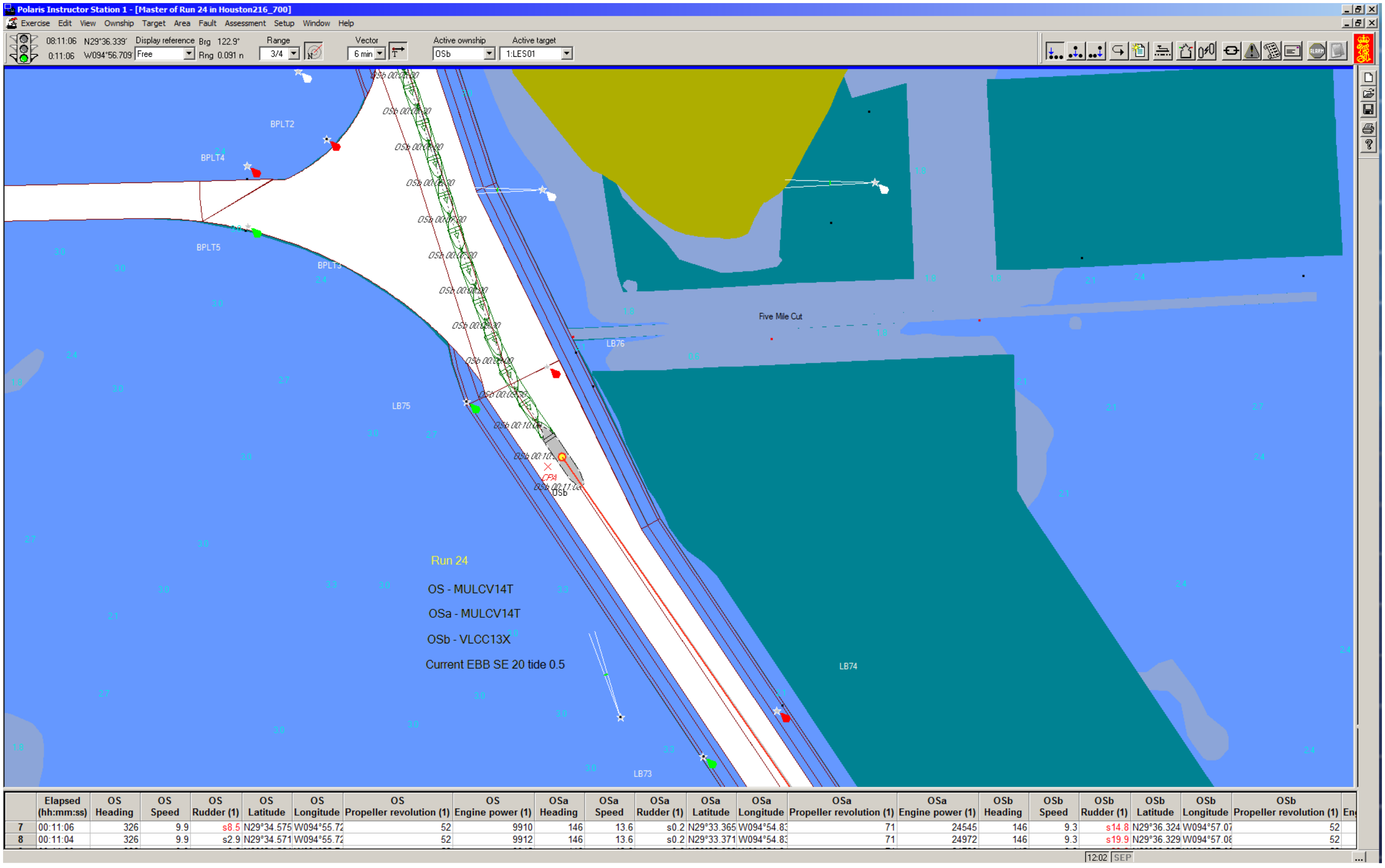


08:10:27 N29°36.476' Display reference Brg 072.9°
0:10:27 W094°56.037' Free Rng 0.653 n
Range 1.5
Vector 6 min
Active ownship OSb
Active target 1:LES01

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	En
7	00:10:26	327	9.9	p17.4	N29°34.483	W094°55.65	52	9931	146	13.5	p0.2	N29°33.490	W094°54.92	71	24745	146	9.3	s9.0	N29°36.409	W094°57.14	52	
8	00:10:24	327	9.9	p13.7	N29°34.479	W094°55.65	52	9929	146	13.5	s0.0	N29°33.497	W094°54.93	71	24800	146	9.3	s10.2	N29°36.414	W094°57.14	52	

This is a buoy

June 26, 2019



08:11:06 N29°36.339' Display reference Free Brg 122.9° Rng 0.091 n
0:11:06 W094°56.709'
Range 3/4
Vector 6 min
Active ownship OSb
Active target 1:LES01

Run 24

OS - MULCV14T

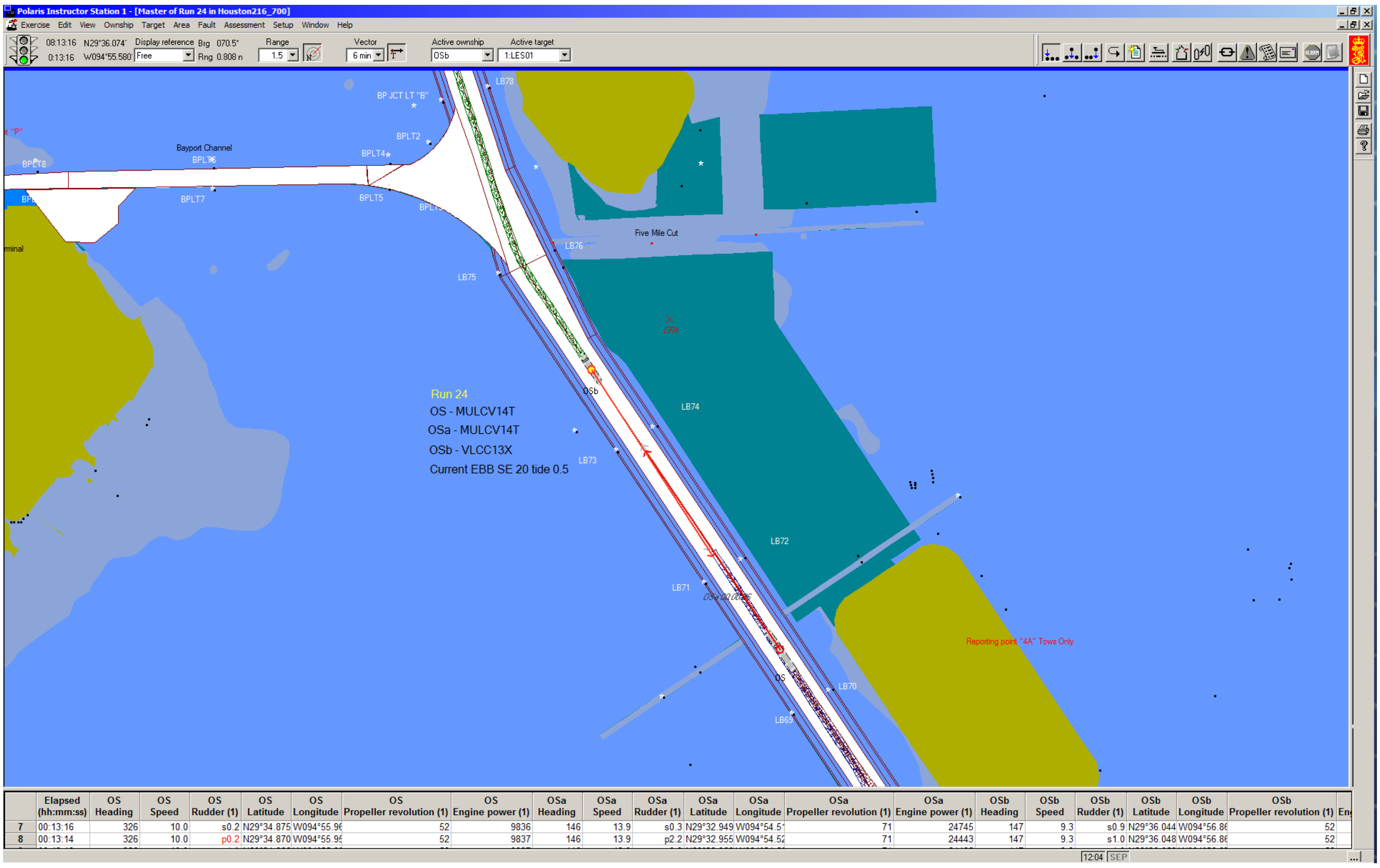
OSa - MULCV14T

OSb - VLCC13X

Current EBB SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	En
7	00:11:06	326	9.9	s8.5	N29°34.575	W094°55.72	52	9910	146	13.6	s0.2	N29°33.365	W094°54.83	71	24545	146	9.3	s14.8	N29°36.324	W094°57.07	52	
8	00:11:04	326	9.9	s2.9	N29°34.571	W094°55.72	52	9912	146	13.6	s0.2	N29°33.371	W094°54.83	71	24972	146	9.3	s19.9	N29°36.329	W094°57.08	52	

12:02 SEP



08:13:16 N29°36.074' Display reference Free Brg 070.5° Rng 0.808 n
0:13:16 W094°55.580'
Range 1.5
Vector 6 min
Active ownship OSb
Active target 1:LES01

Run 24

OS - MULCV14T

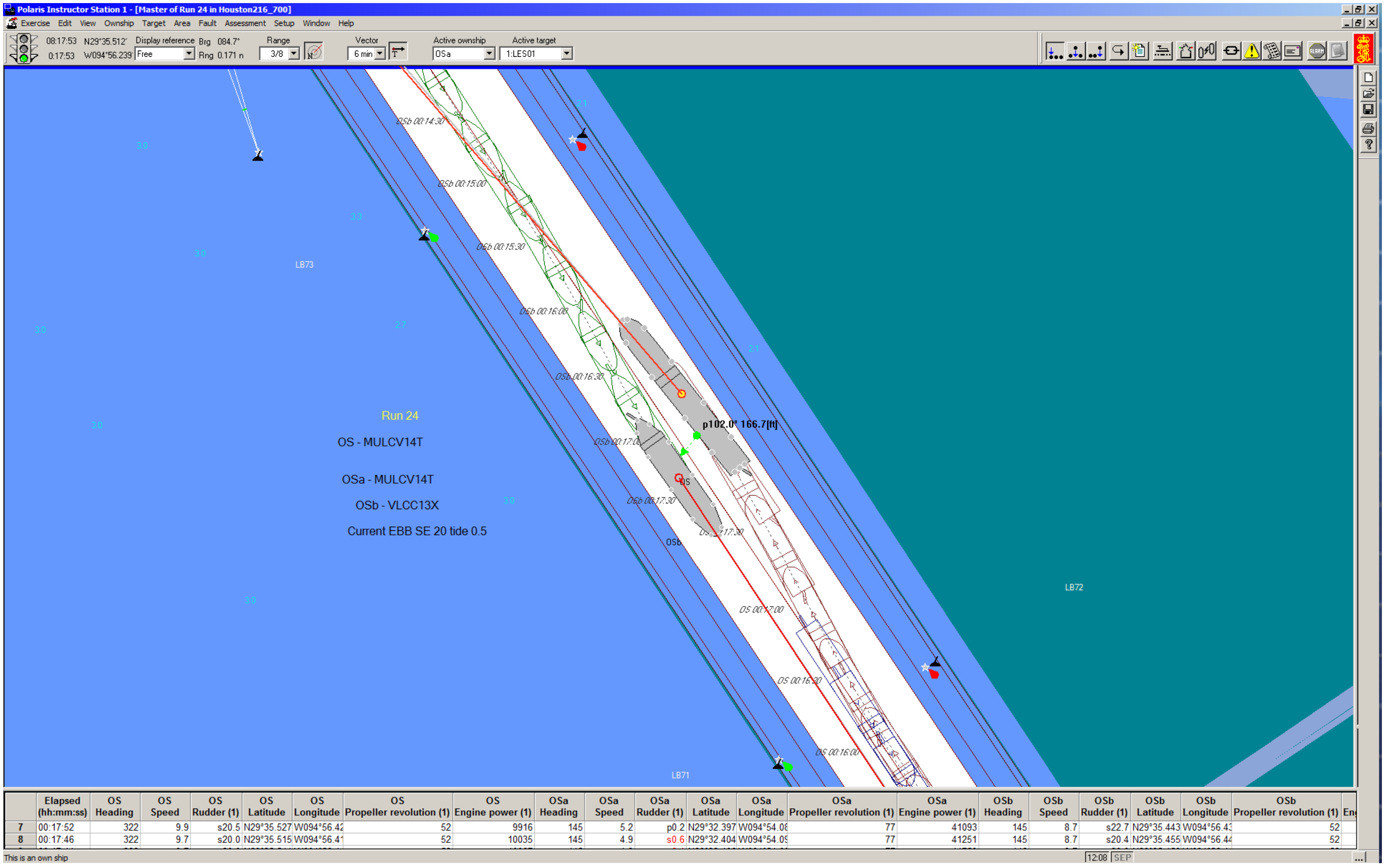
OSa - MULCV14T

OSb - VLCC13X

Current EBB SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	En
7	00:13:16	326	10.0	s0.2	N29°34.875	W094°55.96	52	9836	146	13.9	s0.3	N29°32.949	W094°54.51	71	24745	147	9.3	s0.9	N29°36.044	W094°56.86	52	
8	00:13:14	326	10.0	p0.2	N29°34.870	W094°55.95	52	9837	146	13.9	p2.2	N29°32.955	W094°54.52	71	24443	147	9.3	s1.0	N29°36.048	W094°56.86	52	

12:04 SEP



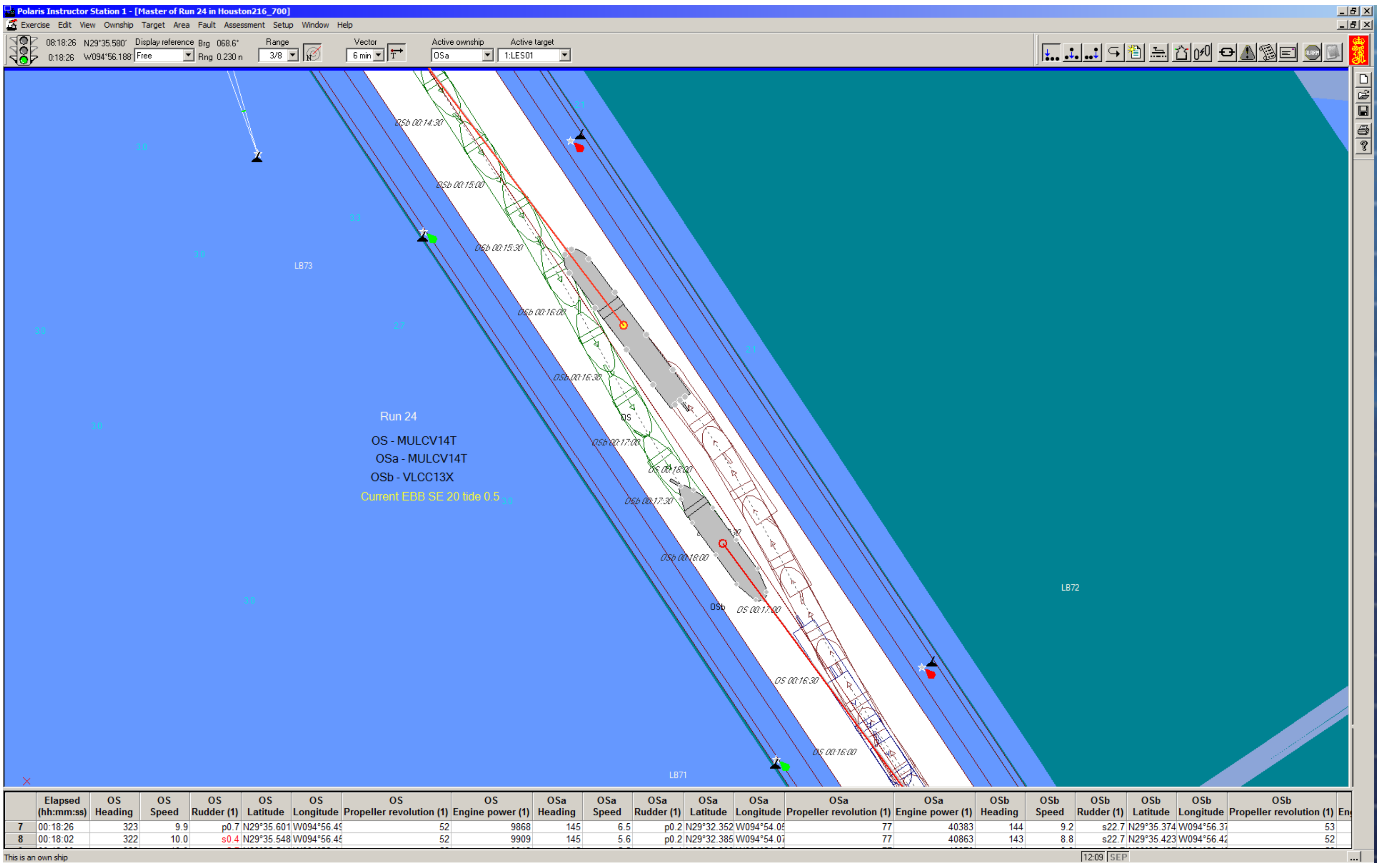
Polaris Instructor Station 1 - [Master of Run 24 in Houston216_700]

08:17:53 N29°35.512′ W094°56.239′
0:17:53
Display reference: Free
Brg 084.7°
Rng 0.171 n
Range: 3/8
Vector: 6 min
Active ownship: OSa
Active target: 1:LES01

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	En
7	00:17:52	322	9.9	s20.5	N29°35.527	W094°56.42	52	9916	145	5.2	p0.2	N29°32.397	W094°54.08	77	41093	145	8.7	s22.7	N29°35.443	W094°56.43	52	
8	00:17:46	322	9.7	s20.0	N29°35.515	W094°56.41	52	10035	145	4.9	s0.6	N29°32.404	W094°54.09	77	41251	145	8.7	s20.4	N29°35.455	W094°56.44	52	

This is an own ship

12:08 SEP



Polaris Instructor Station 1 - [Master of Run 24 in Houston216_700]

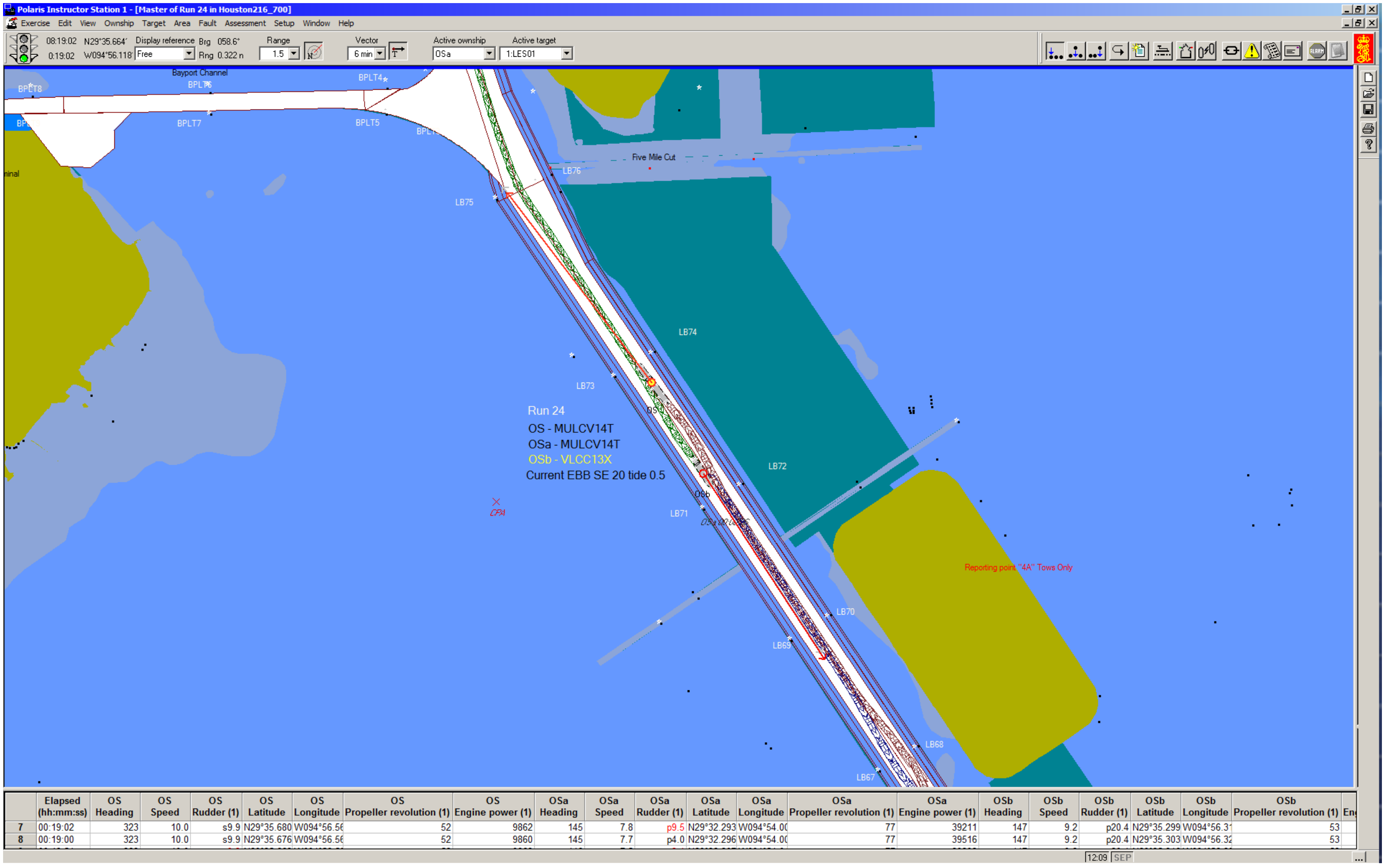
08:18:26 N29°35.580′ W094°56.188′
0:18:26
Display reference: Free
Brg 068.6°
Rng 0.230 n
Range: 3/8
Vector: 6 min
Active ownship: OSa
Active target: 1:LES01

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	En
7	00:18:26	323	9.9	p0.7	N29°35.601	W094°56.49	52	9868	145	6.5	p0.2	N29°32.352	W094°54.05	77	40383	144	9.2	s22.7	N29°35.374	W094°56.37	53	
8	00:18:02	322	10.0	s0.4	N29°35.548	W094°56.45	52	9909	145	5.6	p0.2	N29°32.385	W094°54.07	77	40863	143	8.8	s22.7	N29°35.423	W094°56.42	52	

This is an own ship

12:09 SEP

June 26, 2019



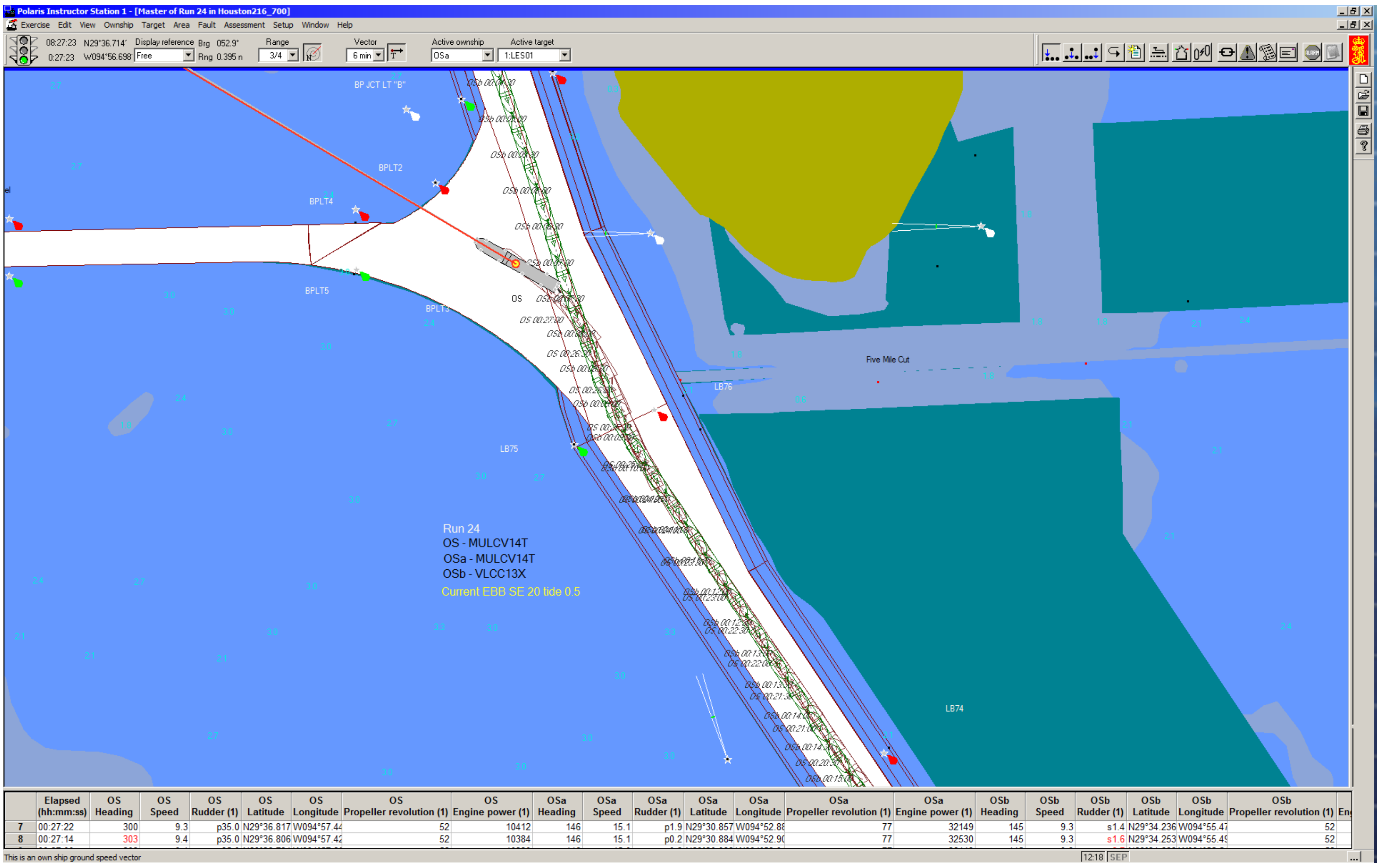
Polaris Instructor Station 1 - [Master of Run 24 in Houston216_700]

08:19:02 N29°35.664' Display reference Brg 058.6°
0:19:02 W094°56.118' Free Rng 0.322 n
Range 1.5
Vector 6 min
Active ownship OSa
Active target 1:LES01

Run 24
OS - MULCV14T
OSa - MULCV14T
OSb - VLCC13X
Current EBB SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	En
7	00:19:02	323	10.0	s9.9	N29°35.680	W094°56.56	52	9862	145	7.8	p9.5	N29°32.293	W094°54.00	77	39211	147	9.2	p20.4	N29°35.299	W094°56.31	53	
8	00:19:00	323	10.0	s9.9	N29°35.676	W094°56.56	52	9860	145	7.7	p4.0	N29°32.296	W094°54.00	77	39516	147	9.2	p20.4	N29°35.303	W094°56.32	53	

12:09 SEP



Polaris Instructor Station 1 - [Master of Run 24 in Houston216_700]

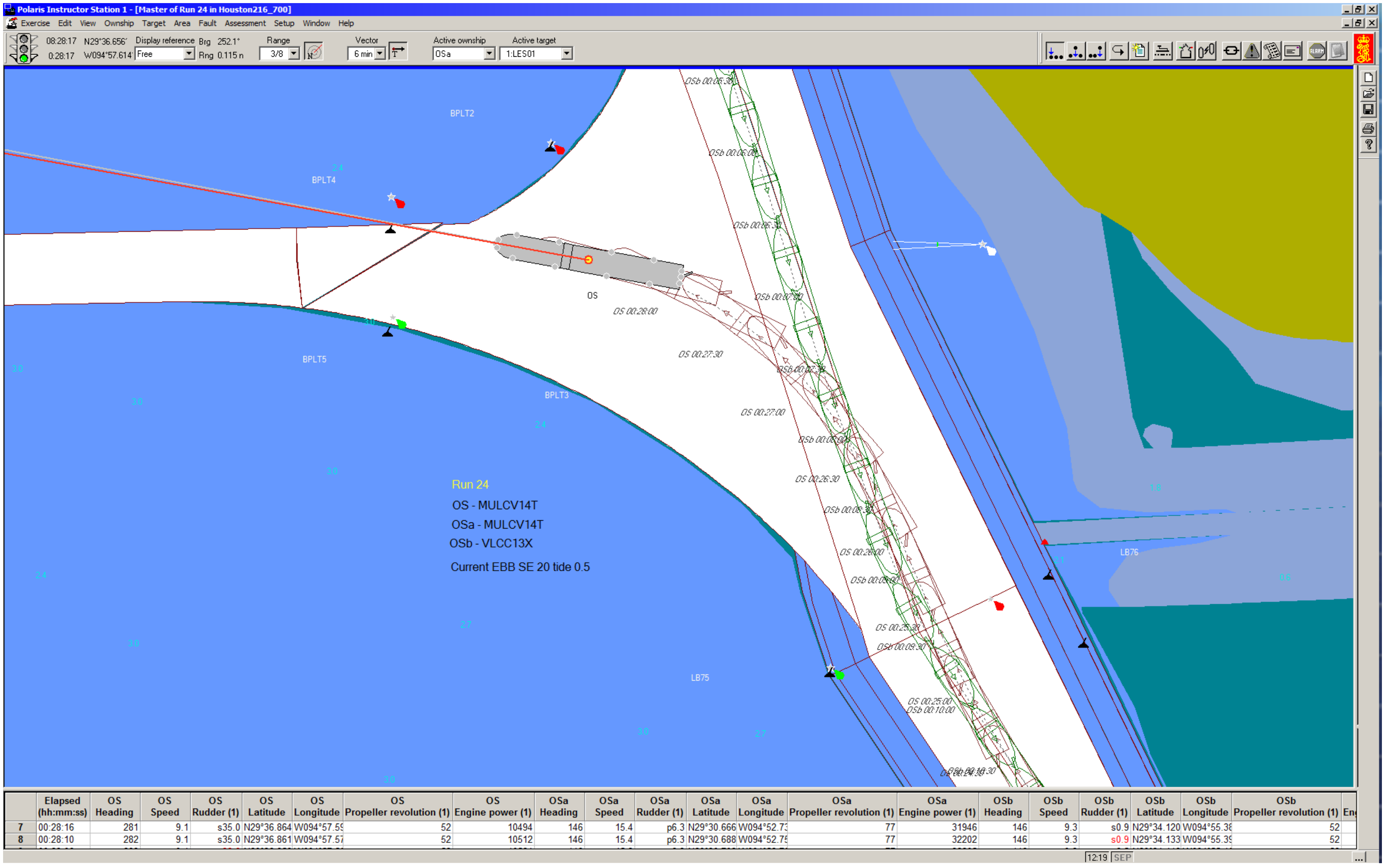
08:27:23 N29°36.714' Display reference Brg 052.9°
0:27:23 W094°56.698' Free Rng 0.395 n
Range 3/4
Vector 6 min
Active ownship OSa
Active target 1:LES01

Run 24
OS - MULCV14T
OSa - MULCV14T
OSb - VLCC13X
Current EBB SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	En
7	00:27:22	300	9.3	p35.0	N29°36.817	W094°57.44	52	10412	146	15.1	p1.9	N29°30.857	W094°52.88	77	32149	145	9.3	s1.4	N29°34.236	W094°55.47	52	
8	00:27:14	303	9.4	p35.0	N29°36.806	W094°57.42	52	10384	146	15.1	p0.2	N29°30.884	W094°52.90	77	32530	145	9.3	s1.6	N29°34.253	W094°55.49	52	

This is an own ship ground speed vector

12:18 SEP

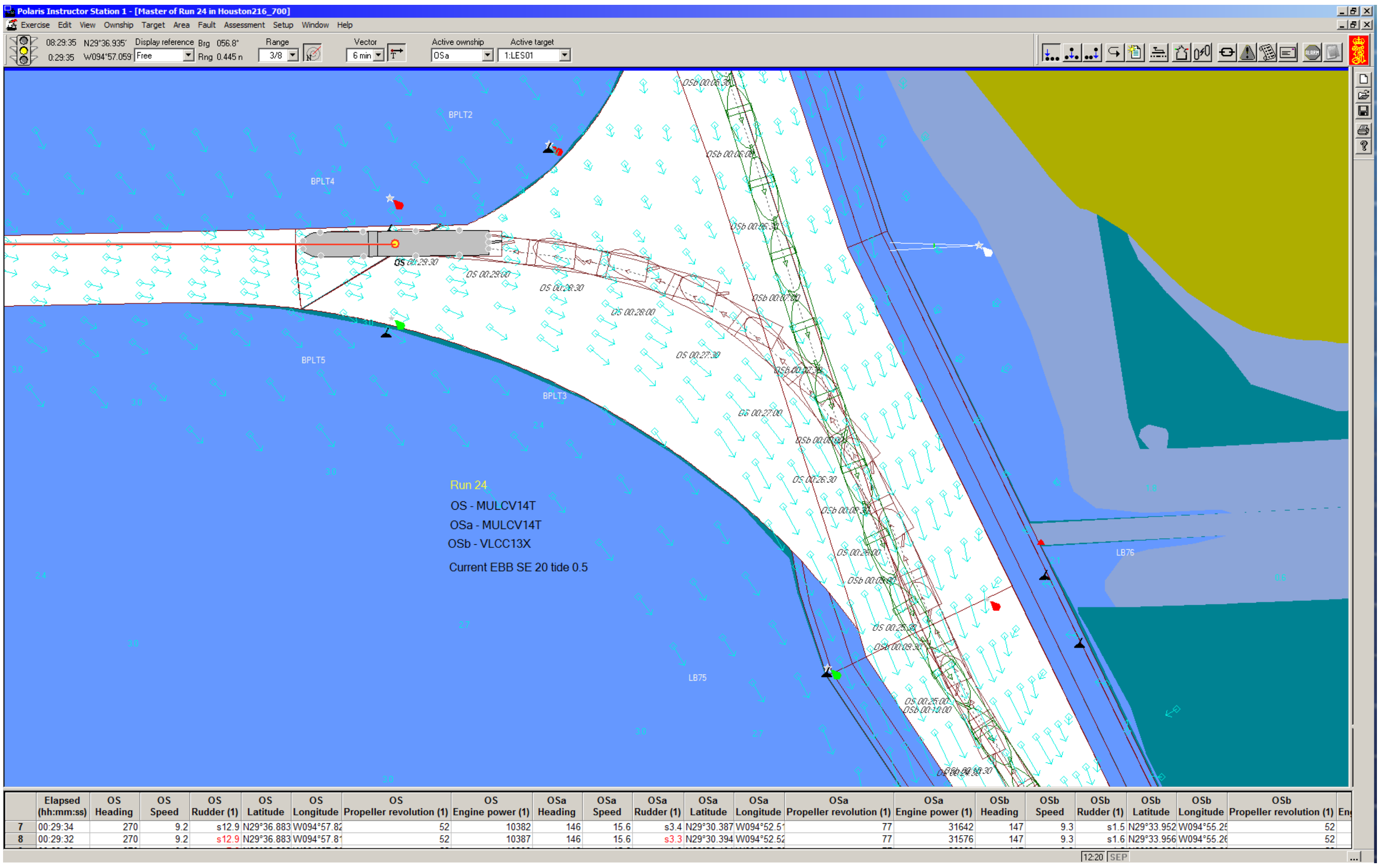


Polaris Instructor Station 1 - [Master of Run 24 in Houston216_700]

08:28:17 N29°36.656′ Display reference Free Brg 252.1° Rng 0.115 n Range 3/8 Vector 6 min Active ownship OSa Active target 1:LES01
0:28:17 W094°57.614′

Run 24
OS - MULCV14T
OSa - MULCV14T
OSb - VLCC13X
Current EBB SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	En
7	00:28:16	281	9.1	s35.0	N29°36.864	W094°57.59	52	10494	146	15.4	p6.3	N29°30.666	W094°52.73	77	31946	146	9.3	s0.9	N29°34.120	W094°55.38	52	
8	00:28:10	282	9.1	s35.0	N29°36.861	W094°57.57	52	10512	146	15.4	p6.3	N29°30.688	W094°52.75	77	32202	146	9.3	s0.9	N29°34.133	W094°55.39	52	

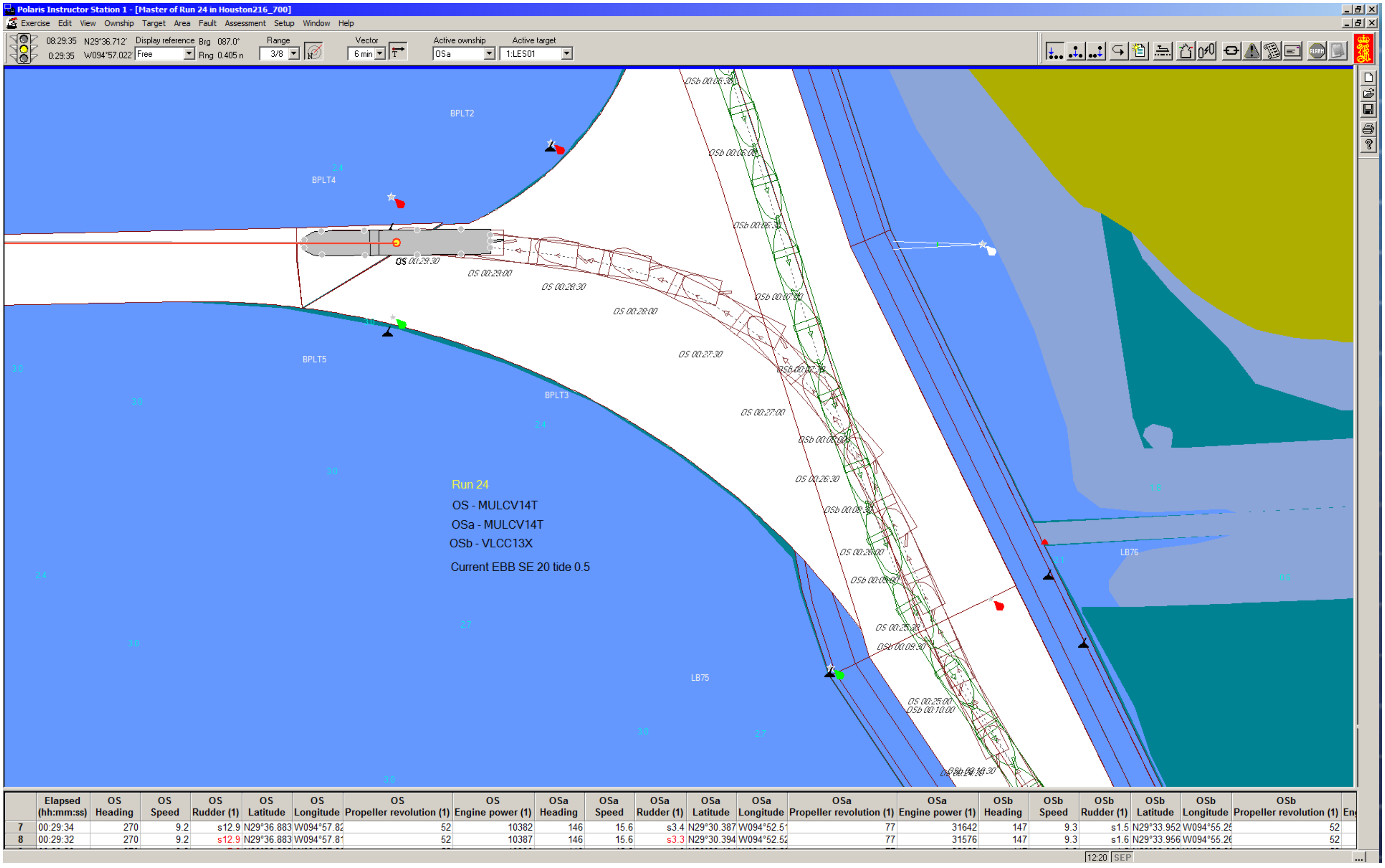


Polaris Instructor Station 1 - [Master of Run 24 in Houston216_700]

08:29:35 N29°36.935′ Display reference Free Brg 056.8° Rng 0.445 n Range 3/8 Vector 6 min Active ownship OSa Active target 1:LES01
0:29:35 W094°57.059′

Run 24
OS - MULCV14T
OSa - MULCV14T
OSb - VLCC13X
Current EBB SE 20 tide 0.5

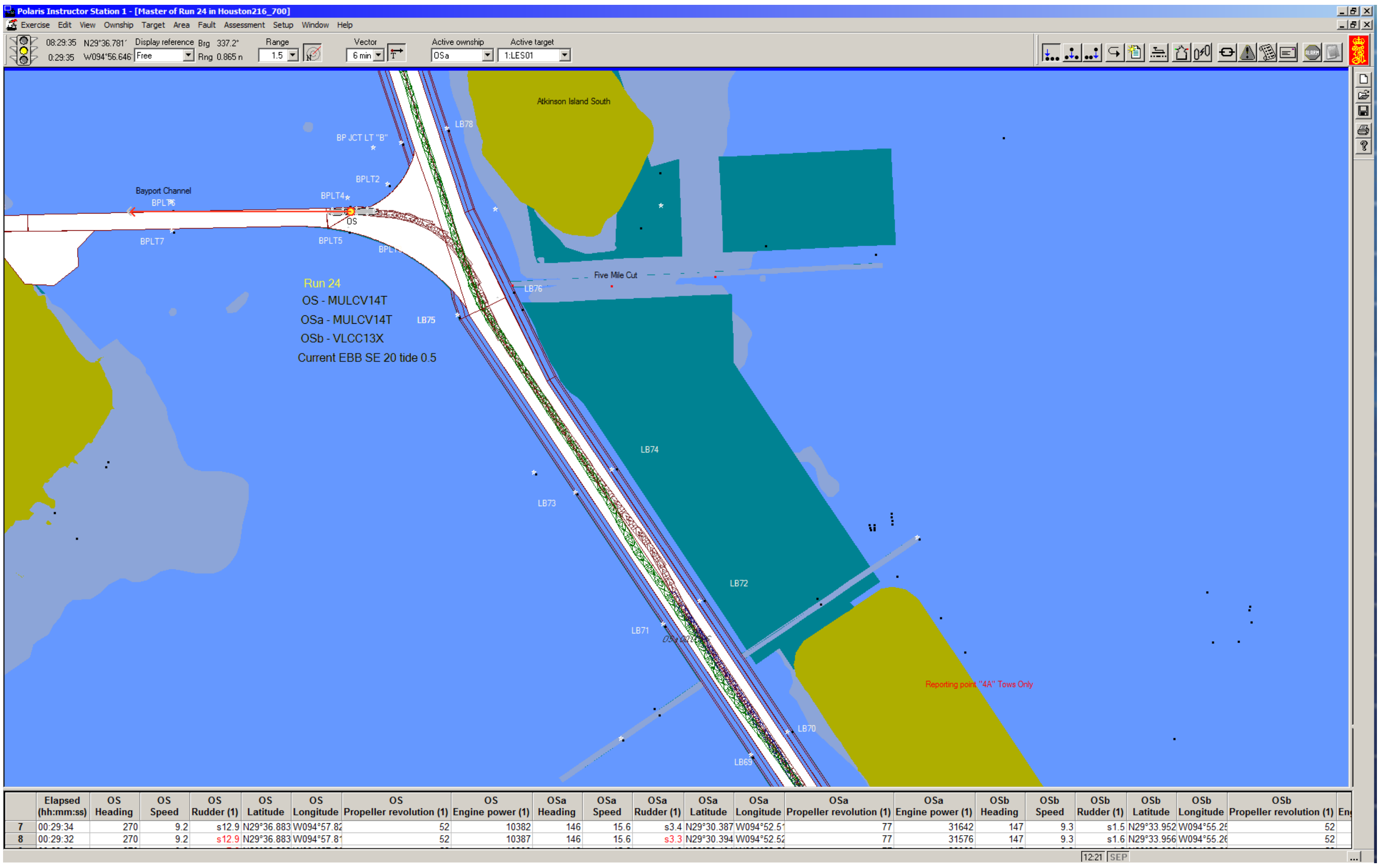
	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	En
7	00:29:34	270	9.2	s12.9	N29°36.883	W094°57.82	52	10382	146	15.6	s3.4	N29°30.387	W094°52.51	77	31642	147	9.3	s1.5	N29°33.952	W094°55.25	52	
8	00:29:32	270	9.2	s12.9	N29°36.883	W094°57.81	52	10387	146	15.6	s3.3	N29°30.394	W094°52.52	77	31576	147	9.3	s1.6	N29°33.956	W094°55.26	52	



08:29:35 N29°36.712' W094°57.022 Display reference Free Brg 087.0° Rng 0.405 n Range 3/8 Vector 6 min Active ownship OSa Active target 1:LES01

Run 24
OS - MULCV14T
OSa - MULCV14T
OSb - VLCC13X
Current EBB SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	En
7	00:29:34	270	9.2	s12.9	N29°36.883	W094°57.82	52	10382	146	15.6	s3.4	N29°30.387	W094°52.51	77	31642	147	9.3	s1.5	N29°33.952	W094°55.25	52	
8	00:29:32	270	9.2	s12.9	N29°36.883	W094°57.81	52	10387	146	15.6	s3.3	N29°30.394	W094°52.52	77	31576	147	9.3	s1.6	N29°33.956	W094°55.26	52	



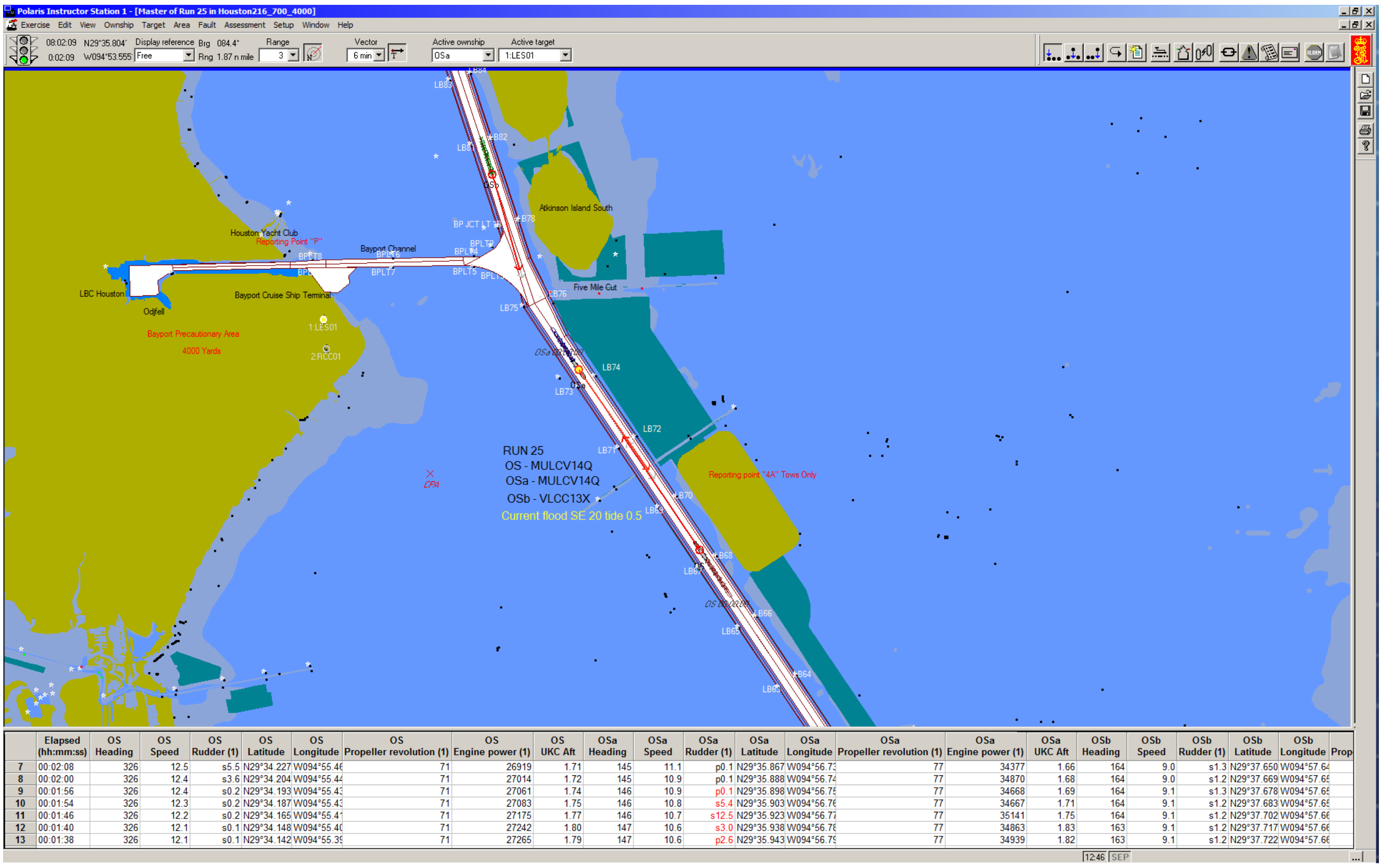
08:29:35 N29°36.781' W094°56.646' Display reference Free Brg 337.2° Rng 0.865 n Range 1.5 Vector 6 min Active ownship OSa Active target 1:LES01

Run 24
OS - MULCV14T
OSa - MULCV14T
OSb - VLCC13X
Current EBB SE 20 tide 0.5

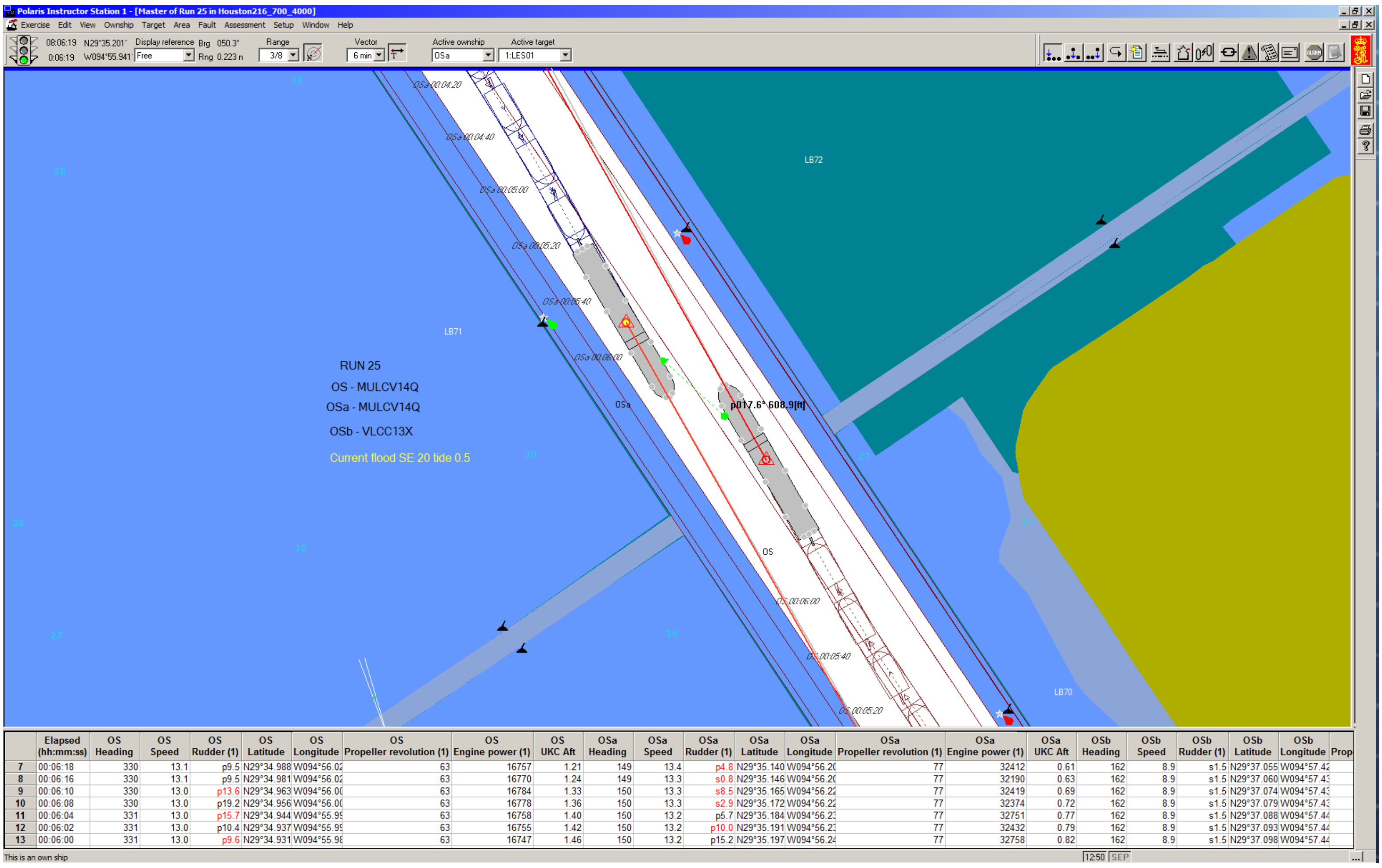
	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	OSb Propeller revolution (1)	En
7	00:29:34	270	9.2	s12.9	N29°36.883	W094°57.82	52	10382	146	15.6	s3.4	N29°30.387	W094°52.51	77	31642	147	9.3	s1.5	N29°33.952	W094°55.25	52	
8	00:29:32	270	9.2	s12.9	N29°36.883	W094°57.81	52	10387	146	15.6	s3.3	N29°30.394	W094°52.52	77	31576	147	9.3	s1.6	N29°33.956	W094°55.26	52	

June 26, 2019

Run 25

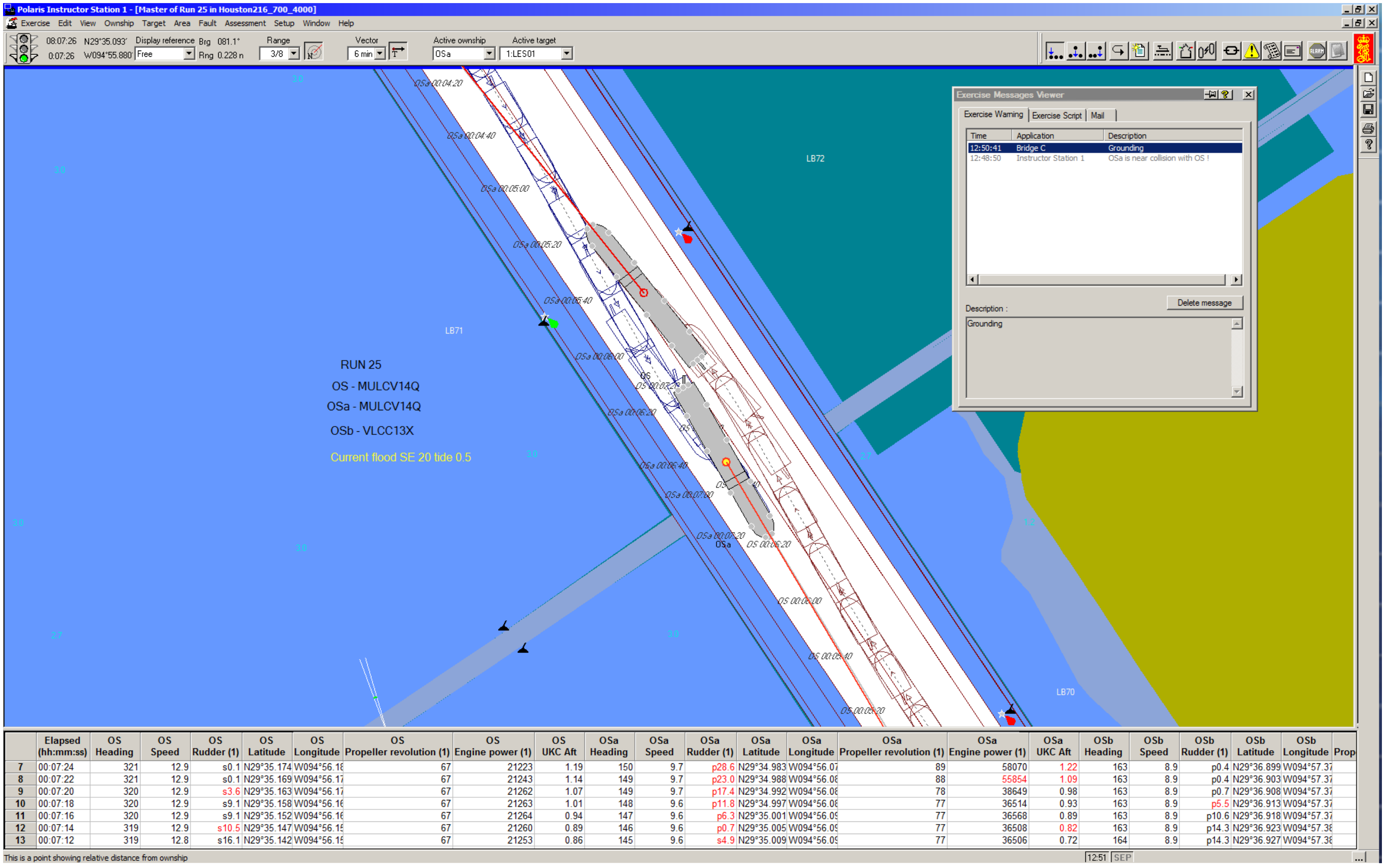


	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS UKC Aft	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	OSa UKC Aft	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	Prop
7	00:02:08	326	12.5	s5.5	N29°34.227	W094°55.46	71	26919	1.71	145	11.1	p0.1	N29°35.867	W094°56.73	77	34377	1.66	164	9.0	s1.3	N29°37.650	W094°57.64	
8	00:02:00	326	12.4	s3.6	N29°34.204	W094°55.44	71	27014	1.72	145	10.9	p0.1	N29°35.888	W094°56.74	77	34870	1.68	164	9.0	s1.2	N29°37.669	W094°57.65	
9	00:01:56	326	12.4	s0.2	N29°34.193	W094°55.43	71	27061	1.74	146	10.9	p0.1	N29°35.898	W094°56.75	77	34668	1.69	164	9.1	s1.3	N29°37.678	W094°57.65	
10	00:01:54	326	12.3	s0.2	N29°34.187	W094°55.43	71	27083	1.75	146	10.8	s5.4	N29°35.903	W094°56.76	77	34667	1.71	164	9.1	s1.2	N29°37.683	W094°57.65	
11	00:01:46	326	12.2	s0.2	N29°34.165	W094°55.41	71	27175	1.77	146	10.7	s12.5	N29°35.923	W094°56.77	77	35141	1.75	164	9.1	s1.2	N29°37.702	W094°57.66	
12	00:01:40	326	12.1	s0.1	N29°34.148	W094°55.40	71	27242	1.80	147	10.6	s3.0	N29°35.938	W094°56.78	77	34863	1.83	163	9.1	s1.2	N29°37.717	W094°57.66	
13	00:01:38	326	12.1	s0.1	N29°34.142	W094°55.39	71	27265	1.79	147	10.6	p2.6	N29°35.943	W094°56.79	77	34939	1.82	163	9.1	s1.2	N29°37.722	W094°57.66	



	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS UKC Aft	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	OSa UKC Aft	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	Prop
7	00:06:18	330	13.1	p9.5	N29°34.988	W094°56.02	63	16757	1.21	149	13.4	p4.8	N29°35.140	W094°56.20	77	32412	0.61	162	8.9	s1.5	N29°37.055	W094°57.42	
8	00:06:16	330	13.1	p9.5	N29°34.981	W094°56.02	63	16770	1.24	149	13.3	s0.8	N29°35.146	W094°56.20	77	32190	0.63	162	8.9	s1.5	N29°37.060	W094°57.43	
9	00:06:10	330	13.0	p13.6	N29°34.963	W094°56.00	63	16784	1.33	150	13.3	s8.5	N29°35.165	W094°56.22	77	32419	0.69	162	8.9	s1.5	N29°37.074	W094°57.43	
10	00:06:08	330	13.0	p19.2	N29°34.956	W094°56.00	63	16778	1.36	150	13.3	s2.9	N29°35.172	W094°56.22	77	32374	0.72	162	8.9	s1.5	N29°37.079	W094°57.43	
11	00:06:04	331	13.0	p15.7	N29°34.944	W094°55.99	63	16758	1.40	150	13.2	p5.7	N29°35.184	W094°56.23	77	32751	0.77	162	8.9	s1.5	N29°37.088	W094°57.44	
12	00:06:02	331	13.0	p10.4	N29°34.937	W094°55.99	63	16755	1.42	150	13.2	p10.0	N29°35.191	W094°56.23	77	32432	0.79	162	8.9	s1.5	N29°37.093	W094°57.44	
13	00:06:00	331	13.0	p9.6	N29°34.931	W094°55.98	63	16747	1.46	150	13.2	p15.2	N29°35.197	W094°56.24	77	32758	0.82	162	8.9	s1.5	N29°37.098	W094°57.44	

This is an own ship



08:07:26 N29°35.093′ Display reference Free Brg 081.1° Range 3/8 Vector 6 min Active ownship OSa Active target 1:LES01

0:07:26 W094°55.880′ Rng 0.228 n

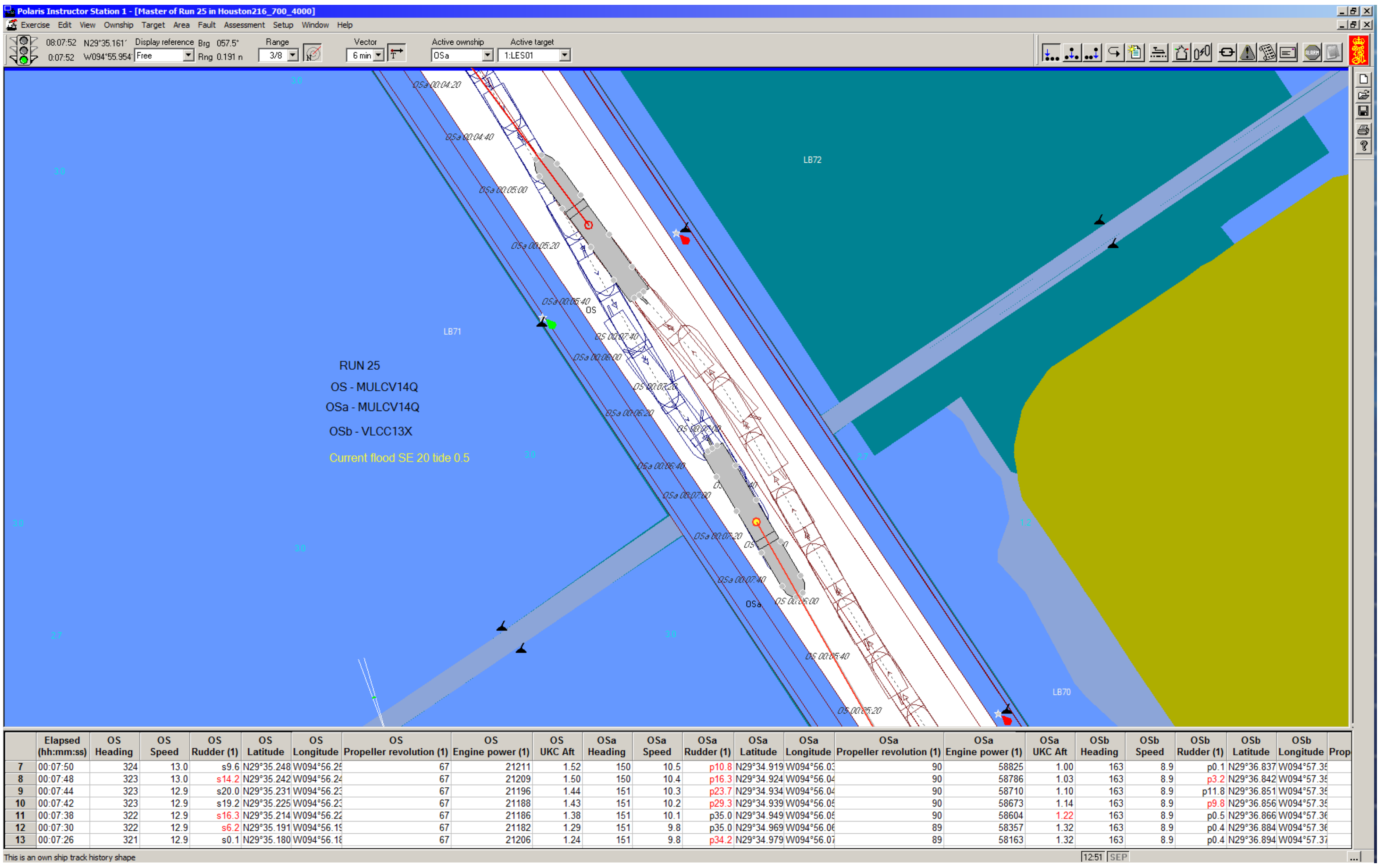
Time	Application	Description
12:50:41	Bridge C	Grounding
12:48:50	Instructor Station 1	OSa is near collision with OS !

Description :

Grounding

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS UKC Aft	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	OSa UKC Aft	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	Prop
7	00:07:24	321	12.9	s0.1	N29°35.174	W094°56.18	67	21223	1.19	150	9.7	p28.6	N29°34.983	W094°56.07	89	58070	1.22	163	8.9	p0.4	N29°36.899	W094°57.37	
8	00:07:22	321	12.9	s0.1	N29°35.169	W094°56.17	67	21243	1.14	149	9.7	p23.0	N29°34.988	W094°56.08	88	55854	1.09	163	8.9	p0.4	N29°36.903	W094°57.37	
9	00:07:20	320	12.9	s3.6	N29°35.163	W094°56.17	67	21262	1.07	149	9.7	p17.4	N29°34.992	W094°56.08	78	38649	0.98	163	8.9	p0.7	N29°36.908	W094°57.37	
10	00:07:18	320	12.9	s9.1	N29°35.158	W094°56.16	67	21263	1.01	148	9.6	p11.8	N29°34.997	W094°56.08	77	36514	0.93	163	8.9	p5.5	N29°36.913	W094°57.37	
11	00:07:16	320	12.9	s9.1	N29°35.152	W094°56.16	67	21264	0.94	147	9.6	p6.3	N29°35.001	W094°56.09	77	36568	0.89	163	8.9	p10.6	N29°36.918	W094°57.37	
12	00:07:14	319	12.9	s10.5	N29°35.147	W094°56.15	67	21260	0.89	146	9.6	p0.7	N29°35.005	W094°56.09	77	36508	0.82	163	8.9	p14.3	N29°36.923	W094°57.38	
13	00:07:12	319	12.8	s16.1	N29°35.142	W094°56.15	67	21253	0.86	145	9.6	s4.9	N29°35.009	W094°56.09	77	36506	0.72	164	8.9	p14.3	N29°36.927	W094°57.38	

This is a point showing relative distance from ownship

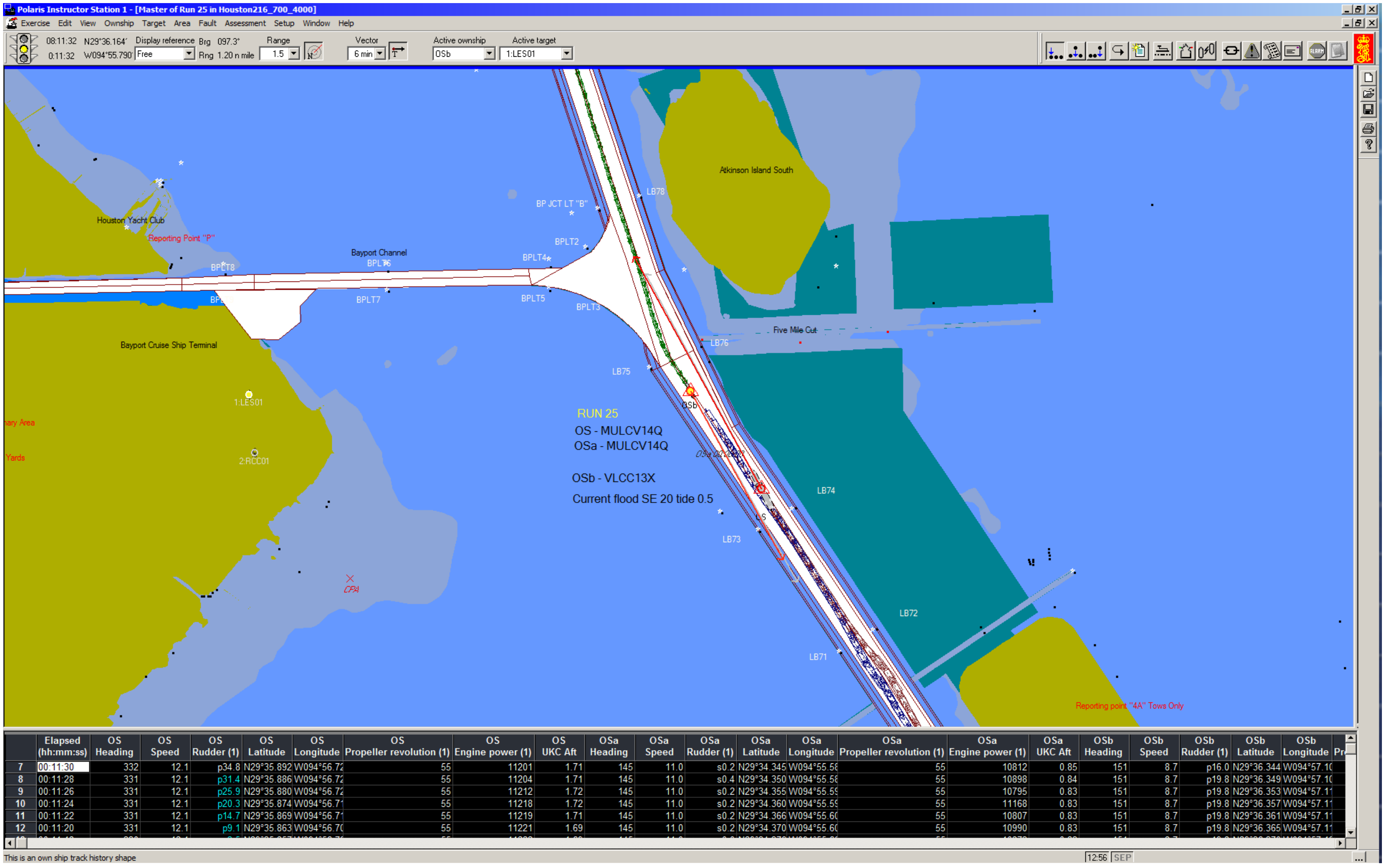


08:07:52 N29°35.161′ Display reference Free Brg 057.5° Range 3/8 Vector 6 min Active ownship OSa Active target 1:LES01

0:07:52 W094°55.954′ Rng 0.191 n

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS UKC Aft	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	OSa UKC Aft	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	Prop
7	00:07:50	324	13.0	s9.6	N29°35.248	W094°56.25	67	21211	1.52	150	10.5	p10.8	N29°34.919	W094°56.03	90	58825	1.00	163	8.9	p0.1	N29°36.837	W094°57.35	
8	00:07:48	323	13.0	s14.2	N29°35.242	W094°56.24	67	21209	1.50	150	10.4	p16.3	N29°34.924	W094°56.04	90	58786	1.03	163	8.9	p3.2	N29°36.842	W094°57.35	
9	00:07:44	323	12.9	s20.0	N29°35.231	W094°56.23	67	21196	1.44	151	10.3	p23.7	N29°34.934	W094°56.04	90	58710	1.10	163	8.9	p11.8	N29°36.851	W094°57.35	
10	00:07:42	323	12.9	s19.2	N29°35.225	W094°56.23	67	21188	1.43	151	10.2	p29.3	N29°34.939	W094°56.05	90	58673	1.14	163	8.9	p9.8	N29°36.856	W094°57.35	
11	00:07:38	322	12.9	s16.3	N29°35.214	W094°56.22	67	21186	1.38	151	10.1	p35.0	N29°34.949	W094°56.05	90	58604	1.22	163	8.9	p0.5	N29°36.866	W094°57.36	
12	00:07:30	322	12.9	s6.2	N29°35.191	W094°56.19	67	21182	1.29	151	9.8	p35.0	N29°34.969	W094°56.06	89	58357	1.32	163	8.9	p0.4	N29°36.884	W094°57.36	
13	00:07:26	321	12.9	s0.1	N29°35.180	W094°56.18	67	21206	1.24	151	9.8	p34.2	N29°34.979	W094°56.07	89	58163	1.32	163	8.9	p0.4	N29°36.894	W094°57.37	

This is an own ship track history shape



Polaris Instructor Station 1 - [Master of Run 25 in Houston216_700_4000]

08:11:32 N29°36.164´
0:11:32 W094°55.790´
Display reference: Free
Brg 097.3°
Rng 1.20 n mile
Range: 1.5
Vector: 6 min
Active ownship: OSb
Active target: 1:LES01

RUN 25

OS - MULCV14Q
OSa - MULCV14Q

OSb - VLCC13X

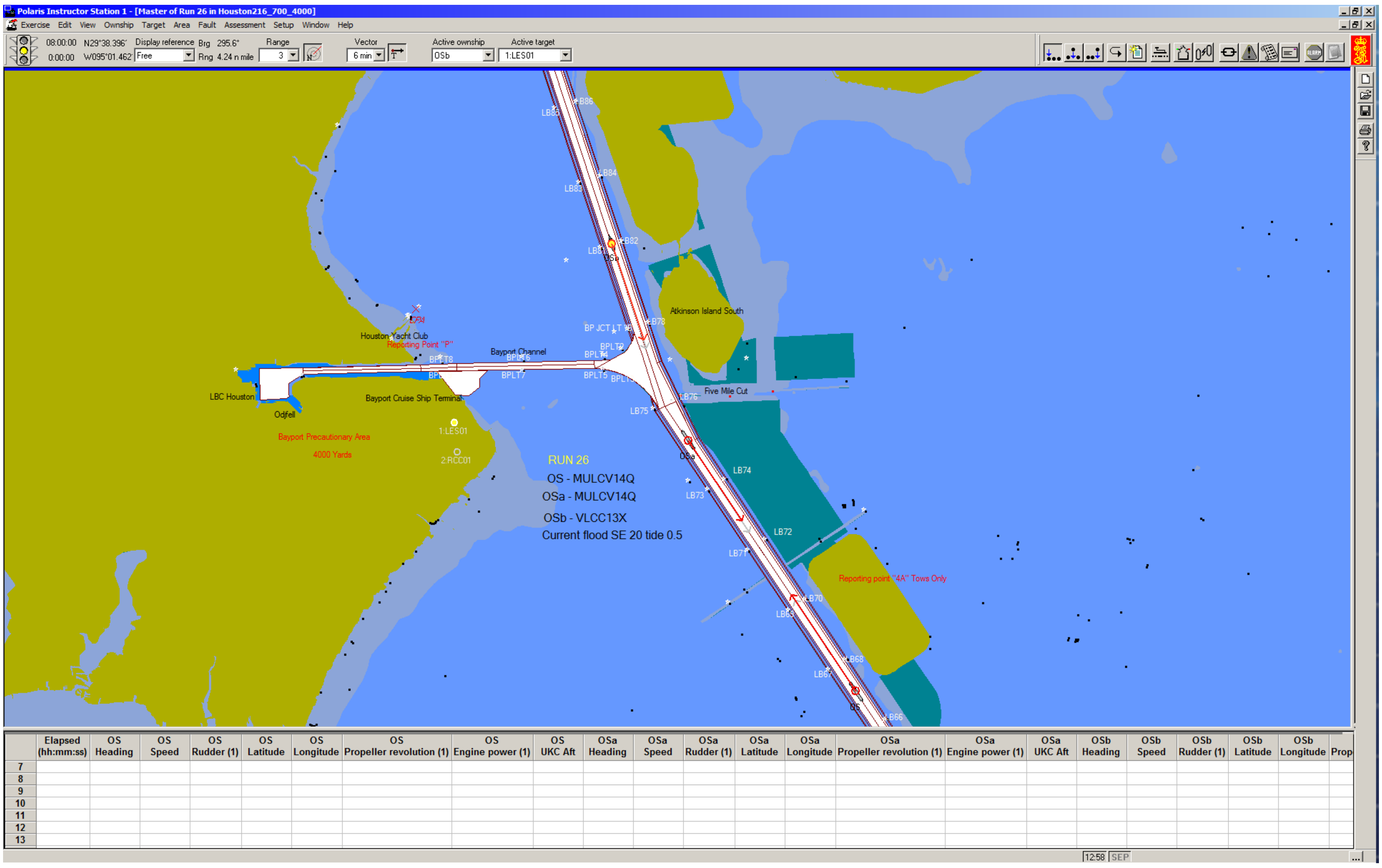
Current flood SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS UKC Aft	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	OSa UKC Aft	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude
7	00:11:30	332	12.1	p34.8	N29°35.892	W094°56.72	55	11201	1.71	145	11.0	s0.2	N29°34.345	W094°55.58	55	10812	0.85	151	8.7	p16.0	N29°36.344	W094°57.10
8	00:11:28	331	12.1	p31.4	N29°35.886	W094°56.72	55	11204	1.71	145	11.0	s0.4	N29°34.350	W094°55.58	55	10898	0.84	151	8.7	p19.8	N29°36.349	W094°57.10
9	00:11:26	331	12.1	p25.9	N29°35.880	W094°56.72	55	11212	1.72	145	11.0	s0.2	N29°34.355	W094°55.59	55	10795	0.83	151	8.7	p19.8	N29°36.353	W094°57.11
10	00:11:24	331	12.1	p20.3	N29°35.874	W094°56.71	55	11218	1.72	145	11.0	s0.2	N29°34.360	W094°55.59	55	11168	0.83	151	8.7	p19.8	N29°36.357	W094°57.11
11	00:11:22	331	12.1	p14.7	N29°35.869	W094°56.71	55	11219	1.71	145	11.0	s0.2	N29°34.366	W094°55.60	55	10807	0.83	151	8.7	p19.8	N29°36.361	W094°57.11
12	00:11:20	331	12.1	p9.1	N29°35.863	W094°56.70	55	11221	1.69	145	11.0	s0.2	N29°34.370	W094°55.60	55	10990	0.83	151	8.7	p19.8	N29°36.365	W094°57.11

This is an own ship track history shape

June 26, 2019

Run 26



08:00:00 N29°38.396'
0:00:00 W095°01.462'
Display reference Free
Brg 295.6°
Rng 4.24 n mile
Range 3
Vector 6 min
Active ownship OSb
Active target 1:LES01

RUN 26

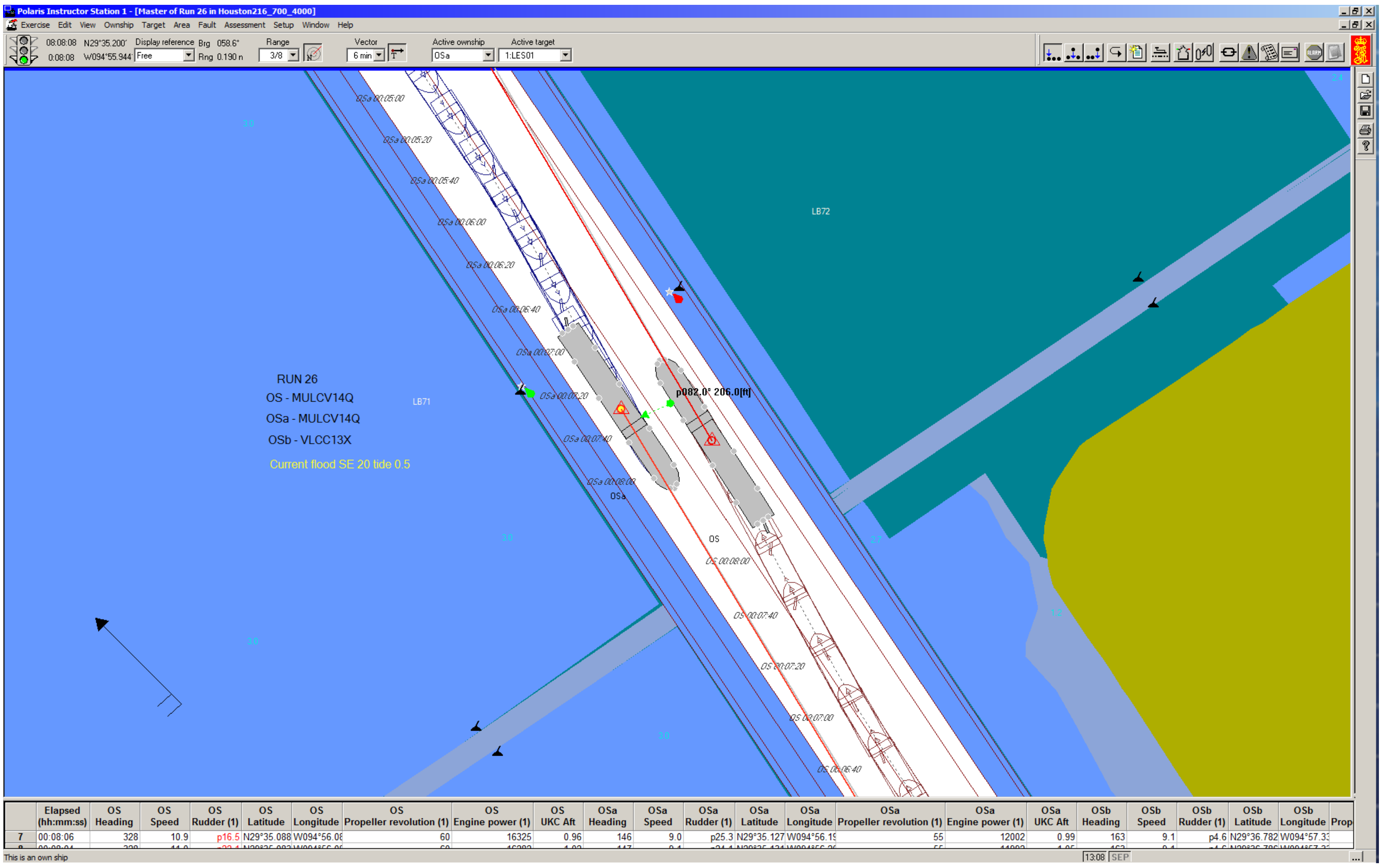
OS - MULCV14Q

OSa - MULCV14Q

OSb - VLCC13X

Current flood SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS UKC Aft	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	OSa UKC Aft	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	Prop
7																							
8																							
9																							
10																							
11																							
12																							
13																							



08:08:08 N29°35.200'
0:08:08 W094°55.944'
Display reference Free
Brg 058.6°
Rng 0.190 n
Range 3/8
Vector 6 min
Active ownship OSa
Active target 1:LES01

RUN 26

OS - MULCV14Q

OSa - MULCV14Q

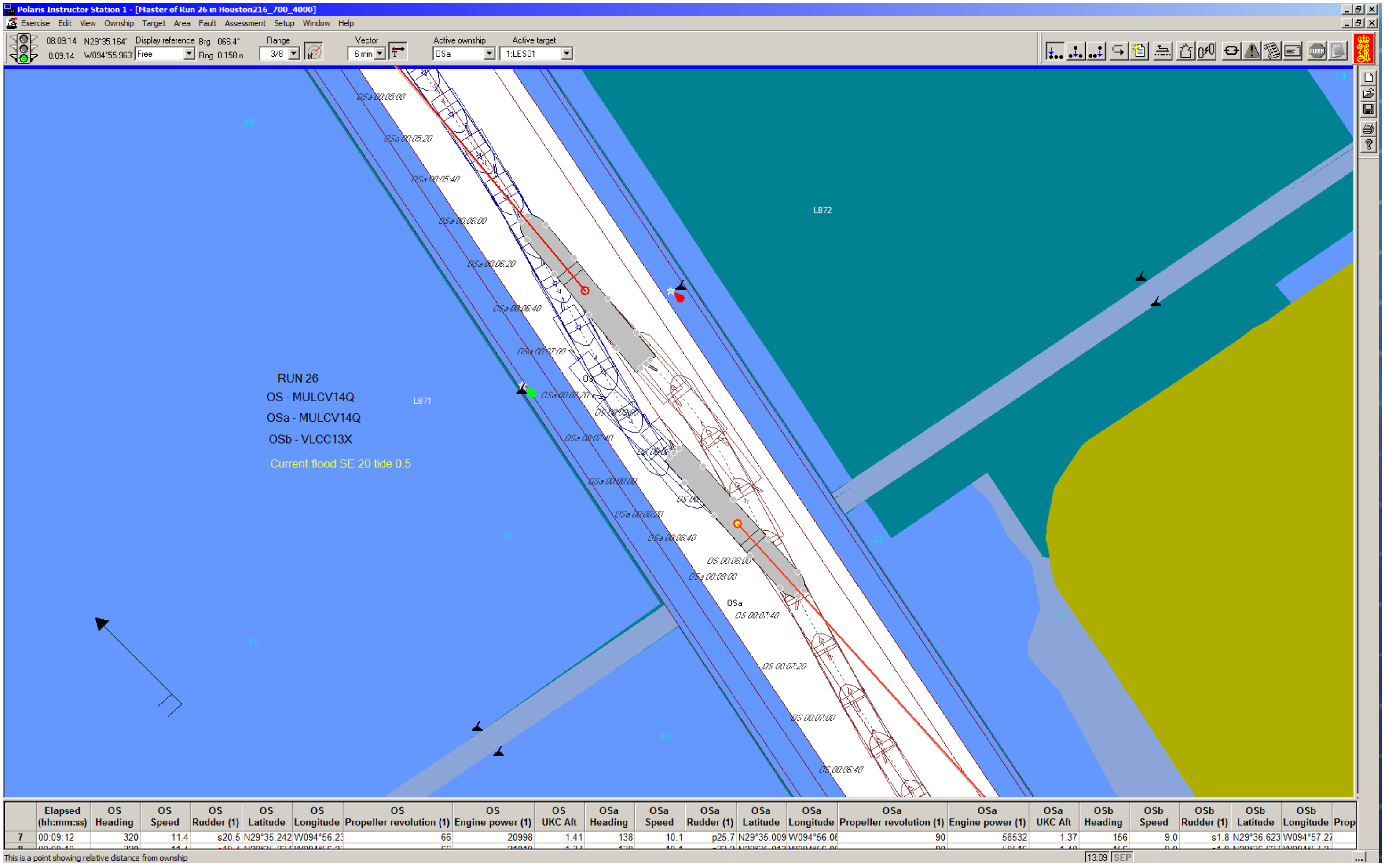
OSb - VLCC13X

Current flood SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS UKC Aft	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	OSa UKC Aft	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	Prop
7	00:08:06	328	10.9	p16.5	N29°35.088	W094°56.08	60	16325	0.96	146	9.0	p25.3	N29°35.127	W094°56.19	55	12002	0.99	163	9.1	p4.6	N29°36.782	W094°57.33	

This is an own ship

June 26, 2019



Polaris Instructor Station 1 - [Master of Run 26 in Houston216_700_4000]

08:09:14 N29°35.164′ Display reference: Free Brg 066.4° Range: 3/8 Vector: 6 min Active ownship: OSa Active target: 1:LES01

0:09:14 W094°55.963′ Rng 0.158 n

RUN 26

OS - MULCV14Q

OSa - MULCV14Q

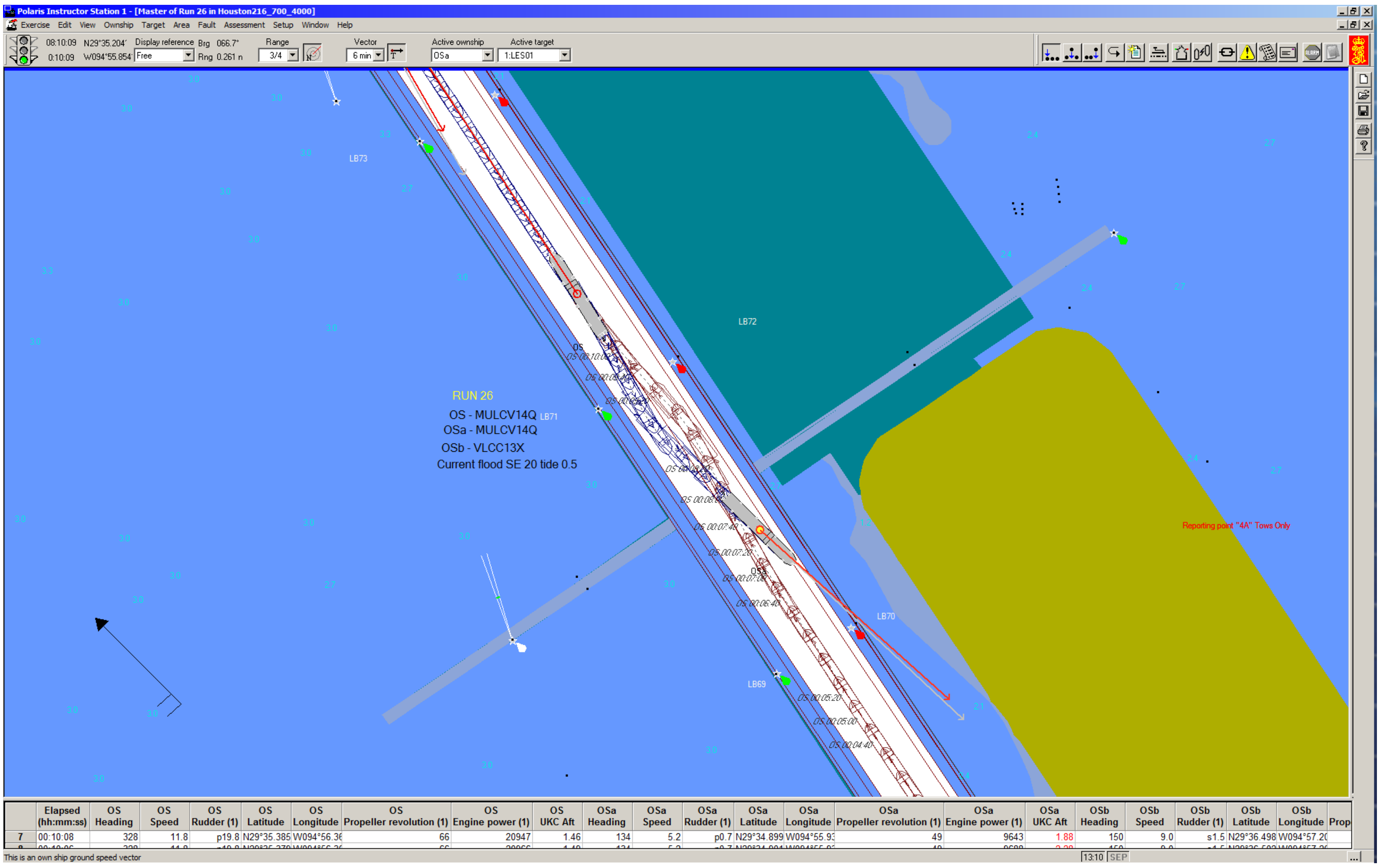
OSb - VLCC13X

Current flood SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS UKC Aft	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	OSa UKC Aft	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	Prop
7	00:09:12	320	11.4	s20.5	N29°35.242	W094°56.23	66	20998	1.41	138	10.1	p25.7	N29°35.009	W094°56.06	90	58532	1.37	156	9.0	s1.8	N29°36.623	W094°57.27	

This is a point showing relative distance from ownship

13:09 SEP



Polaris Instructor Station 1 - [Master of Run 26 in Houston216_700_4000]

08:10:09 N29°35.204′ Display reference: Free Brg 066.7° Range: 3/4 Vector: 6 min Active ownship: OSa Active target: 1:LES01

0:10:09 W094°55.854′ Rng 0.261 n

RUN 26

OS - MULCV14Q

OSa - MULCV14Q

OSb - VLCC13X

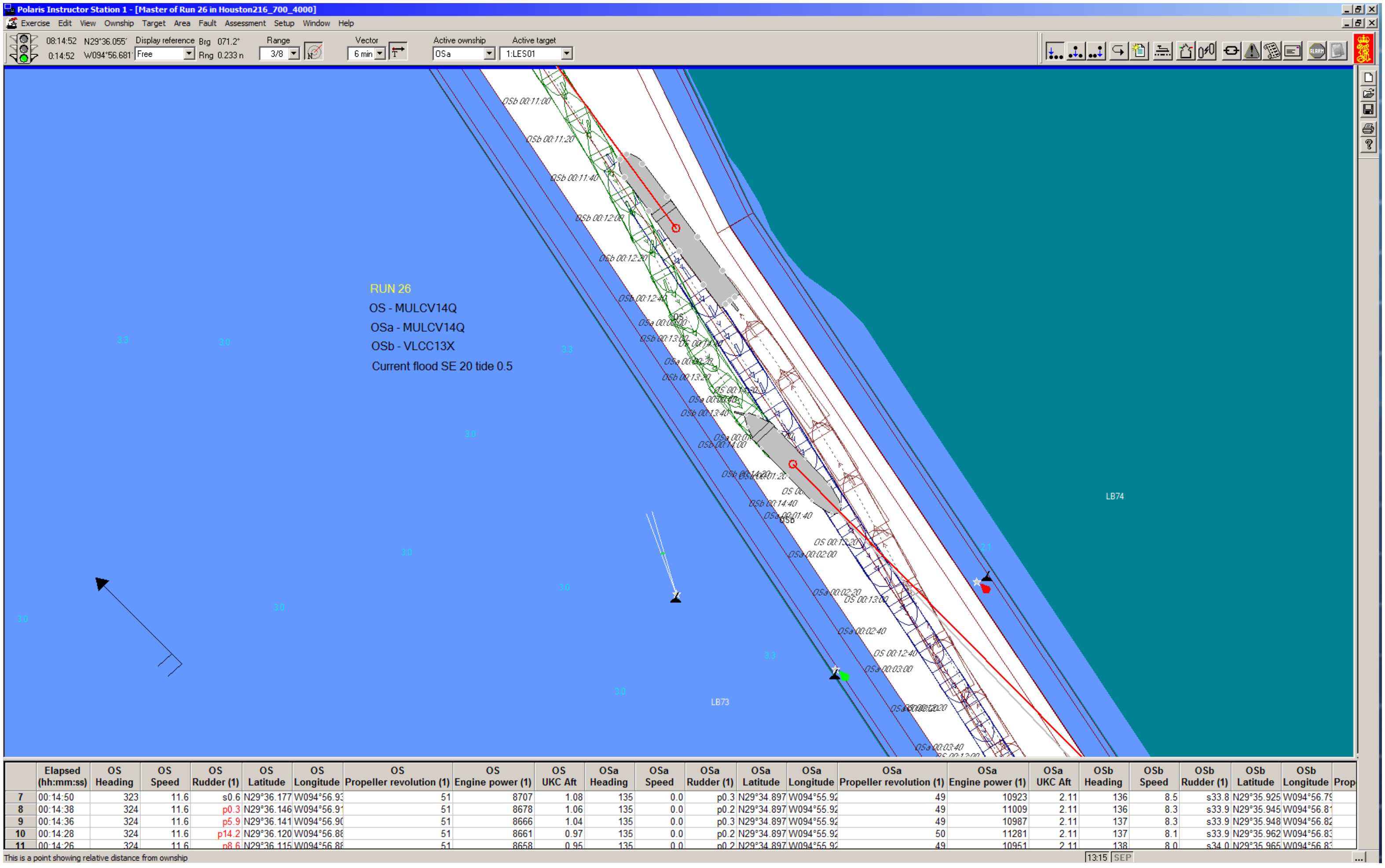
Current flood SE 20 tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS UKC Aft	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	OSa UKC Aft	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	Prop
7	00:10:08	328	11.8	p19.8	N29°35.385	W094°56.36	66	20947	1.46	134	5.2	p0.7	N29°34.899	W094°55.93	49	9643	1.88	150	9.0	s1.5	N29°36.498	W094°57.20	

This is an own ship ground speed vector

13:10 SEP

June 26, 2019



08:14:52 N29°36.055′ Display reference Free Brg 071.2° Rng 0.233 n Range 3/8 Vector 6 min Active ownship OSa Active target 1:LES01

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS UKC Aft	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	OSa UKC Aft	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	Prop
7	00:14:50	323	11.6	s0.6	N29°36.177	W094°56.93	51	8707	1.08	135	0.0	p0.3	N29°34.897	W094°55.92	49	10923	2.11	136	8.5	s33.8	N29°35.925	W094°56.79	
8	00:14:38	324	11.6	p0.3	N29°36.146	W094°56.91	51	8678	1.06	135	0.0	p0.2	N29°34.897	W094°55.92	49	11009	2.11	136	8.3	s33.9	N29°35.945	W094°56.81	
9	00:14:36	324	11.6	p5.9	N29°36.141	W094°56.90	51	8666	1.04	135	0.0	p0.3	N29°34.897	W094°55.92	49	10987	2.11	137	8.3	s33.9	N29°35.948	W094°56.82	
10	00:14:28	324	11.6	p14.2	N29°36.120	W094°56.88	51	8661	0.97	135	0.0	p0.2	N29°34.897	W094°55.92	50	11281	2.11	137	8.1	s33.9	N29°35.962	W094°56.83	
11	00:14:26	324	11.6	p8.6	N29°36.115	W094°56.88	51	8658	0.95	135	0.0	p0.2	N29°34.897	W094°55.92	49	10951	2.11	138	8.0	s34.0	N29°35.965	W094°56.83	

This is a point showing relative distance from ownship

13:15 SEP

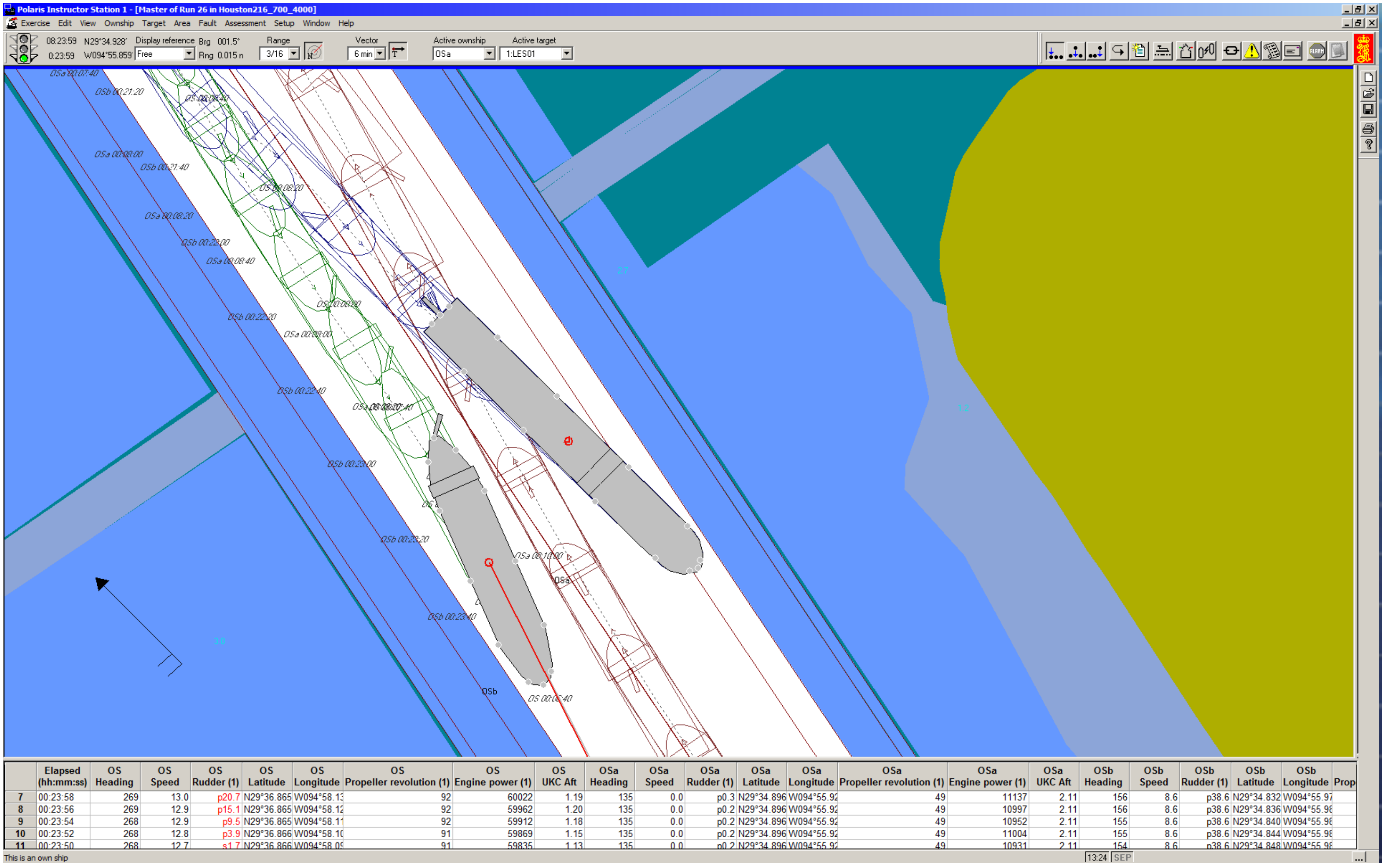
08:16:06 N29°35.871′ 0:16:06 W094°57.055′ Display reference Free Brg 223.7° Rng 0.151 n Range 3/4 Vector 6 min Active ownship OSa Active target 1:LES01

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS UKC Aft	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	OSa UKC Aft	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	Prop
7	00:16:04	323	11.3	s35.0	N29°36.366	W094°57.09	46	6074	1.64	135	0.0	p0.2	N29°34.897	W094°55.92	49	10913	2.11	146	8.5	p6.2	N29°35.793	W094°56.66	
8	00:16:00	323	11.3	s35.0	N29°36.356	W094°57.08	46	6062	1.61	135	0.0	p0.2	N29°34.897	W094°55.92	49	10948	2.11	146	8.5	p10.1	N29°35.800	W094°56.66	
9	00:15:58	323	11.3	s29.5	N29°36.351	W094°57.08	46	6057	1.61	135	0.0	p0.3	N29°34.897	W094°55.92	49	11054	2.11	145	8.5	p11.1	N29°35.804	W094°56.67	
10	00:15:56	323	11.3	s23.9	N29°36.346	W094°57.08	46	6050	1.60	135	0.0	p0.2	N29°34.897	W094°55.92	49	10913	2.11	145	8.5	p11.1	N29°35.808	W094°56.67	
11	00:15:50	323	11.4	s18.7	N29°36.331	W094°57.06	46	6030	1.55	135	0.0	p0.2	N29°34.897	W094°55.92	49	10944	2.11	144	8.5	p8.6	N29°35.819	W094°56.68	

This is an own ship

13:16 SEP

June 26, 2019



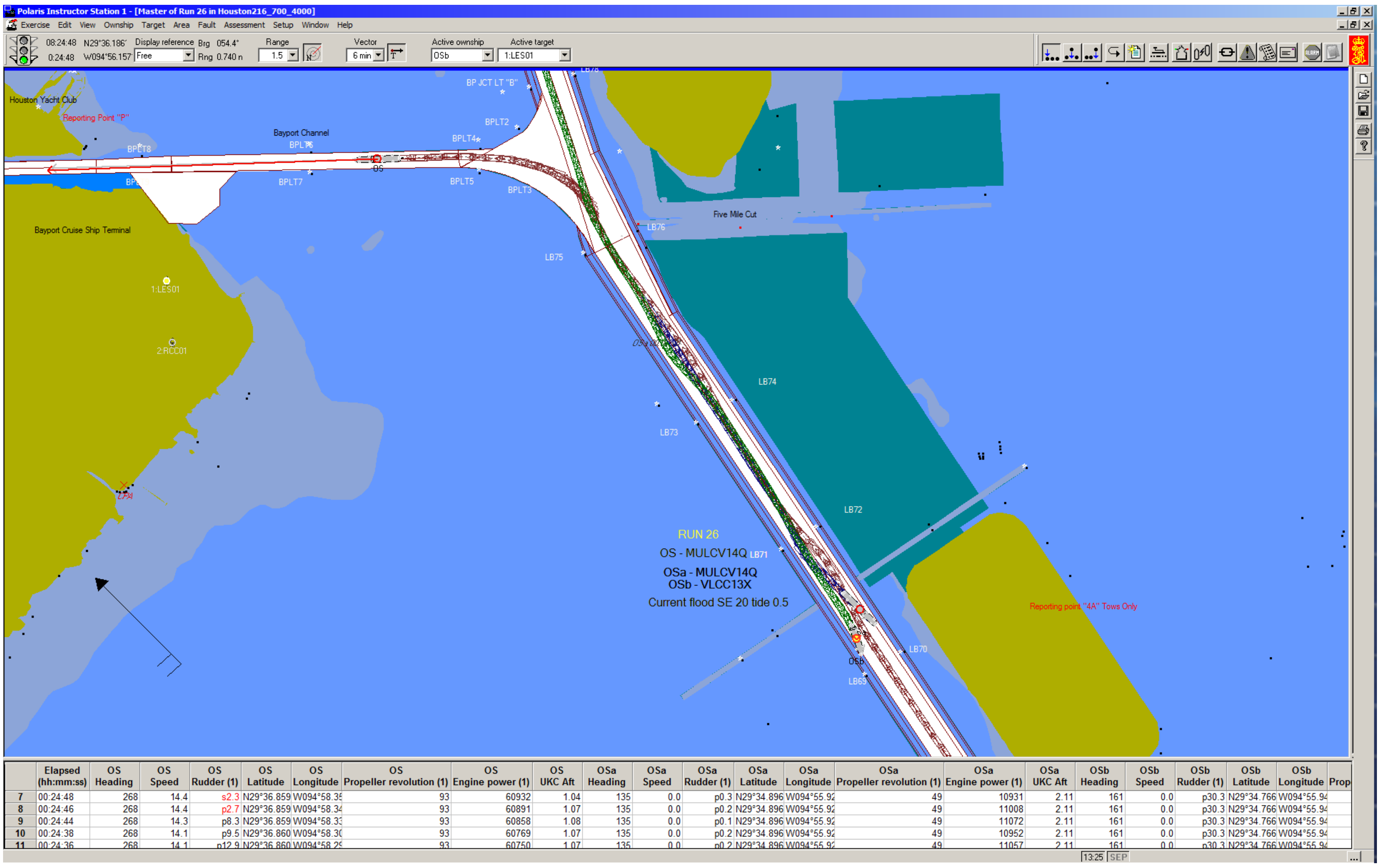
Polaris Instructor Station 1 - [Master of Run 26 in Houston216_700_4000]

08:23:59 N29°34.928′
0:23:59 W094°55.859′
Display reference: Free
Brg 001.5°
Rng 0.015 n
Range: 3/16
Vector: 6 min
Active ownship: OSa
Active target: 1:LES01

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS UKC Aft	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	OSa UKC Aft	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	Prop
7	00:23:58	269	13.0	p20.7	N29°36.865	W094°58.13	92	60022	1.19	135	0.0	p0.3	N29°34.896	W094°55.92	49	11137	2.11	156	8.6	p38.6	N29°34.832	W094°55.97	
8	00:23:56	269	12.9	p15.1	N29°36.865	W094°58.12	92	59962	1.20	135	0.0	p0.2	N29°34.896	W094°55.92	49	10997	2.11	156	8.6	p38.6	N29°34.836	W094°55.98	
9	00:23:54	268	12.9	p9.5	N29°36.865	W094°58.11	92	59912	1.18	135	0.0	p0.2	N29°34.896	W094°55.92	49	10952	2.11	155	8.6	p38.6	N29°34.840	W094°55.98	
10	00:23:52	268	12.8	p3.9	N29°36.866	W094°58.10	91	59869	1.15	135	0.0	p0.2	N29°34.896	W094°55.92	49	11004	2.11	155	8.6	p38.6	N29°34.844	W094°55.98	
11	00:23:50	268	12.7	s1.7	N29°36.866	W094°58.09	91	59835	1.13	135	0.0	p0.2	N29°34.896	W094°55.92	49	10931	2.11	154	8.6	p38.6	N29°34.848	W094°55.98	

This is an own ship

13:24 SEP



Polaris Instructor Station 1 - [Master of Run 26 in Houston216_700_4000]

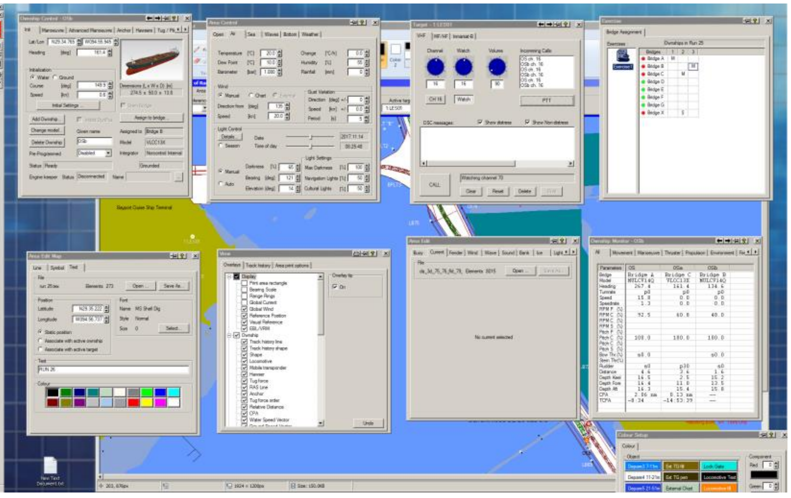
08:24:48 N29°36.186′
0:24:48 W094°56.157′
Display reference: Free
Brg 054.4°
Rng 0.740 n
Range: 1.5
Vector: 6 min
Active ownship: OSb
Active target: 1:LES01

RUN 26
OS - MULCV14Q
OSa - MULCV14Q
OSb - VLCC13X
Current flood SE 20 tide 0.5

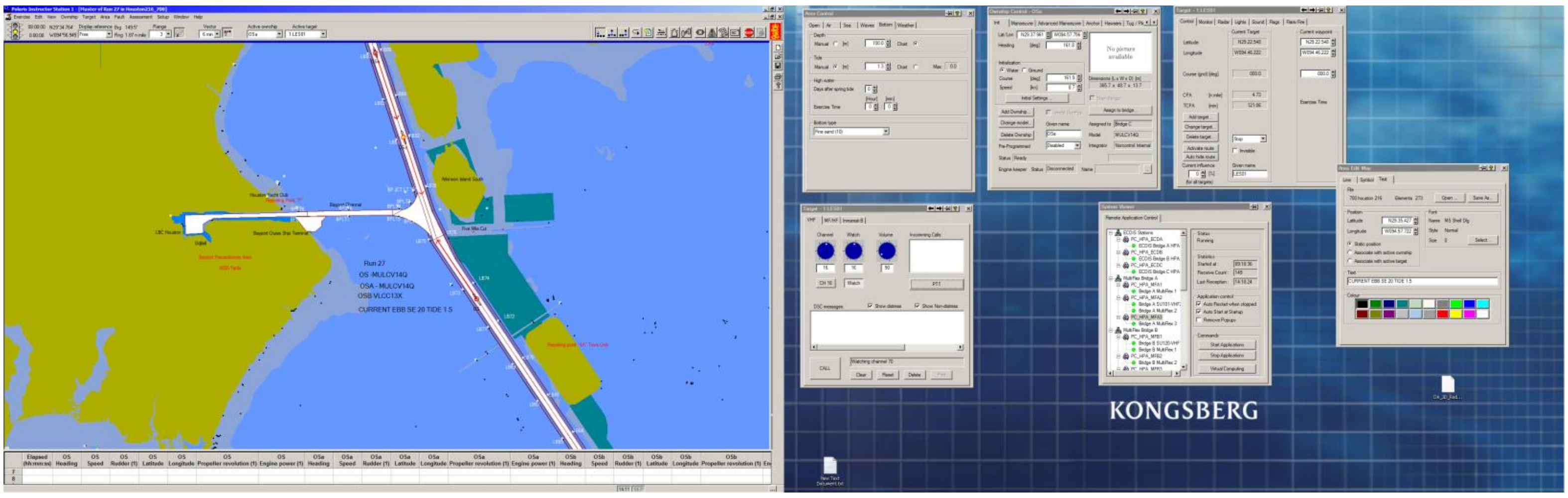
	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS UKC Aft	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	OSa UKC Aft	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	Prop
7	00:24:48	268	14.4	s2.3	N29°36.859	W094°58.35	93	60932	1.04	135	0.0	p0.3	N29°34.896	W094°55.92	49	10931	2.11	161	0.0	p30.3	N29°34.766	W094°55.94	
8	00:24:46	268	14.4	p2.7	N29°36.859	W094°58.34	93	60891	1.07	135	0.0	p0.2	N29°34.896	W094°55.92	49	11008	2.11	161	0.0	p30.3	N29°34.766	W094°55.94	
9	00:24:44	268	14.3	p8.3	N29°36.859	W094°58.33	93	60858	1.08	135	0.0	p0.1	N29°34.896	W094°55.92	49	11072	2.11	161	0.0	p30.3	N29°34.766	W094°55.94	
10	00:24:38	268	14.1	p9.5	N29°36.860	W094°58.30	93	60769	1.07	135	0.0	p0.2	N29°34.896	W094°55.92	49	10952	2.11	161	0.0	p30.3	N29°34.766	W094°55.94	
11	00:24:36	268	14.1	p12.9	N29°36.860	W094°58.29	93	60750	1.07	135	0.0	p0.2	N29°34.896	W094°55.92	49	11057	2.11	161	0.0	p30.3	N29°34.766	W094°55.94	

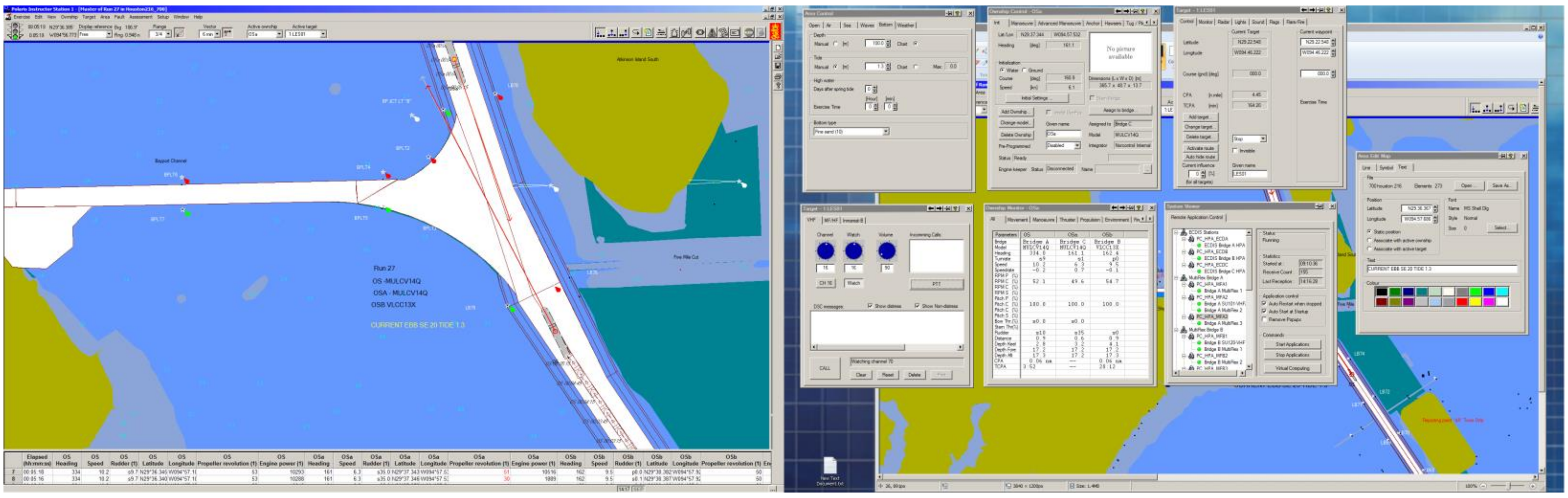
13:25 SEP

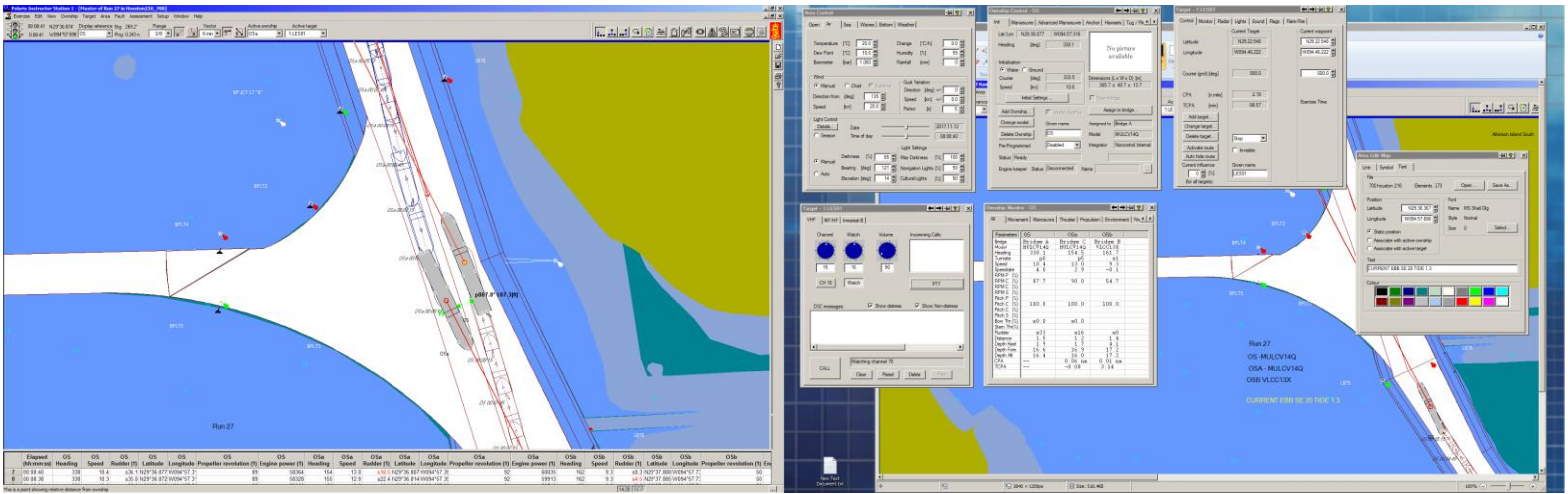
	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS UKC Aft	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	OSa UKC Aft	OSb Heading	OSb Speed	OSb Rudder (1)	OSb Latitude	OSb Longitude	Prop
7	00:25:46	267	15.8	p0.0	N29°36.849	W094°58.6	94	61922	1.03	135	0.0	p0.1	N29°34.896	W094°55.9	49	11196	2.11	161	0.0	p30.3	N29°34.766	W094°55.9	
8	00:25:12	268	15.0	p4.5	N29°36.855	W094°58.4	94	61373	1.04	135	0.0	p0.2	N29°34.896	W094°55.9	49	10958	2.11	161	0.0	p30.3	N29°34.766	W094°55.9	
9	00:25:00	268	14.7	s4.5	N29°36.857	W094°58.4	93	61173	1.03	135	0.0	p0.2	N29°34.896	W094°55.9	49	10945	2.11	161	0.0	p30.3	N29°34.766	W094°55.9	
10	00:24:48	268	14.4	s2.3	N29°36.859	W094°58.3	93	60932	1.04	135	0.0	p0.3	N29°34.896	W094°55.9	49	10931	2.11	161	0.0	p30.3	N29°34.766	W094°55.9	
11	00:24:46	268	14.4	p2.7	N29°36.859	W094°58.3	93	60891	1.07	135	0.0	p0.2	N29°34.896	W094°55.9	49	11008	2.11	161	0.0	p30.3	N29°34.766	W094°55.9	

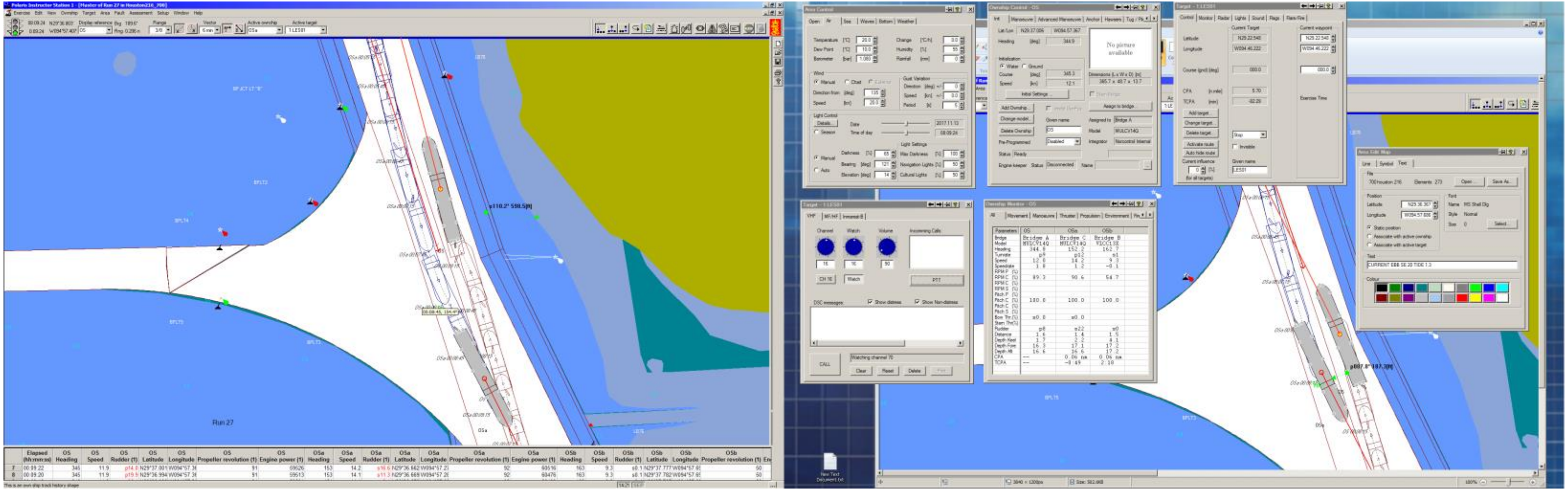


Run 27

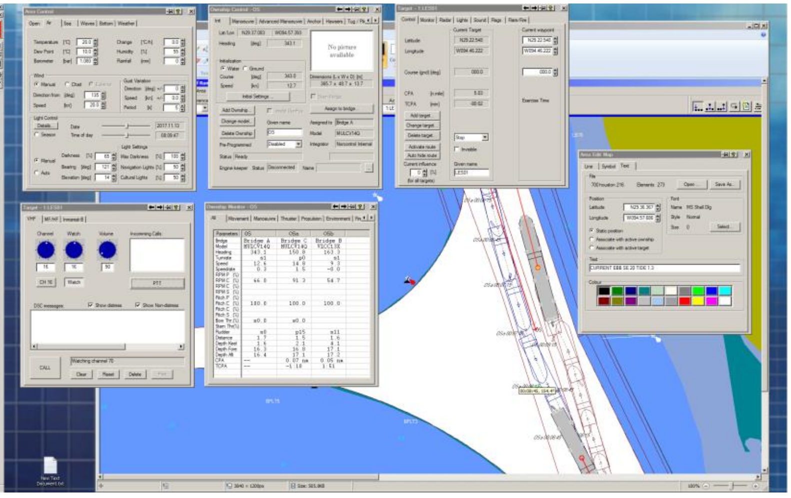

Atkinson Island South
Bayport Channel
Five Mile Cut
Run 27
OS -MULCV14Q
OSA - MULCV14Q
OSB VLCC13X
CURRENT EBB SE 20 TIDE 1.5
KONGSBERG

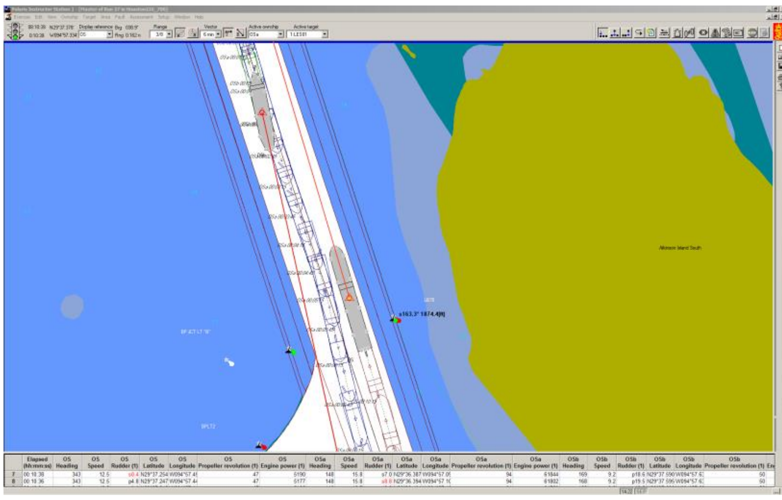

Bayport Channel
Five Mile Cut
Run 27
OS -MULCV14Q
OSA - MULCV14Q
OSB VLCC13X
CURRENT EBB SE 20 TIDE 1.5

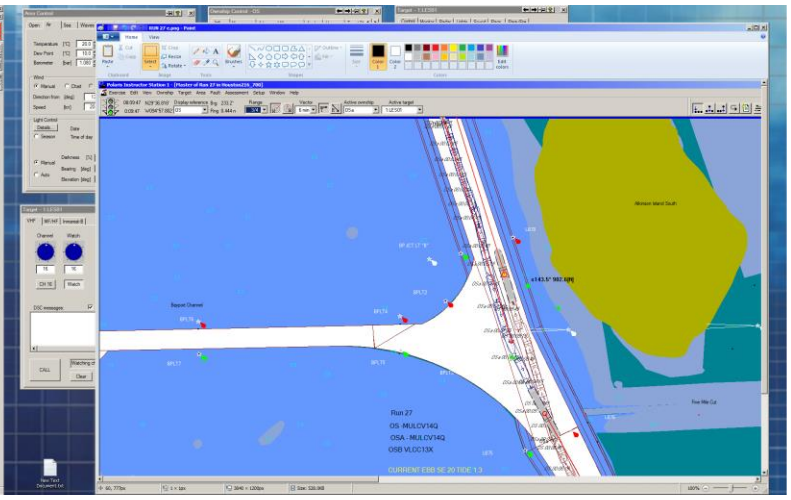

Run 27
OS -MULCV14Q
OSA - MULCV14Q
OSB VLCC13X
CURRENT EBB SE 20 TIDE 1.5

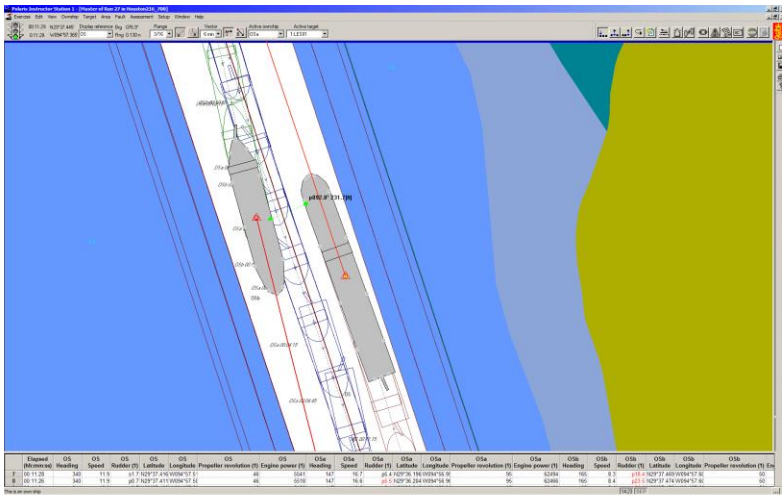

Run 27

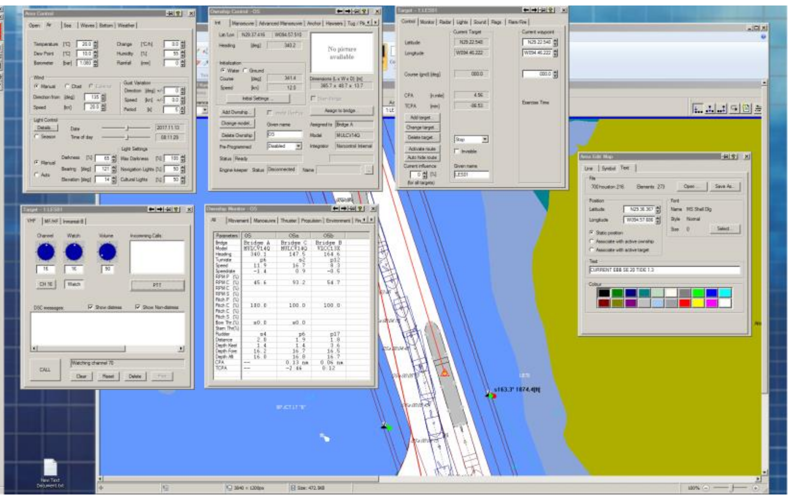

Run 27
OS -MULCV14Q
OSA - MULCV14Q
OSB VLCC13X
CURRENT EBB SE 20 TIDE 1.3

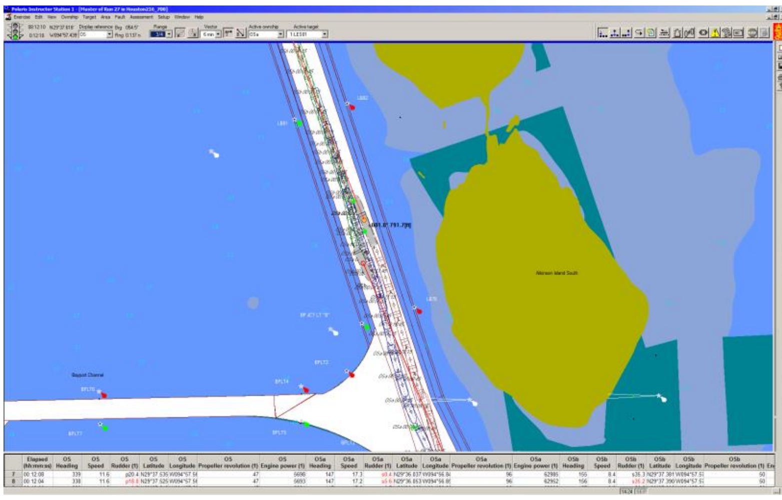


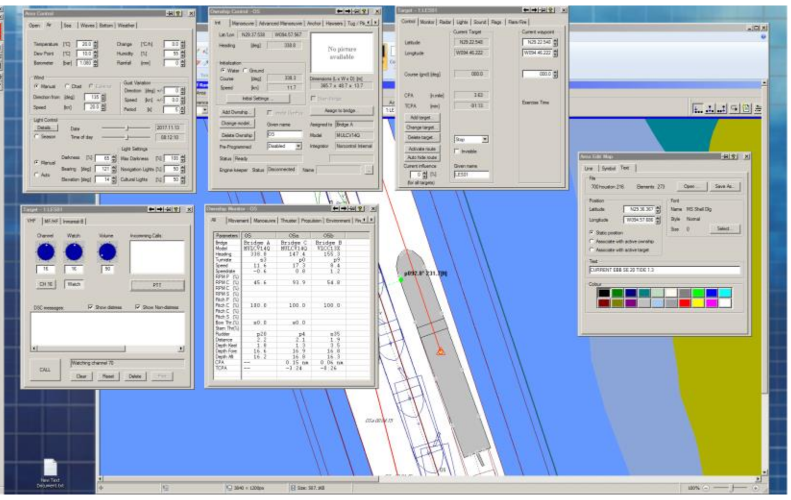



Run 27
OS -MULCV14Q
OSA - MULCV14Q
OSB VLCC13X
CURRENT EBB SE 20 TIDE 1.3

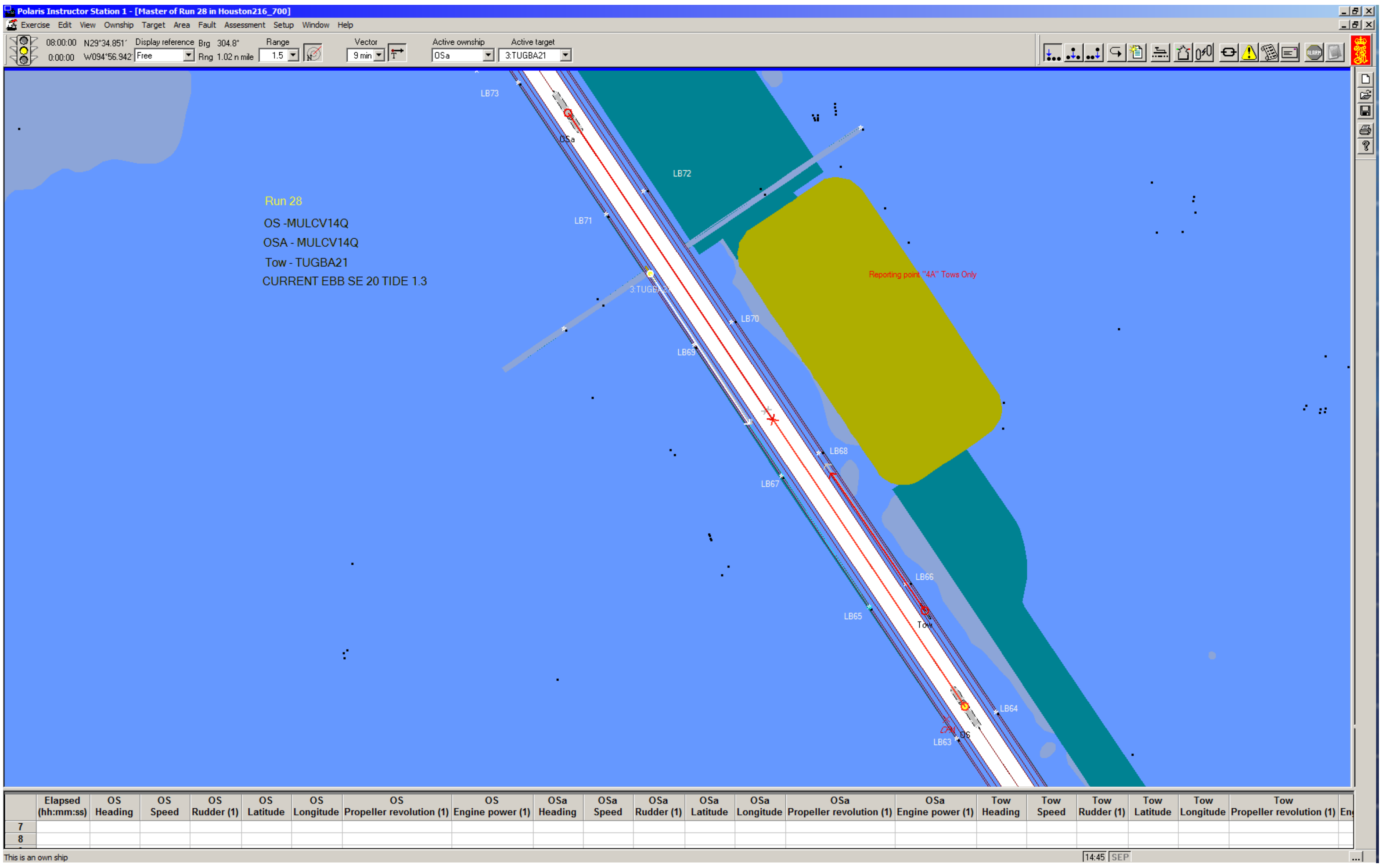








Run 28



Polaris Instructor Station 1 - [Master of Run 28 in Houston216_700]

Exercise Edit View Ownship Target Area Fault Assessment Setup Window Help

08:00:00 N29°34.851′ Display reference Free Brg 304.8° Rng 1.02 n mile Range 1.5 Vector 9 min Active ownship OSa Active target 3:TUGBA21

0:00:00 W094°56.942′

Run 28

OS -MULCV14Q

OSA - MULCV14Q

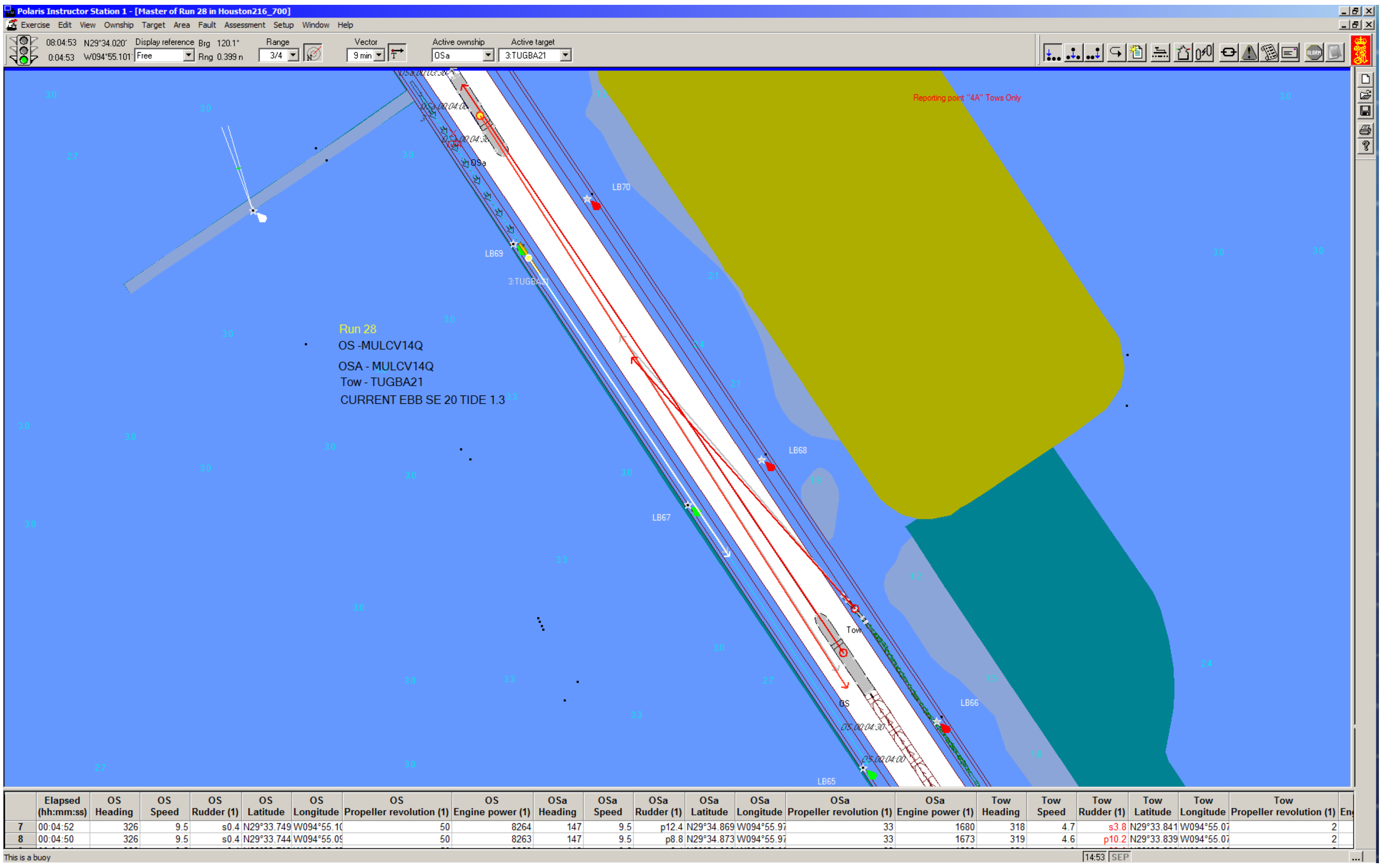
Tow - TUGBA21

CURRENT EBB SE 20 TIDE 1.3

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	Tow Heading	Tow Speed	Tow Rudder (1)	Tow Latitude	Tow Longitude	Tow Propeller revolution (1)	En
7																						
8																						

This is an own ship

14:45 SEP



Polaris Instructor Station 1 - [Master of Run 28 in Houston216_700]

Exercise Edit View Ownship Target Area Fault Assessment Setup Window Help

08:04:53 N29°34.020′ Display reference Free Brg 120.1° Rng 0.399 n Range 3/4 Vector 9 min Active ownship OSa Active target 3:TUGBA21

0:04:53 W094°55.101′

Run 28

OS -MULCV14Q

OSA - MULCV14Q

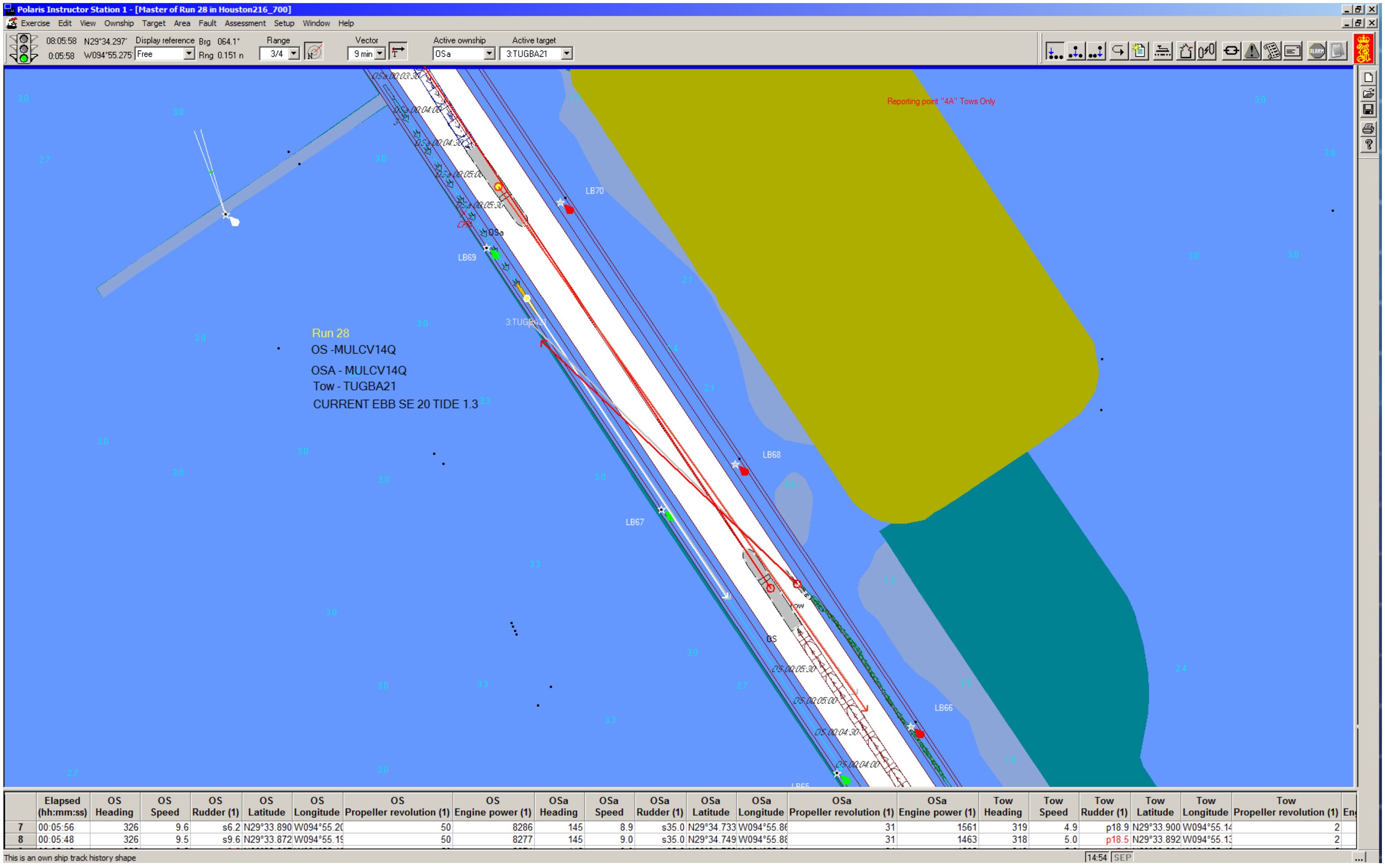
Tow - TUGBA21

CURRENT EBB SE 20 TIDE 1.3

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	Tow Heading	Tow Speed	Tow Rudder (1)	Tow Latitude	Tow Longitude	Tow Propeller revolution (1)	En
7	00:04:52	326	9.5	s0.4	N29°33.749	W094°55.10	50	8264	147	9.5	p12.4	N29°34.869	W094°55.97	33	1680	318	4.7	s3.8	N29°33.841	W094°55.07	2	
8	00:04:50	326	9.5	s0.4	N29°33.744	W094°55.09	50	8263	147	9.5	p8.8	N29°34.873	W094°55.97	33	1673	319	4.6	p10.2	N29°33.839	W094°55.07	2	

This is a buoy

14:53 SEP



Polaris Instructor Station 1 - [Master of Run 28 in Houston216_700]

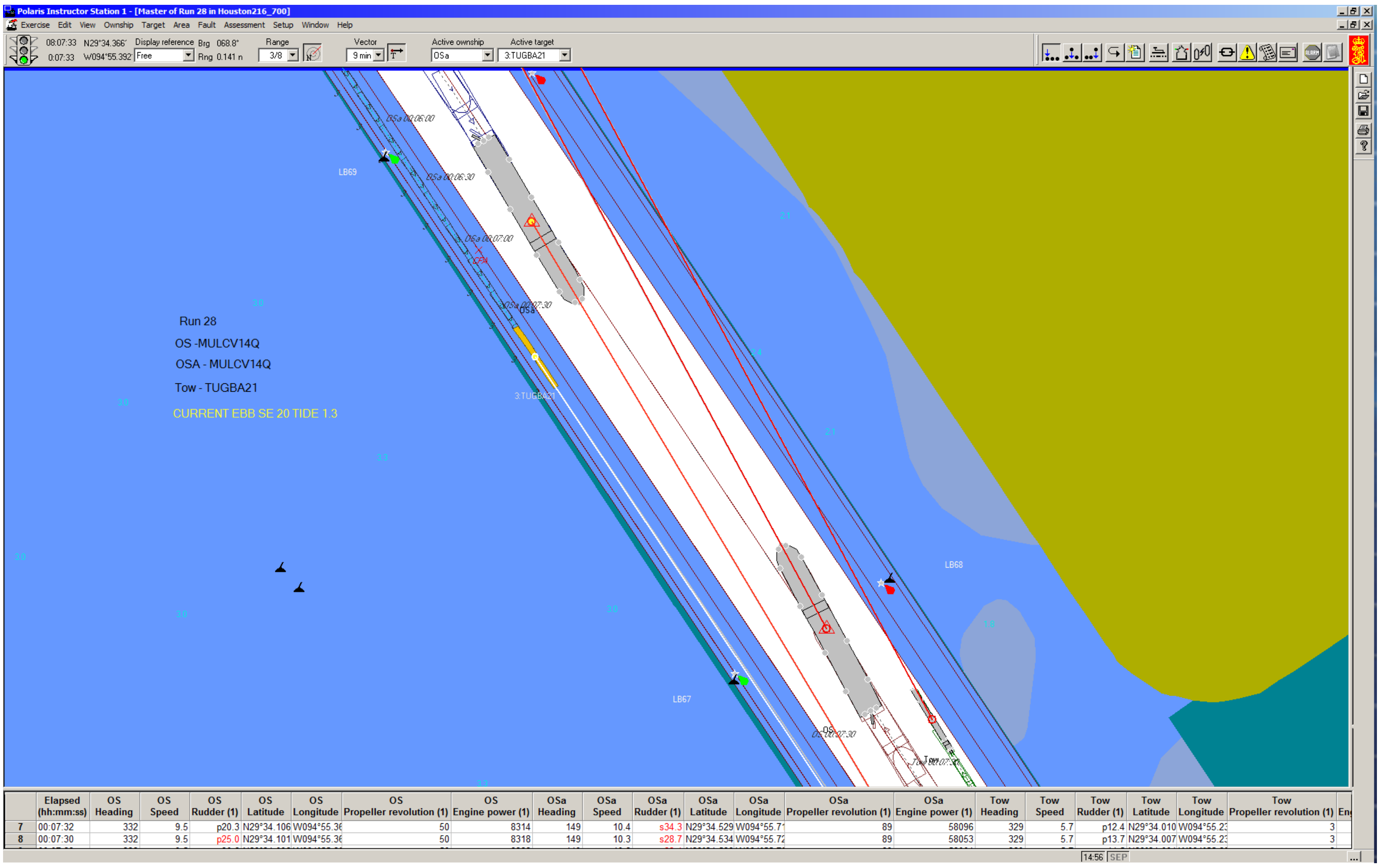
08:05:58 N29°34.297'
0:05:58 W094°55.275'
Display reference: Free
Brg 064.1°
Rng 0.151 n
Range: 3/4
Vector: 9 min
Active ownship: OSa
Active target: 3:TUGBA21

Run 28
OS -MULCV14Q
OSA - MULCV14Q
Tow - TUGBA21
CURRENT EBB SE 20 TIDE 1.3

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	Tow Heading	Tow Speed	Tow Rudder (1)	Tow Latitude	Tow Longitude	Tow Propeller revolution (1)	En
7	00:05:56	326	9.6	s6.2	N29°33.890	W094°55.2	50	8286	145	8.9	s35.0	N29°34.733	W094°55.8	31	1561	319	4.9	p18.9	N29°33.900	W094°55.1	2	
8	00:05:48	326	9.5	s9.6	N29°33.872	W094°55.1	50	8277	145	9.0	s35.0	N29°34.749	W094°55.8	31	1463	318	5.0	p18.5	N29°33.892	W094°55.1	2	

This is an own ship track history shape

14:54 SEP



Polaris Instructor Station 1 - [Master of Run 28 in Houston216_700]

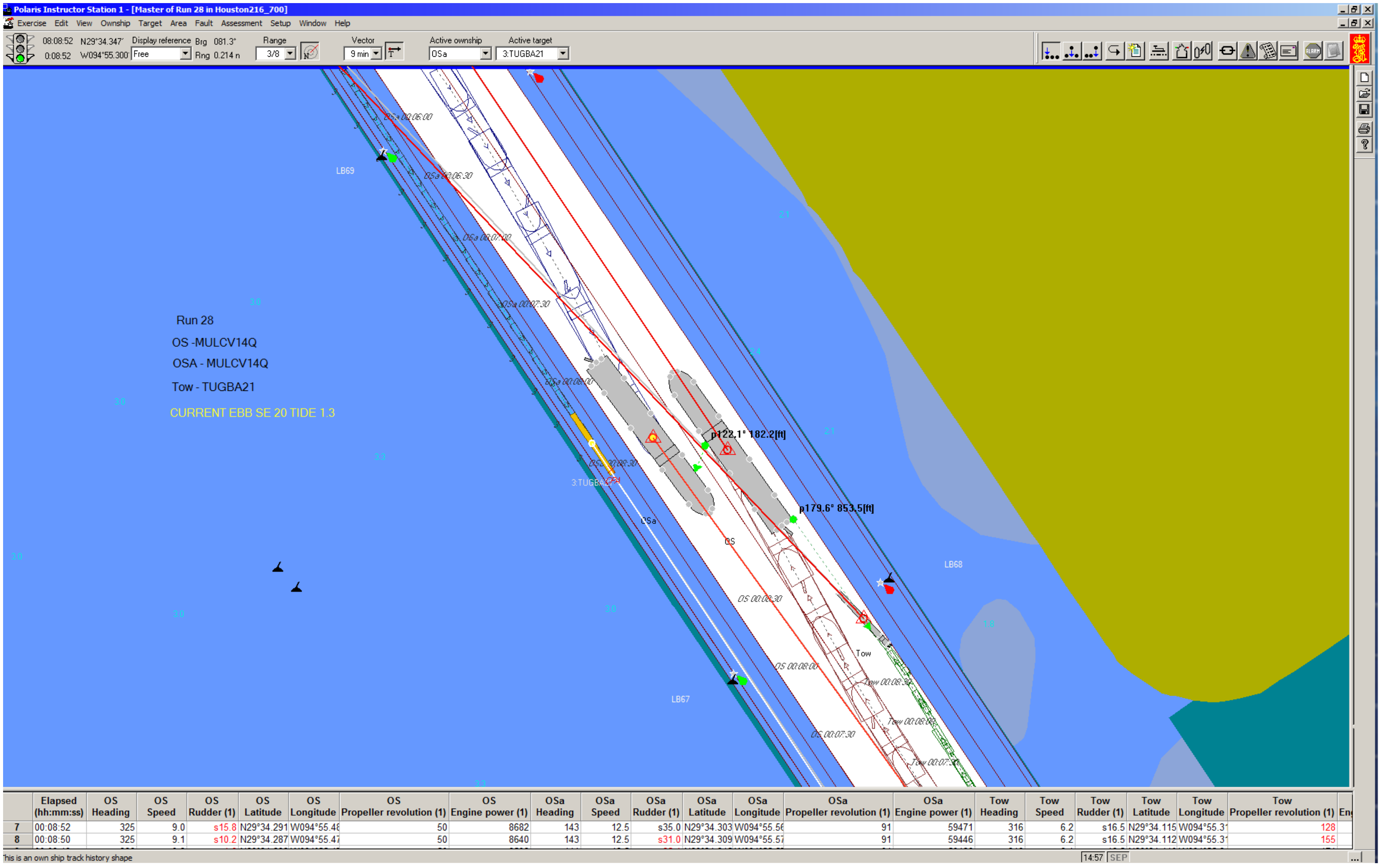
08:07:33 N29°34.366'
0:07:33 W094°55.392'
Display reference: Free
Brg 068.8°
Rng 0.141 n
Range: 3/8
Vector: 9 min
Active ownship: OSa
Active target: 3:TUGBA21

Run 28
OS -MULCV14Q
OSA - MULCV14Q
Tow - TUGBA21
CURRENT EBB SE 20 TIDE 1.3

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	Tow Heading	Tow Speed	Tow Rudder (1)	Tow Latitude	Tow Longitude	Tow Propeller revolution (1)	En
7	00:07:32	332	9.5	p20.3	N29°34.106	W094°55.3	50	8314	149	10.4	s34.3	N29°34.529	W094°55.7	89	58096	329	5.7	p12.4	N29°34.010	W094°55.2	3	
8	00:07:30	332	9.5	p25.0	N29°34.101	W094°55.3	50	8318	149	10.3	s28.7	N29°34.534	W094°55.7	89	58053	329	5.7	p13.7	N29°34.007	W094°55.2	3	

14:56 SEP

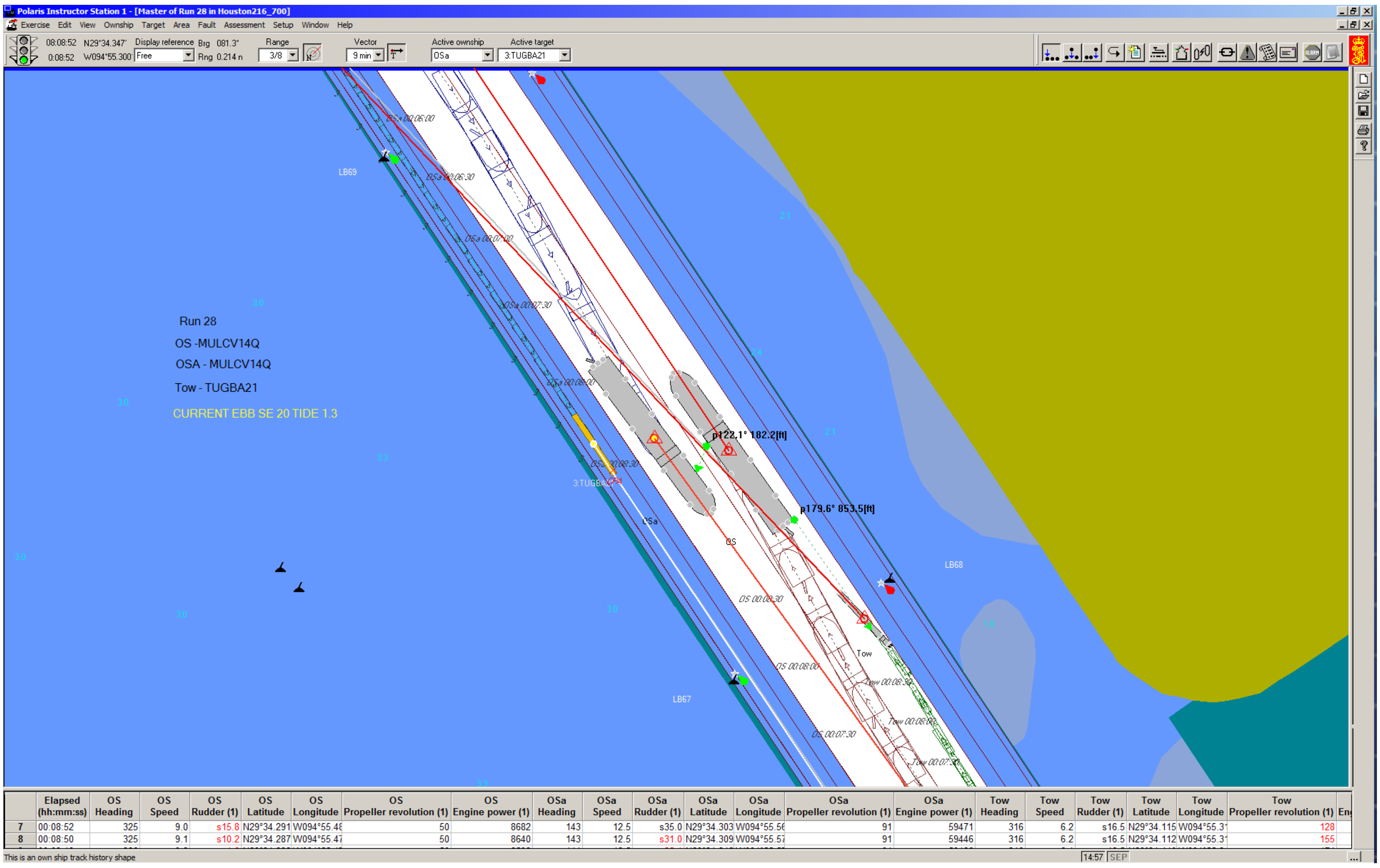
June 26, 2019



08:08:52 N29°34.347' Display reference Free Brg 081.3° Range 3/8 Vector 9 min Active ownship OSa Active target 3:TUGBA21
0:08:52 W094°55.300' Rng 0.214 n

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	Tow Heading	Tow Speed	Tow Rudder (1)	Tow Latitude	Tow Longitude	Tow Propeller revolution (1)	En
7	00:08:52	325	9.0	s15.8	N29°34.291	W094°55.48	50	8682	143	12.5	s35.0	N29°34.303	W094°55.56	91	59471	316	6.2	s16.5	N29°34.115	W094°55.31	128	
8	00:08:50	325	9.1	s10.2	N29°34.287	W094°55.47	50	8640	143	12.5	s31.0	N29°34.309	W094°55.57	91	59446	316	6.2	s16.5	N29°34.112	W094°55.31	155	

This is an own ship track history shape 14:57 SEP

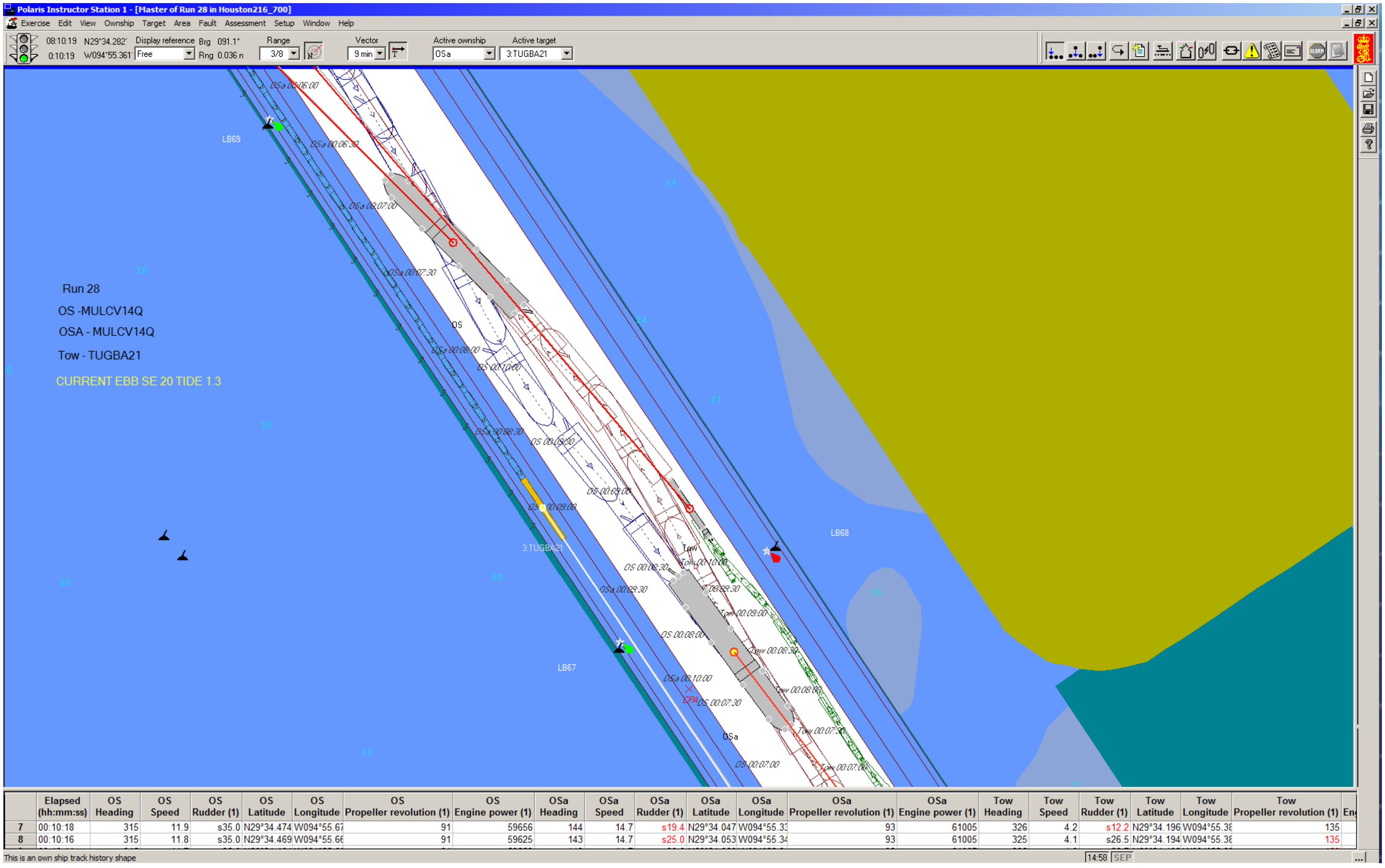


08:08:52 N29°34.347' Display reference Free Brg 081.3° Range 3/8 Vector 9 min Active ownship OSa Active target 3:TUGBA21
0:08:52 W094°55.300' Rng 0.214 n

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	Tow Heading	Tow Speed	Tow Rudder (1)	Tow Latitude	Tow Longitude	Tow Propeller revolution (1)	En
7	00:08:52	325	9.0	s15.8	N29°34.291	W094°55.48	50	8682	143	12.5	s35.0	N29°34.303	W094°55.56	91	59471	316	6.2	s16.5	N29°34.115	W094°55.31	128	
8	00:08:50	325	9.1	s10.2	N29°34.287	W094°55.47	50	8640	143	12.5	s31.0	N29°34.309	W094°55.57	91	59446	316	6.2	s16.5	N29°34.112	W094°55.31	155	

This is an own ship track history shape 14:57 SEP

June 26, 2019

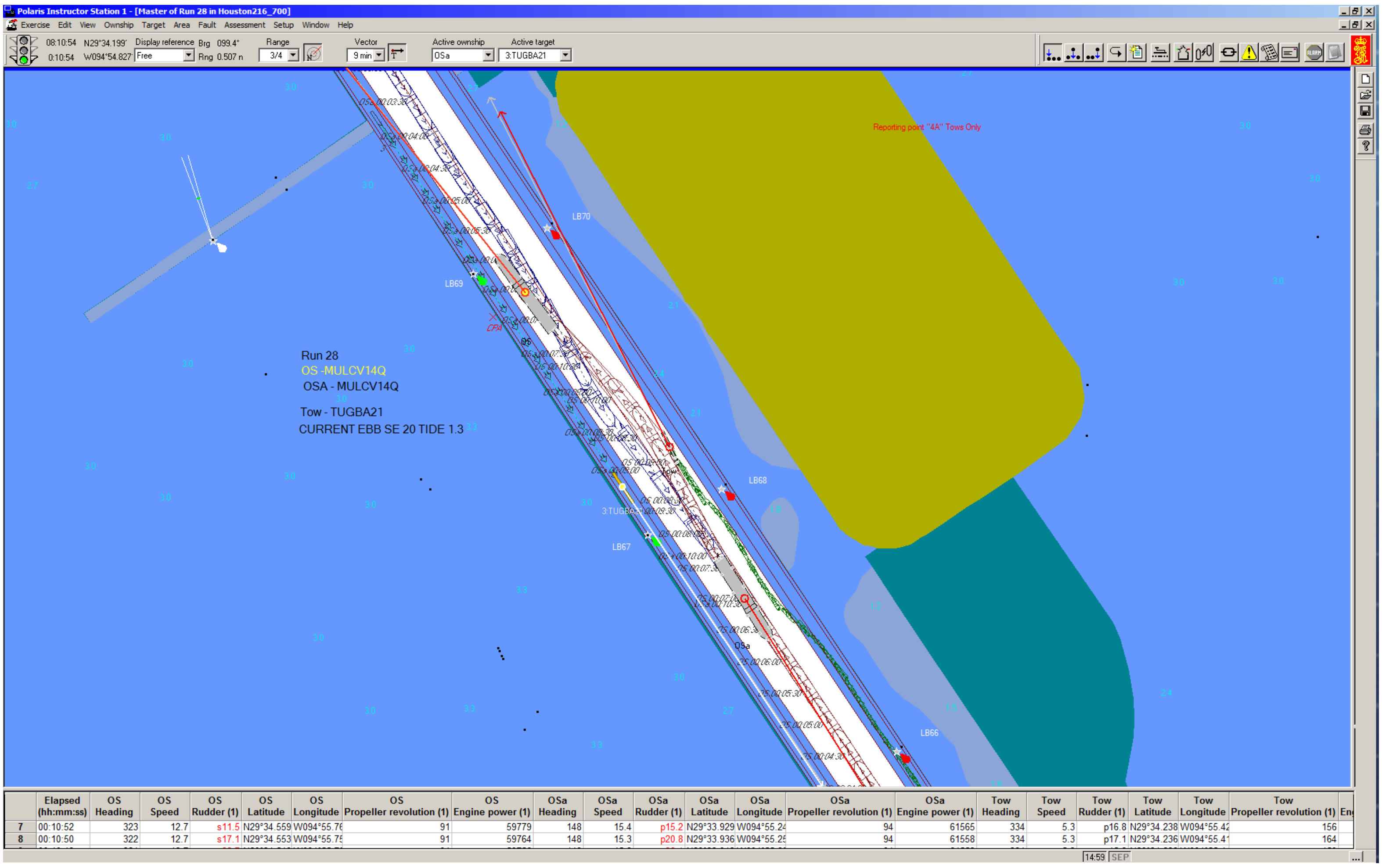


08:10:19 N29°34.282' Display reference: Free Brg 091.1° Rng 0.036 n
0:10:19 W094°55.361'
Range: 3/8
Vector: 9 min
Active ownship: OSa
Active target: 3:TUGBA21

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	Tow Heading	Tow Speed	Tow Rudder (1)	Tow Latitude	Tow Longitude	Tow Propeller revolution (1)	En
7	00:10:18	315	11.9	s35.0	N29°34.474	W094°55.67	91	59656	144	14.7	s19.4	N29°34.047	W094°55.33	93	61005	326	4.2	s12.2	N29°34.196	W094°55.38	135	
8	00:10:16	315	11.8	s35.0	N29°34.469	W094°55.66	91	59625	143	14.7	s25.0	N29°34.053	W094°55.34	93	61005	325	4.1	s26.5	N29°34.194	W094°55.38	135	

This is an own ship track history shape

14:58 SEP

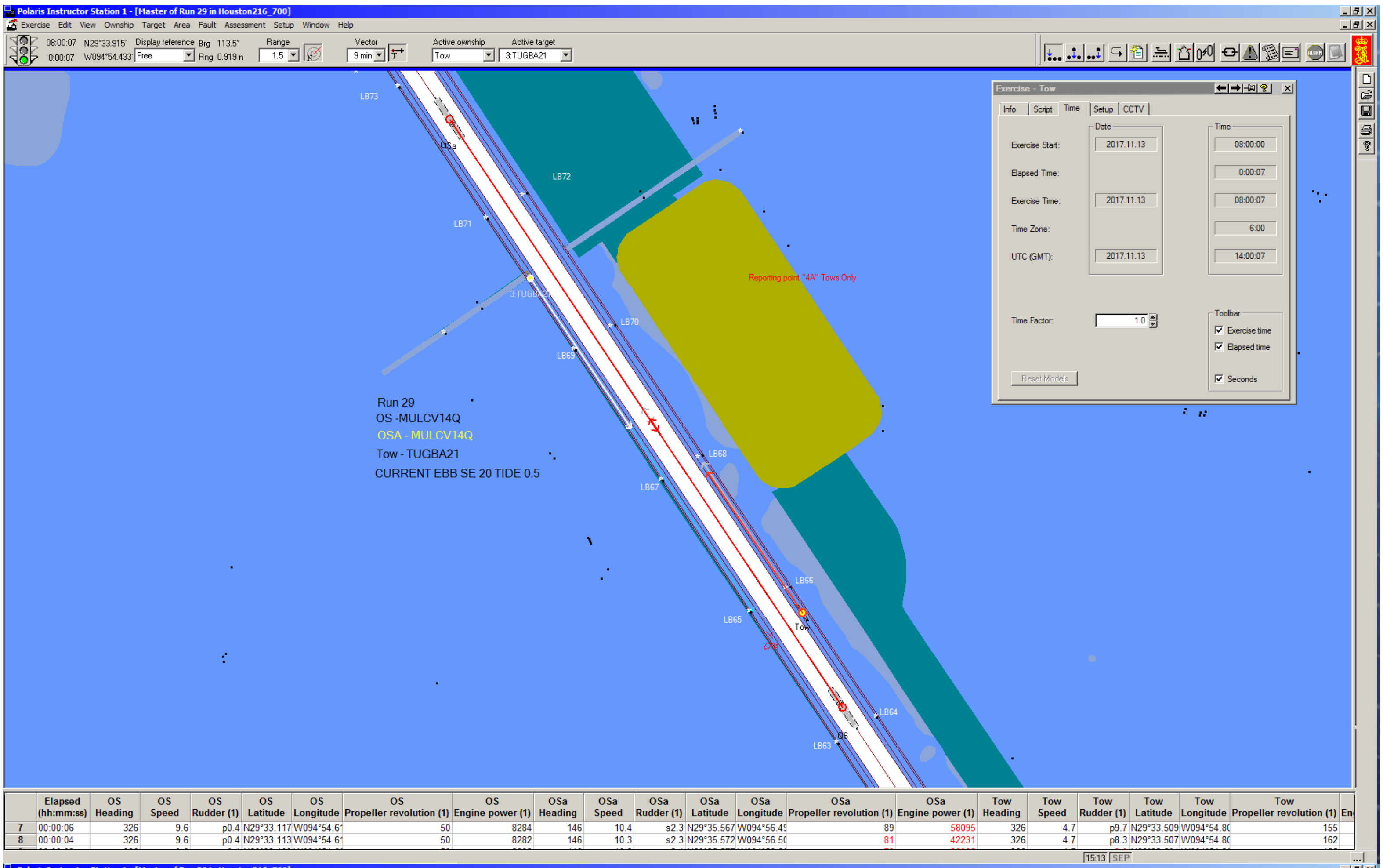


08:10:54 N29°34.199' Display reference: Free Brg 099.4° Rng 0.507 n
0:10:54 W094°54.827'
Range: 3/4
Vector: 9 min
Active ownship: OSa
Active target: 3:TUGBA21

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	Tow Heading	Tow Speed	Tow Rudder (1)	Tow Latitude	Tow Longitude	Tow Propeller revolution (1)	En
7	00:10:52	323	12.7	s11.5	N29°34.559	W094°55.76	91	59779	148	15.4	p15.2	N29°33.929	W094°55.24	94	61565	334	5.3	p16.8	N29°34.238	W094°55.42	156	
8	00:10:50	322	12.7	s17.1	N29°34.553	W094°55.75	91	59764	148	15.3	p20.8	N29°33.936	W094°55.25	94	61558	334	5.3	p17.1	N29°34.236	W094°55.41	164	

14:59 SEP

Run 29



08:00:07 N29°33.915' Display reference Brg 113.5°
0:00:07 W094°54.433' Free Rng 0.919 n
Range 1.5
Vector 9 min
Active ownship Tow
Active target 3:TUGBA21

Exercise - Tow

Info | Script | Time | Setup | CCTV

	Date	Time
Exercise Start:	2017.11.13	08:00:00
Elapsed Time:		0:00:07
Exercise Time:	2017.11.13	08:00:07
Time Zone:		6:00
UTC (GMT):	2017.11.13	14:00:07

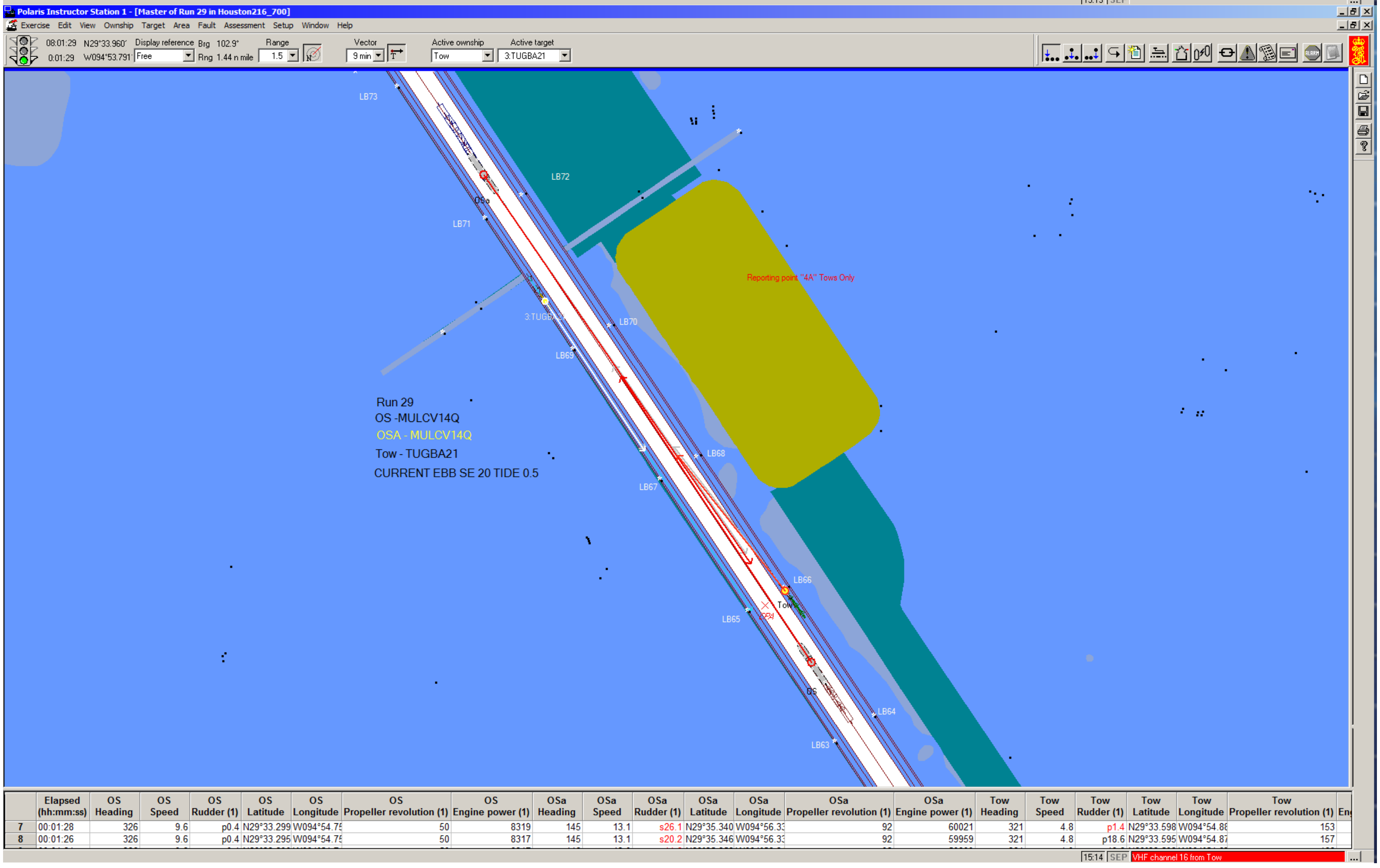
Time Factor: 1.0

Toolbar
☑ Exercise time
☑ Elapsed time
☑ Seconds

Reset Models

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	Tow Heading	Tow Speed	Tow Rudder (1)	Tow Latitude	Tow Longitude	Tow Propeller revolution (1)	En
7	00:00:06	326	9.6	p0.4	N29°33.117	W094°54.61	50	8284	146	10.4	s2.3	N29°35.567	W094°56.49	89	58095	326	4.7	p9.7	N29°33.509	W094°54.80	155	
8	00:00:04	326	9.6	p0.4	N29°33.113	W094°54.61	50	8282	146	10.3	s2.3	N29°35.572	W094°56.50	81	42231	326	4.7	p8.3	N29°33.507	W094°54.80	162	

15:13 SEP

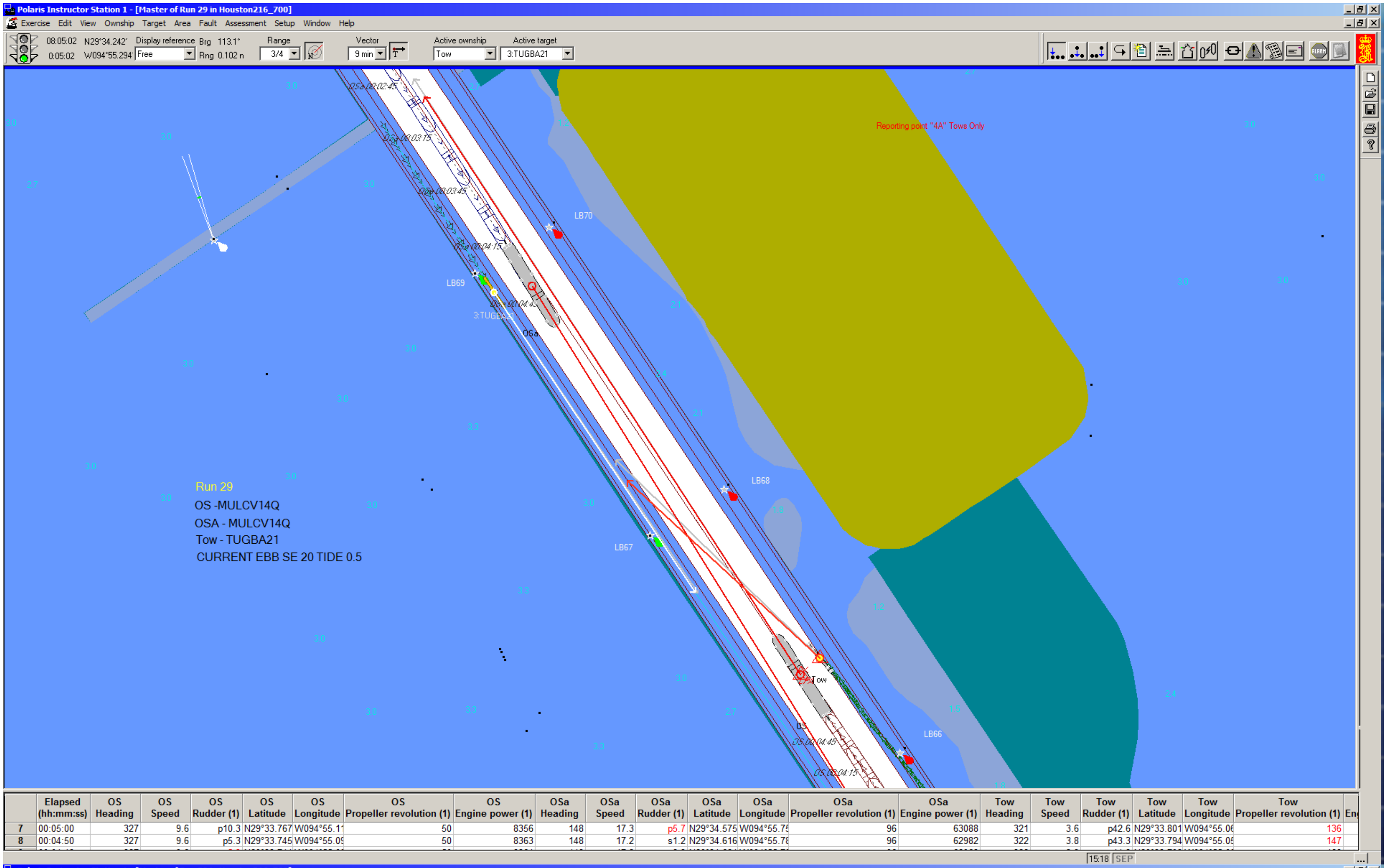


08:01:29 N29°33.960' Display reference Brg 102.9°
0:01:29 W094°53.791' Free Rng 1.44 n mile
Range 1.5
Vector 9 min
Active ownship Tow
Active target 3:TUGBA21

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	Tow Heading	Tow Speed	Tow Rudder (1)	Tow Latitude	Tow Longitude	Tow Propeller revolution (1)	En
7	00:01:28	326	9.6	p0.4	N29°33.299	W094°54.75	50	8319	145	13.1	s26.1	N29°35.340	W094°56.33	92	60021	321	4.8	p1.4	N29°33.598	W094°54.88	153	
8	00:01:26	326	9.6	p0.4	N29°33.295	W094°54.75	50	8317	145	13.1	s20.2	N29°35.346	W094°56.33	92	59959	321	4.8	p18.6	N29°33.595	W094°54.87	157	

15:14 SEP VHF channel 16 from Tow

June 26, 2019



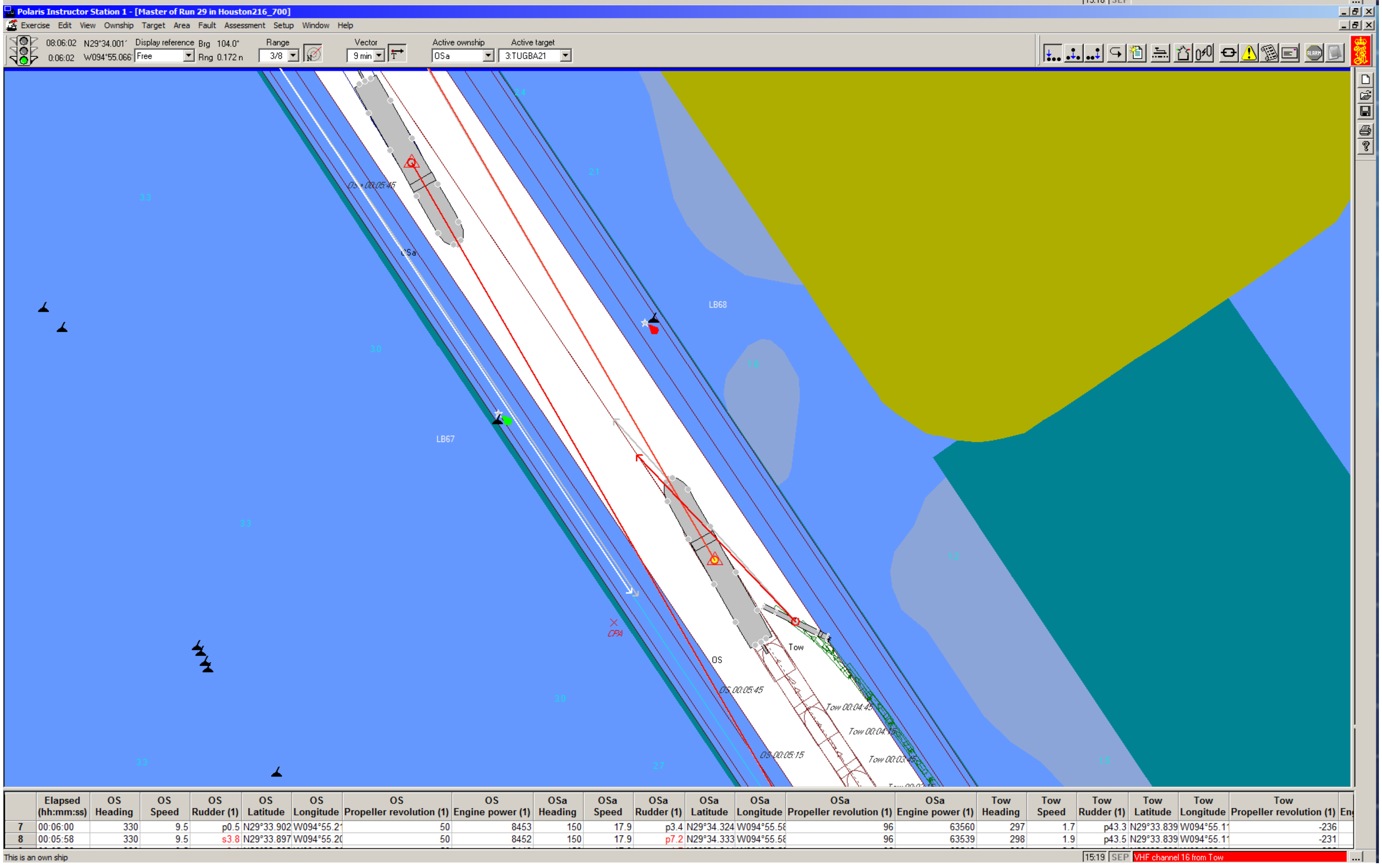
Polaris Instructor Station 1 - [Master of Run 29 in Houston216_700]

08:05:02 N29°34.242′ Display reference Free Brg 113.1° Rng 0.102 n Range 3/4 Vector 9 min Active ownship Tow Active target 3:TUGBA21
0:05:02 W094°55.294′

Run 29
OS -MULCV14Q
OSA - MULCV14Q
Tow - TUGBA21
CURRENT EBB SE 20 TIDE 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	Tow Heading	Tow Speed	Tow Rudder (1)	Tow Latitude	Tow Longitude	Tow Propeller revolution (1)	En
7	00:05:00	327	9.6	p10.3	N29°33.767	W094°55.1	50	8356	148	17.3	p5.7	N29°34.575	W094°55.7	96	63088	321	3.6	p42.6	N29°33.801	W094°55.0	136	
8	00:04:50	327	9.6	p5.3	N29°33.745	W094°55.0	50	8363	148	17.2	s1.2	N29°34.616	W094°55.7	96	62982	322	3.8	p43.3	N29°33.794	W094°55.0	147	

15:18 SEP



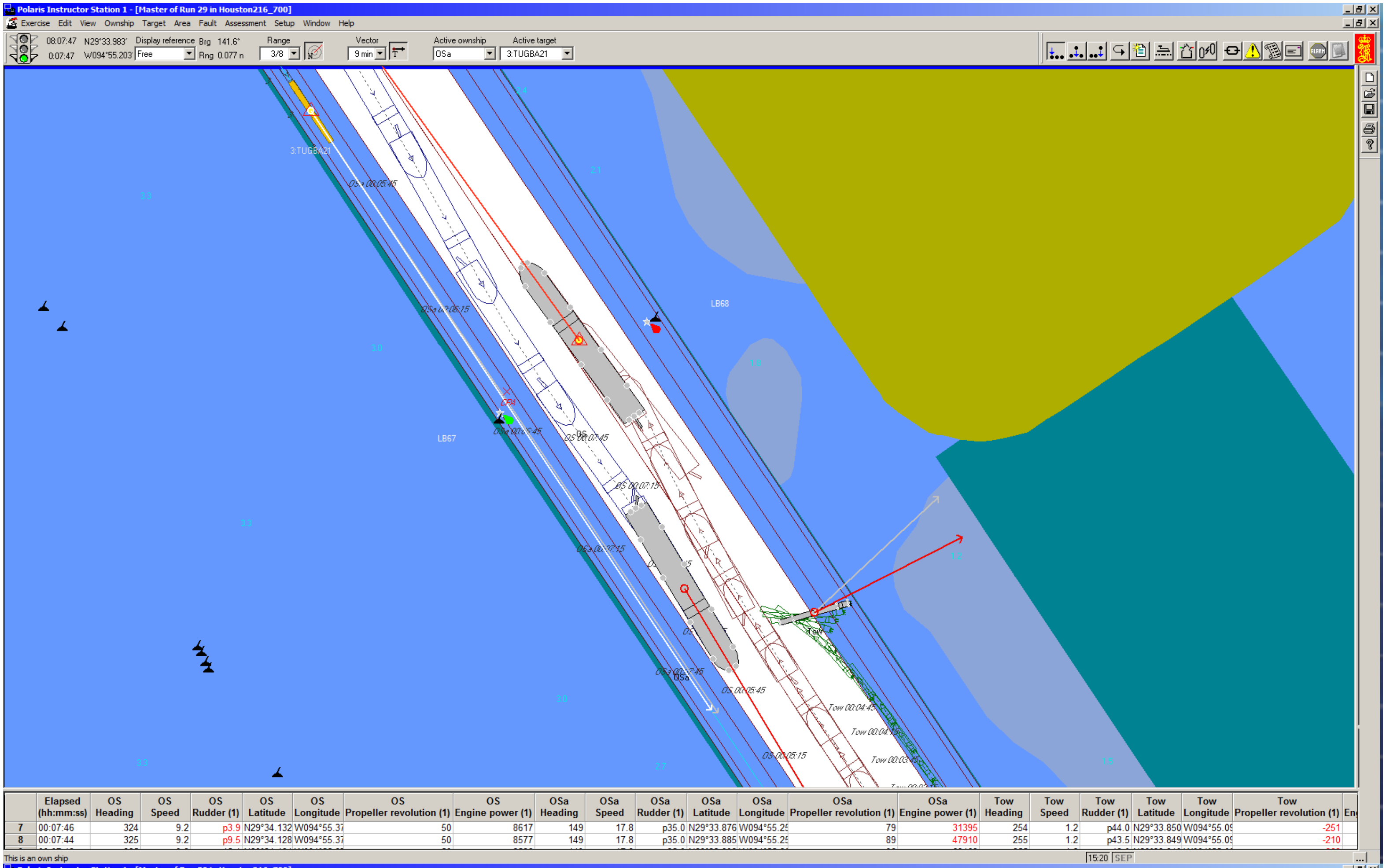
Polaris Instructor Station 1 - [Master of Run 29 in Houston216_700]

08:06:02 N29°34.001′ Display reference Free Brg 104.0° Rng 0.172 n Range 3/8 Vector 9 min Active ownship OSa Active target 3:TUGBA21
0:06:02 W094°55.066′

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	Tow Heading	Tow Speed	Tow Rudder (1)	Tow Latitude	Tow Longitude	Tow Propeller revolution (1)	En
7	00:06:00	330	9.5	p0.5	N29°33.902	W094°55.2	50	8453	150	17.9	p3.4	N29°34.324	W094°55.5	96	63560	297	1.7	p43.3	N29°33.839	W094°55.1	-236	
8	00:05:58	330	9.5	s3.8	N29°33.897	W094°55.2	50	8452	150	17.9	p7.2	N29°34.333	W094°55.5	96	63539	298	1.9	p43.5	N29°33.839	W094°55.1	-231	

This is an own ship

15:19 SEP VHF channel 16 from Tow



Polaris Instructor Station 1 - [Master of Run 29 in Houston216_700]

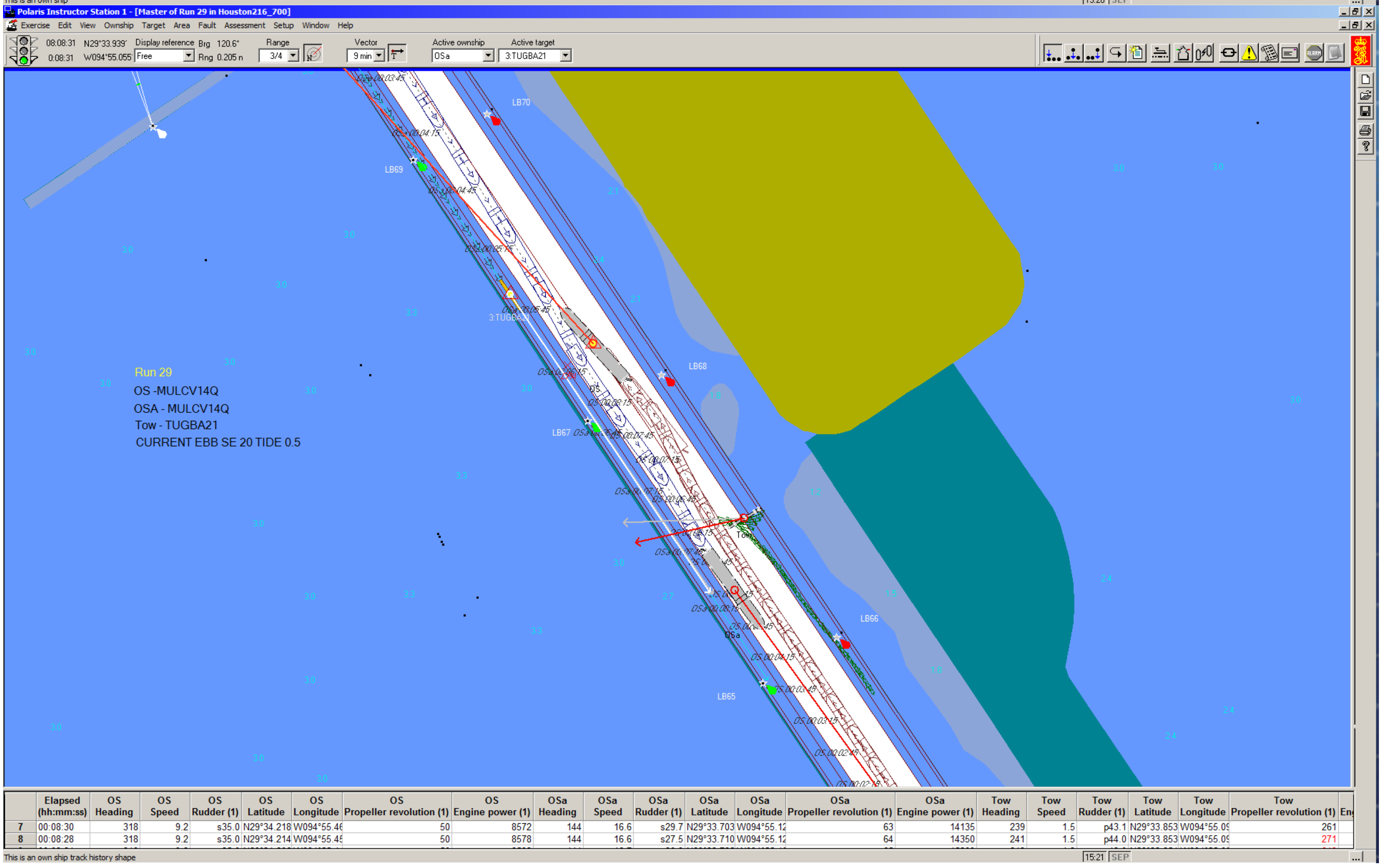
08:07:47 N29°33.983' Display reference: Free Brg 141.6° Rng 0.077 n Range 3/8 Vector 9 min Active ownship OSa Active target 3:TUGBA21

0:07:47 W094°55.203'

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	Tow Heading	Tow Speed	Tow Rudder (1)	Tow Latitude	Tow Longitude	Tow Propeller revolution (1)	En
7	00:07:46	324	9.2	p3.9	N29°34.132	W094°55.37	50	8617	149	17.8	p35.0	N29°33.876	W094°55.25	79	31395	254	1.2	p44.0	N29°33.850	W094°55.09	-251	
8	00:07:44	325	9.2	p9.5	N29°34.128	W094°55.37	50	8577	149	17.8	p35.0	N29°33.885	W094°55.25	89	47910	255	1.2	p43.5	N29°33.849	W094°55.09	-210	

This is an own ship

15:20 SEP



Polaris Instructor Station 1 - [Master of Run 29 in Houston216_700]

08:08:31 N29°33.939' Display reference: Free Brg 120.6° Rng 0.205 n Range 3/4 Vector 9 min Active ownship OSa Active target 3:TUGBA21

0:08:31 W094°55.055'

Run 29

OS -MULCV14Q

OSA - MULCV14Q

Tow - TUGBA21

CURRENT EBB SE 20 TIDE 0.5

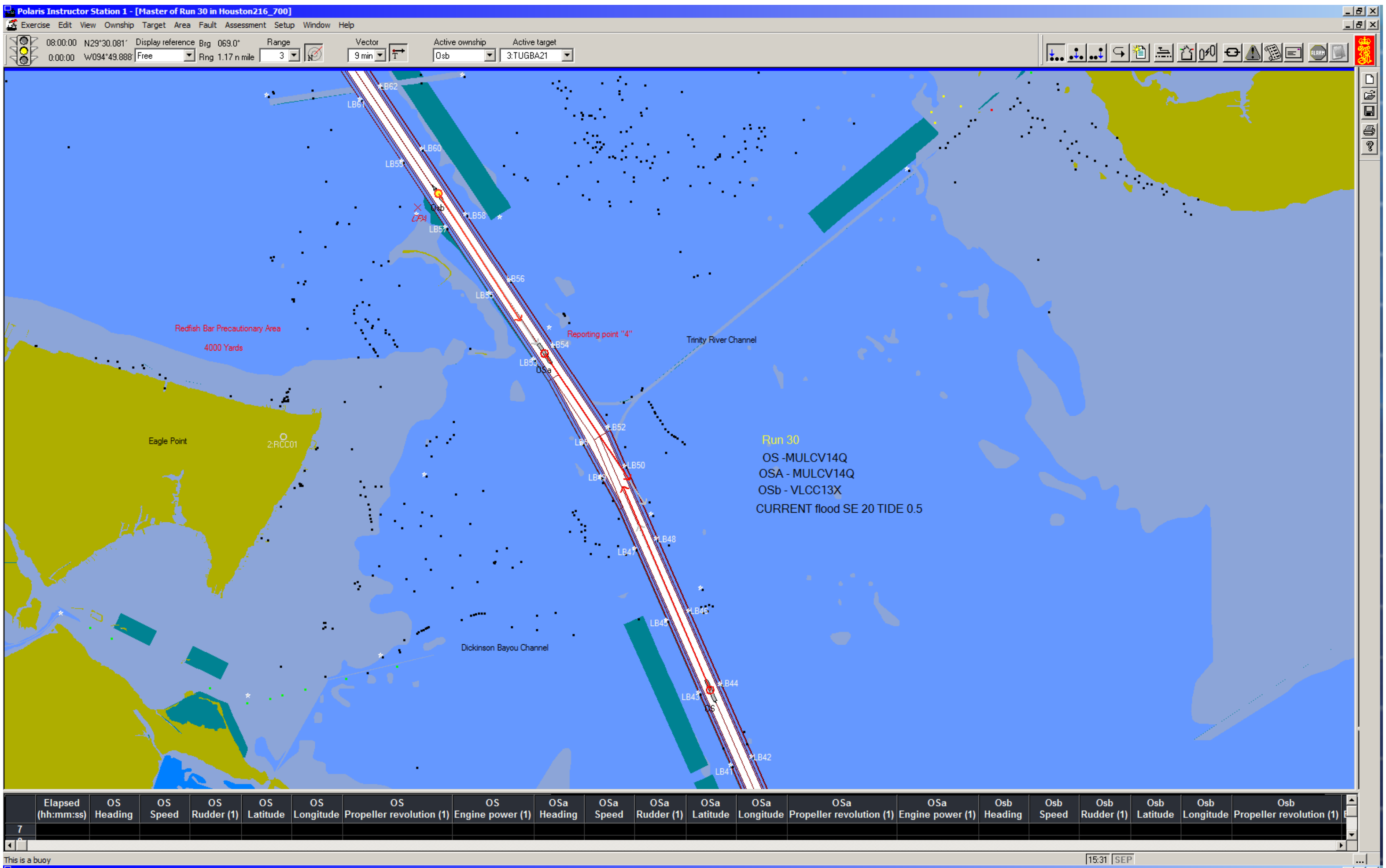
	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	Tow Heading	Tow Speed	Tow Rudder (1)	Tow Latitude	Tow Longitude	Tow Propeller revolution (1)	En
7	00:08:30	318	9.2	s35.0	N29°34.218	W094°55.46	50	8572	144	16.6	s29.7	N29°33.703	W094°55.12	63	14135	239	1.5	p43.1	N29°33.853	W094°55.09	261	
8	00:08:28	318	9.2	s35.0	N29°34.214	W094°55.45	50	8578	144	16.6	s27.5	N29°33.710	W094°55.12	64	14350	241	1.5	p44.0	N29°33.853	W094°55.09	271	

This is an own ship track history shape

15:21 SEP

June 26, 2019

Run 30



Polaris Instructor Station 1 - [Master of Run 30 in Houston216_700]

08:00:00 N29°30.081′
0:00:00 W094°49.888′
Display reference: Free
Brg 069.0°
Rng 1.17 n mile
Range: 3
Vector: 9 min
Active ownship: Osb
Active target: 3:TUGBA21

Run 30
OS -MULCV14Q
OSA - MULCV14Q
OSb - VLCC13X
CURRENT flood SE 20 TIDE 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	Osb Heading	Osb Speed	Osb Rudder (1)	Osb Latitude	Osb Longitude	Osb Propeller revolution (1)
7																					

This is a buoy

Polaris Instructor Station 1 - [Master of Run 30 in Houston216_700]

08:05:45 N29°29.007′
0:05:45 W094°50.897′
Display reference: Free
Brg 076.0°
Rng 0.497 n
Range: 3/4
Vector: 9 min
Active ownship: Osb
Active target: 3:TUGBA21

Run 30
OS -MULCV14Q
OSA - MULCV14Q
OSb - VLCC13X
CURRENT flood SE 20 TIDE 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	Osb Heading	Osb Speed	Osb Rudder (1)	Osb Latitude	Osb Longitude	Osb Propeller revolution (1)
7	00:05:44	336	10.8	s0.1	N29°28.490	W094°51.34	40	4215	156	11.0	p8.6	N29°29.429	W094°51.86	37	1554	143	6.8	s4.8	N29°31.018	W094°53.01	39

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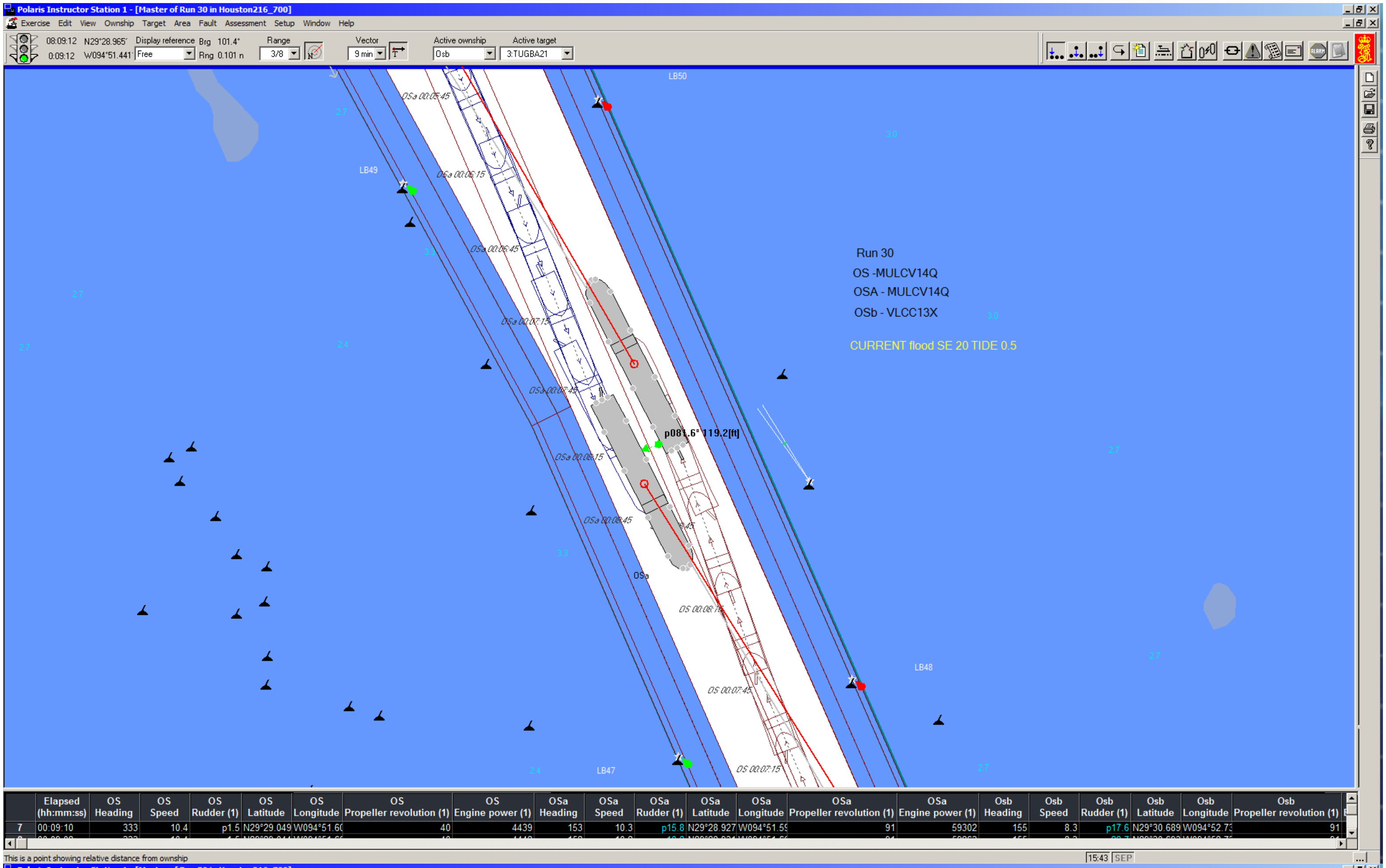


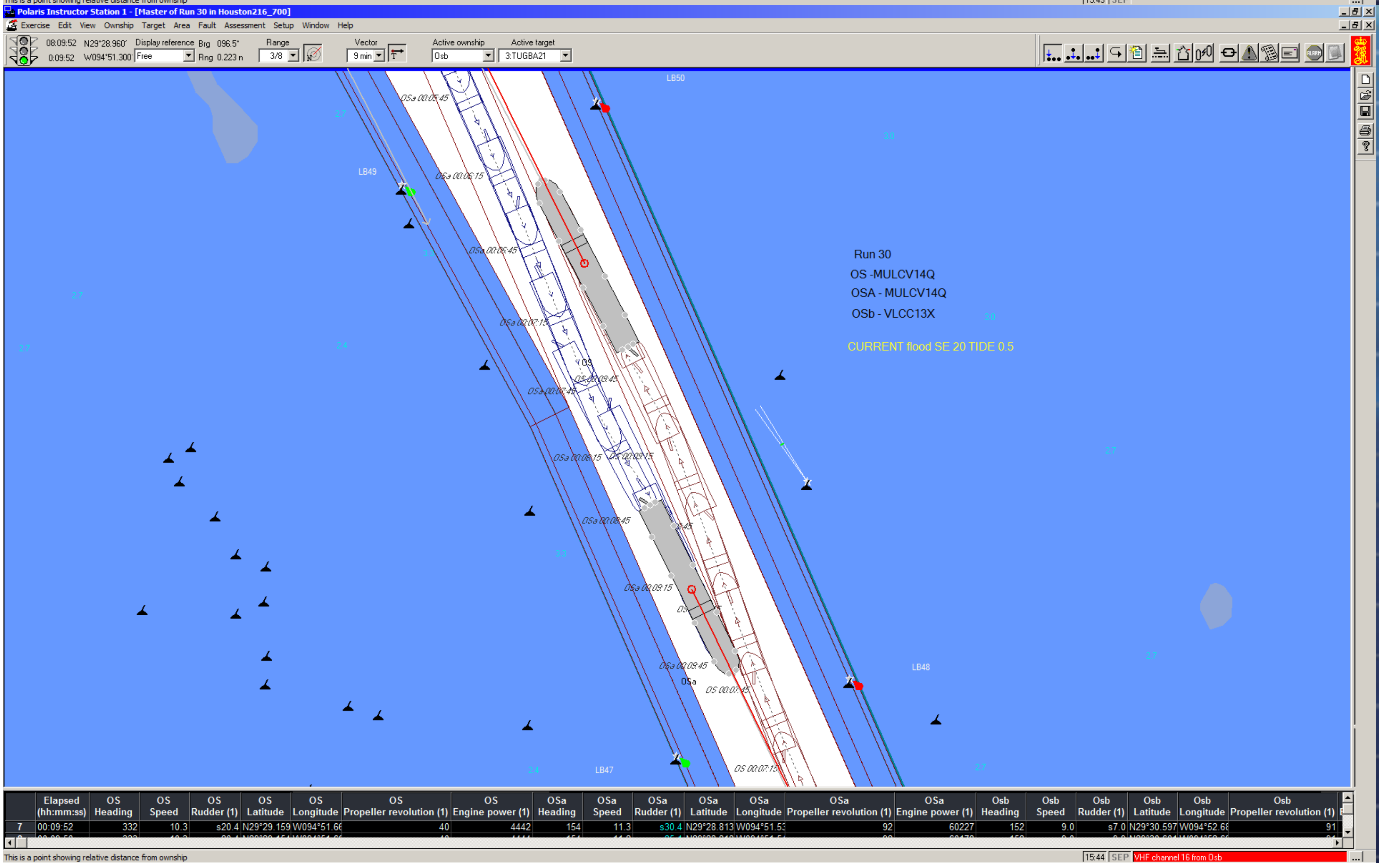
Run 30
OS -MULCV14Q
OSA - MULCV14Q
OSb - VLCC13X

CURRENT flood SE 20 TIDE 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	Osb Heading	Osb Speed	Osb Rudder (1)	Osb Latitude	Osb Longitude	Osb Propeller revolution (1)
7	00:09:10	333	10.4	p1.5	N29°29.049	W094°51.60	40	4439	153	10.3	p15.8	N29°28.927	W094°51.59	91	59302	155	8.3	p17.6	N29°30.689	W094°52.73	91

This is a point showing relative distance from ownship

15:43 SEP



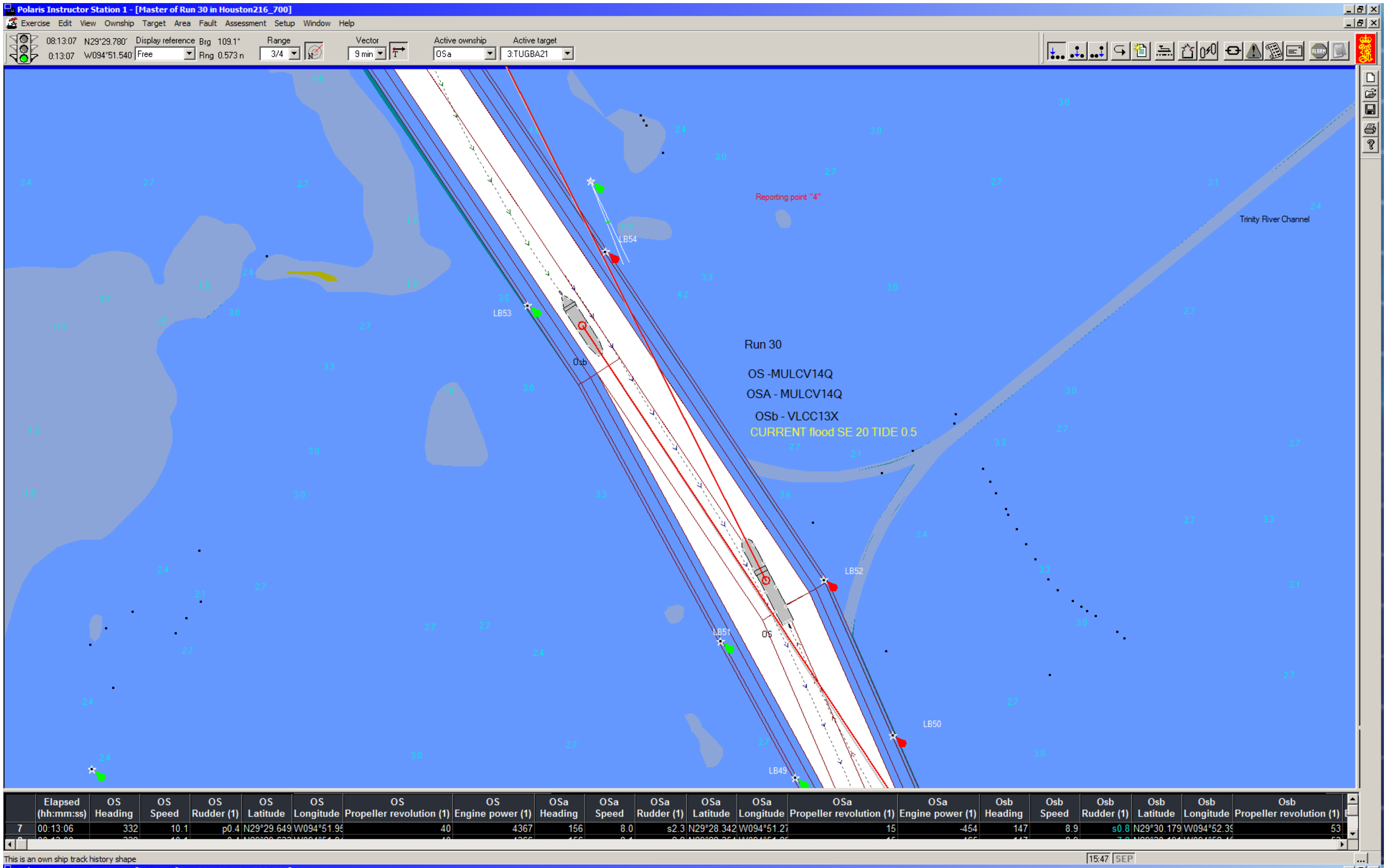
Run 30
OS -MULCV14Q
OSA - MULCV14Q
OSb - VLCC13X

CURRENT flood SE 20 TIDE 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	Osb Heading	Osb Speed	Osb Rudder (1)	Osb Latitude	Osb Longitude	Osb Propeller revolution (1)
7	00:09:52	332	10.3	s20.4	N29°29.159	W094°51.66	40	4442	154	11.3	s30.4	N29°28.813	W094°51.53	92	60227	152	9.0	s7.0	N29°30.597	W094°52.68	91

This is a point showing relative distance from ownship

15:44 SEP VHF channel 16 from Osb



Polaris Instructor Station 1 - [Master of Run 30 in Houston216_700]

08:13:07 N29°29.780' Display reference Free Brg 109.1° Rng 0.573 n
0:13:07 W094°51.540'

Range 3/4 Vector 9 min Active ownship OSa Active target 3:TUGBA21

Run 30

OS -MULCV14Q

OSA - MULCV14Q

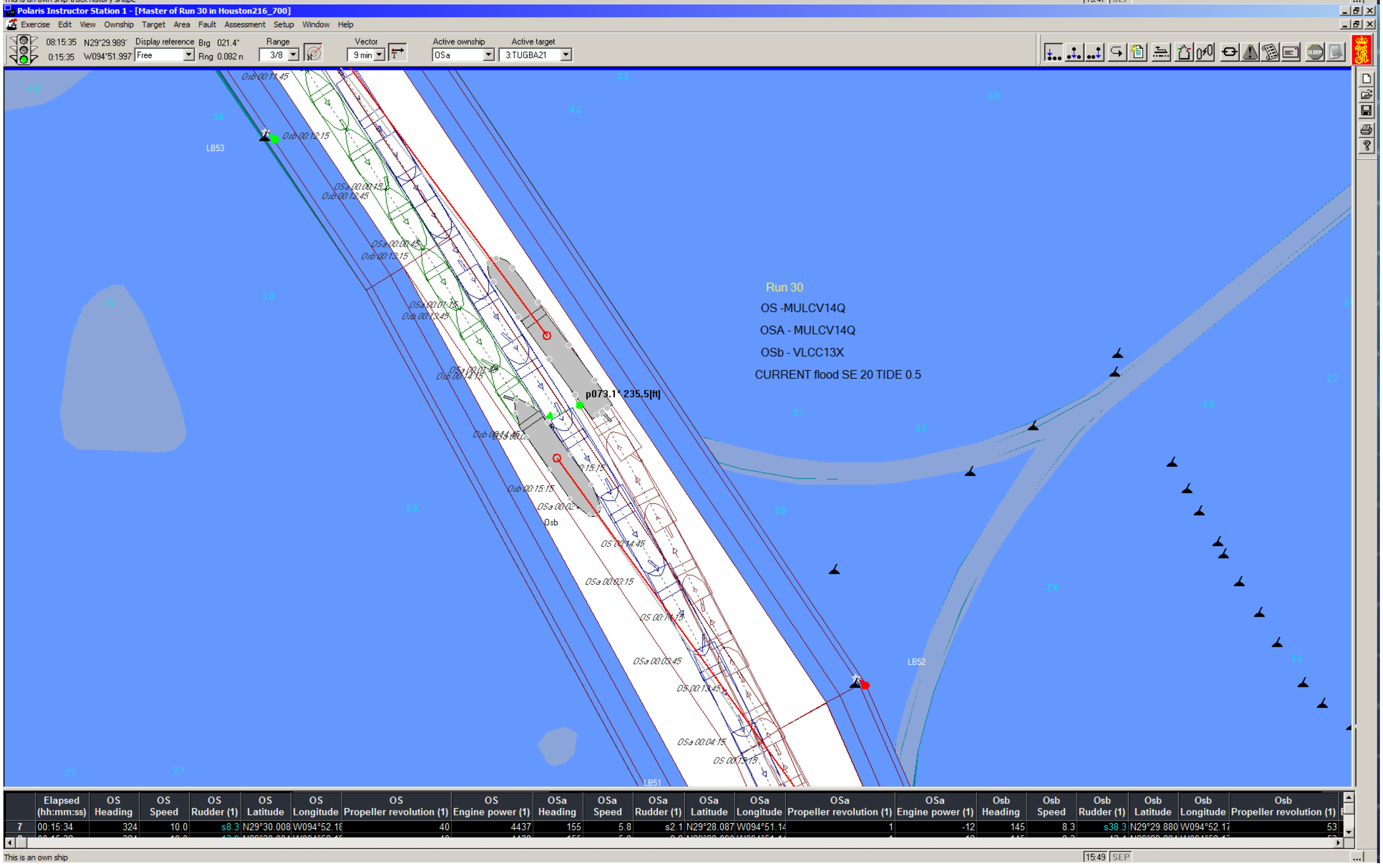
OSb - VLCC13X

CURRENT flood SE 20 TIDE 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	Osb Heading	Osb Speed	Osb Rudder (1)	Osb Latitude	Osb Longitude	Osb Propeller revolution (1)
7	00:13:06	332	10.1	p0.4	N29°29.649	W094°51.95	40	4367	156	8.0	s2.3	N29°28.342	W094°51.27	15	-454	147	8.9	s0.8	N29°30.179	W094°52.39	53

This is an own ship track history shape

15:47 SEP



Polaris Instructor Station 1 - [Master of Run 30 in Houston216_700]

08:15:35 N29°29.989' Display reference Free Brg 021.4° Rng 0.082 n
0:15:35 W094°51.997'

Range 3/8 Vector 9 min Active ownship OSa Active target 3:TUGBA21

Run 30

OS -MULCV14Q

OSA - MULCV14Q

OSb - VLCC13X

CURRENT flood SE 20 TIDE 0.5

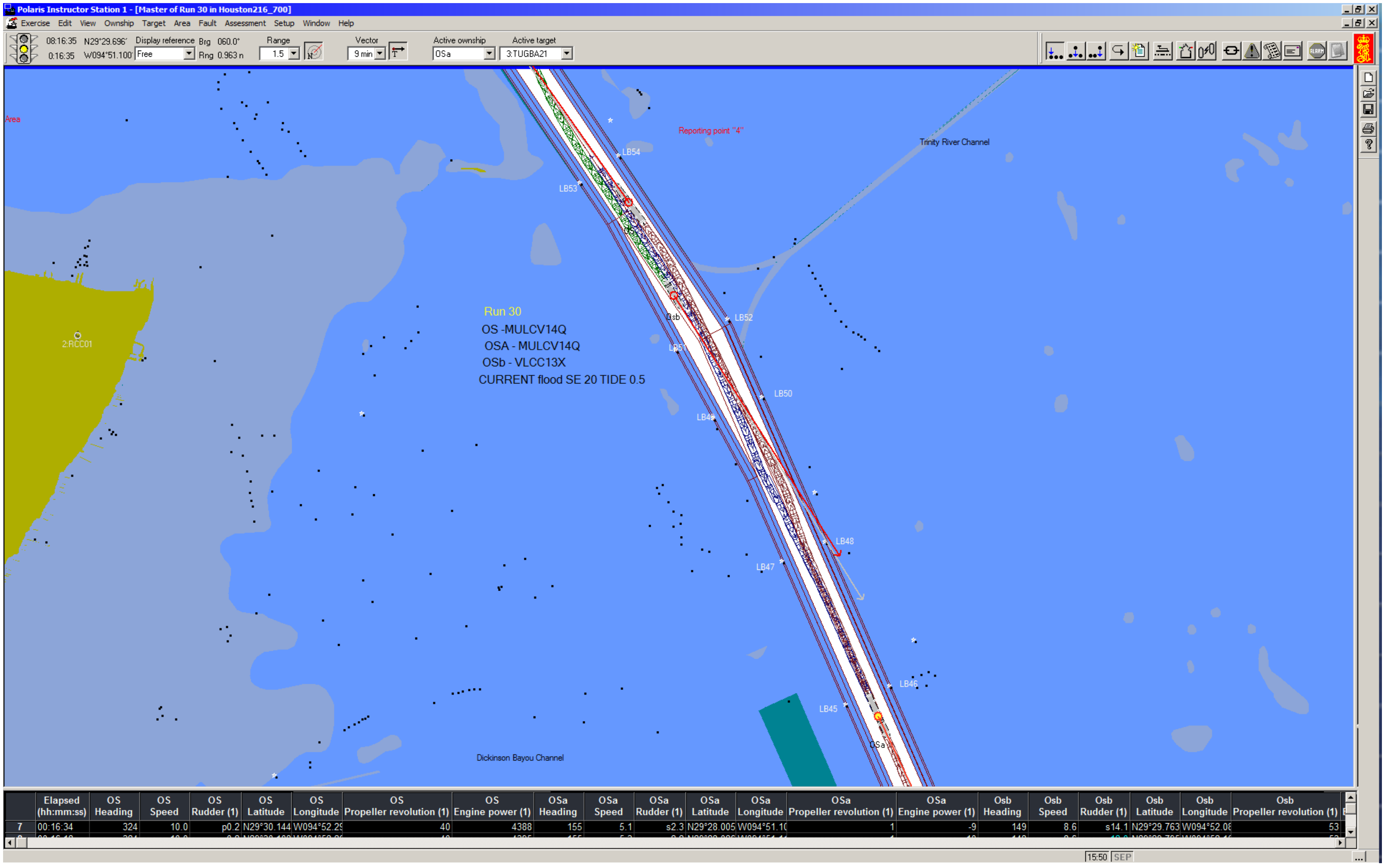
p073.1° 235.5[ft]

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	Osb Heading	Osb Speed	Osb Rudder (1)	Osb Latitude	Osb Longitude	Osb Propeller revolution (1)
7	00:15:34	324	10.0	s8.3	N29°30.008	W094°52.18	40	4437	155	5.8	s2.1	N29°28.087	W094°51.14	1	-12	145	8.3	s38.3	N29°29.880	W094°52.17	53

This is an own ship

15:49 SEP

June 26, 2019



Polaris Instructor Station 1 - [Master of Run 30 in Houston216_700]

08:16:35 N29°29.696' Display reference Free Brg 060.0° Rng 0.963 n

0:16:35 W094°51.100'

Range 1.5

Vector 9 min

Active ownship OSa

Active target 3:TUGBA21

Run 30

OS -MULCV14Q

OSA - MULCV14Q

OSb - VLCC13X

CURRENT flood SE 20 TIDE 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OSa Heading	OSa Speed	OSa Rudder (1)	OSa Latitude	OSa Longitude	OSa Propeller revolution (1)	OSa Engine power (1)	Osb Heading	Osb Speed	Osb Rudder (1)	Osb Latitude	Osb Longitude	Osb Propeller revolution (1)
7	00:16:34	324	10.0	p0.2	N29°30.144	W094°52.29	40	4388	155	5.1	s2.3	N29°28.005	W094°51.10	1	-9	149	8.6	s14.1	N29°29.763	W094°52.08	53

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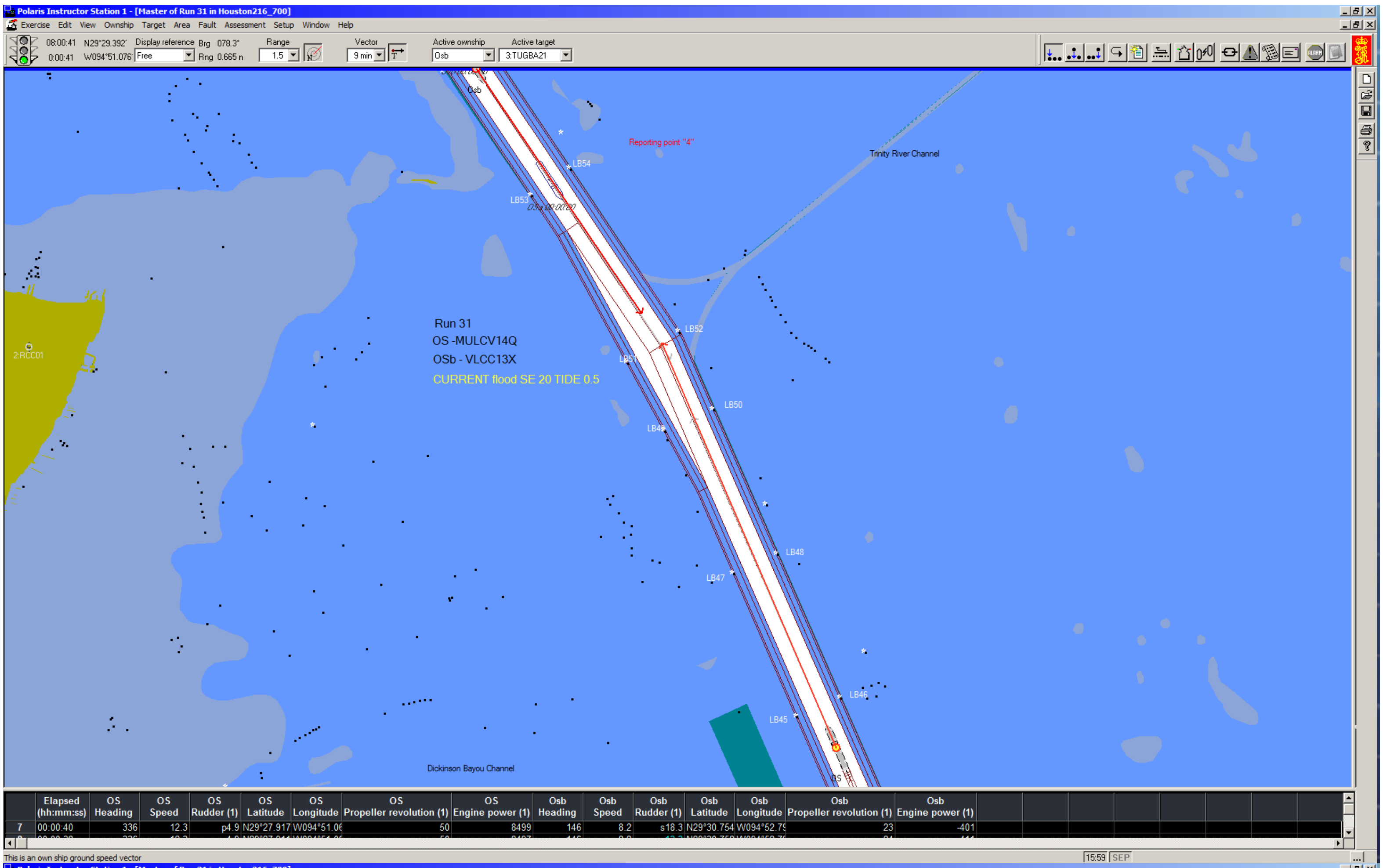
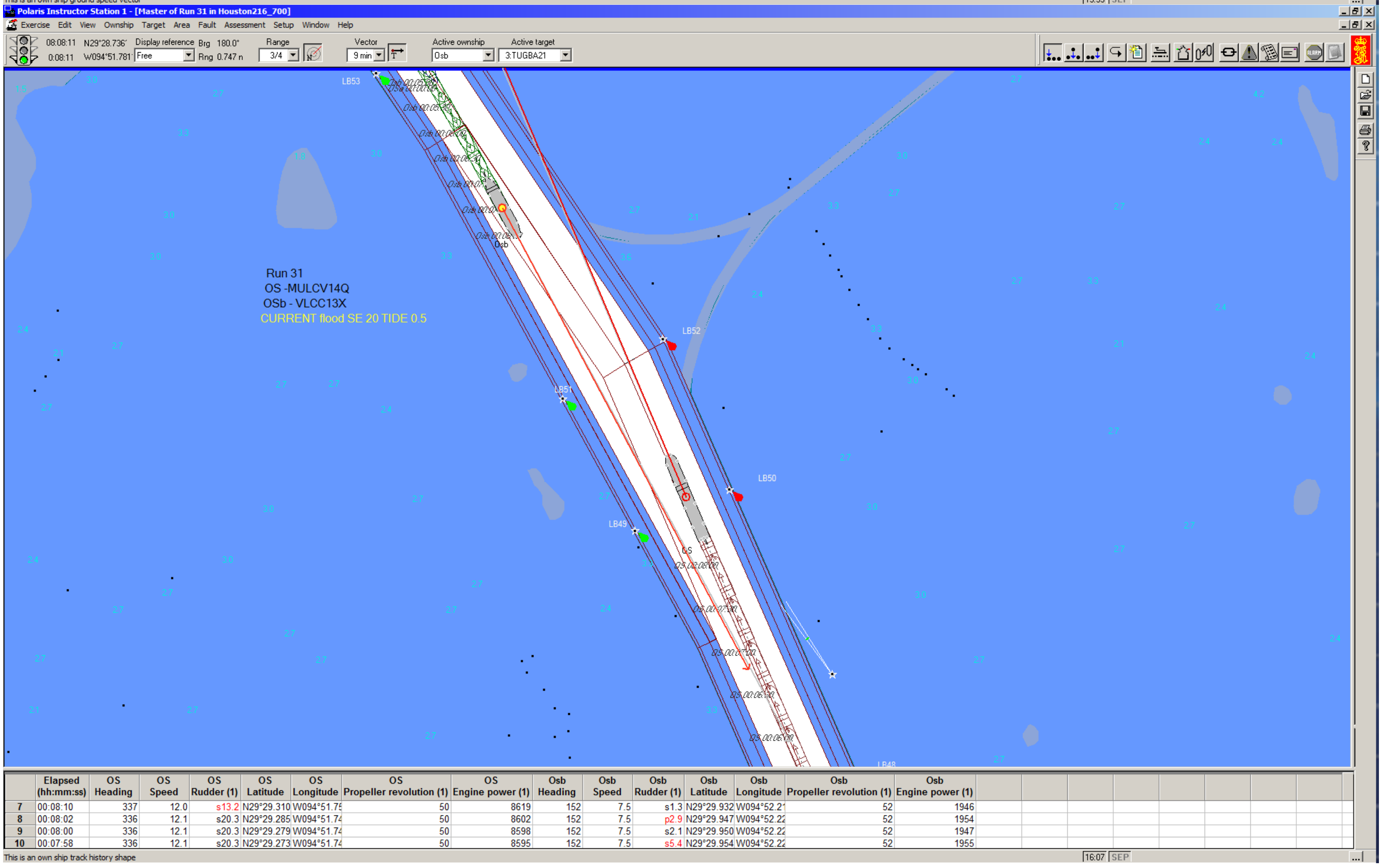
June 26, 2019

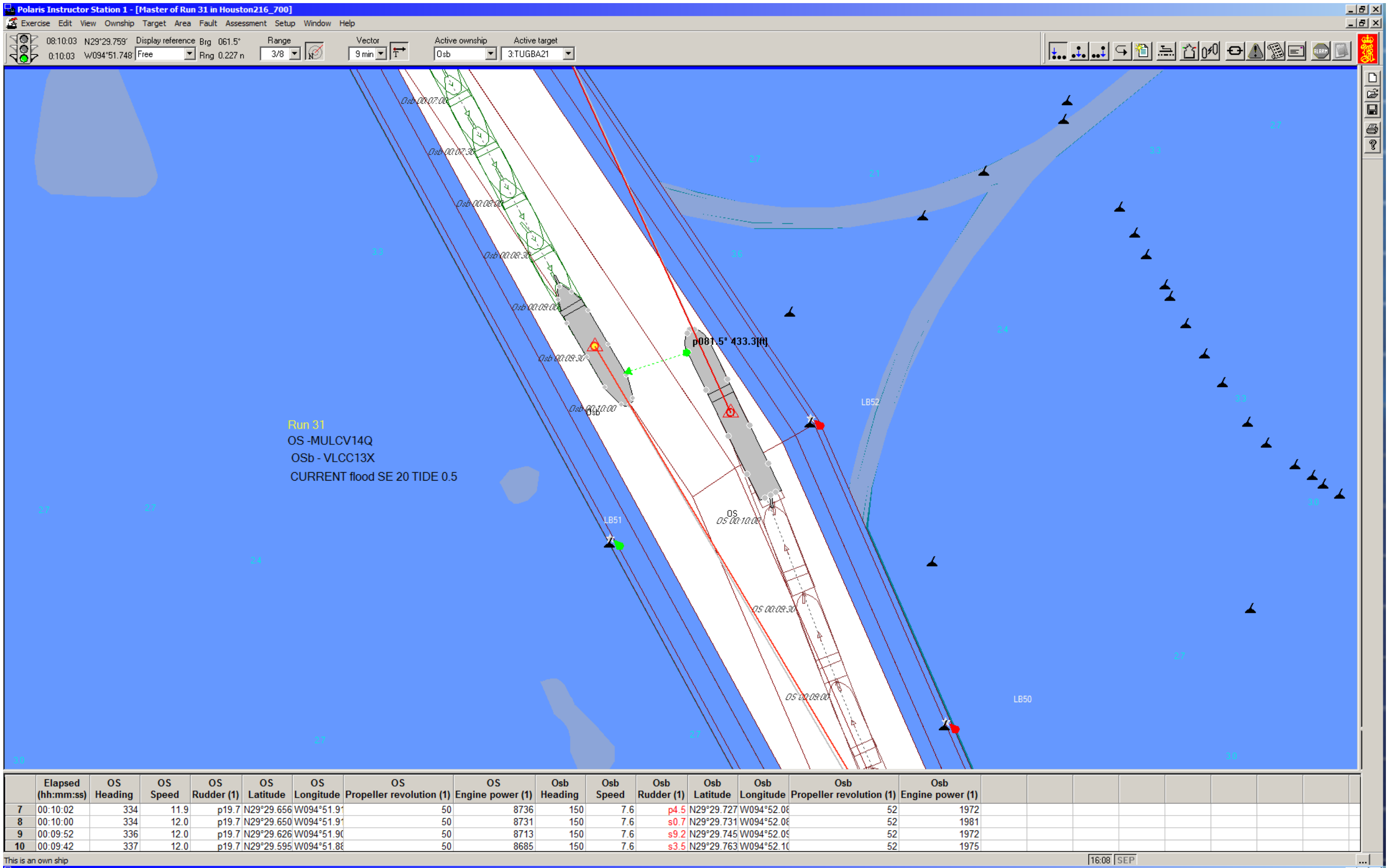
Run 31



	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	Osb Heading	Osb Speed	Osb Rudder (1)	Osb Latitude	Osb Longitude	Osb Propeller revolution (1)	Osb Engine power (1)
7	00:00:40	336	12.3	p4.9	N29°27.917	W094°51.06	50	8499	146	8.2	s18.3	N29°30.754	W094°52.79	23	-401



	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	Osb Heading	Osb Speed	Osb Rudder (1)	Osb Latitude	Osb Longitude	Osb Propeller revolution (1)	Osb Engine power (1)
7	00:08:10	337	12.0	s13.2	N29°29.310	W094°51.75	50	8619	152	7.5	s1.3	N29°29.932	W094°52.21	52	1946
8	00:08:02	336	12.1	s20.3	N29°29.285	W094°51.74	50	8602	152	7.5	p2.9	N29°29.947	W094°52.22	52	1954
9	00:08:00	336	12.1	s20.3	N29°29.279	W094°51.74	50	8598	152	7.5	s2.1	N29°29.950	W094°52.22	52	1947
10	00:07:58	336	12.1	s20.3	N29°29.273	W094°51.74	50	8595	152	7.5	s5.4	N29°29.954	W094°52.22	52	1955

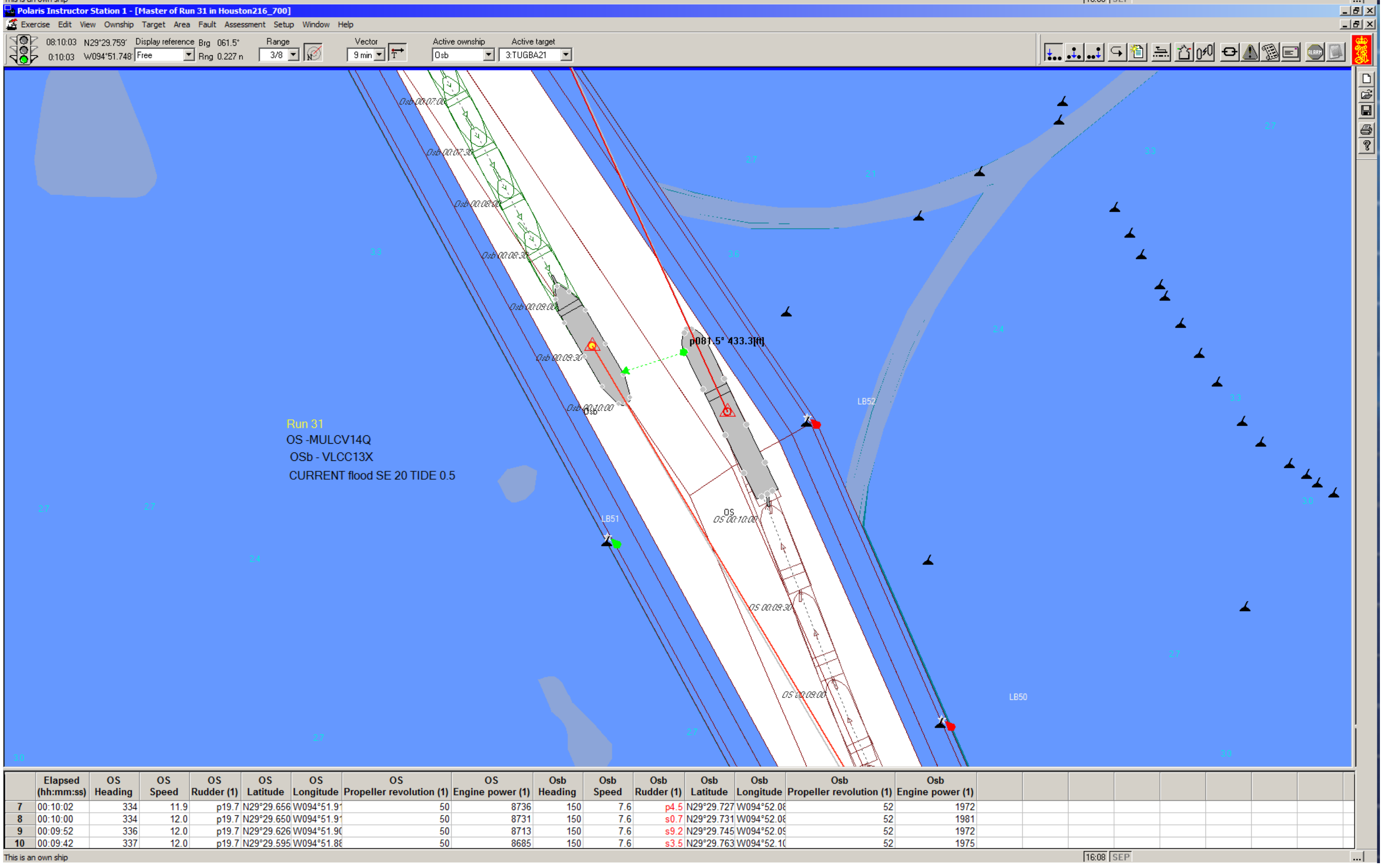


Polaris Instructor Station 1 - [Master of Run 31 in Houston216_700]

Run 31
OS -MULCV14Q
OSb - VLCC13X
CURRENT flood SE 20 TIDE 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	Osb Heading	Osb Speed	Osb Rudder (1)	Osb Latitude	Osb Longitude	Osb Propeller revolution (1)	Osb Engine power (1)
7	00:10:02	334	11.9	p19.7	N29°29.656	W094°51.9	50	8736	150	7.6	p4.5	N29°29.727	W094°52.0	52	1972
8	00:10:00	334	12.0	p19.7	N29°29.650	W094°51.9	50	8731	150	7.6	s0.7	N29°29.731	W094°52.0	52	1981
9	00:09:52	336	12.0	p19.7	N29°29.626	W094°51.9	50	8713	150	7.6	s9.2	N29°29.745	W094°52.0	52	1972
10	00:09:42	337	12.0	p19.7	N29°29.595	W094°51.8	50	8685	150	7.6	s3.5	N29°29.763	W094°52.1	52	1975

This is an own ship



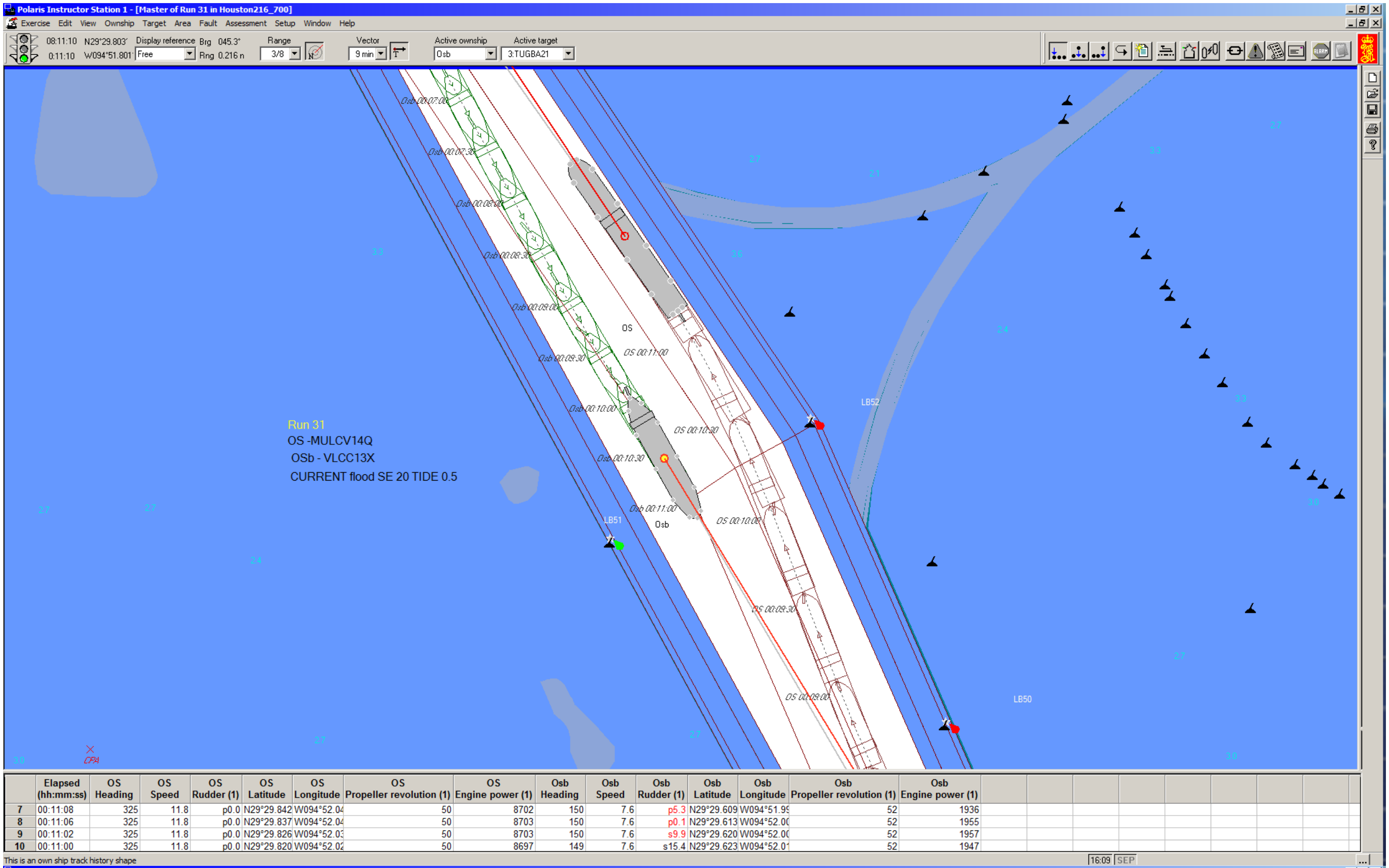
Polaris Instructor Station 1 - [Master of Run 31 in Houston216_700]

Run 31
OS -MULCV14Q
OSb - VLCC13X
CURRENT flood SE 20 TIDE 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	Osb Heading	Osb Speed	Osb Rudder (1)	Osb Latitude	Osb Longitude	Osb Propeller revolution (1)	Osb Engine power (1)
7	00:10:02	334	11.9	p19.7	N29°29.656	W094°51.9	50	8736	150	7.6	p4.5	N29°29.727	W094°52.0	52	1972
8	00:10:00	334	12.0	p19.7	N29°29.650	W094°51.9	50	8731	150	7.6	s0.7	N29°29.731	W094°52.0	52	1981
9	00:09:52	336	12.0	p19.7	N29°29.626	W094°51.9	50	8713	150	7.6	s9.2	N29°29.745	W094°52.0	52	1972
10	00:09:42	337	12.0	p19.7	N29°29.595	W094°51.8	50	8685	150	7.6	s3.5	N29°29.763	W094°52.1	52	1975

This is an own ship

June 26, 2019



Polaris Instructor Station 1 - [Master of Run 31 in Houston216_700]

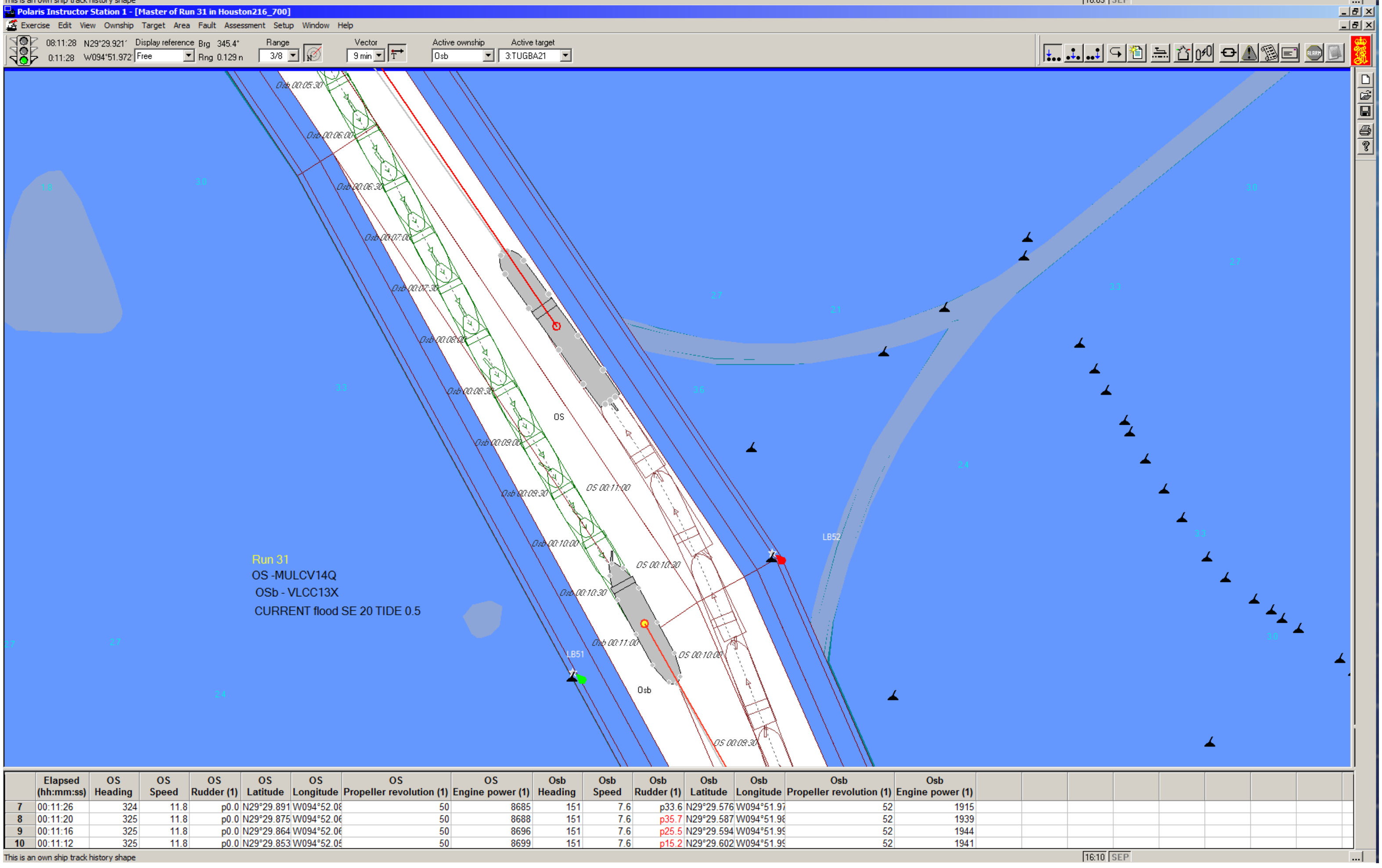
08:11:10 N29°29.803' Display reference Free Brg 045.3°
0:11:10 W094°51.801' Rng 0.216 n
Range 3/8
Vector 9 min
Active ownship Osb
Active target 3:TUGBA21

Run 31
OS -MULCV14Q
OSb - VLCC13X
CURRENT flood SE 20 TIDE 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	Osb Heading	Osb Speed	Osb Rudder (1)	Osb Latitude	Osb Longitude	Osb Propeller revolution (1)	Osb Engine power (1)
7	00:11:08	325	11.8	p0.0	N29°29.842	W094°52.04	50	8702	150	7.6	p5.3	N29°29.609	W094°51.99	52	1936
8	00:11:06	325	11.8	p0.0	N29°29.837	W094°52.04	50	8703	150	7.6	p0.1	N29°29.613	W094°52.00	52	1955
9	00:11:02	325	11.8	p0.0	N29°29.826	W094°52.03	50	8703	150	7.6	s9.9	N29°29.620	W094°52.00	52	1957
10	00:11:00	325	11.8	p0.0	N29°29.820	W094°52.02	50	8697	149	7.6	s15.4	N29°29.623	W094°52.01	52	1947

This is an own ship track history shape

16:09 SEP



Polaris Instructor Station 1 - [Master of Run 31 in Houston216_700]

08:11:28 N29°29.921' Display reference Free Brg 345.4°
0:11:28 W094°51.972' Rng 0.129 n
Range 3/8
Vector 9 min
Active ownship Osb
Active target 3:TUGBA21

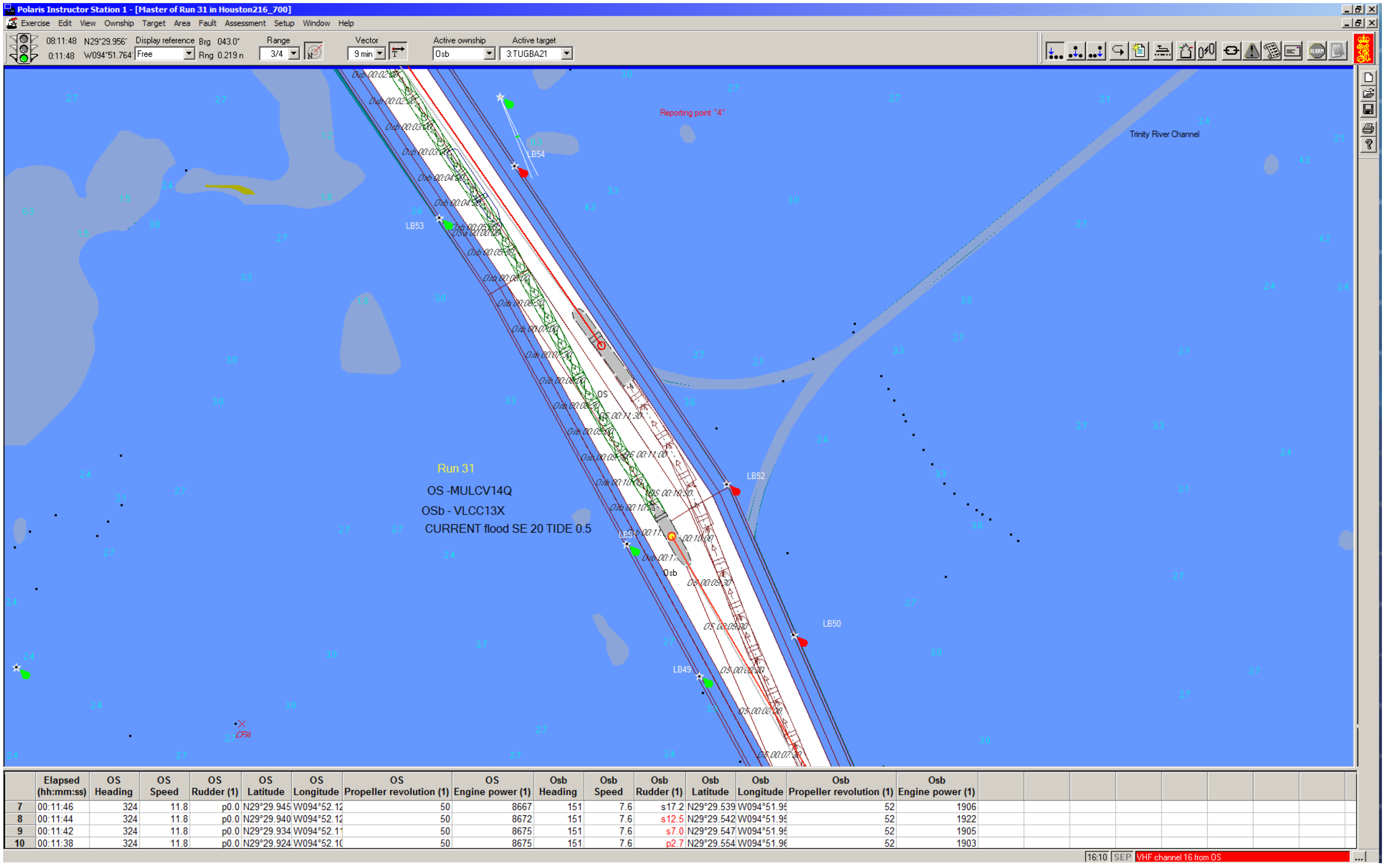
Run 31
OS -MULCV14Q
OSb - VLCC13X
CURRENT flood SE 20 TIDE 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	Osb Heading	Osb Speed	Osb Rudder (1)	Osb Latitude	Osb Longitude	Osb Propeller revolution (1)	Osb Engine power (1)
7	00:11:26	324	11.8	p0.0	N29°29.891	W094°52.08	50	8685	151	7.6	p33.6	N29°29.576	W094°51.97	52	1915
8	00:11:20	325	11.8	p0.0	N29°29.875	W094°52.06	50	8688	151	7.6	p35.7	N29°29.587	W094°51.98	52	1939
9	00:11:16	325	11.8	p0.0	N29°29.864	W094°52.06	50	8696	151	7.6	p25.5	N29°29.594	W094°51.99	52	1944
10	00:11:12	325	11.8	p0.0	N29°29.853	W094°52.05	50	8699	151	7.6	p15.2	N29°29.602	W094°51.99	52	1941

This is an own ship track history shape

16:10 SEP

June 26, 2019



08:11:48 N29°29.956' Display reference Free Brg 043.0° Rng 0.219 n
0:11:48 W094°51.764'
Range 3/4
Vector 9 min
Active ownship Osb
Active target 3:TUGBA21

Run 31

OS -MULCV14Q

OSb - VLCC13X

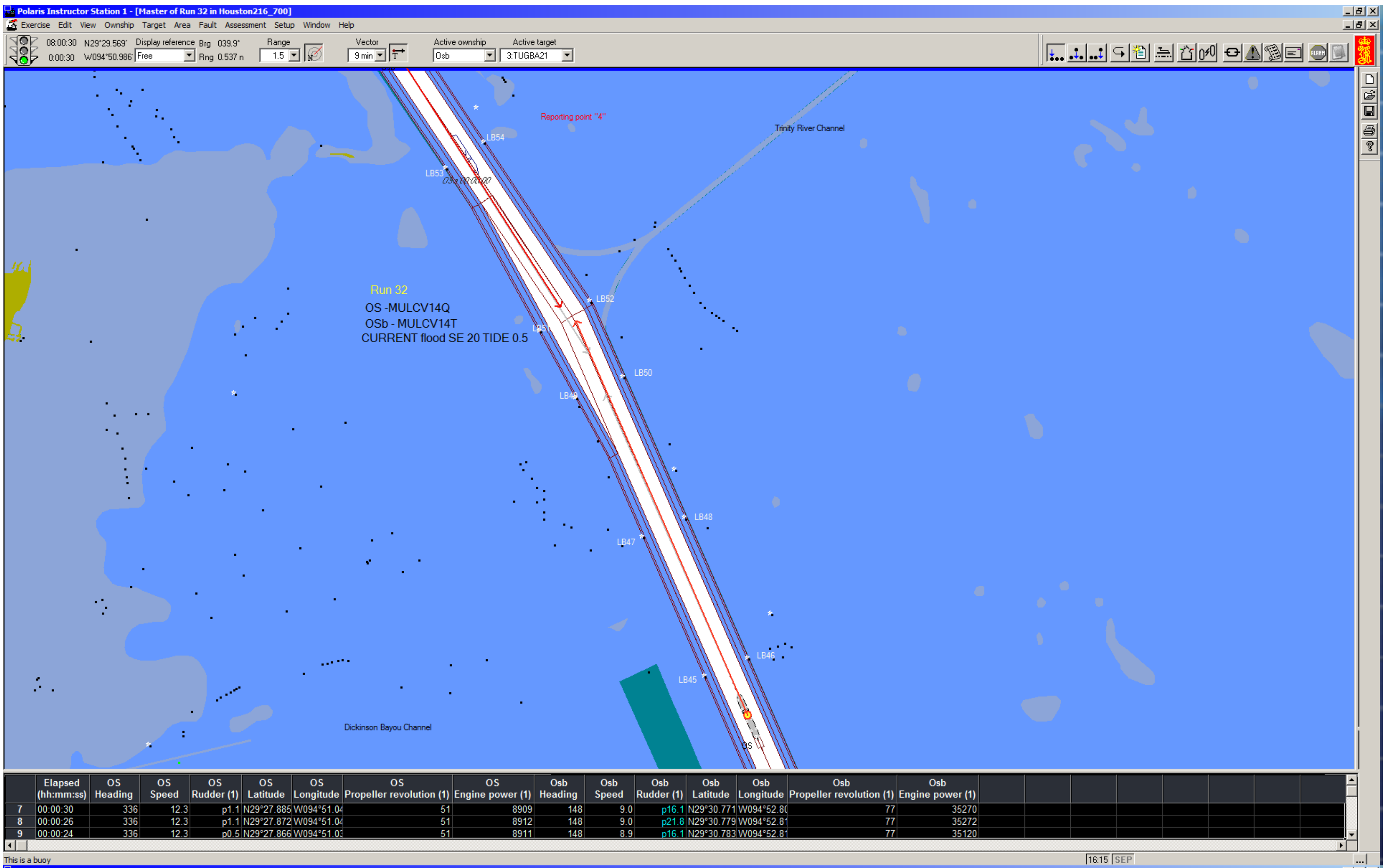
CURRENT flood SE 20 TIDE 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	Osb Heading	Osb Speed	Osb Rudder (1)	Osb Latitude	Osb Longitude	Osb Propeller revolution (1)	Osb Engine power (1)
7	00:11:46	324	11.8	p0.0	N29°29.945	W094°52.12	50	8667	151	7.6	s17.2	N29°29.539	W094°51.95	52	1906
8	00:11:44	324	11.8	p0.0	N29°29.940	W094°52.12	50	8672	151	7.6	s12.5	N29°29.542	W094°51.95	52	1922
9	00:11:42	324	11.8	p0.0	N29°29.934	W094°52.11	50	8675	151	7.6	s7.0	N29°29.547	W094°51.95	52	1905
10	00:11:38	324	11.8	p0.0	N29°29.924	W094°52.10	50	8675	151	7.6	p2.7	N29°29.554	W094°51.96	52	1903

16:10 SEP VHF channel 16 from OS

June 26, 2019

Run 32



08:00:30 N29°29.569′ Display reference: Free Brg 039.9° Rng 0.537 n

0:00:30 W094°50.986′

Range: 1.5

Vector: 9 min

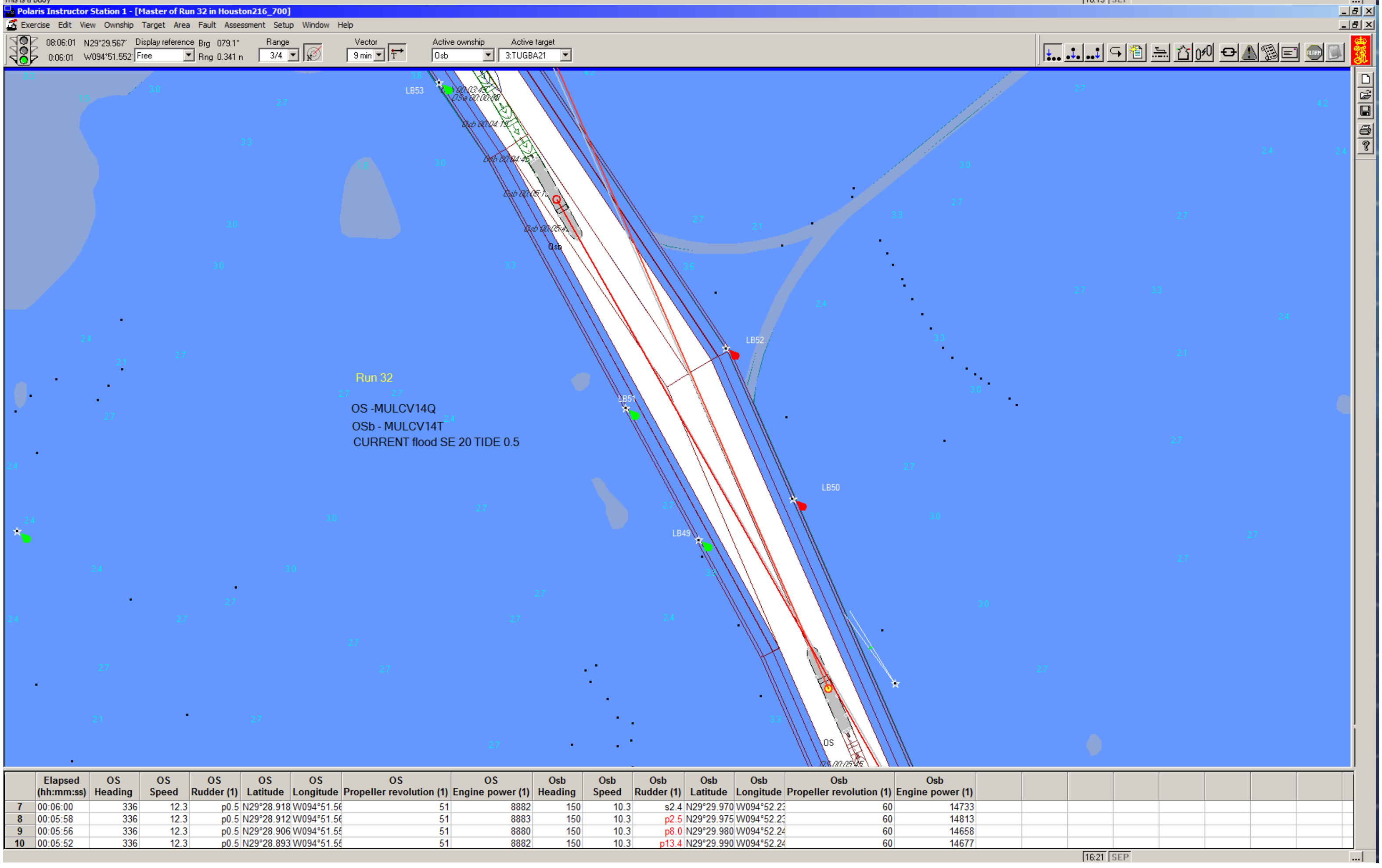
Active ownship: Osb

Active target: 3:TUGBA21

Run 32
OS -MULCV14Q
OSb - MULCV14T
CURRENT flood SE 20 TIDE 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	Osb Heading	Osb Speed	Osb Rudder (1)	Osb Latitude	Osb Longitude	Osb Propeller revolution (1)	Osb Engine power (1)
7	00:00:30	336	12.3	p1.1	N29°27.885	W094°51.04	51	8909	148	9.0	p16.1	N29°30.771	W094°52.80	77	35270
8	00:00:26	336	12.3	p1.1	N29°27.872	W094°51.04	51	8912	148	9.0	p21.8	N29°30.779	W094°52.81	77	35272
9	00:00:24	336	12.3	p0.5	N29°27.866	W094°51.03	51	8911	148	8.9	p16.1	N29°30.783	W094°52.81	77	35120

This is a buoy



08:06:01 N29°29.567′ Display reference: Free Brg 079.1° Rng 0.341 n

0:06:01 W094°51.552′

Range: 3/4

Vector: 9 min

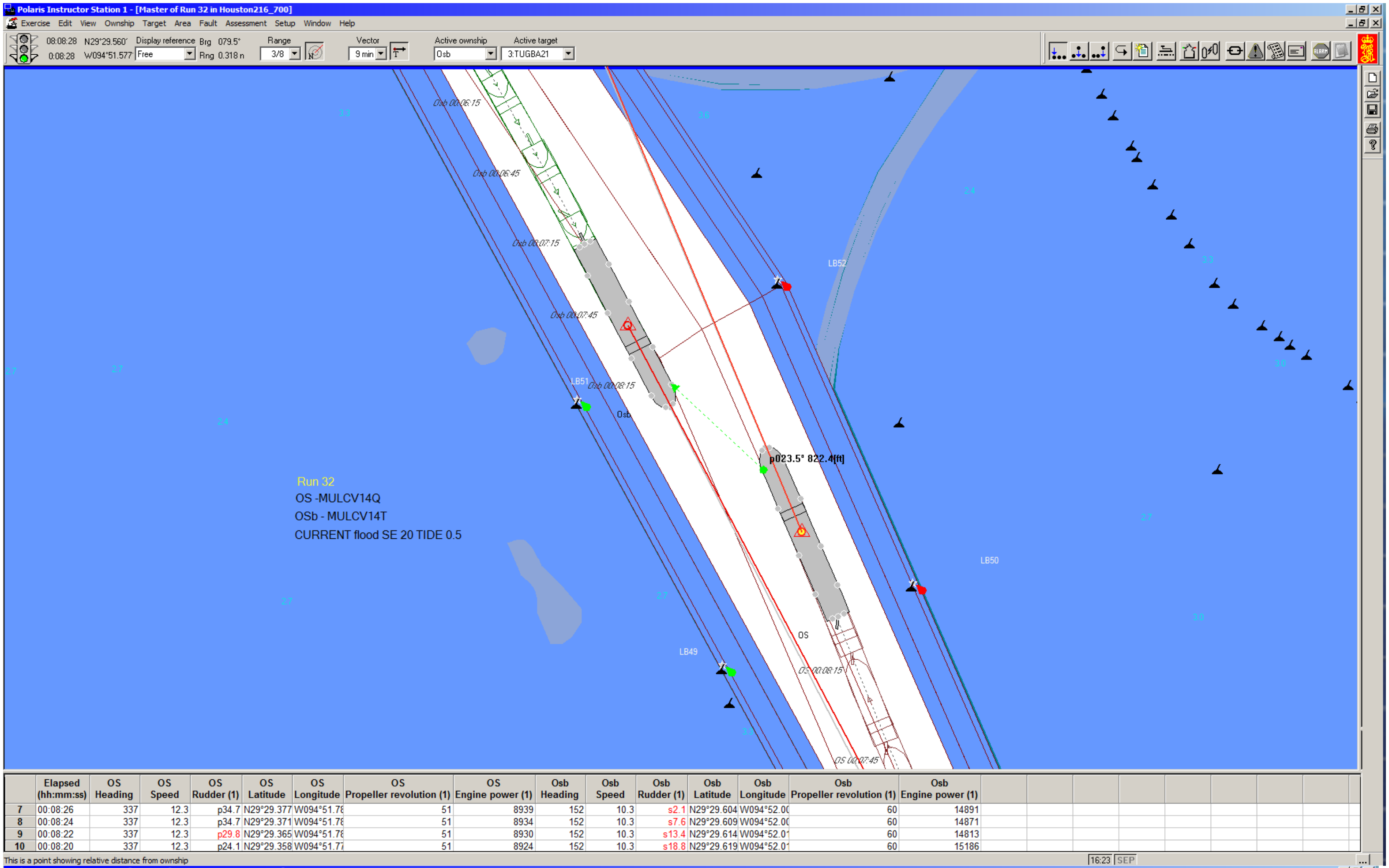
Active ownship: Osb

Active target: 3:TUGBA21

Run 32
OS -MULCV14Q
OSb - MULCV14T
CURRENT flood SE 20 TIDE 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	Osb Heading	Osb Speed	Osb Rudder (1)	Osb Latitude	Osb Longitude	Osb Propeller revolution (1)	Osb Engine power (1)
7	00:06:00	336	12.3	p0.5	N29°28.918	W094°51.56	51	8882	150	10.3	s2.4	N29°29.970	W094°52.23	60	14733
8	00:05:58	336	12.3	p0.5	N29°28.912	W094°51.56	51	8883	150	10.3	p2.5	N29°29.975	W094°52.23	60	14813
9	00:05:56	336	12.3	p0.5	N29°28.906	W094°51.55	51	8880	150	10.3	p8.0	N29°29.980	W094°52.24	60	14658
10	00:05:52	336	12.3	p0.5	N29°28.893	W094°51.55	51	8882	150	10.3	p13.4	N29°29.990	W094°52.24	60	14677

June 26, 2019

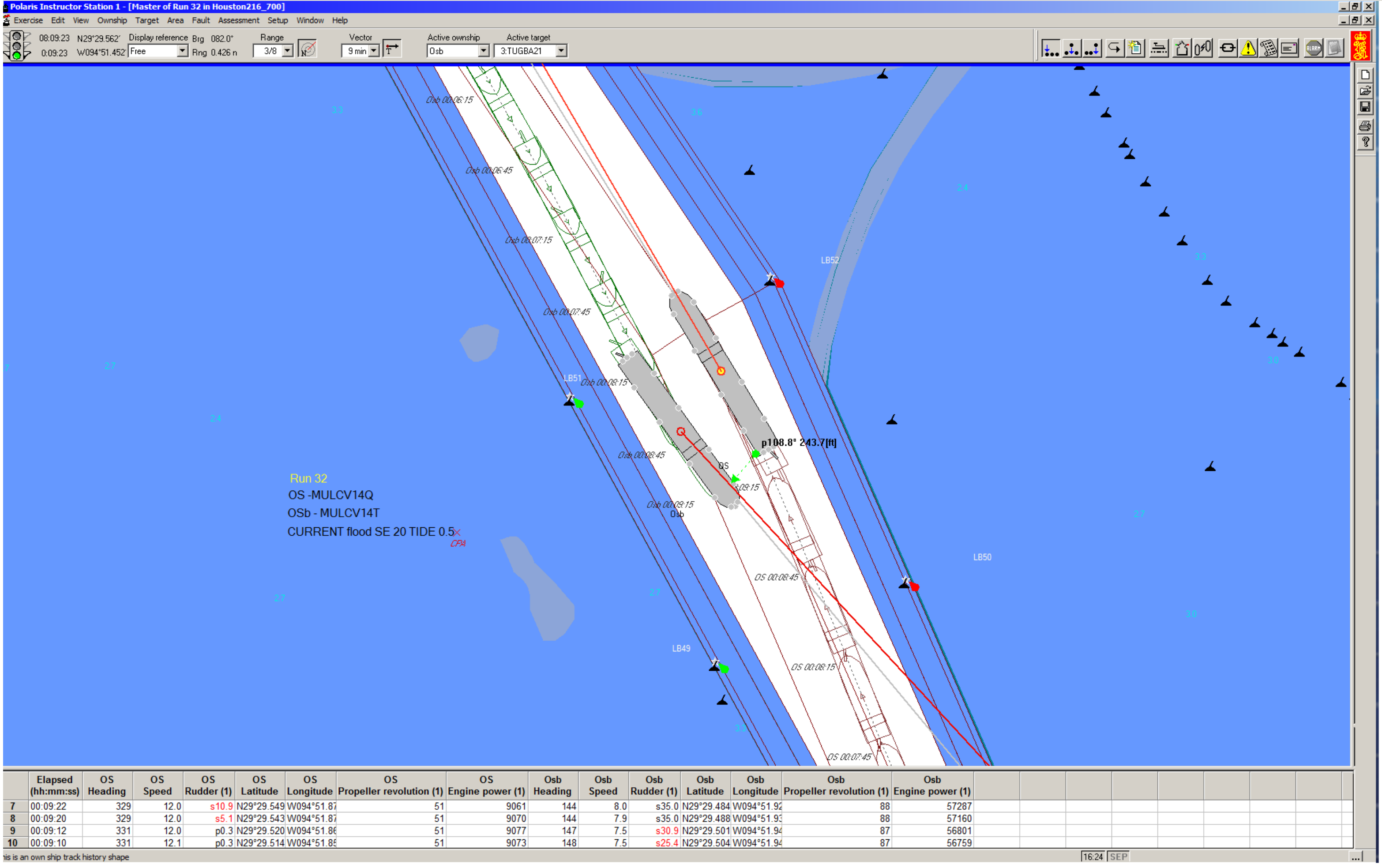


08:08:28 N29°29.560' Display reference Free Brg 079.5° Rng 0.318 n Range 3/8 Vector 9 min Active ownship Osb Active target 3:TUGBA21
0:08:28 W094°51.577'

Run 32
OS -MULCV14Q
OSb - MULCV14T
CURRENT flood SE 20 TIDE 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	Osb Heading	Osb Speed	Osb Rudder (1)	Osb Latitude	Osb Longitude	Osb Propeller revolution (1)	Osb Engine power (1)
7	00:08:26	337	12.3	p34.7	N29°29.377	W094°51.78	51	8939	152	10.3	s2.1	N29°29.604	W094°52.00	60	14891
8	00:08:24	337	12.3	p34.7	N29°29.371	W094°51.78	51	8934	152	10.3	s7.6	N29°29.609	W094°52.00	60	14871
9	00:08:22	337	12.3	p29.8	N29°29.365	W094°51.78	51	8930	152	10.3	s13.4	N29°29.614	W094°52.01	60	14813
10	00:08:20	337	12.3	p24.1	N29°29.358	W094°51.77	51	8924	152	10.3	s18.8	N29°29.619	W094°52.01	60	15186

This is a point showing relative distance from ownship



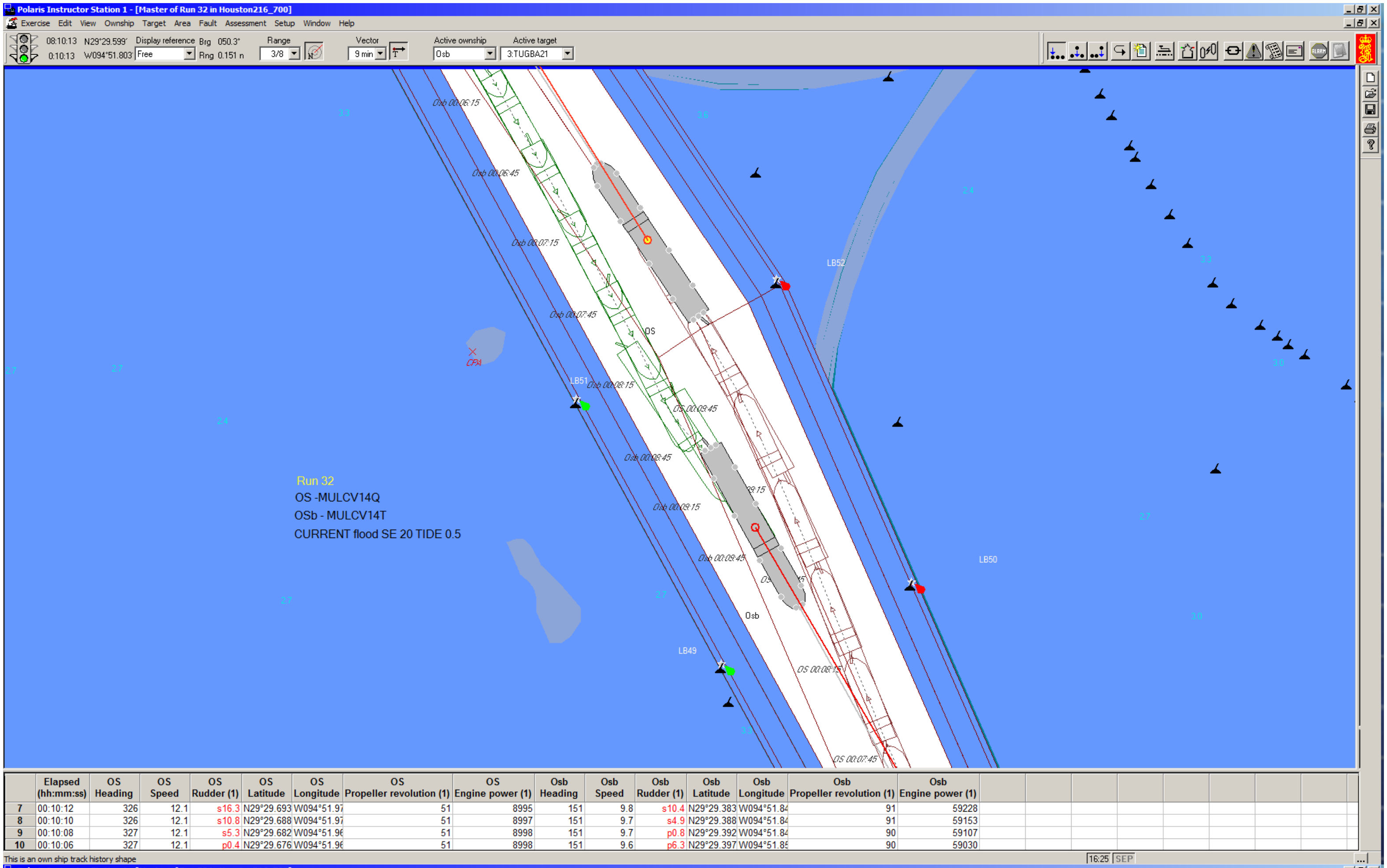
08:09:23 N29°29.562' Display reference Free Brg 082.0° Rng 0.426 n Range 3/8 Vector 9 min Active ownship Osb Active target 3:TUGBA21
0:09:23 W094°51.452'

Run 32
OS -MULCV14Q
OSb - MULCV14T
CURRENT flood SE 20 TIDE 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	Osb Heading	Osb Speed	Osb Rudder (1)	Osb Latitude	Osb Longitude	Osb Propeller revolution (1)	Osb Engine power (1)
7	00:09:22	329	12.0	s10.9	N29°29.549	W094°51.87	51	9061	144	8.0	s35.0	N29°29.484	W094°51.92	88	57287
8	00:09:20	329	12.0	s5.1	N29°29.543	W094°51.87	51	9070	144	7.9	s35.0	N29°29.488	W094°51.93	88	57160
9	00:09:12	331	12.0	p0.3	N29°29.520	W094°51.86	51	9077	147	7.5	s30.9	N29°29.501	W094°51.94	87	56801
10	00:09:10	331	12.1	p0.3	N29°29.514	W094°51.85	51	9073	148	7.5	s25.4	N29°29.504	W094°51.94	87	56759

is is an own ship track history shape

June 26, 2019



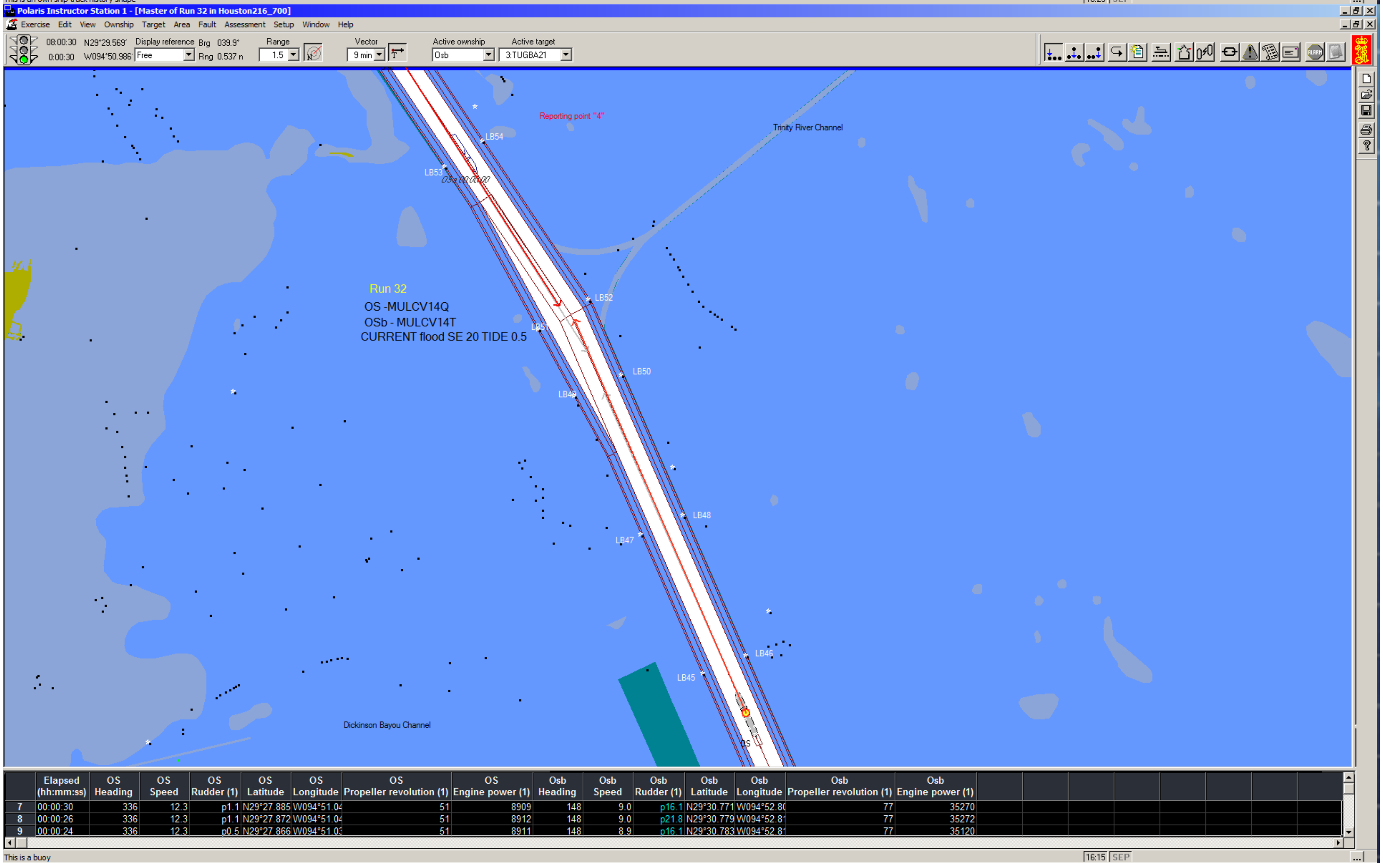
Polaris Instructor Station 1 - [Master of Run 32 in Houston216_700]

08:10:13 N29°29.599' Display reference Brg 050.3°
0:10:13 W094°51.803' Free Rng 0.151 n
Range 3/8
Vector 9 min
Active ownship Osb
Active target 3:TUGBA21

Run 32
OS -MULCV14Q
OSb - MULCV14T
CURRENT flood SE 20 TIDE 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	Osb Heading	Osb Speed	Osb Rudder (1)	Osb Latitude	Osb Longitude	Osb Propeller revolution (1)	Osb Engine power (1)
7	00:10:12	326	12.1	s16.3	N29°29.693	W094°51.97	51	8995	151	9.8	s10.4	N29°29.383	W094°51.84	91	59228
8	00:10:10	326	12.1	s10.8	N29°29.688	W094°51.97	51	8997	151	9.7	s4.9	N29°29.388	W094°51.84	91	59153
9	00:10:08	327	12.1	s5.3	N29°29.682	W094°51.96	51	8998	151	9.7	p0.8	N29°29.392	W094°51.84	90	59107
10	00:10:06	327	12.1	p0.4	N29°29.676	W094°51.96	51	8998	151	9.6	p6.3	N29°29.397	W094°51.85	90	59030

This is an own ship track history shape



Polaris Instructor Station 1 - [Master of Run 32 in Houston216_700]

08:00:30 N29°29.569' Display reference Brg 039.9°
0:00:30 W094°50.986' Free Rng 0.537 n
Range 1.5
Vector 9 min
Active ownship Osb
Active target 3:TUGBA21

Run 32
OS -MULCV14Q
OSb - MULCV14T
CURRENT flood SE 20 TIDE 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	Osb Heading	Osb Speed	Osb Rudder (1)	Osb Latitude	Osb Longitude	Osb Propeller revolution (1)	Osb Engine power (1)
7	00:00:30	336	12.3	p1.1	N29°27.885	W094°51.04	51	8909	148	9.0	p16.1	N29°30.771	W094°52.80	77	35270
8	00:00:26	336	12.3	p1.1	N29°27.872	W094°51.04	51	8912	148	9.0	p21.8	N29°30.779	W094°52.81	77	35272
9	00:00:24	336	12.3	p0.5	N29°27.866	W094°51.03	51	8911	148	8.9	p16.1	N29°30.783	W094°52.81	77	35120

This is a buoy

Appendix M: HSC – Barbours Cut Channel Simulations

June 26, 2019

Run 33

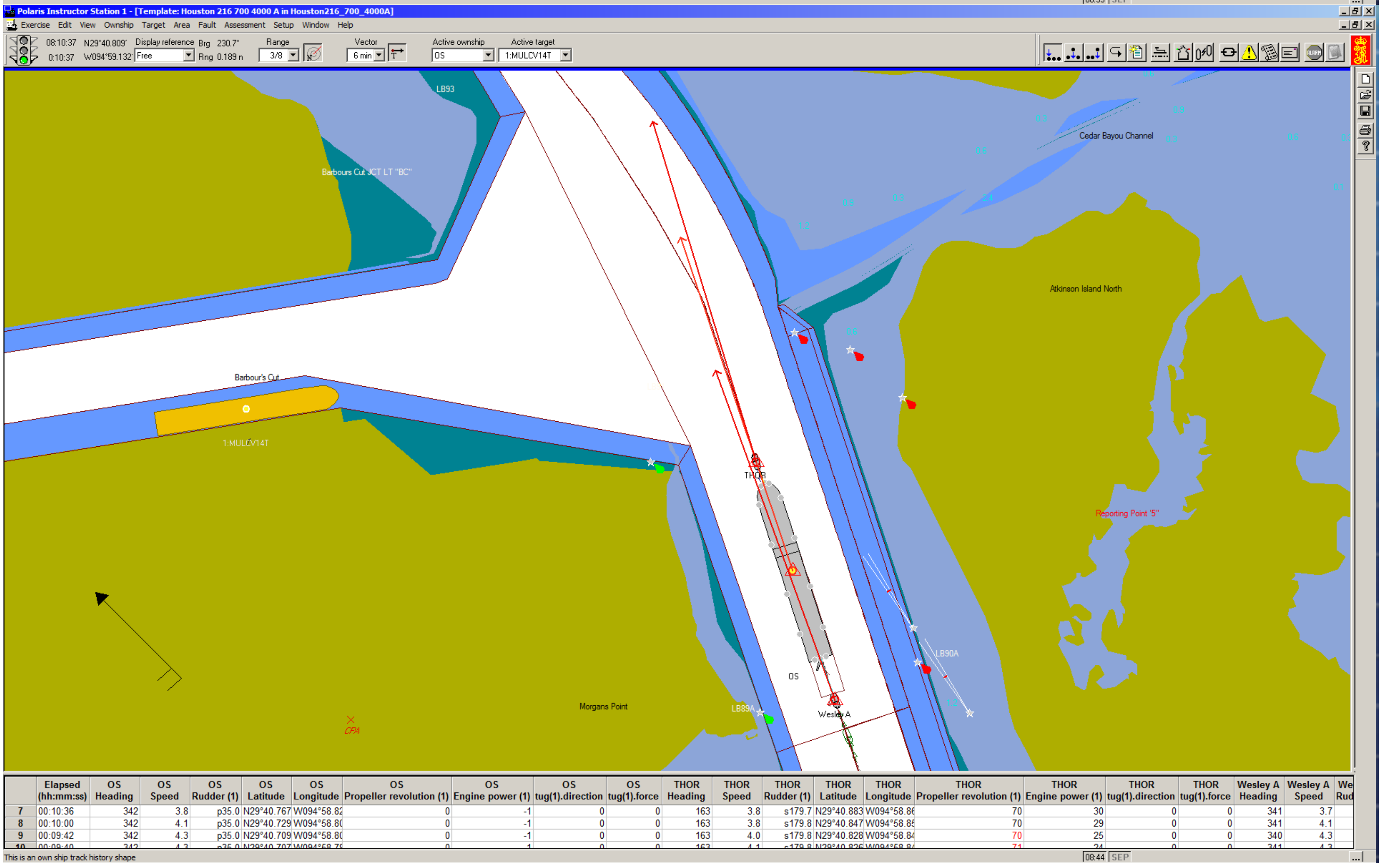
Polaris Instructor Station 1 - [Template: Houston 216 700 4000 A in Houston216_700_4000A]

08:01:03 N29°40.257′ Display reference: Free Brg 105.6° Rng 0.476 n
0:01:03 W094°58.036′ Range 1.5 Vector 18 min Active ownship OS Active target 1:MULCV14T

OS - MULCV14T
THOR - ms7505
Wesley A - mz7505
Current EBB SE 20 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:01:02	342	6.8	p11.7	N29°39.891	W094°58.49	33	2471	0	0	165	7.8	s179.5	N29°40.015	W094°58.54	141	247	0	0	338	6.6	
8	00:01:00	342	6.8	p11.7	N29°39.888	W094°58.49	33	2471	0	0	165	7.8	s175.4	N29°40.010	W094°58.53	141	241	0	0	344	6.7	
9	00:00:58	342	6.8	p8.2	N29°39.884	W094°58.48	33	2472	0	0	165	7.9	s178.5	N29°40.006	W094°58.53	141	234	0	0	349	6.9	
10	00:00:56	342	6.8	p2.6	N29°39.881	W094°58.48	33	2472	0	0	164	8.0	s176.9	N29°40.002	W094°58.53	141	220	0	0	355	7.1	
11	00:00:54	342	6.8	p1.0	N29°39.877	W094°58.48	33	2471	0	0	164	8.0	s177.1	N29°39.997	W094°58.53	141	211	0	0	360	7.2	
12	00:00:50	342	6.8	p9.6	N29°39.870	W094°58.48	33	2472	0	0	165	8.3	s179.6	N29°39.989	W094°58.53	142	189	0	0	004	7.2	
13	00:00:48	342	6.8	p12.0	N29°39.866	W094°58.48	33	2472	0	0	165	8.5	s179.6	N29°39.984	W094°58.53	143	176	0	0	004	7.2	
14	00:00:46	342	6.8	p10.5	N29°39.863	W094°58.48	33	2472	0	0	166	8.6	s179.7	N29°39.980	W094°58.53	145	180	0	0	002	7.2	

08:35 SEP



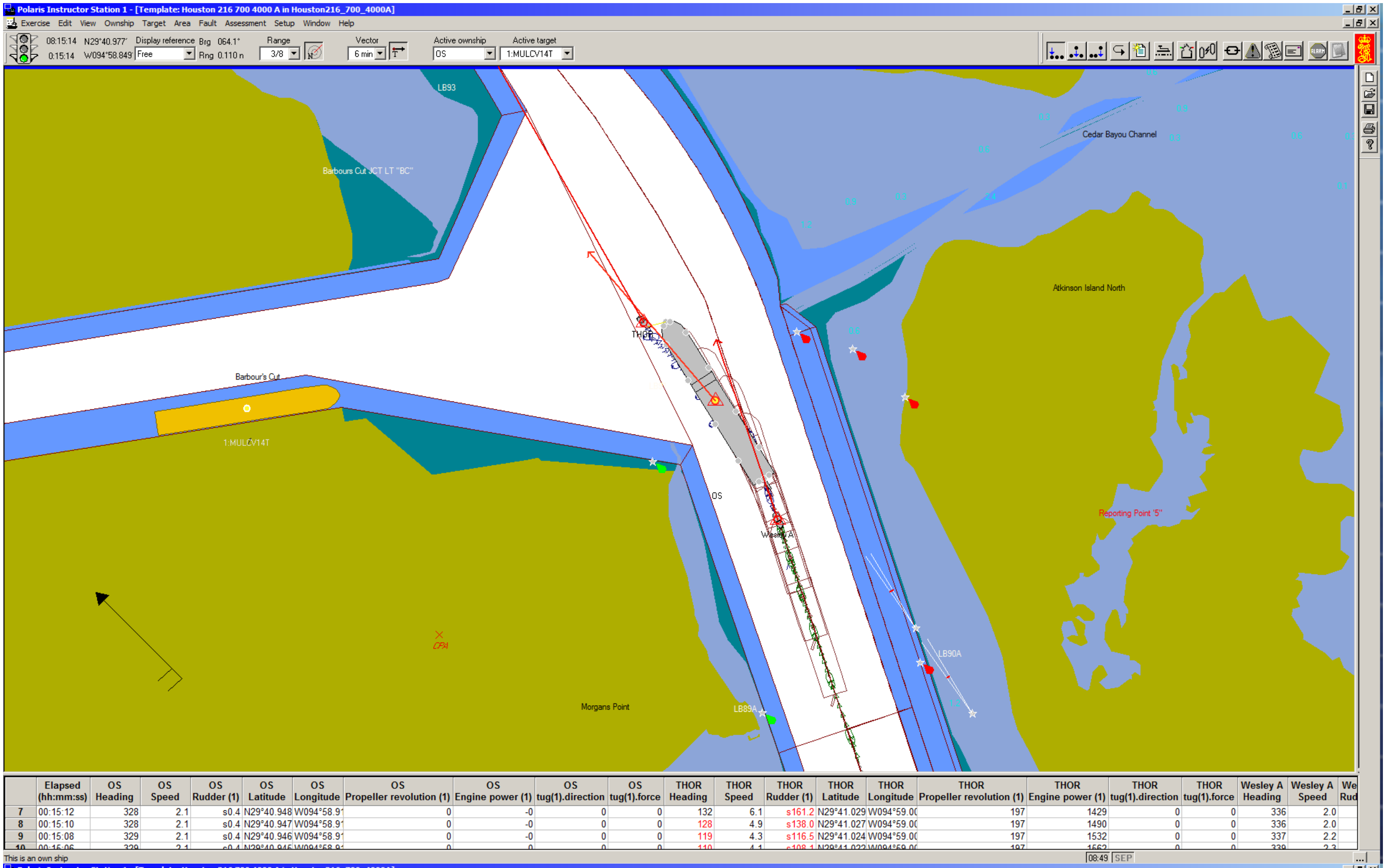
Polaris Instructor Station 1 - [Template: Houston 216 700 4000 A in Houston216_700_4000A]

08:10:37 N29°40.809′ Display reference: Free Brg 230.7° Rng 0.189 n
0:10:37 W094°59.132′ Range 3/8 Vector 6 min Active ownship OS Active target 1:MULCV14T

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:10:36	342	3.8	p35.0	N29°40.767	W094°58.82	0	-1	0	0	163	3.8	s179.7	N29°40.883	W094°58.86	70	30	0	0	341	3.7	
8	00:10:00	342	4.1	p35.0	N29°40.729	W094°58.80	0	-1	0	0	163	3.8	s179.8	N29°40.847	W094°58.85	70	29	0	0	341	4.1	
9	00:09:42	342	4.3	p35.0	N29°40.709	W094°58.80	0	-1	0	0	163	4.0	s179.8	N29°40.828	W094°58.84	70	25	0	0	340	4.3	
10	00:09:40	342	4.3	p35.0	N29°40.707	W094°58.79	0	-1	0	0	163	4.1	s179.8	N29°40.826	W094°58.84	71	24	0	0	341	4.3	

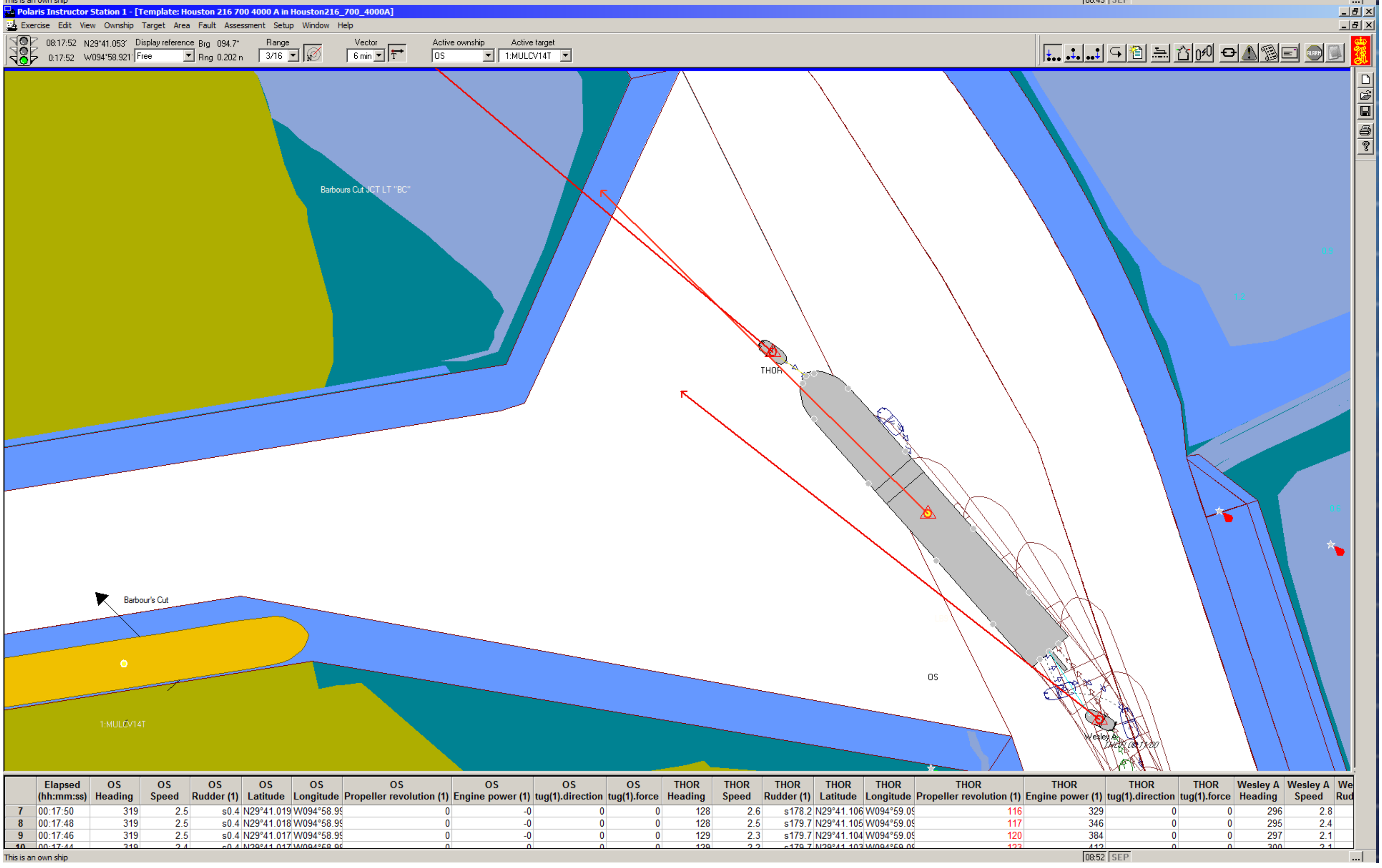
This is an own ship track history shape

08:44 SEP



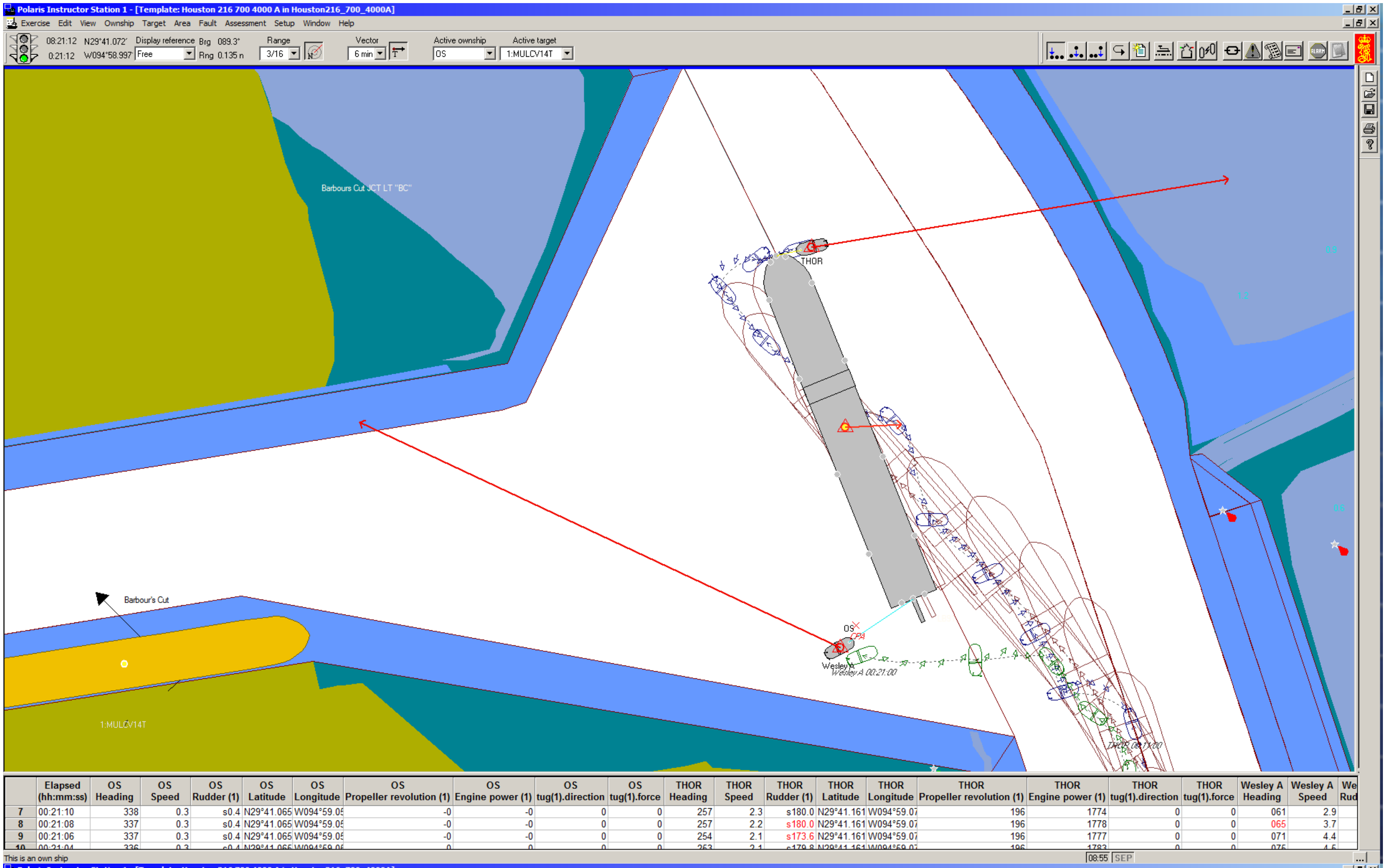
08:15:14 N29°40.977' Display reference Brg 064.1°
0:15:14 W094°58.849 Free Rng 0.110 n
Range 3/8
Vector 6 min
Active ownship OS
Active target 1:MULCV14T

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:15:12	328	2.1	s0.4	N29°40.948	W094°58.91	0	-0	0	0	132	6.1	s161.2	N29°41.029	W094°59.00	197	1429	0	0	336	2.0	
8	00:15:10	328	2.1	s0.4	N29°40.947	W094°58.91	0	-0	0	0	128	4.9	s138.0	N29°41.027	W094°59.00	197	1490	0	0	336	2.0	
9	00:15:08	329	2.1	s0.4	N29°40.946	W094°58.91	0	-0	0	0	119	4.3	s116.5	N29°41.024	W094°59.00	197	1532	0	0	337	2.2	



08:17:52 N29°41.053' Display reference Brg 094.7°
0:17:52 W094°58.921 Free Rng 0.202 n
Range 3/16
Vector 6 min
Active ownship OS
Active target 1:MULCV14T

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:17:50	319	2.5	s0.4	N29°41.019	W094°58.99	0	-0	0	0	128	2.6	s178.2	N29°41.106	W094°59.09	116	329	0	0	296	2.8	
8	00:17:48	319	2.5	s0.4	N29°41.018	W094°58.99	0	-0	0	0	128	2.5	s179.7	N29°41.105	W094°59.09	117	346	0	0	295	2.4	
9	00:17:46	319	2.5	s0.4	N29°41.017	W094°58.99	0	-0	0	0	129	2.3	s179.7	N29°41.104	W094°59.09	120	384	0	0	297	2.1	



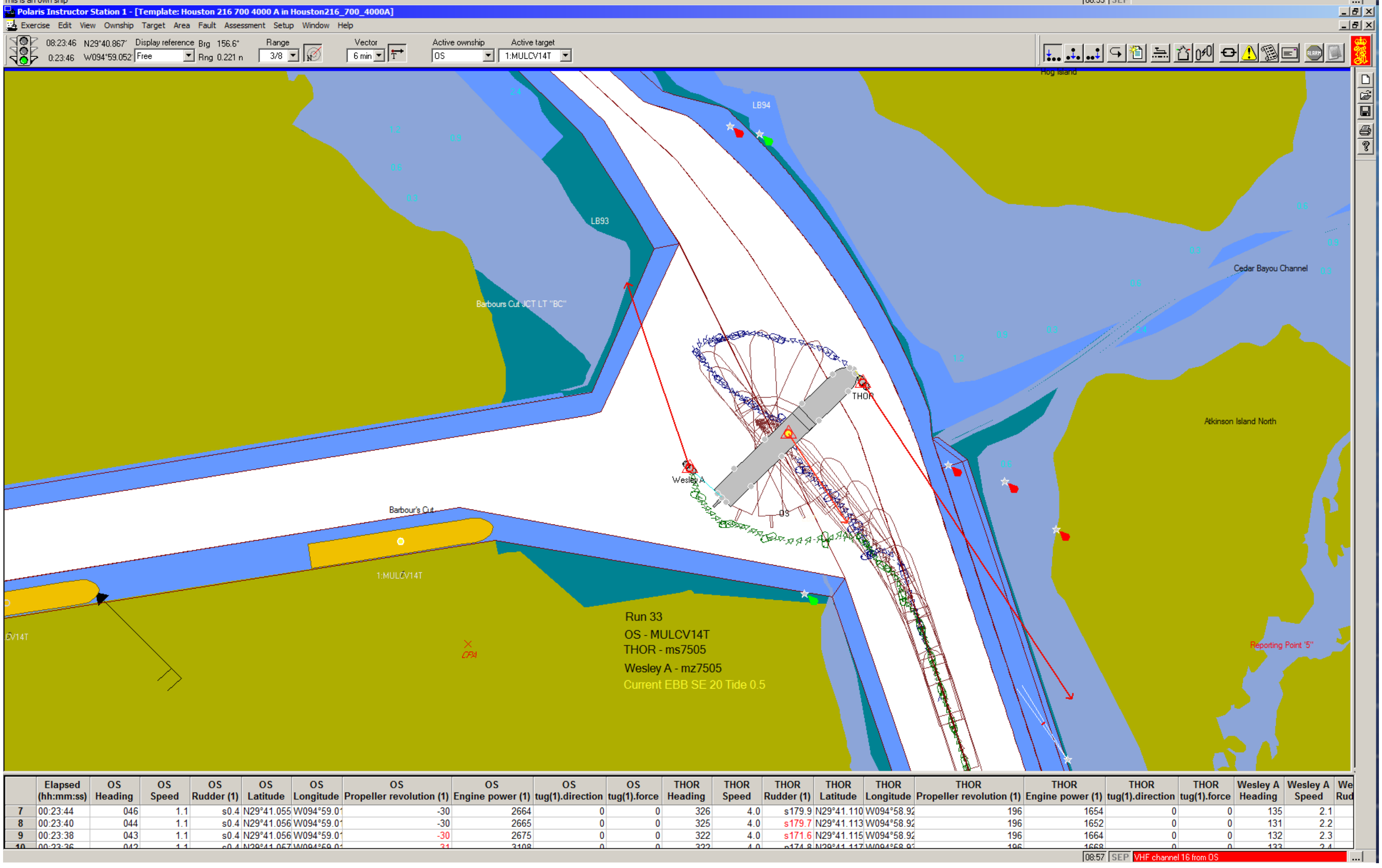
Polaris Instructor Station 1 - [Template: Houston 216 700 4000 A in Houston216_700_4000A]

08:21:12 N29°41.072'
0:21:12 W094°58.997'
Display reference: Free
Brg 089.3°
Rng 0.135 n
Range: 3/16
Vector: 6 min
Active ownship: OS
Active target: 1:MULCV14T

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:21:10	338	0.3	s0.4	N29°41.065	W094°59.05	-0	-0	0	0	257	2.3	s180.0	N29°41.161	W094°59.07	196	1774	0	0	061	2.9	
8	00:21:08	337	0.3	s0.4	N29°41.065	W094°59.05	-0	-0	0	0	257	2.2	s180.0	N29°41.161	W094°59.07	196	1778	0	0	065	3.7	
9	00:21:06	337	0.3	s0.4	N29°41.065	W094°59.05	-0	-0	0	0	254	2.1	s173.6	N29°41.161	W094°59.07	196	1777	0	0	071	4.4	

This is an own ship

08:55 SEP



Polaris Instructor Station 1 - [Template: Houston 216 700 4000 A in Houston216_700_4000A]

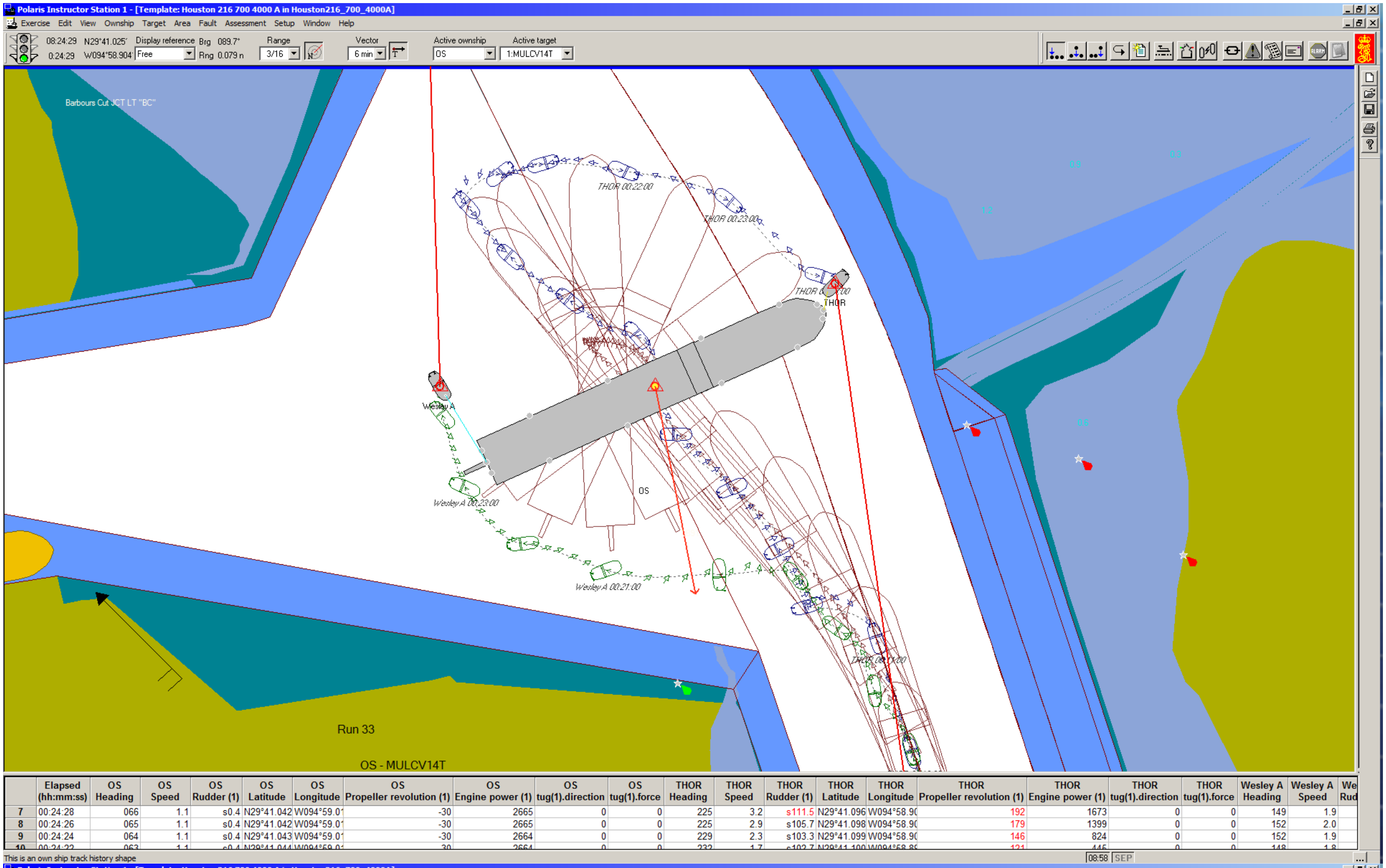
08:23:46 N29°40.867'
0:23:46 W094°59.052'
Display reference: Free
Brg 156.6°
Rng 0.221 n
Range: 3/8
Vector: 6 min
Active ownship: OS
Active target: 1:MULCV14T

Run 33
OS - MULCV14T
THOR - ms7505
Wesley A - mz7505
Current EBB SE 20 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:23:44	046	1.1	s0.4	N29°41.055	W094°59.01	-30	2664	0	0	326	4.0	s179.9	N29°41.110	W094°58.92	196	1654	0	0	135	2.1	
8	00:23:40	044	1.1	s0.4	N29°41.056	W094°59.01	-30	2665	0	0	325	4.0	s179.7	N29°41.113	W094°58.92	196	1652	0	0	131	2.2	
9	00:23:38	043	1.1	s0.4	N29°41.056	W094°59.01	-30	2675	0	0	322	4.0	s171.6	N29°41.115	W094°58.92	196	1664	0	0	132	2.3	

08:57 SEP VHF channel 16 from OS

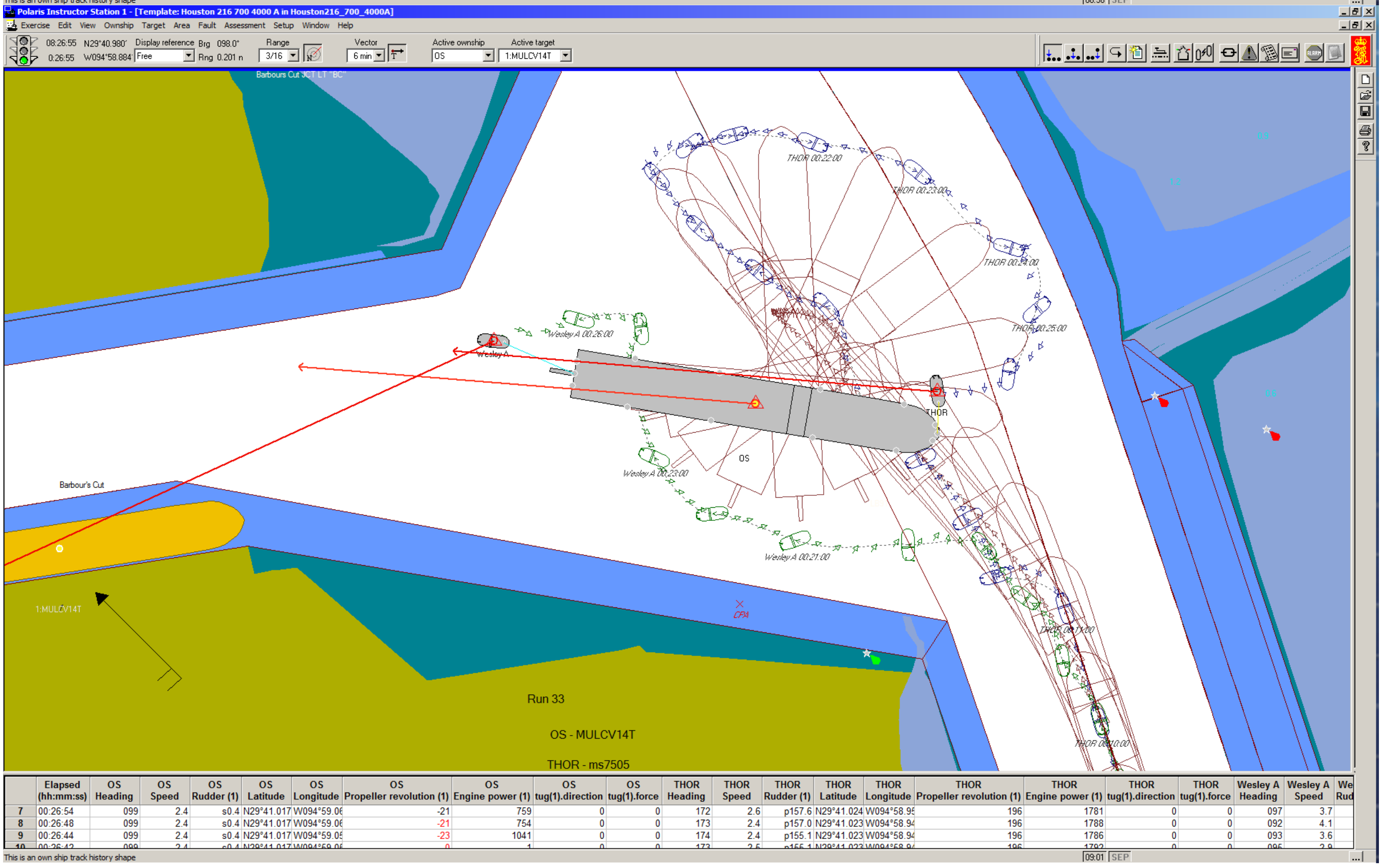
June 26, 2019



Polaris Instructor Station 1 - [Template: Houston 216 700 4000 A in Houston216_700_4000A]

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:24:28	066	1.1	s0.4	N29°41.042	W094°59.01	-30	2665	0	0	225	3.2	s111.5	N29°41.096	W094°58.90	192	1673	0	0	149	1.9	
8	00:24:26	065	1.1	s0.4	N29°41.042	W094°59.01	-30	2665	0	0	225	2.9	s105.7	N29°41.098	W094°58.90	179	1399	0	0	152	2.0	
9	00:24:24	064	1.1	s0.4	N29°41.043	W094°59.01	-30	2664	0	0	229	2.3	s103.3	N29°41.099	W094°58.90	146	824	0	0	152	1.9	

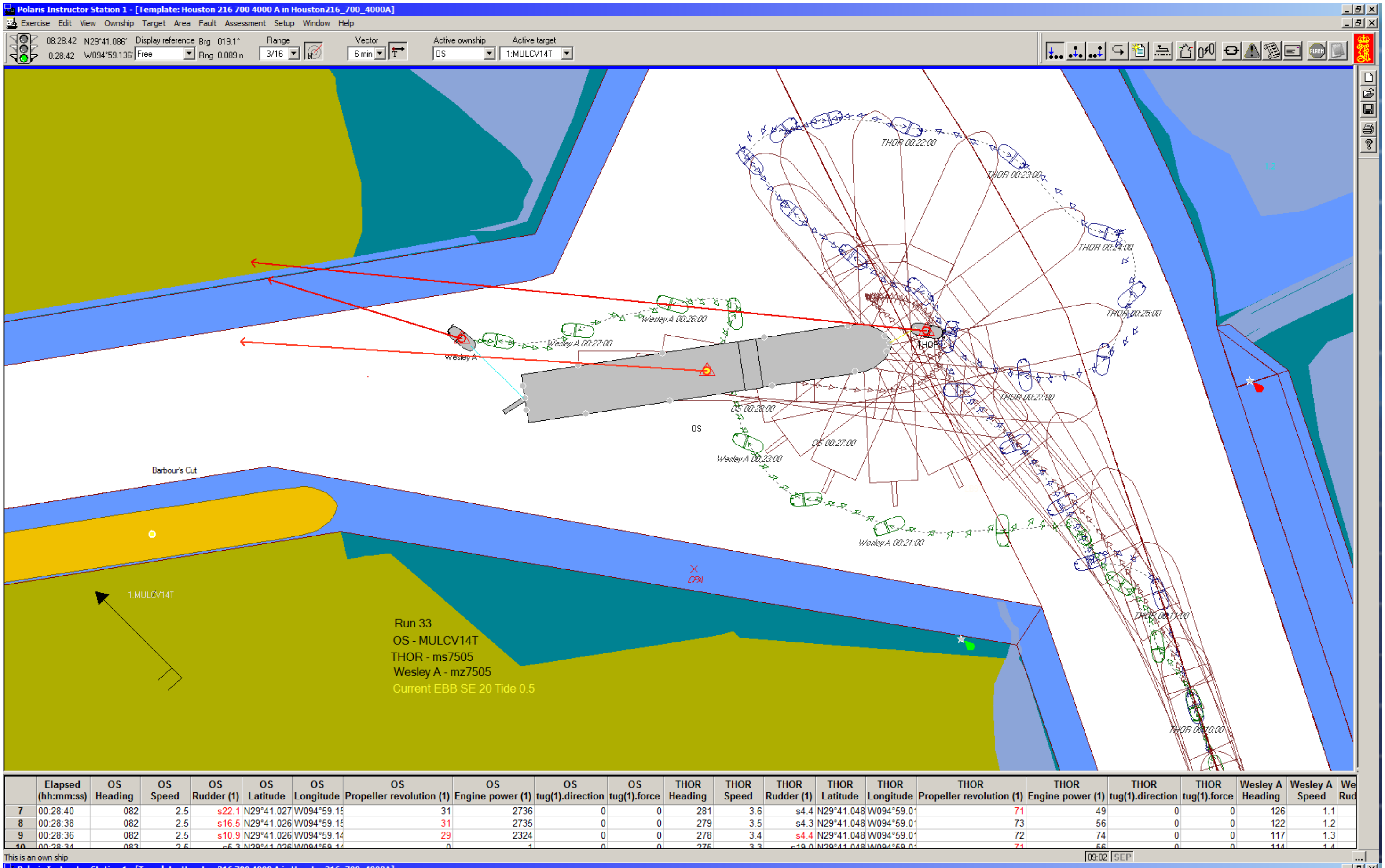
This is an own ship track history shape



Polaris Instructor Station 1 - [Template: Houston 216 700 4000 A in Houston216_700_4000A]

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:26:54	099	2.4	s0.4	N29°41.017	W094°59.06	-21	759	0	0	172	2.6	p157.6	N29°41.024	W094°58.95	196	1781	0	0	097	3.7	
8	00:26:48	099	2.4	s0.4	N29°41.017	W094°59.06	-21	754	0	0	173	2.4	p157.0	N29°41.023	W094°58.94	196	1788	0	0	092	4.1	
9	00:26:44	099	2.4	s0.4	N29°41.017	W094°59.05	-23	1041	0	0	174	2.4	p155.1	N29°41.023	W094°58.94	196	1786	0	0	093	3.6	

This is an own ship track history shape



Polaris Instructor Station 1 - [Template: Houston 216 700 4000 A in Houston216_700_4000A]

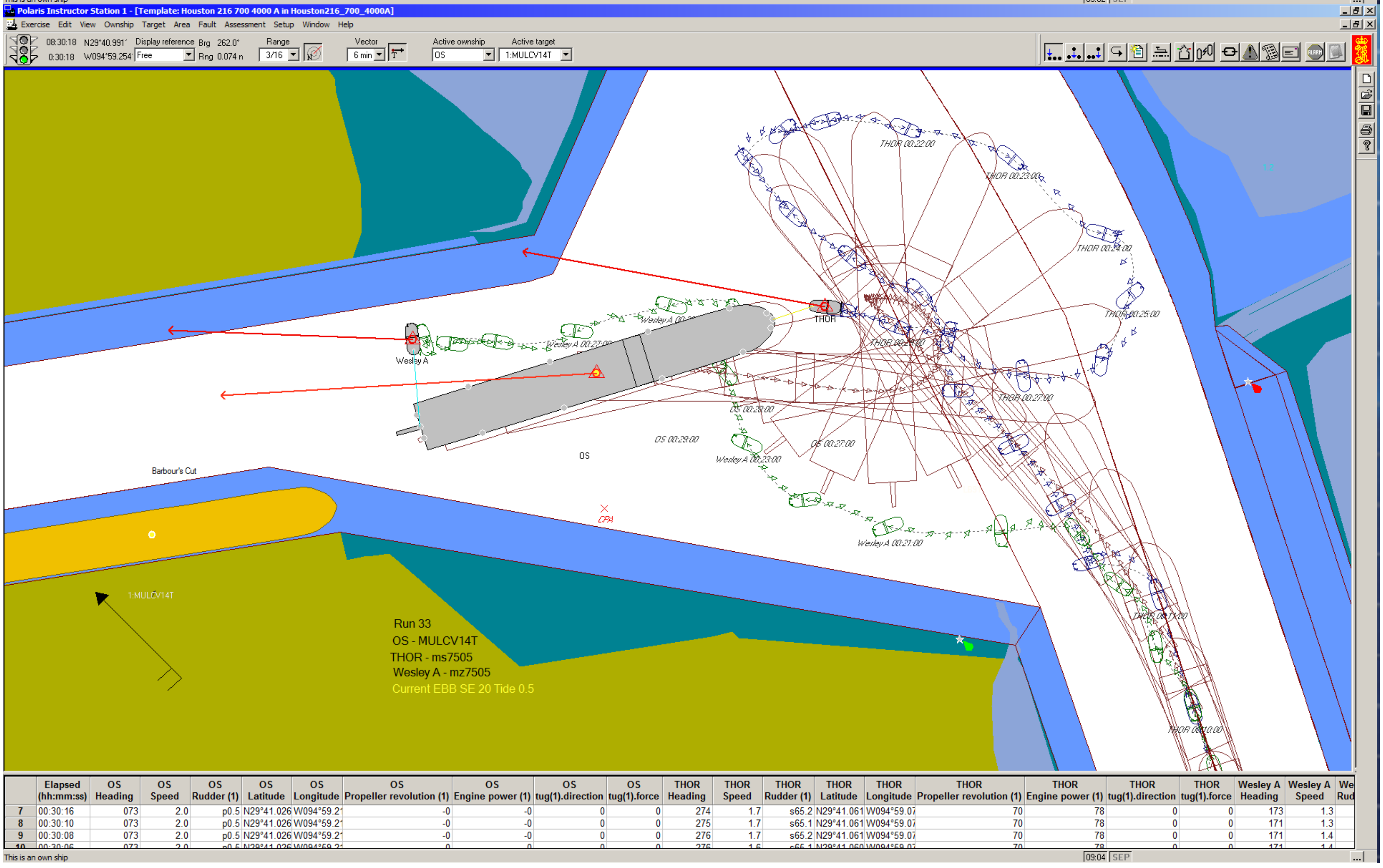
08:28:42 N29°41.086'
0:28:42 W094°59.136'
Display reference: Free
Brg 019.1°
Rng 0.089 n
Range: 3/16
Vector: 6 min
Active ownship: OS
Active target: 1:MULCV14T

Run 33
OS - MULCV14T
THOR - ms7505
Wesley A - mz7505
Current EBB SE 20 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:28:40	082	2.5	s22.1	N29°41.027	W094°59.15	31	2736	0	0	281	3.6	s4.4	N29°41.048	W094°59.01	71	49	0	0	126	1.1	
8	00:28:38	082	2.5	s16.5	N29°41.026	W094°59.15	31	2735	0	0	279	3.5	s4.3	N29°41.048	W094°59.01	73	56	0	0	122	1.2	
9	00:28:36	082	2.5	s10.9	N29°41.026	W094°59.14	29	2324	0	0	278	3.4	s4.4	N29°41.048	W094°59.01	72	74	0	0	117	1.3	
10	00:28:34	083	2.5	s5.3	N29°41.026	W094°59.14	0	1	0	0	275	3.3	s19.0	N29°41.048	W094°59.01	71	56	0	0	114	1.4	

This is an own ship

09:02 SEP



Polaris Instructor Station 1 - [Template: Houston 216 700 4000 A in Houston216_700_4000A]

08:30:18 N29°40.991'
0:30:18 W094°59.254'
Display reference: Free
Brg 262.0°
Rng 0.074 n
Range: 3/16
Vector: 6 min
Active ownship: OS
Active target: 1:MULCV14T

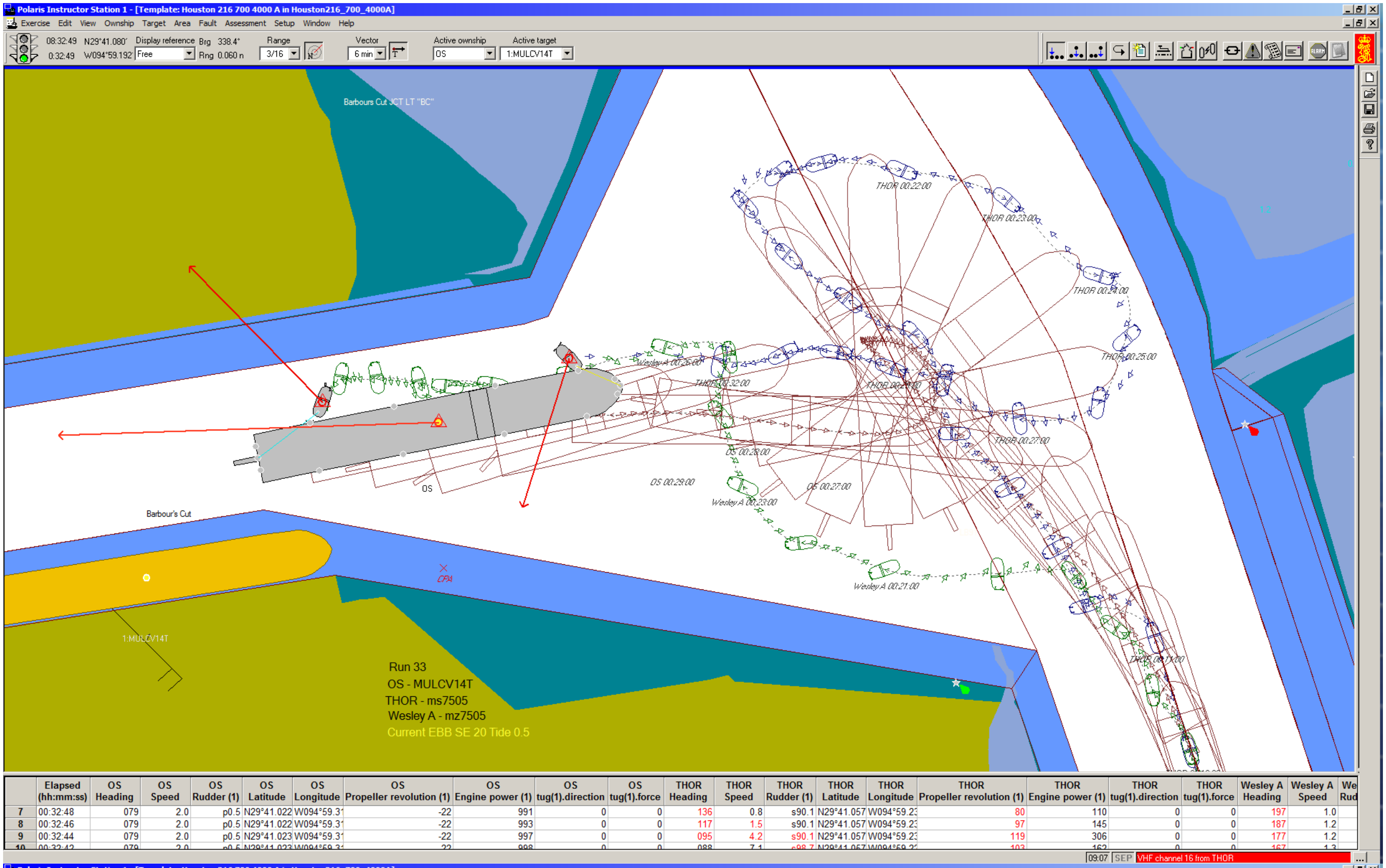
Run 33
OS - MULCV14T
THOR - ms7505
Wesley A - mz7505
Current EBB SE 20 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:30:16	073	2.0	p0.5	N29°41.026	W094°59.21	-0	-0	0	0	274	1.7	s65.2	N29°41.061	W094°59.07	70	78	0	0	173	1.3	
8	00:30:10	073	2.0	p0.5	N29°41.026	W094°59.21	-0	-0	0	0	275	1.7	s65.1	N29°41.061	W094°59.07	70	78	0	0	171	1.3	
9	00:30:08	073	2.0	p0.5	N29°41.026	W094°59.21	-0	-0	0	0	276	1.7	s65.2	N29°41.061	W094°59.07	70	78	0	0	171	1.4	
10	00:30:06	073	2.0	p0.5	N29°41.026	W094°59.21	0	0	0	0	276	1.6	s65.1	N29°41.060	W094°59.07	70	78	0	0	171	1.4	

This is an own ship

09:04 SEP

June 26, 2019



Polaris Instructor Station 1 - [Template: Houston 216 700 4000 A in Houston216_700_4000A]

08:32:49 N29°41.080' Display reference Free Brg 338.4° Rng 0.060 n

0:32:49 W094°59.192'

Range 3/16

Vector 6 min

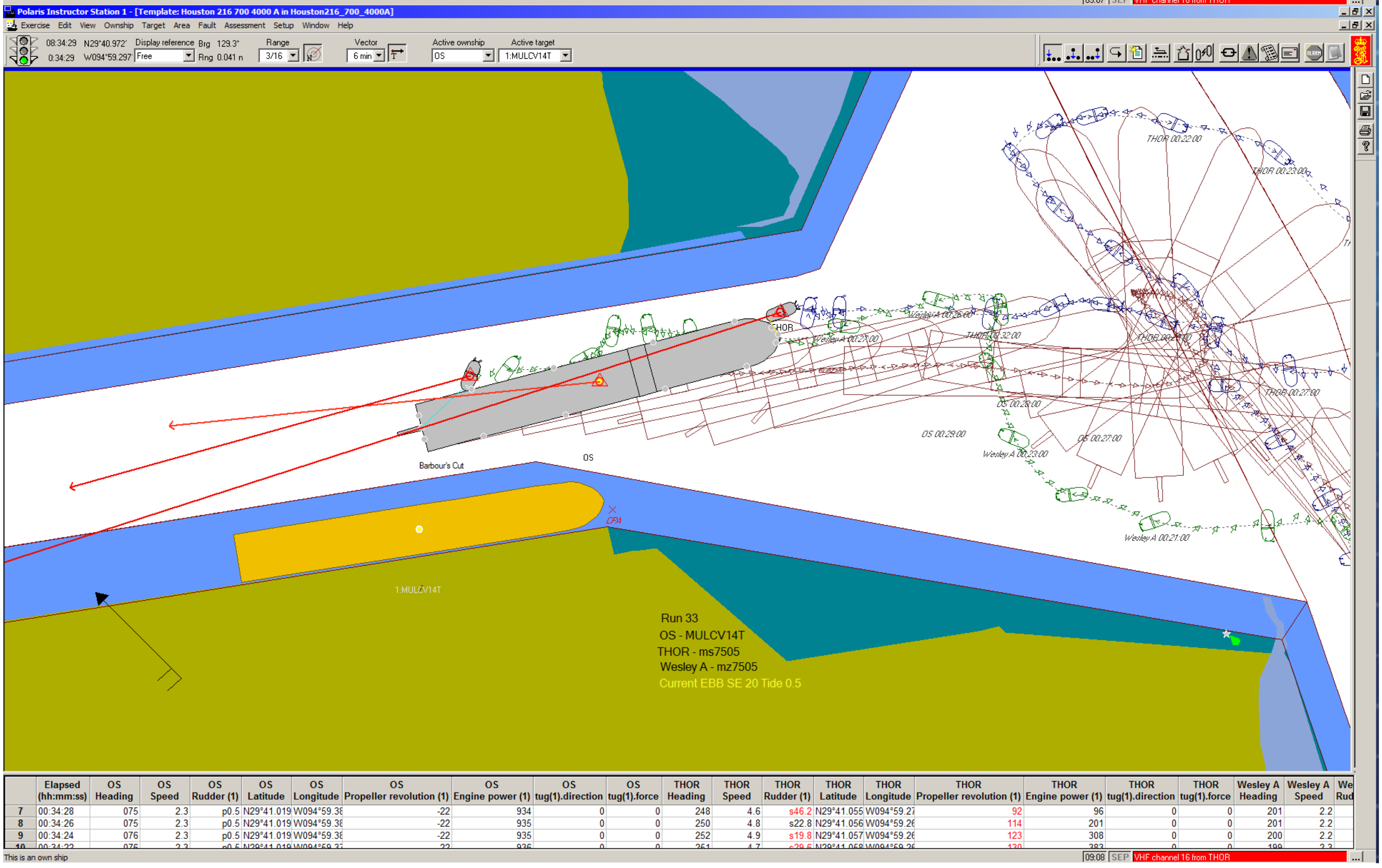
Active ownship OS

Active target 1:MULCV14T

Run 33
OS - MULCV14T
THOR - ms7505
Wesley A - mz7505
Current EBB SE 20 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:32:48	079	2.0	p0.5	N29°41.022	W094°59.3	-22	991	0	0	136	0.8	s90.1	N29°41.057	W094°59.2	80	110	0	0	197	1.0	
8	00:32:46	079	2.0	p0.5	N29°41.022	W094°59.3	-22	993	0	0	117	1.5	s90.1	N29°41.057	W094°59.2	97	145	0	0	187	1.2	
9	00:32:44	079	2.0	p0.5	N29°41.023	W094°59.3	-22	997	0	0	095	4.2	s90.1	N29°41.057	W094°59.2	119	306	0	0	177	1.2	

09:07 SEP VHF channel 16 from THOR



Polaris Instructor Station 1 - [Template: Houston 216 700 4000 A in Houston216_700_4000A]

08:34:29 N29°40.972' Display reference Free Brg 129.3° Rng 0.041 n

0:34:29 W094°59.297'

Range 3/16

Vector 6 min

Active ownship OS

Active target 1:MULCV14T

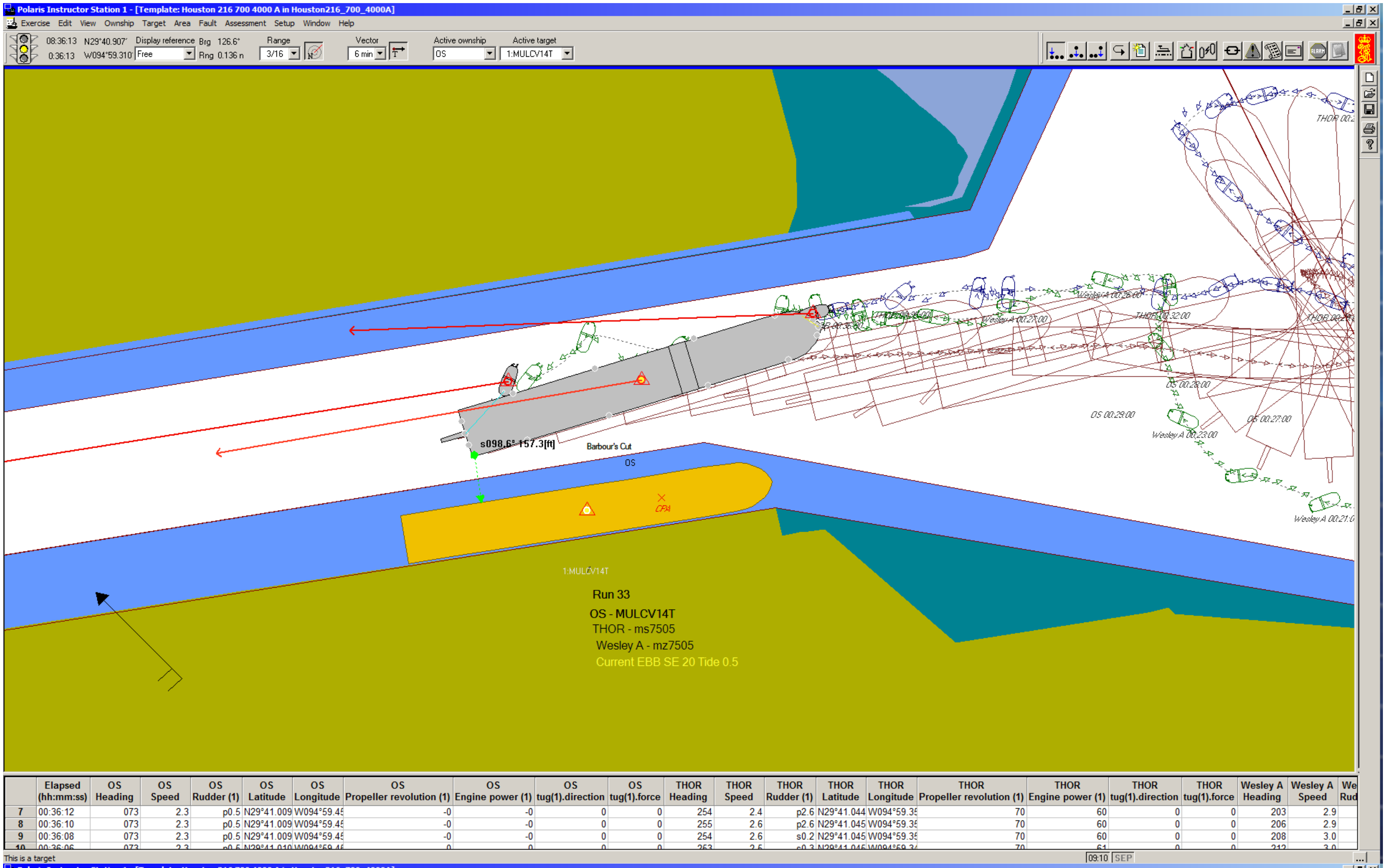
Run 33
OS - MULCV14T
THOR - ms7505
Wesley A - mz7505
Current EBB SE 20 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:34:28	075	2.3	p0.5	N29°41.019	W094°59.3	-22	934	0	0	248	4.6	s46.2	N29°41.055	W094°59.2	92	96	0	0	201	2.2	
8	00:34:26	075	2.3	p0.5	N29°41.019	W094°59.3	-22	935	0	0	250	4.8	s22.8	N29°41.056	W094°59.2	114	201	0	0	201	2.2	
9	00:34:24	076	2.3	p0.5	N29°41.019	W094°59.3	-22	935	0	0	252	4.9	s19.8	N29°41.057	W094°59.2	123	308	0	0	200	2.2	

This is an own ship

09:08 SEP VHF channel 16 from THOR

June 26, 2019



Polaris Instructor Station 1 - [Template: Houston 216 700 4000 A in Houston216_700_4000A]

08:36:13 N29°40.907′
0:36:13 W094°59.310′

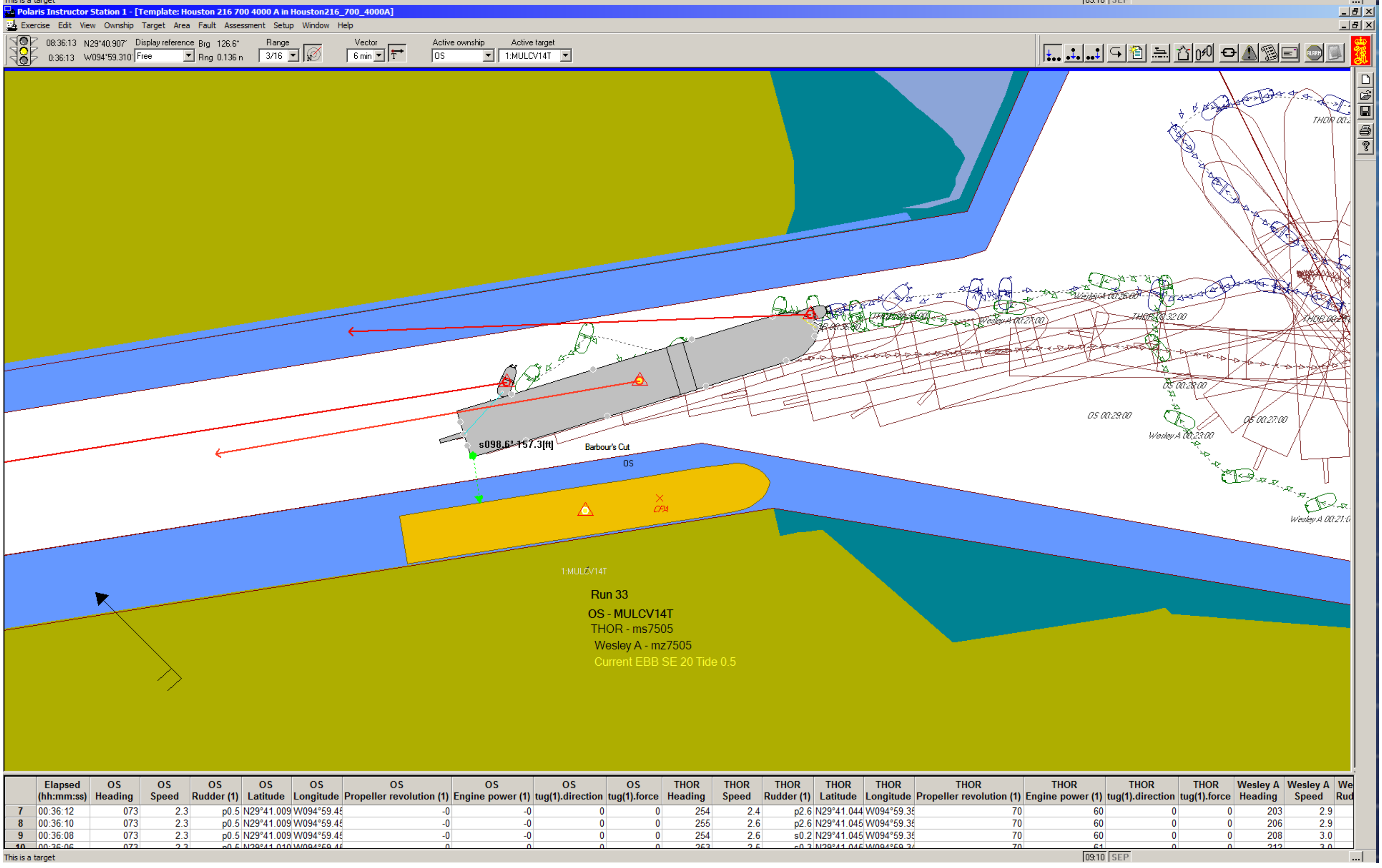
Display reference: Free
Brg 126.6°
Rng 0.136 n
Range: 3/16
Vector: 6 min
Active ownship: OS
Active target: 1:MULCV14T

Run 33
OS - MULCV14T
THOR - ms7505
Wesley A - mz7505
Current EBB SE 20 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed
7	00:36:12	073	2.3	p0.5	N29°41.009	W094°59.45	-0	-0	0	0	254	2.4	p2.6	N29°41.044	W094°59.35	70	60	0	0	203	2.9
8	00:36:10	073	2.3	p0.5	N29°41.009	W094°59.45	-0	-0	0	0	255	2.6	p2.6	N29°41.045	W094°59.35	70	60	0	0	206	2.9
9	00:36:08	073	2.3	p0.5	N29°41.009	W094°59.45	-0	-0	0	0	254	2.6	s0.2	N29°41.045	W094°59.35	70	60	0	0	208	3.0

This is a target

09:10 SEP



Polaris Instructor Station 1 - [Template: Houston 216 700 4000 A in Houston216_700_4000A]

08:36:13 N29°40.907′
0:36:13 W094°59.310′

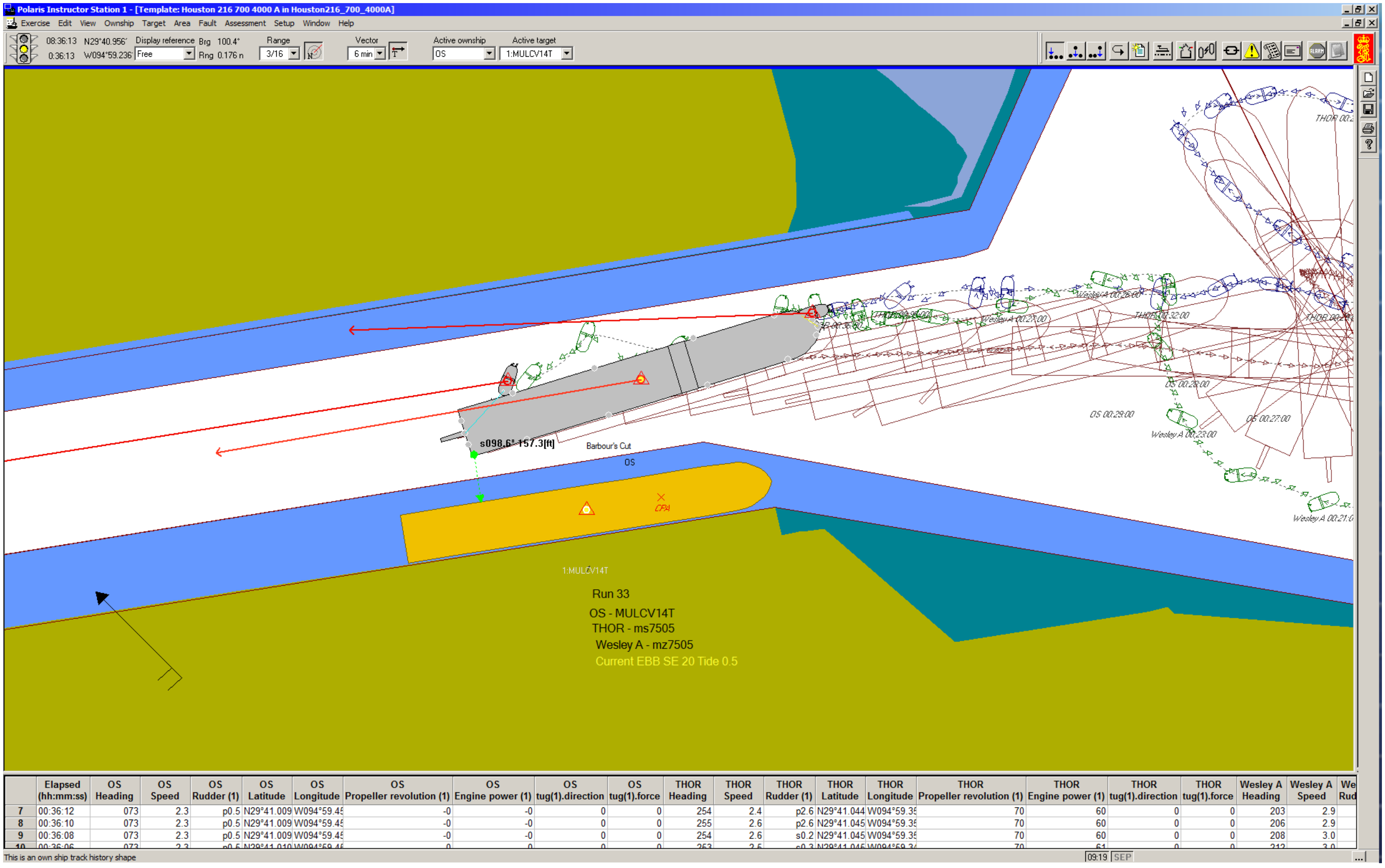
Display reference: Free
Brg 126.6°
Rng 0.136 n
Range: 3/16
Vector: 6 min
Active ownship: OS
Active target: 1:MULCV14T

Run 33
OS - MULCV14T
THOR - ms7505
Wesley A - mz7505
Current EBB SE 20 Tide 0.5

This is a target

09:10 SEP

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed
7	00:36:12	073	2.3	p0.5	N29°41.009	W094°59.45	-0	-0	0	0	254	2.4	p2.6	N29°41.044	W094°59.35	70	60	0	0	203	2.9
8	00:36:10	073	2.3	p0.5	N29°41.009	W094°59.45	-0	-0	0	0	255	2.6	p2.6	N29°41.045	W094°59.35	70	60	0	0	206	2.9
9	00:36:08	073	2.3	p0.5	N29°41.009	W094°59.45	-0	-0	0	0	254	2.6	s0.2	N29°41.045	W094°59.35	70	60	0	0	208	3.0



Polaris Instructor Station 1 - [Template: Houston 216 700 4000 A in Houston216_700_4000A]

Run 33

OS - MULCV14T

THOR - ms7505

Wesley A - mz7505

Current EBB SE 20 Tide 0.5

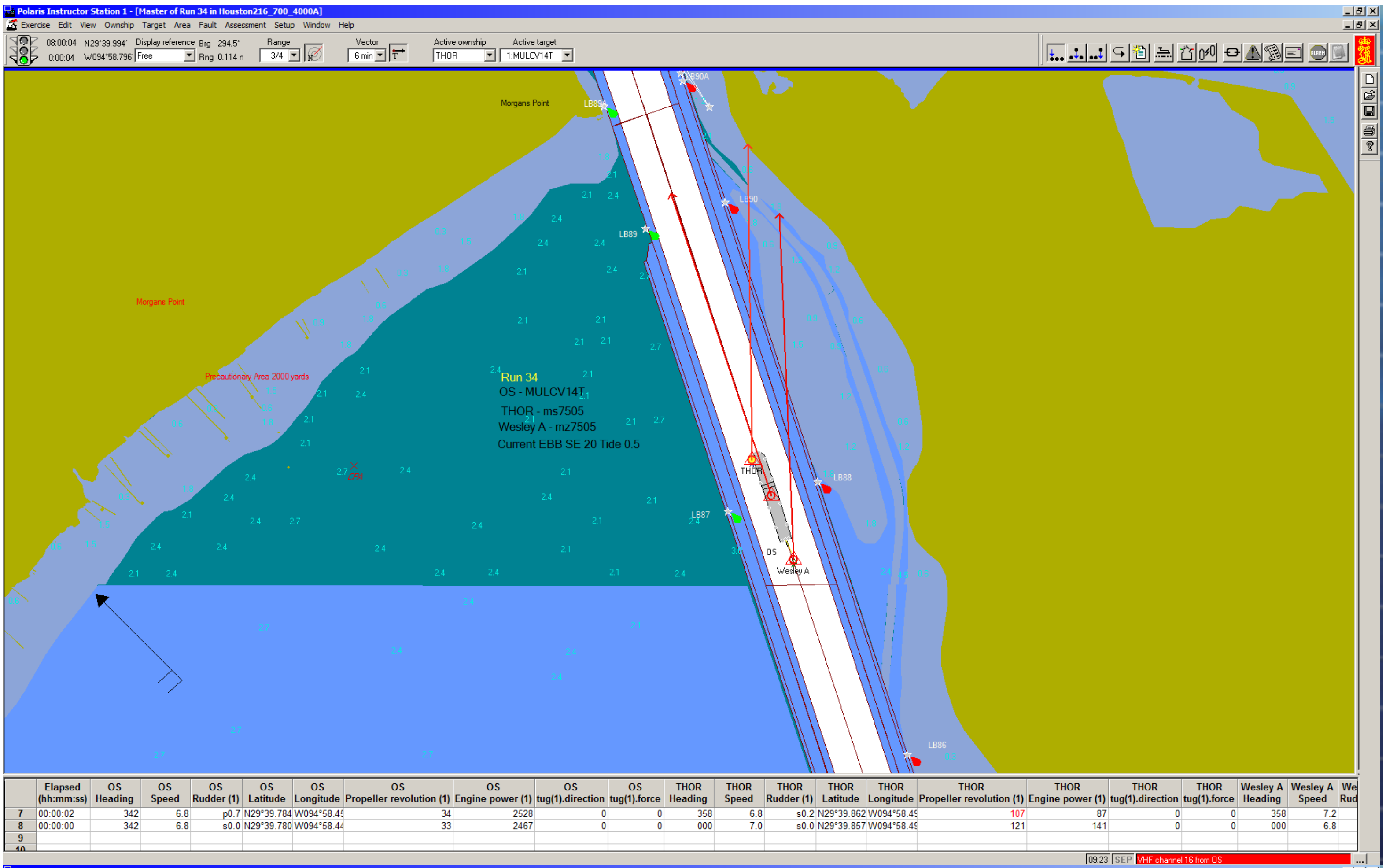
	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force
7	00:36:12	073	2.3	p0.5	N29°41.009	W094°59.45	-0	-0	0	0
8	00:36:10	073	2.3	p0.5	N29°41.009	W094°59.45	-0	-0	0	0
9	00:36:08	073	2.3	p0.5	N29°41.009	W094°59.45	-0	-0	0	0

	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	254	2.4	p2.6	N29°41.044	W094°59.35	70	60	0	0	203	2.9	
8	255	2.6	p2.6	N29°41.045	W094°59.35	70	60	0	0	206	2.9	
9	254	2.6	s0.2	N29°41.045	W094°59.35	70	60	0	0	208	3.0	

This is an own ship track history shape

June 26, 2019

Run 34

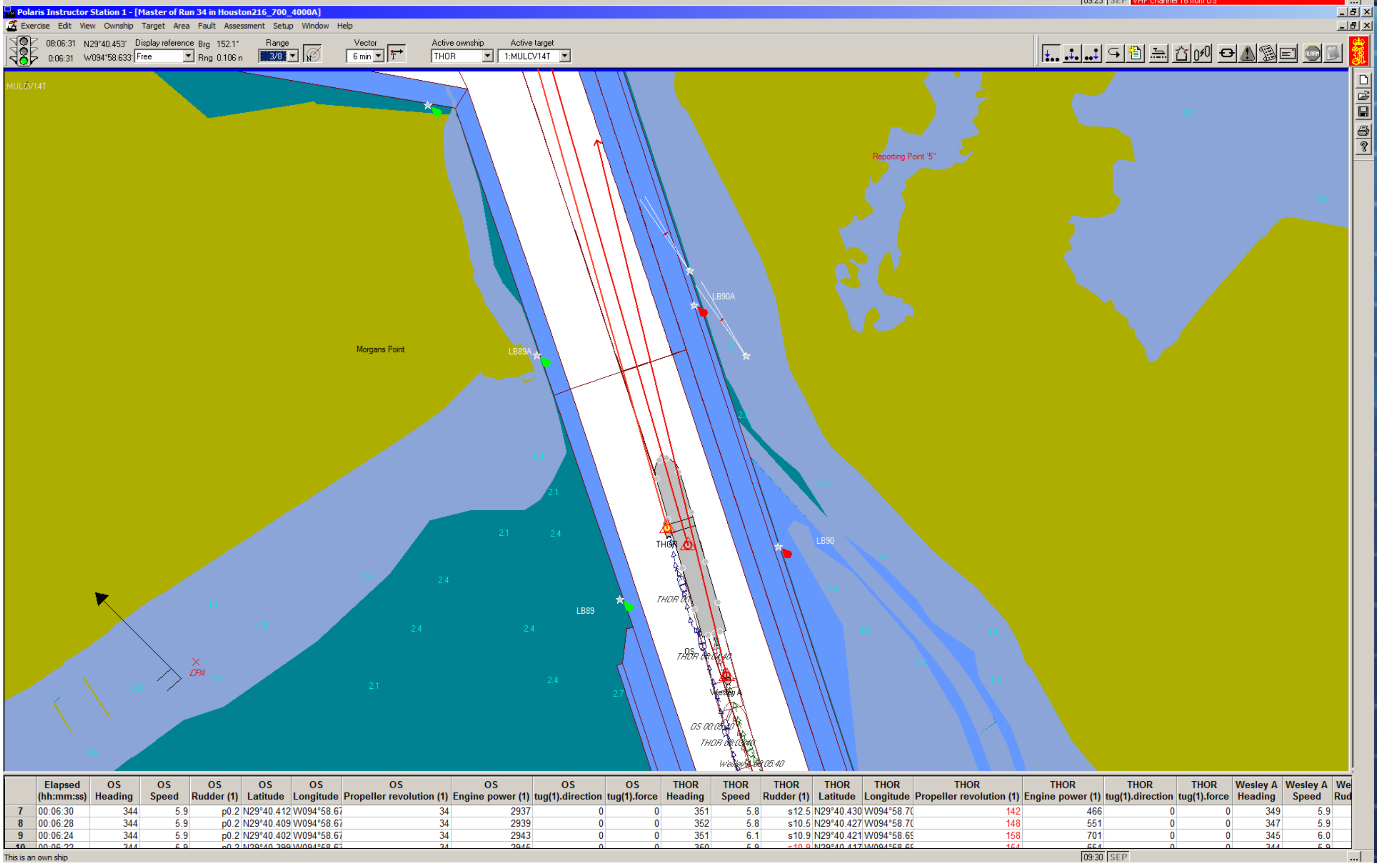


08:00:04 N29°39.994' Brg 294.5°
0:00:04 W094°58.796' Rng 0.114 n
Display reference: Free
Range: 3/4
Vector: 6 min
Active ownship: THOR
Active target: 1:MULCV14T

Run 34
OS - MULCV14T
THOR - ms7505
Wesley A - mz7505
Current EBB SE 20 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:00:02	342	6.8	p0.7	N29°39.784	W094°58.45	34	2528	0	0	358	6.8	s0.2	N29°39.862	W094°58.49	107	87	0	0	358	7.2	
8	00:00:00	342	6.8	s0.0	N29°39.780	W094°58.44	33	2467	0	0	000	7.0	s0.0	N29°39.857	W094°58.49	121	141	0	0	000	6.8	
9																						
10																						

09:23 SEP VHF channel 16 from OS



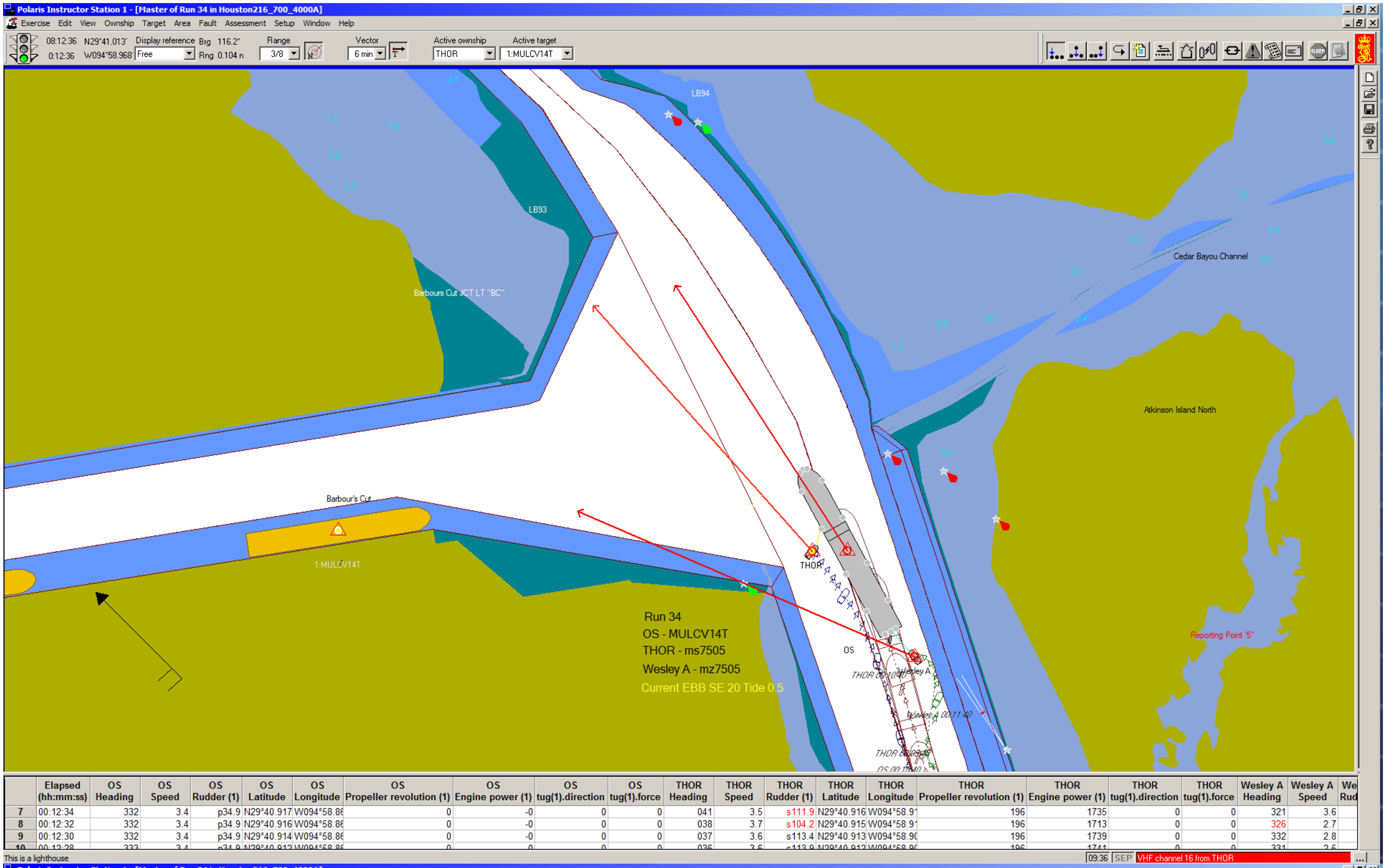
08:06:31 N29°40.453' Brg 152.1°
0:06:31 W094°58.633' Rng 0.106 n
Display reference: Free
Range: 3/8
Vector: 6 min
Active ownship: THOR
Active target: 1:MULCV14T

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:06:30	344	5.9	p0.2	N29°40.412	W094°58.67	34	2937	0	0	351	5.8	s12.5	N29°40.430	W094°58.70	142	466	0	0	349	5.9	
8	00:06:28	344	5.9	p0.2	N29°40.409	W094°58.67	34	2939	0	0	352	5.8	s10.5	N29°40.427	W094°58.70	148	551	0	0	347	5.9	
9	00:06:24	344	5.9	p0.2	N29°40.402	W094°58.67	34	2943	0	0	351	6.1	s10.9	N29°40.421	W094°58.69	158	701	0	0	345	6.0	
10	00:06:22	344	5.9	p0.2	N29°40.399	W094°58.67	34	2945	0	0	350	5.9	s10.9	N29°40.417	W094°58.69	164	654	0	0	344	5.9	

This is an own ship

09:30 SEP

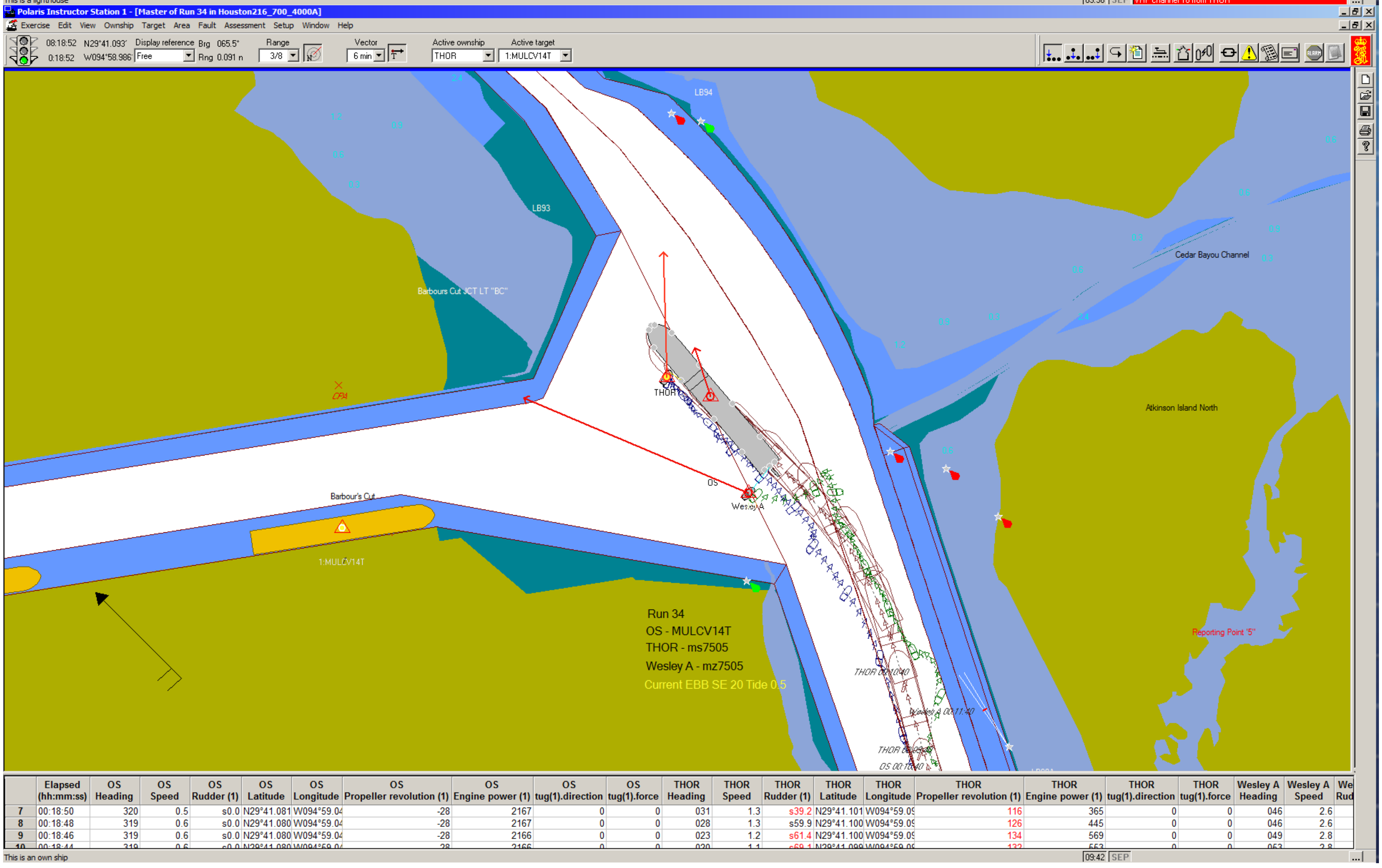
June 26, 2019



	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:12:34	332	3.4	p34.9	N29°40.917	W094°58.86	0	-0	0	0	041	3.5	s111.9	N29°40.916	W094°58.91	196	1735	0	0	321	3.6	
8	00:12:32	332	3.4	p34.9	N29°40.916	W094°58.86	0	-0	0	0	038	3.7	s104.2	N29°40.915	W094°58.91	196	1713	0	0	326	2.7	
9	00:12:30	332	3.4	p34.9	N29°40.914	W094°58.86	0	-0	0	0	037	3.6	s113.4	N29°40.913	W094°58.90	196	1739	0	0	332	2.8	
10	00:12:28	333	3.4	p34.9	N29°40.912	W094°58.86	0	-0	0	0	036	3.6	s113.9	N29°40.912	W094°58.90	196	1741	0	0	331	2.5	

This is a lighthouse

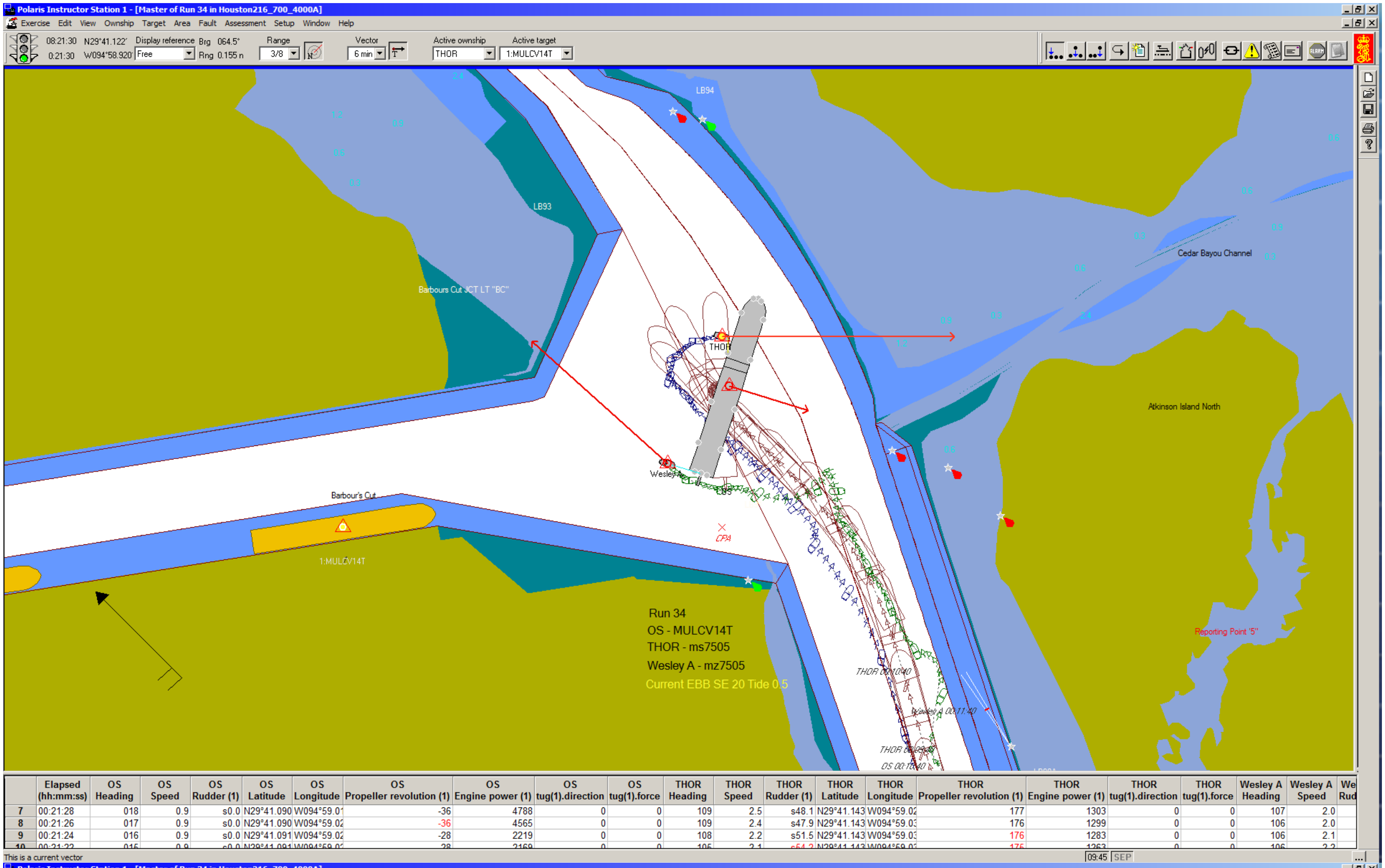
09:36 SEP VHF channel 16 from THOR



	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:18:50	320	0.5	s0.0	N29°41.081	W094°59.04	-28	2167	0	0	031	1.3	s39.2	N29°41.101	W094°59.09	116	365	0	0	046	2.6	
8	00:18:48	319	0.6	s0.0	N29°41.080	W094°59.04	-28	2167	0	0	028	1.3	s59.9	N29°41.100	W094°59.09	126	445	0	0	046	2.6	
9	00:18:46	319	0.6	s0.0	N29°41.080	W094°59.04	-28	2166	0	0	023	1.2	s61.4	N29°41.100	W094°59.09	134	569	0	0	049	2.8	
10	00:18:44	319	0.6	s0.0	N29°41.080	W094°59.04	-28	2166	0	0	020	1.1	s69.1	N29°41.099	W094°59.09	132	553	0	0	053	2.8	

This is an own ship

09:42 SEP



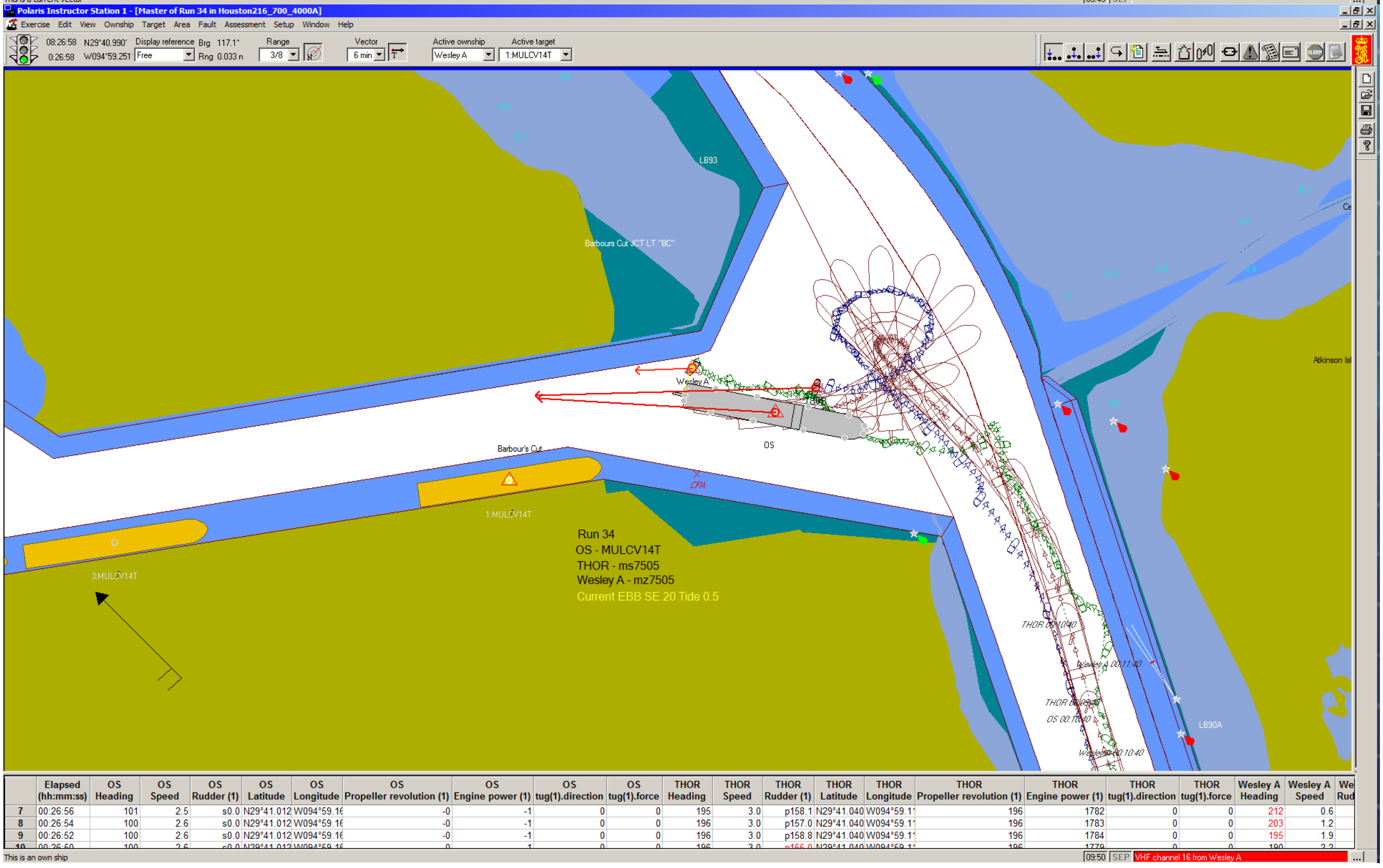
Polaris Instructor Station 1 - [Master of Run 34 in Houston216_700_4000A]

08:21:30 N29°41.122' Display reference Brg 064.5°
0:21:30 W094°58.920' Free Rng 0.155 n
Range 3/8
Vector 6 min
Active ownship THOR
Active target 1:MULCV14T

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:21:28	018	0.9	s0.0	N29°41.090	W094°59.01	-36	4788	0	0	109	2.5	s48.1	N29°41.143	W094°59.02	177	1303	0	0	107	2.0	
8	00:21:26	017	0.9	s0.0	N29°41.090	W094°59.02	-36	4565	0	0	109	2.4	s47.9	N29°41.143	W094°59.03	176	1299	0	0	106	2.0	
9	00:21:24	016	0.9	s0.0	N29°41.091	W094°59.02	-28	2219	0	0	108	2.2	s51.5	N29°41.143	W094°59.03	176	1283	0	0	106	2.1	

This is a current vector

09:45 SEP



Polaris Instructor Station 1 - [Master of Run 34 in Houston216_700_4000A]

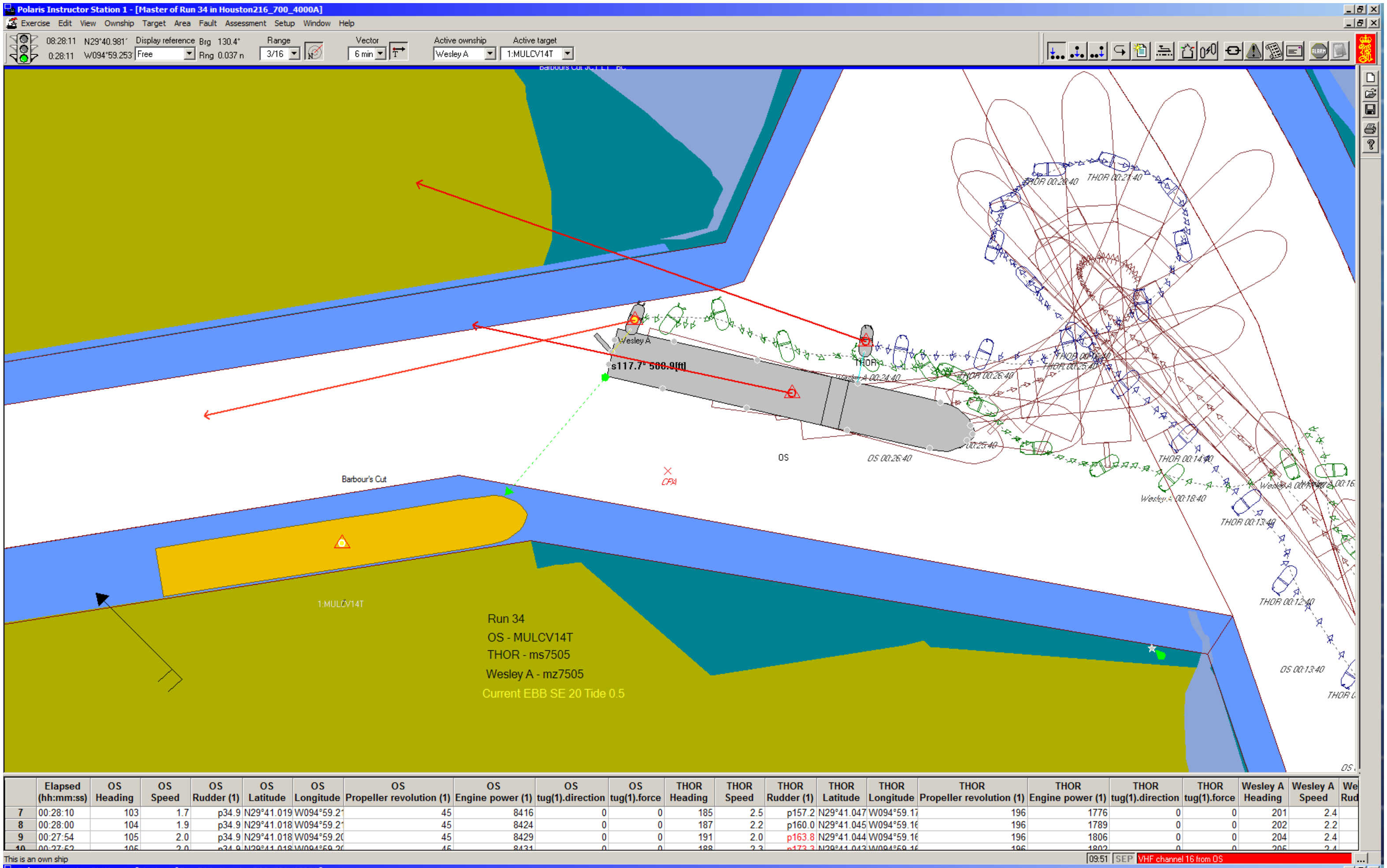
08:26:58 N29°40.990' Display reference Brg 117.1°
0:26:58 W094°59.251' Free Rng 0.033 n
Range 3/8
Vector 6 min
Active ownship Wesley A
Active target 1:MULCV14T

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:26:56	101	2.5	s0.0	N29°41.012	W094°59.16	-0	-1	0	0	195	3.0	p158.1	N29°41.040	W094°59.11	196	1782	0	0	212	0.6	
8	00:26:54	100	2.6	s0.0	N29°41.012	W094°59.16	-0	-1	0	0	196	3.0	p157.0	N29°41.040	W094°59.11	196	1783	0	0	203	1.2	
9	00:26:52	100	2.6	s0.0	N29°41.012	W094°59.16	-0	-1	0	0	196	3.0	p158.8	N29°41.040	W094°59.11	196	1784	0	0	195	1.9	

This is an own ship

09:50 SEP VHF channel 16 from Wesley A

June 26, 2019



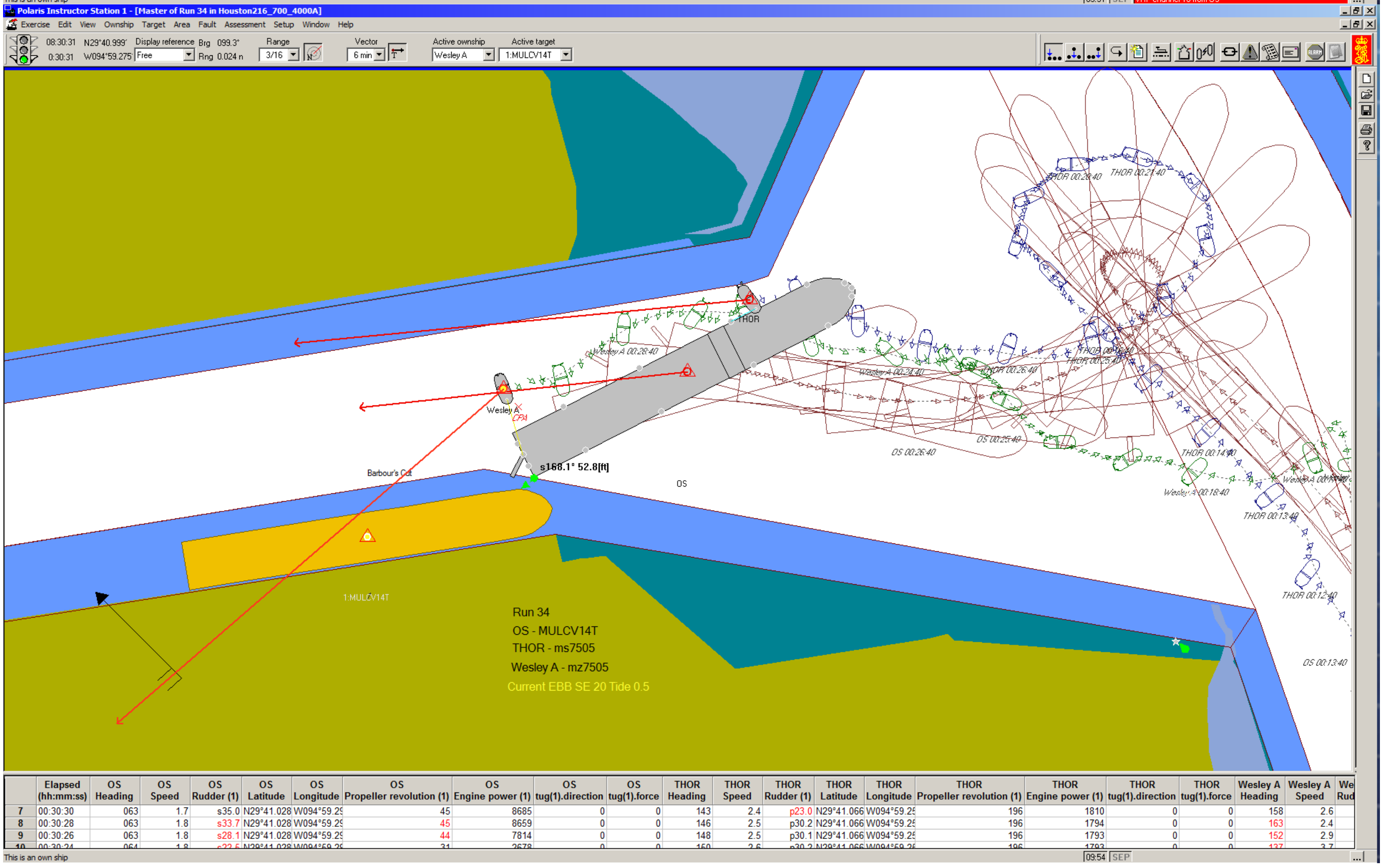
Polaris Instructor Station 1 - [Master of Run 34 in Houston216_700_4000A]

08:28:11 N29°40.981′ Display reference Free Brg 130.4° Rng 0.037 n Range 3/16 Vector 6 min Active ownship Wesley A Active target 1:MULCV14T
0:28:11 W094°59.253′

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:28:10	103	1.7	p34.9	N29°41.019	W094°59.2	45	8416	0	0	185	2.5	p157.2	N29°41.047	W094°59.17	196	1776	0	0	201	2.4	
8	00:28:00	104	1.9	p34.9	N29°41.018	W094°59.2	45	8424	0	0	187	2.2	p160.0	N29°41.045	W094°59.16	196	1789	0	0	202	2.2	
9	00:27:54	105	2.0	p34.9	N29°41.018	W094°59.20	45	8429	0	0	191	2.0	p163.8	N29°41.044	W094°59.16	196	1806	0	0	204	2.4	

This is an own ship

09:51 SEP VHF channel 16 from OS



Polaris Instructor Station 1 - [Master of Run 34 in Houston216_700_4000A]

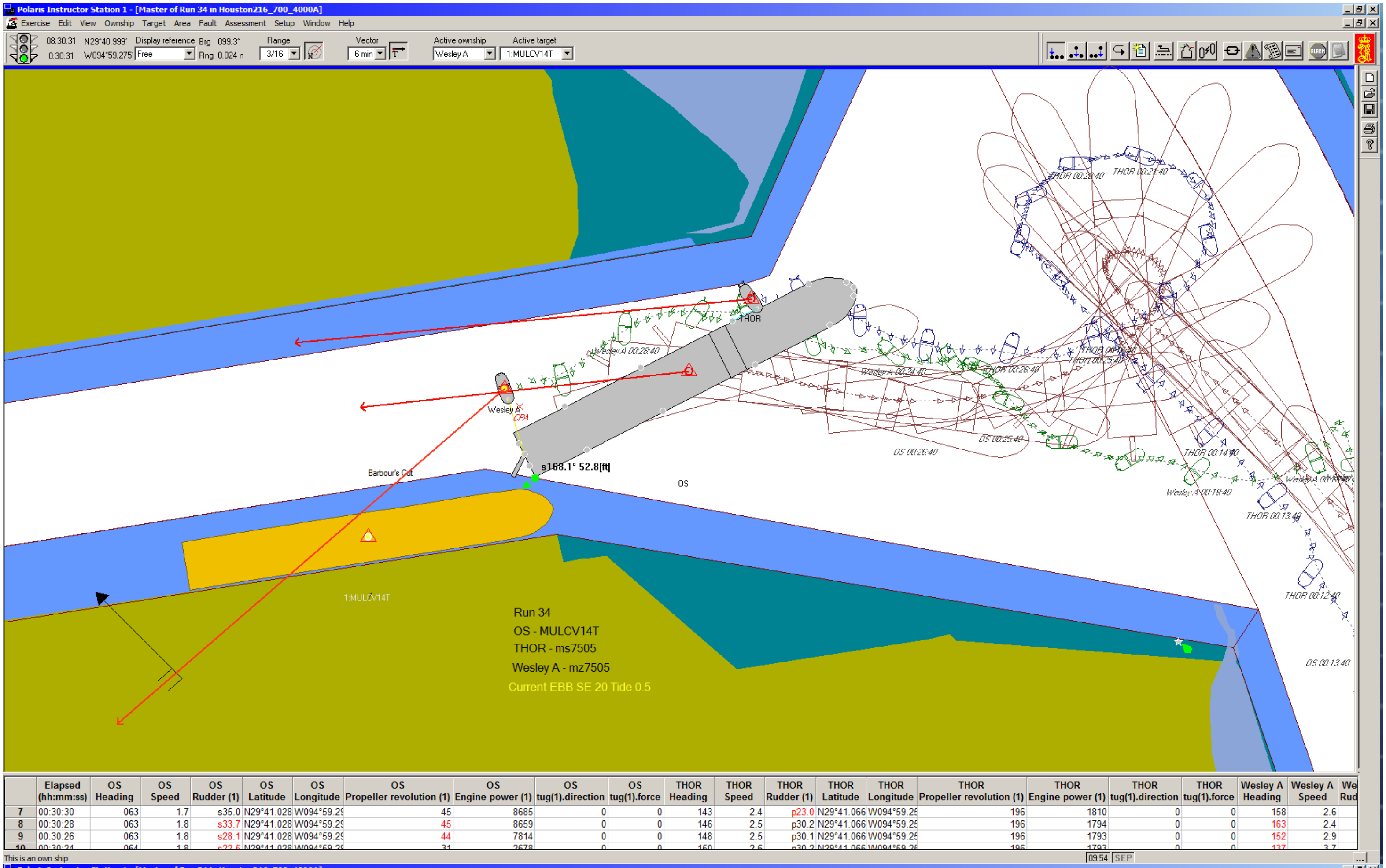
08:30:31 N29°40.999′ Display reference Free Brg 099.3° Rng 0.024 n Range 3/16 Vector 6 min Active ownship Wesley A Active target 1:MULCV14T
0:30:31 W094°59.275′

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:30:30	063	1.7	s35.0	N29°41.028	W094°59.2	45	8685	0	0	143	2.4	p23.0	N29°41.066	W094°59.2	196	1810	0	0	158	2.6	
8	00:30:28	063	1.8	s33.7	N29°41.028	W094°59.2	45	8659	0	0	146	2.5	p30.2	N29°41.066	W094°59.2	196	1794	0	0	163	2.4	
9	00:30:26	063	1.8	s28.1	N29°41.028	W094°59.2	44	7814	0	0	148	2.5	p30.1	N29°41.066	W094°59.2	196	1793	0	0	152	2.9	

This is an own ship

09:54 SEP

- Page 373



Polaris Instructor Station 1 - [Master of Run 34 in Houston216_700_4000A]

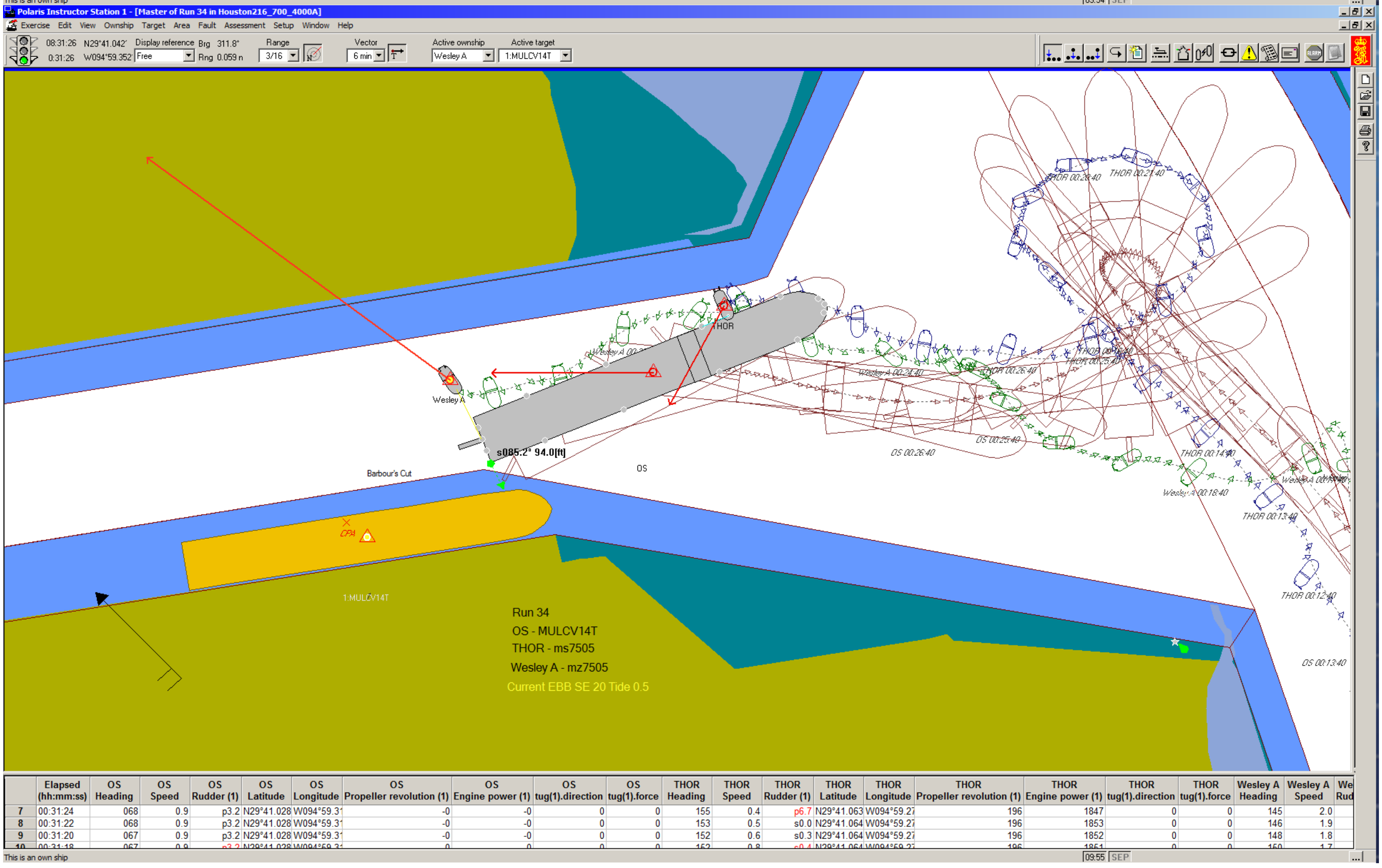
08:30:31 N29°40.999' Display reference Free Brg 099.3° Rng 0.024 n Range 3/16 Vector 6 min Active ownship Wesley A Active target 1:MULCV14T
0:30:31 W094°59.275'

Run 34
OS - MULCV14T
THOR - ms7505
Wesley A - mz7505
Current EBB SE 20 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:30:30	063	1.7	s35.0	N29°41.028	W094°59.2	45	8685	0	0	143	2.4	p23.0	N29°41.066	W094°59.2	196	1810	0	0	158	2.6	
8	00:30:28	063	1.8	s33.7	N29°41.028	W094°59.2	45	8659	0	0	146	2.5	p30.2	N29°41.066	W094°59.2	196	1794	0	0	163	2.4	
9	00:30:26	063	1.8	s28.1	N29°41.028	W094°59.2	44	7814	0	0	148	2.5	p30.1	N29°41.066	W094°59.2	196	1793	0	0	152	2.9	

This is an own ship

09:54



Polaris Instructor Station 1 - [Master of Run 34 in Houston216_700_4000A]

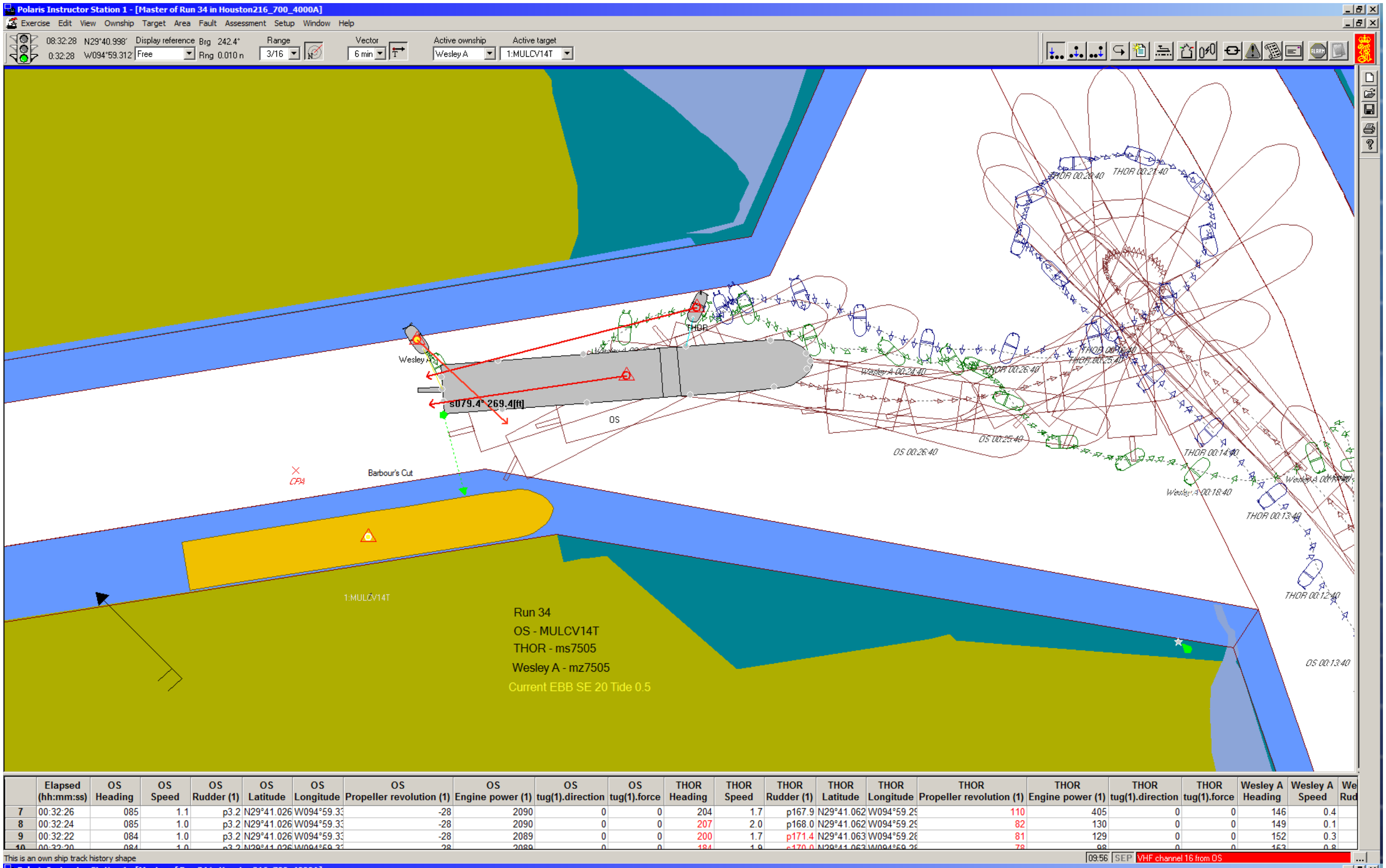
08:31:26 N29°41.042' Display reference Free Brg 311.8° Rng 0.059 n Range 3/16 Vector 6 min Active ownship Wesley A Active target 1:MULCV14T
0:31:26 W094°59.352'

Run 34
OS - MULCV14T
THOR - ms7505
Wesley A - mz7505
Current EBB SE 20 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:31:24	068	0.9	p3.2	N29°41.028	W094°59.3	-0	-0	0	0	155	0.4	p6.7	N29°41.063	W094°59.2	196	1847	0	0	145	2.0	
8	00:31:22	068	0.9	p3.2	N29°41.028	W094°59.3	-0	-0	0	0	153	0.5	s0.0	N29°41.064	W094°59.2	196	1853	0	0	146	1.9	
9	00:31:20	067	0.9	p3.2	N29°41.028	W094°59.3	-0	-0	0	0	152	0.6	s0.3	N29°41.064	W094°59.2	196	1852	0	0	148	1.8	

This is an own ship

09:55

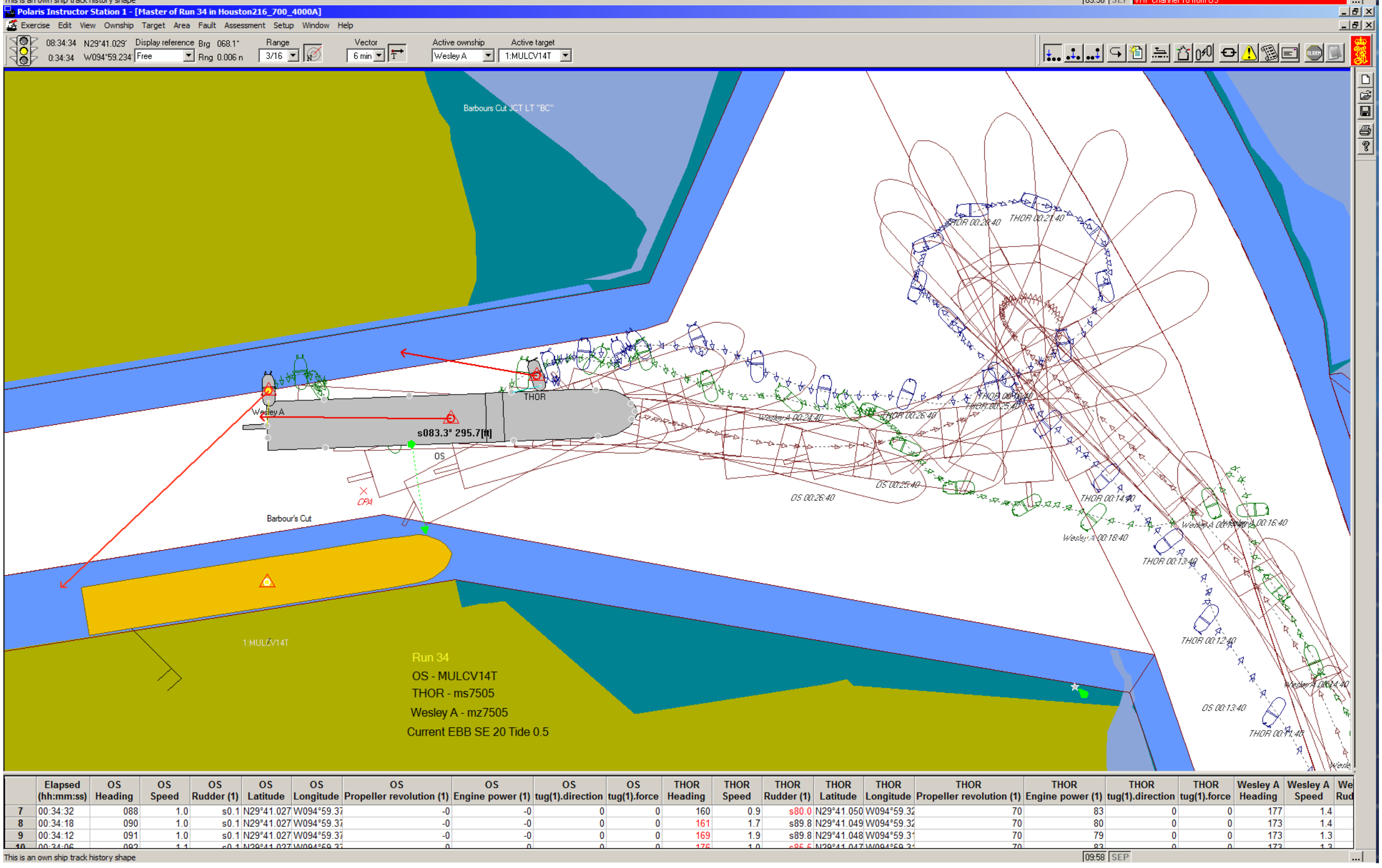


08:32:28 N29°40.998' Display reference Free Brg 242.4° Rng 0.010 n Range 3/16 Vector 6 min Active ownship Wesley A Active target 1:MULCV14T
0:32:28 W094°59.312

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:32:26	085	1.1	p3.2	N29°41.026	W094°59.33	-28	2090	0	0	204	1.7	p167.9	N29°41.062	W094°59.29	110	405	0	0	146	0.4	
8	00:32:24	085	1.0	p3.2	N29°41.026	W094°59.33	-28	2090	0	0	207	2.0	p168.0	N29°41.062	W094°59.29	82	130	0	0	149	0.1	
9	00:32:22	084	1.0	p3.2	N29°41.026	W094°59.33	-28	2089	0	0	200	1.7	p171.4	N29°41.063	W094°59.28	81	129	0	0	152	0.3	

This is an own ship track history shape

09:56 SEP VHF channel 16 from OS



08:34:34 N29°41.029' Display reference Free Brg 068.1° Rng 0.006 n Range 3/16 Vector 6 min Active ownship Wesley A Active target 1:MULCV14T
0:34:34 W094°59.234'

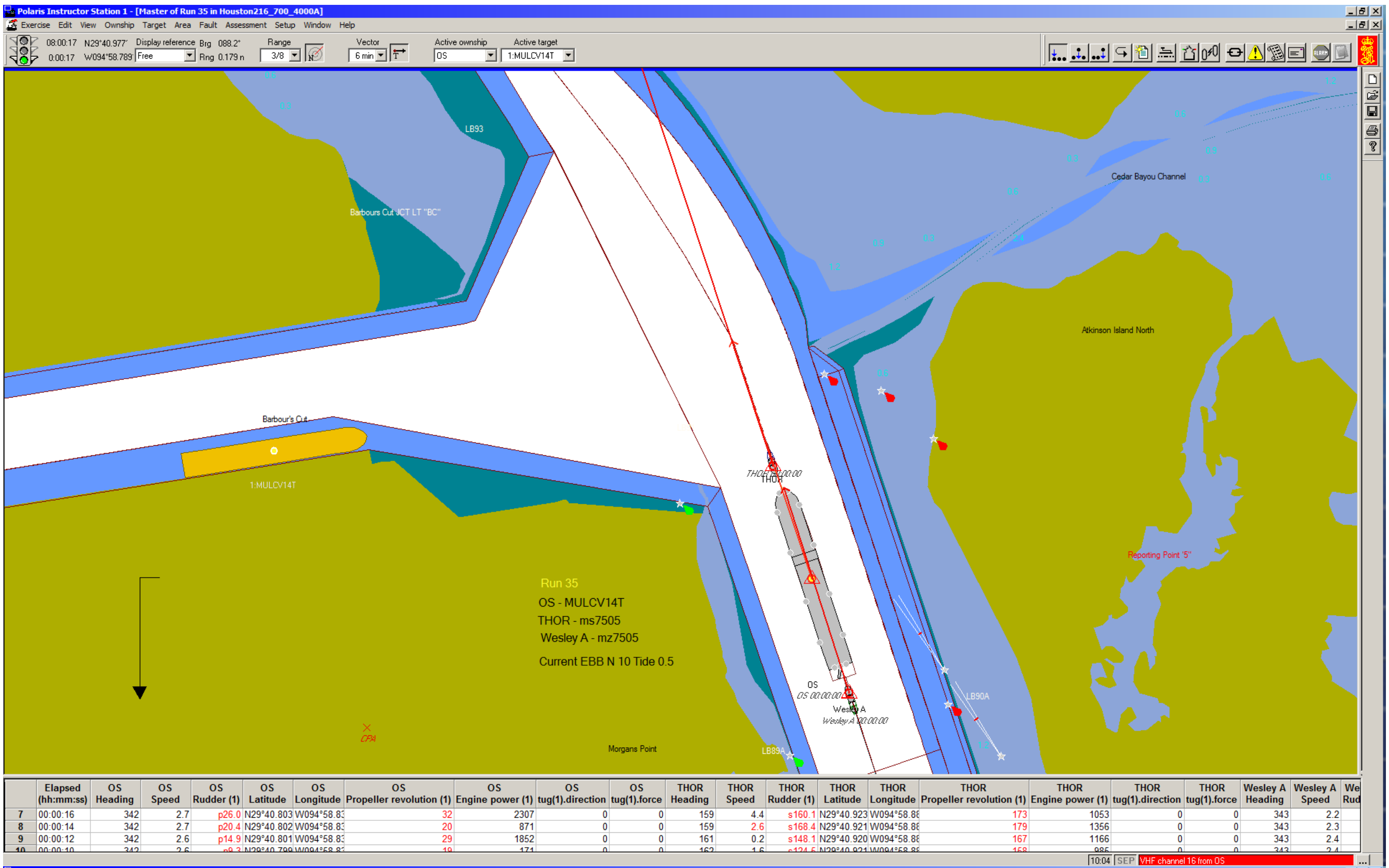
	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:34:32	088	1.0	s0.1	N29°41.027	W094°59.37	-0	-0	0	0	160	0.9	s80.0	N29°41.050	W094°59.32	70	83	0	0	177	1.4	
8	00:34:18	090	1.0	s0.1	N29°41.027	W094°59.37	-0	-0	0	0	161	1.7	s89.8	N29°41.049	W094°59.32	70	80	0	0	173	1.4	
9	00:34:12	091	1.0	s0.1	N29°41.027	W094°59.37	-0	-0	0	0	169	1.9	s89.8	N29°41.048	W094°59.31	70	79	0	0	173	1.3	

This is an own ship track history shape

09:58 SEP

June 26, 2019

Run 35



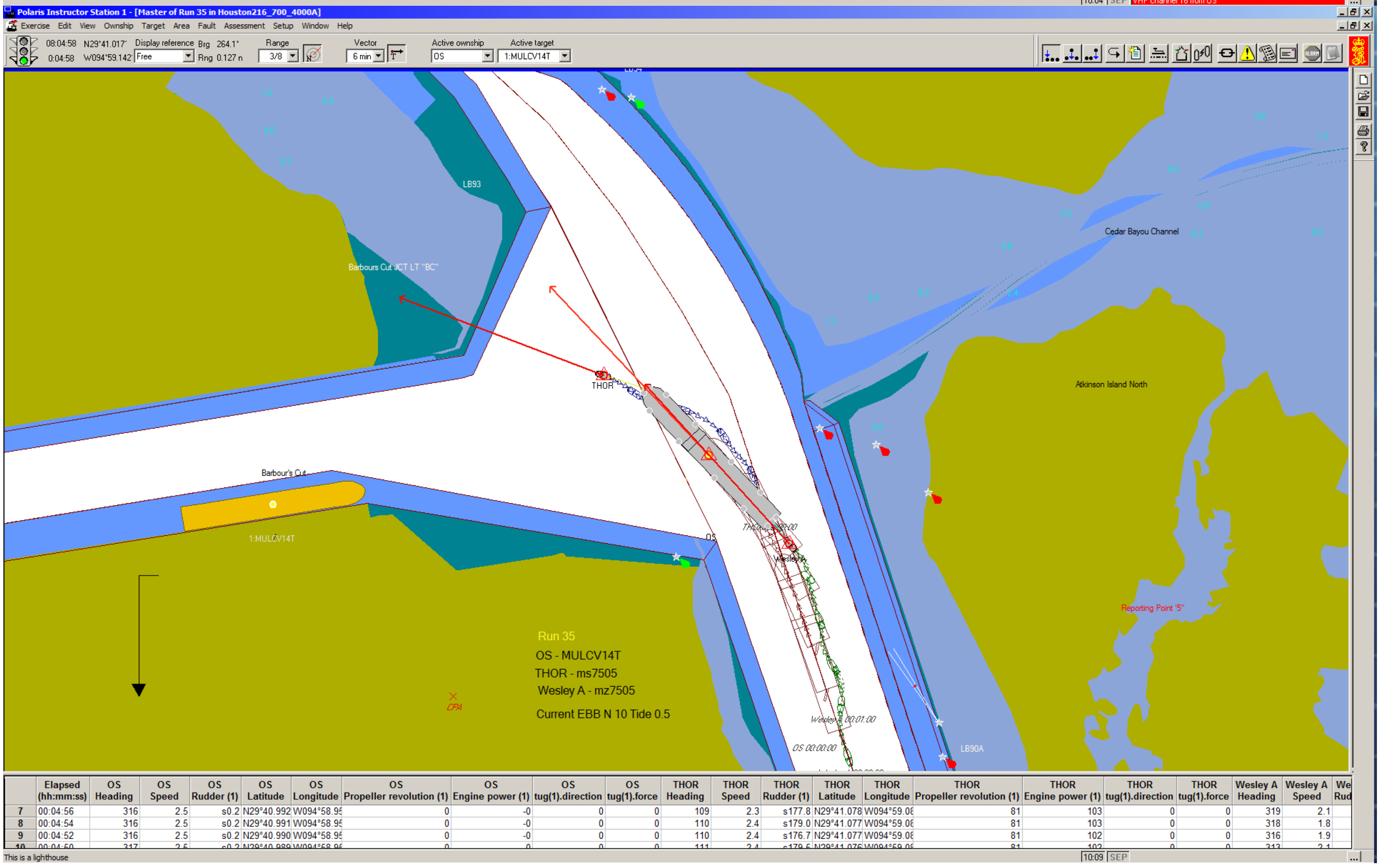
Polaris Instructor Station 1 - [Master of Run 35 in Houston216_700_4000A]

08:00:17 N29°40.977′ Display reference Free Brg 088.2° Range 3/8 Vector 6 min Active ownship OS Active target 1:MULCV14T
0:00:17 W094°58.789′ Rng 0.179 n

Run 35
OS - MULCV14T
THOR - ms7505
Wesley A - mz7505
Current EBB N 10 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed
7	00:00:16	342	2.7	p26.0	N29°40.803	W094°58.83	32	2307	0	0	159	4.4	s160.1	N29°40.923	W094°58.88	173	1053	0	0	343	2.2
8	00:00:14	342	2.7	p20.4	N29°40.802	W094°58.83	20	871	0	0	159	2.6	s168.4	N29°40.921	W094°58.88	179	1356	0	0	343	2.3
9	00:00:12	342	2.6	p14.9	N29°40.801	W094°58.83	29	1852	0	0	161	0.2	s148.1	N29°40.920	W094°58.88	167	1166	0	0	343	2.4

10:04 SEP VHF channel 16 from OS



Polaris Instructor Station 1 - [Master of Run 35 in Houston216_700_4000A]

08:04:58 N29°41.017′ Display reference Free Brg 264.1° Range 3/8 Vector 6 min Active ownship OS Active target 1:MULCV14T
0:04:58 W094°59.142′ Rng 0.127 n

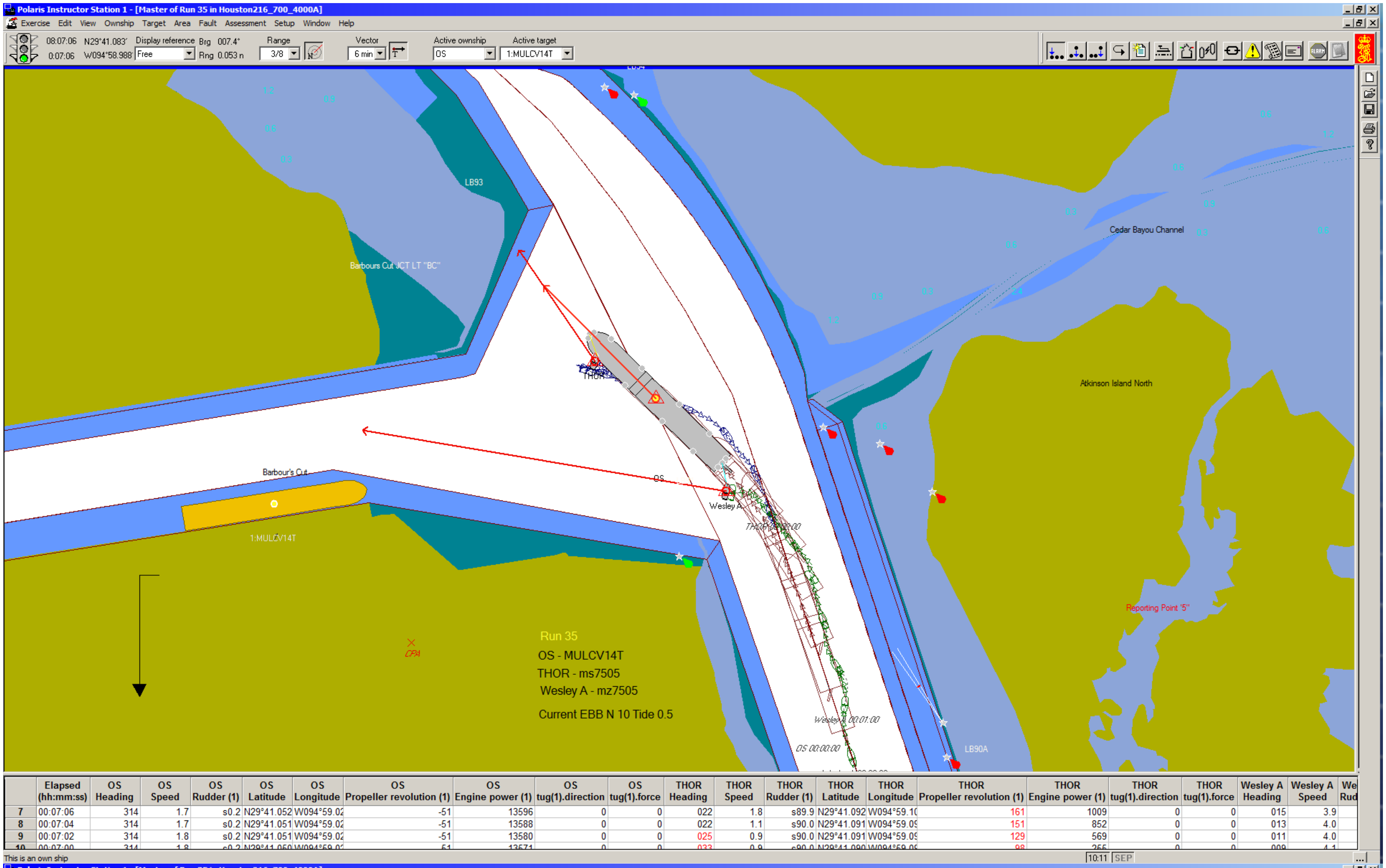
Run 35
OS - MULCV14T
THOR - ms7505
Wesley A - mz7505
Current EBB N 10 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed
7	00:04:56	316	2.5	s0.2	N29°40.992	W094°58.95	0	-0	0	0	109	2.3	s177.8	N29°41.078	W094°59.08	81	103	0	0	319	2.1
8	00:04:54	316	2.5	s0.2	N29°40.991	W094°58.95	0	-0	0	0	110	2.4	s179.0	N29°41.077	W094°59.08	81	103	0	0	318	1.8
9	00:04:52	316	2.5	s0.2	N29°40.990	W094°58.95	0	-0	0	0	110	2.4	s176.7	N29°41.077	W094°59.08	81	102	0	0	316	1.9

This is a lighthouse

10:09 SEP

June 26, 2019



Polaris Instructor Station 1 - [Master of Run 35 in Houston216_700_4000A]

Exercise Edit View Ownship Target Area Fault Assessment Setup Window Help

08:07:06 N29°41.083' 0:07:06 W094°58.988'

Display reference: Free

Brg 007.4° Rng 0.053 n

Range: 3/8

Vector: 6 min

Active ownship: OS

Active target: 1:MULCV14T

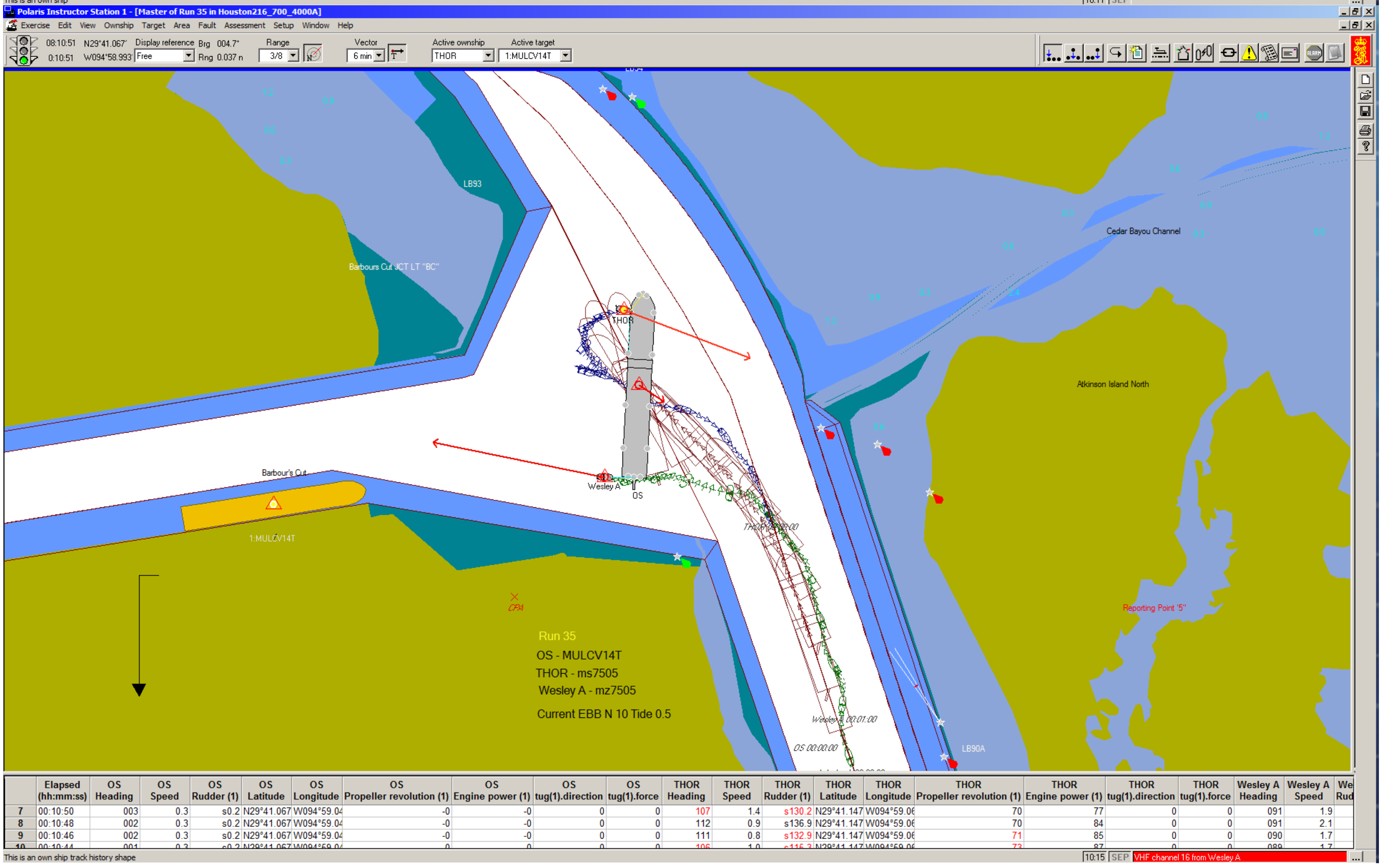
Run 35
OS - MULCV14T
THOR - ms7505
Wesley A - mz7505

Current EBB N 10 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed
7	00:07:06	314	1.7	s0.2	N29°41.052	W094°59.02	-51	13596	0	0	022	1.8	s89.9	N29°41.092	W094°59.10	161	1009	0	0	015	3.9
8	00:07:04	314	1.7	s0.2	N29°41.051	W094°59.02	-51	13588	0	0	022	1.1	s90.0	N29°41.091	W094°59.09	151	852	0	0	013	4.0
9	00:07:02	314	1.8	s0.2	N29°41.051	W094°59.02	-51	13580	0	0	025	0.9	s90.0	N29°41.091	W094°59.09	129	569	0	0	011	4.0

This is an own ship

10:11 SEP



Polaris Instructor Station 1 - [Master of Run 35 in Houston216_700_4000A]

Exercise Edit View Ownship Target Area Fault Assessment Setup Window Help

08:10:51 N29°41.067' 0:10:51 W094°58.993'

Display reference: Free

Brg 004.7° Rng 0.037 n

Range: 3/8

Vector: 6 min

Active ownship: THOR

Active target: 1:MULCV14T

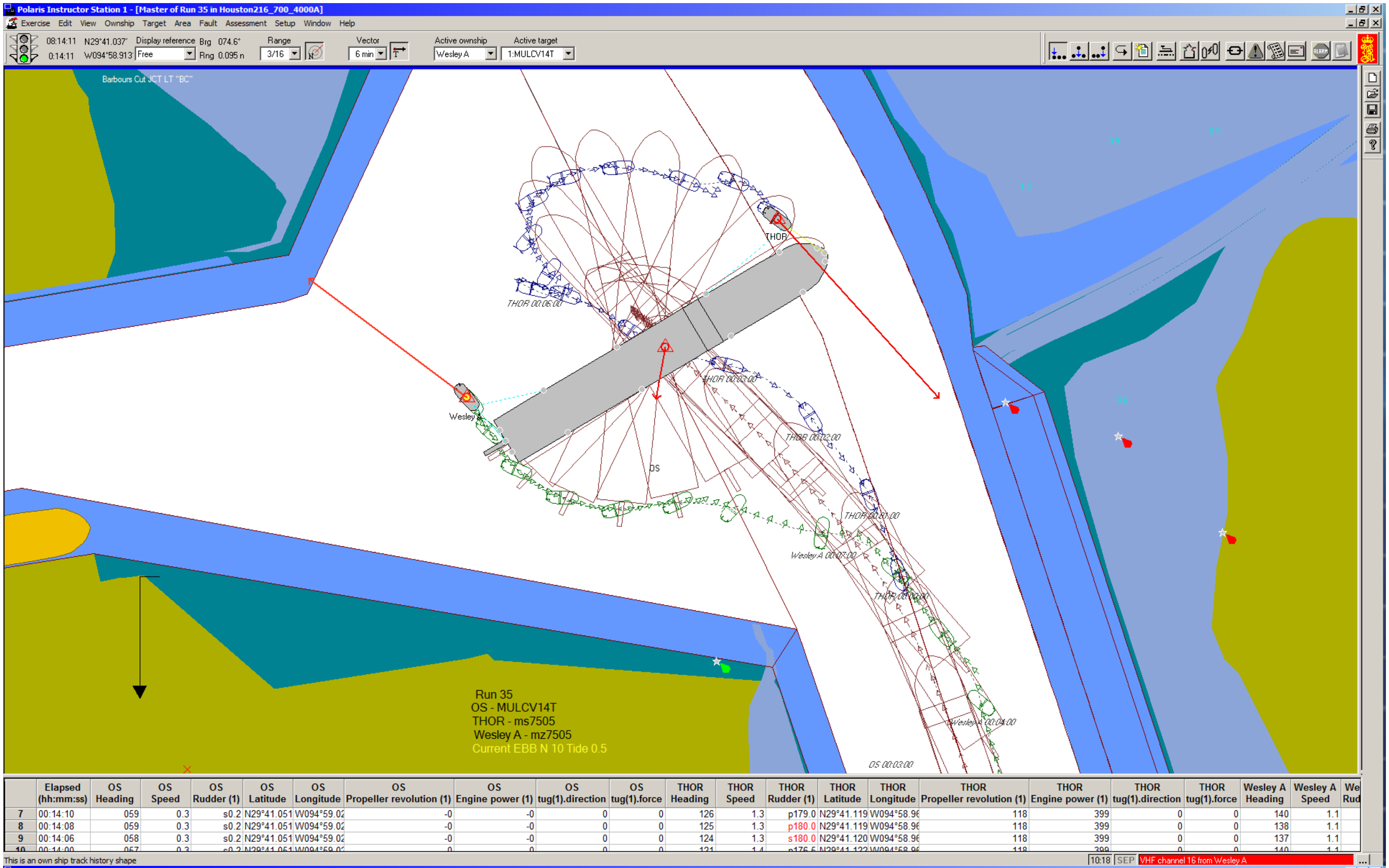
Run 35
OS - MULCV14T
THOR - ms7505
Wesley A - mz7505

Current EBB N 10 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed
7	00:10:50	003	0.3	s0.2	N29°41.067	W094°59.04	-0	-0	0	0	107	1.4	s130.2	N29°41.147	W094°59.06	70	77	0	0	091	1.9
8	00:10:48	002	0.3	s0.2	N29°41.067	W094°59.04	-0	-0	0	0	112	0.9	s136.9	N29°41.147	W094°59.06	70	84	0	0	091	2.1
9	00:10:46	002	0.3	s0.2	N29°41.067	W094°59.04	-0	-0	0	0	111	0.8	s132.9	N29°41.147	W094°59.06	71	85	0	0	090	1.7

This is an own ship track history shape

10:15 SEP VHF channel 16 from Wesley A



Polaris Instructor Station 1 - [Master of Run 35 in Houston216_700_4000A]

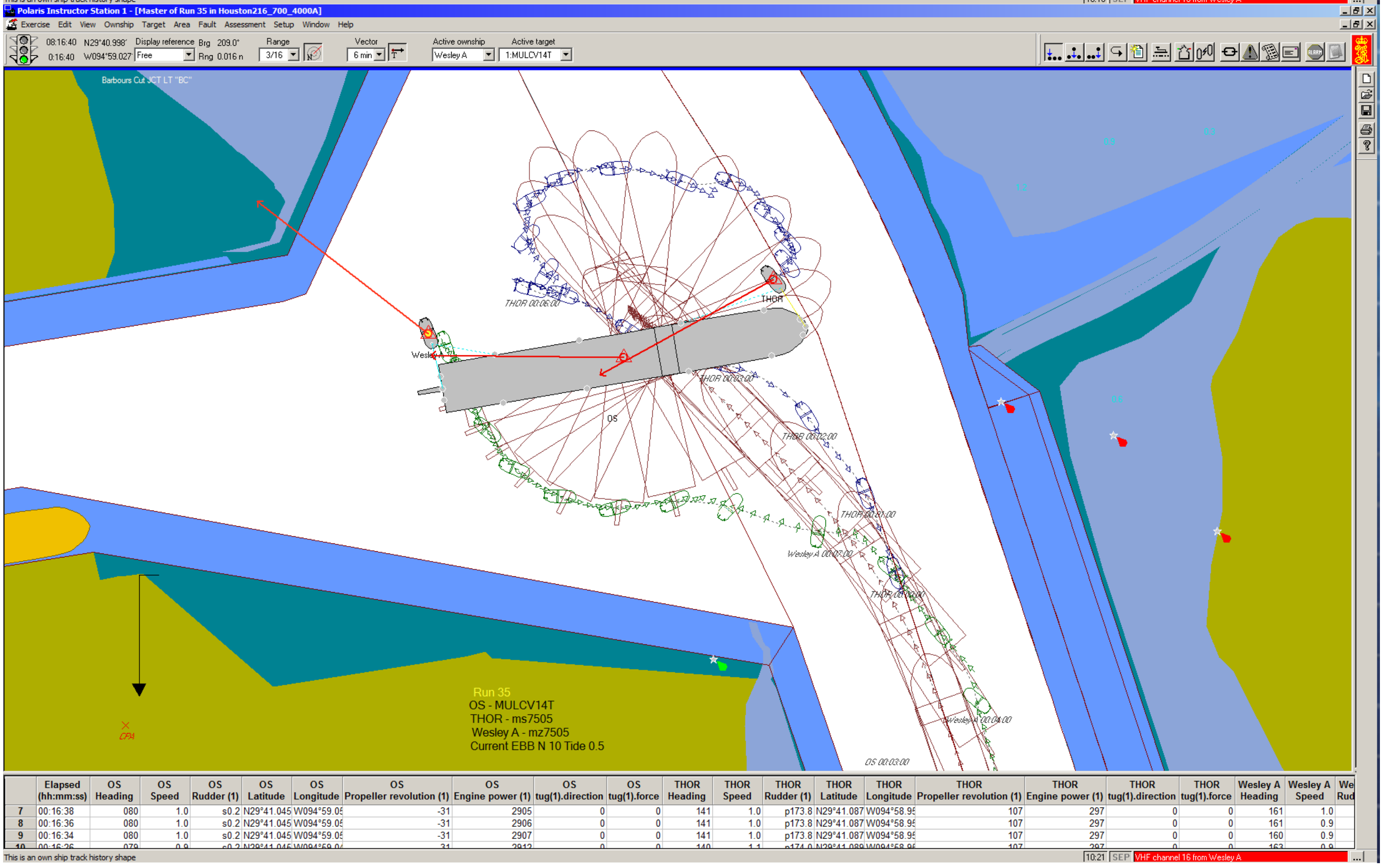
08:14:11 N29°41.037′ Display reference Brg 074.6°
0:14:11 W094°58.913′ Free Rng 0.095 n
Range 3/16
Vector 6 min
Active ownship Wesley A
Active target 1:MULCV14T

Run 35
OS - MULCV14T
THOR - ms7505
Wesley A - mz7505
Current EBB N 10 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:14:10	059	0.3	s0.2	N29°41.051	W094°59.02	-0	-0	0	0	126	1.3	p179.0	N29°41.119	W094°58.96	118	399	0	0	140	1.1	
8	00:14:08	059	0.3	s0.2	N29°41.051	W094°59.02	-0	-0	0	0	125	1.3	p180.0	N29°41.119	W094°58.96	118	399	0	0	138	1.1	
9	00:14:06	058	0.3	s0.2	N29°41.051	W094°59.02	-0	-0	0	0	124	1.3	s180.0	N29°41.120	W094°58.96	118	399	0	0	137	1.1	

This is an own ship track history shape

10:18 SEP VHF channel 16 from Wesley A



Polaris Instructor Station 1 - [Master of Run 35 in Houston216_700_4000A]

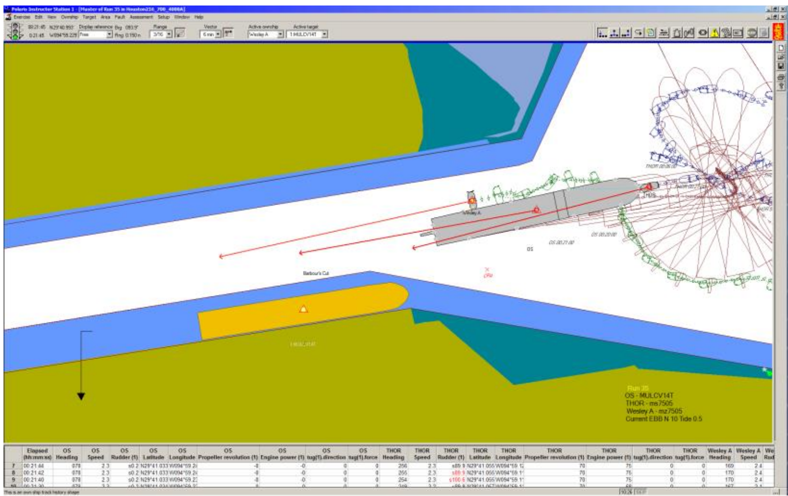
08:16:40 N29°40.998′ Display reference Brg 209.0°
0:16:40 W094°59.027′ Free Rng 0.016 n
Range 3/16
Vector 6 min
Active ownship Wesley A
Active target 1:MULCV14T

Run 35
OS - MULCV14T
THOR - ms7505
Wesley A - mz7505
Current EBB N 10 Tide 0.5

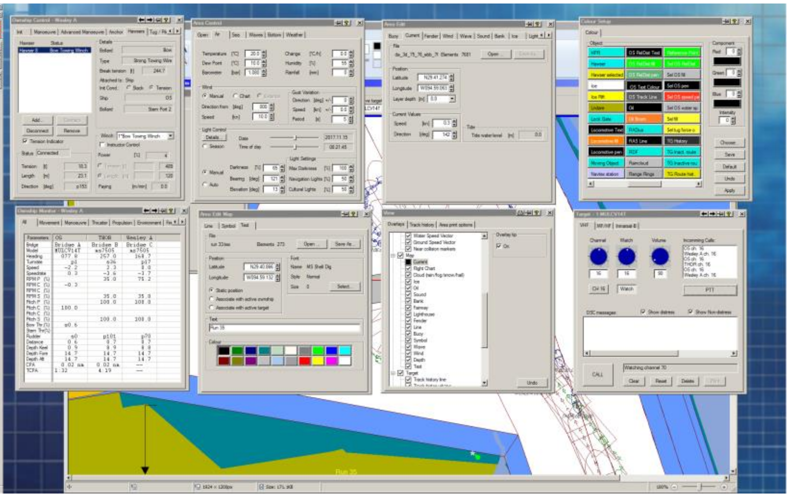
	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:16:38	080	1.0	s0.2	N29°41.045	W094°59.05	-31	2905	0	0	141	1.0	p173.8	N29°41.087	W094°58.95	107	297	0	0	161	1.0	
8	00:16:36	080	1.0	s0.2	N29°41.045	W094°59.05	-31	2906	0	0	141	1.0	p173.8	N29°41.087	W094°58.95	107	297	0	0	161	0.9	
9	00:16:34	080	1.0	s0.2	N29°41.045	W094°59.05	-31	2907	0	0	141	1.0	p173.8	N29°41.087	W094°58.95	107	297	0	0	160	0.9	

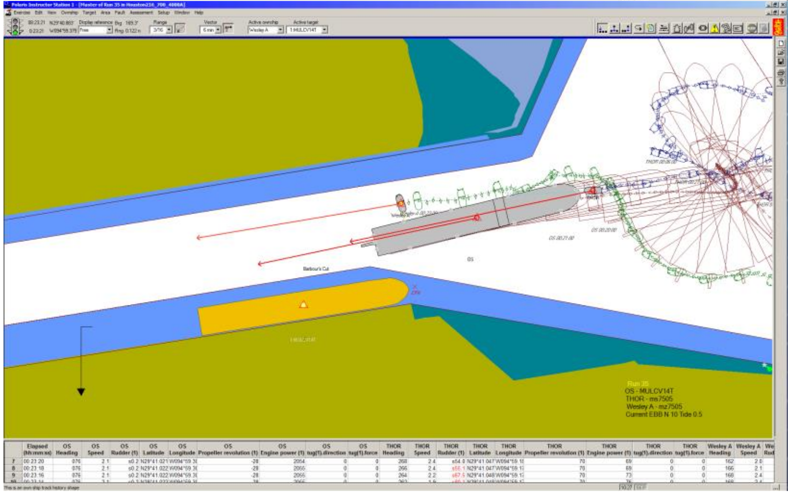
This is an own ship track history shape

10:21 SEP VHF channel 16 from Wesley A

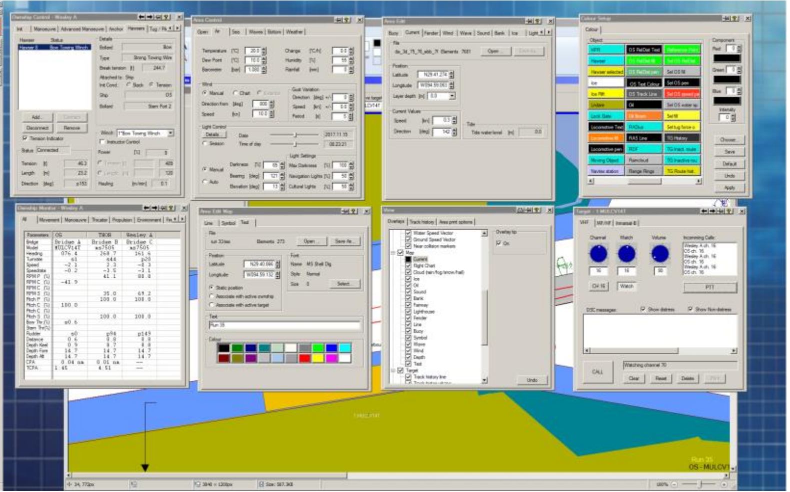


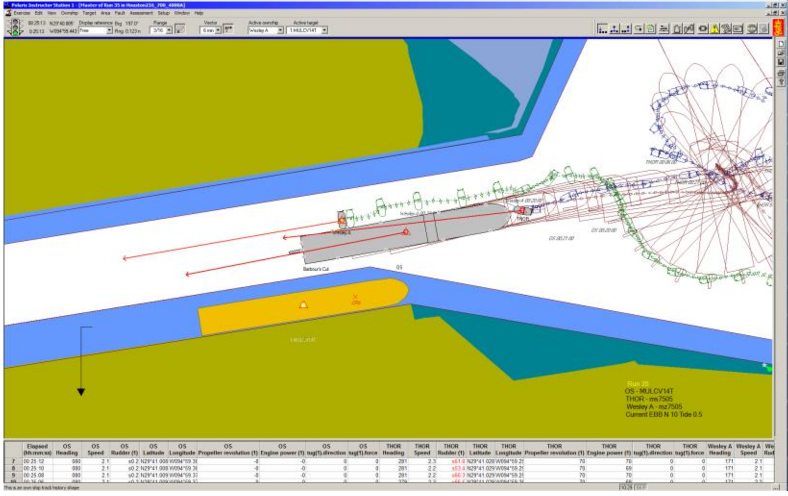
	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed
7	00:21:44	078	2.3	s0.2	N29°41.033	W094°59.2	-8	-0	0	0	256	2.3	s89.9	N29°41.055	W094°59.1	70	75	0	0	169	2.4
8	00:21:42	078	2.3	s0.2	N29°41.033	W094°59.2	-8	-0	0	0	255	2.3	s89.9	N29°41.055	W094°59.1	70	75	0	0	170	2.4
9	00:21:40	078	2.3	s0.2	N29°41.033	W094°59.2	-8	-0	0	0	254	2.3	s100.6	N29°41.055	W094°59.1	70	75	0	0	170	2.4



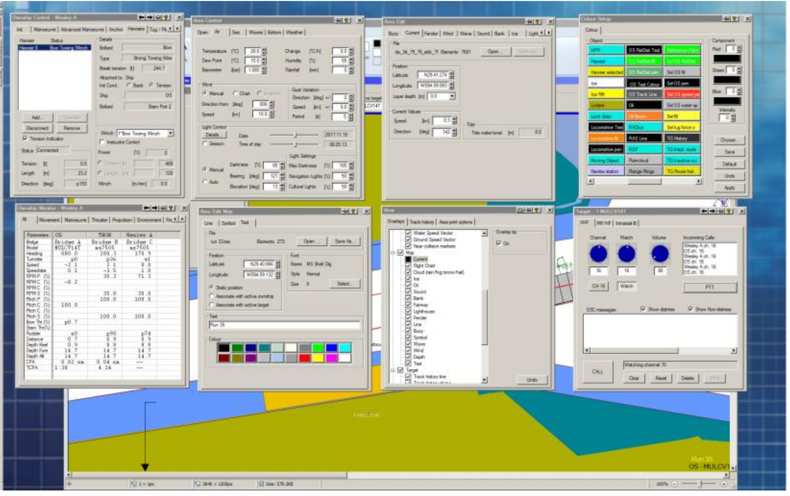


	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed
7	00:23:20	076	2.1	s0.2	N29°41.021	W094°59.3	-28	2054	0	0	268	2.4	s54.0	N29°41.047	W094°59.1	70	69	0	0	162	2.0
8	00:23:18	076	2.1	s0.2	N29°41.022	W094°59.3	-28	2055	0	0	266	2.4	s55.1	N29°41.047	W094°59.1	70	69	0	0	166	2.1
9	00:23:16	076	2.1	s0.2	N29°41.022	W094°59.3	-28	2055	0	0	264	2.2	s57.5	N29°41.048	W094°59.1	70	73	0	0	168	2.4

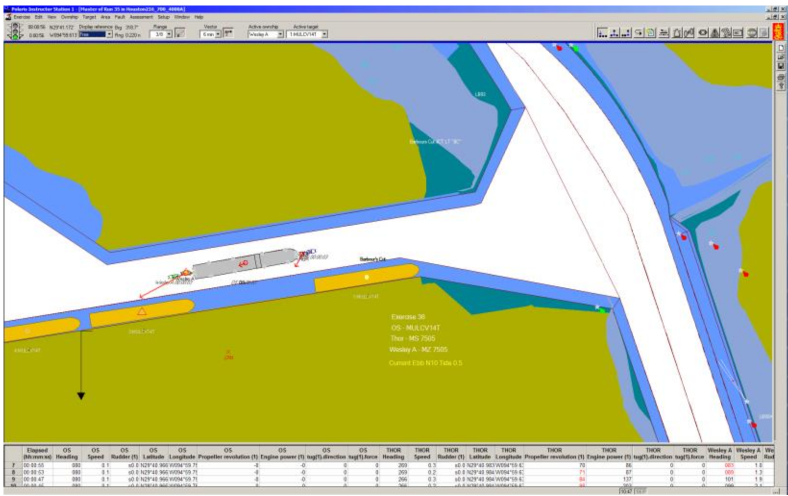


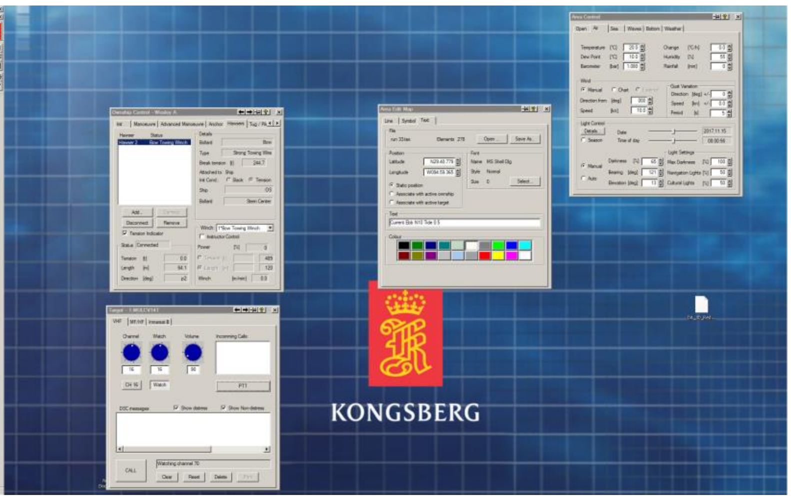


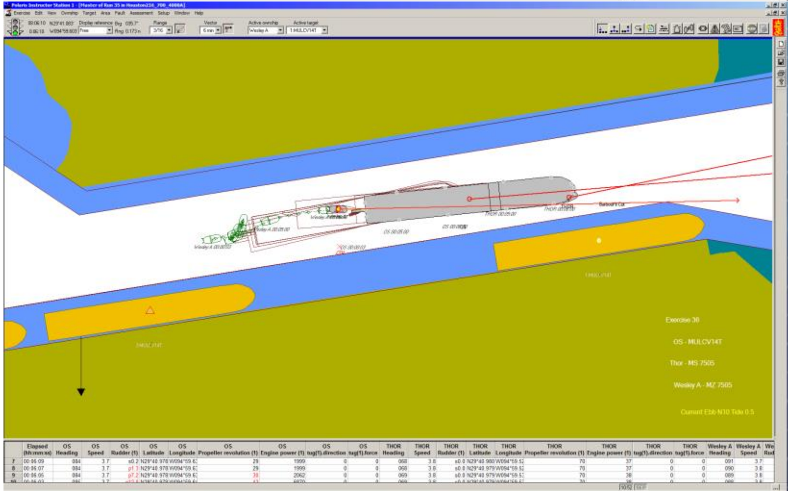
	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed
7	00:25:12	080	2.1	s0.2	N29°41.008	W094°59.3	-8	-0	0	0	281	2.3	s61.0	N29°41.028	W094°59.2	70	70	0	0	171	2.1
8	00:25:10	080	2.1	s0.2	N29°41.008	W094°59.3	-8	-0	0	0	281	2.2	s57.4	N29°41.029	W094°59.2	70	69	0	0	171	2.1
9	00:25:08	080	2.1	s0.2	N29°41.009	W094°59.3	-8	-0	0	0	281	2.2	s60.3	N29°41.029	W094°59.2	70	70	0	0	171	2.1

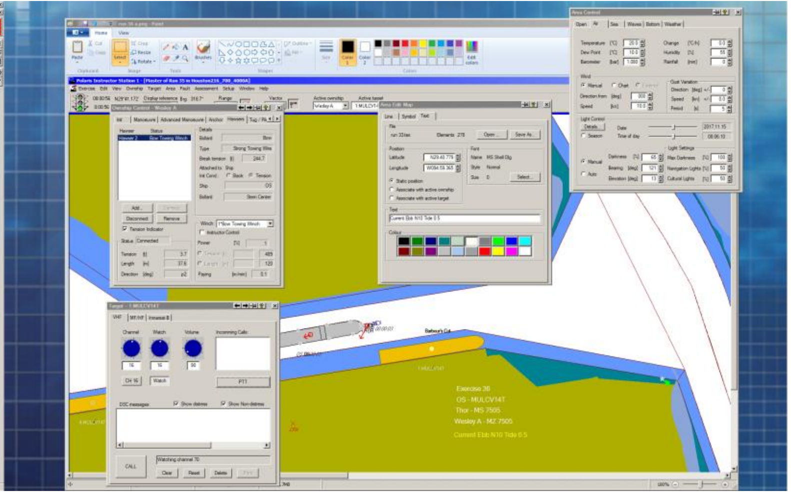


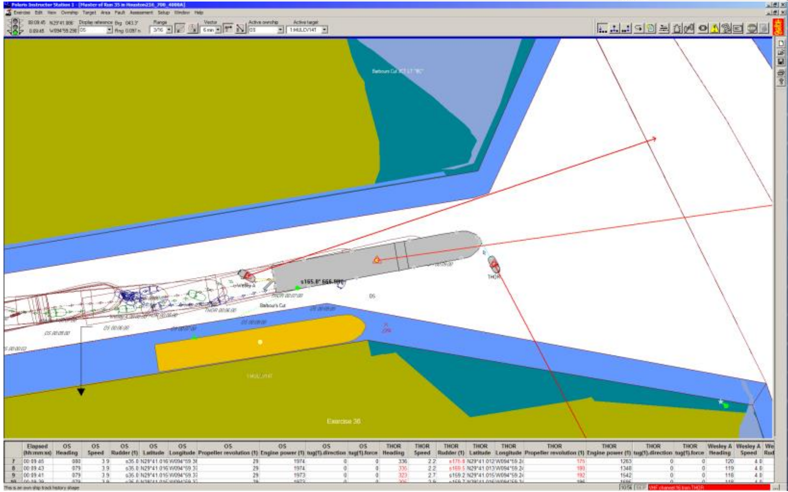
Run 36

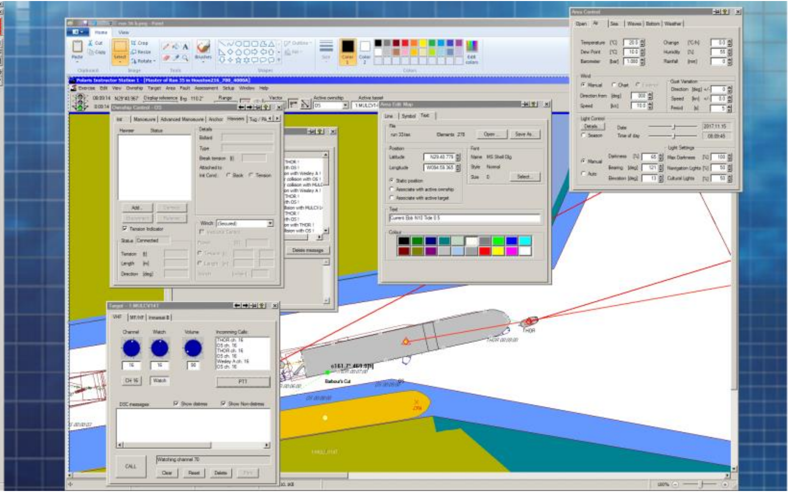

Balfour's Cut
Exercise 36
OS - MULCV14T
Thor - MS 7505
Wesley A - MZ 7505
Current Ebb N10 Tide 0.5

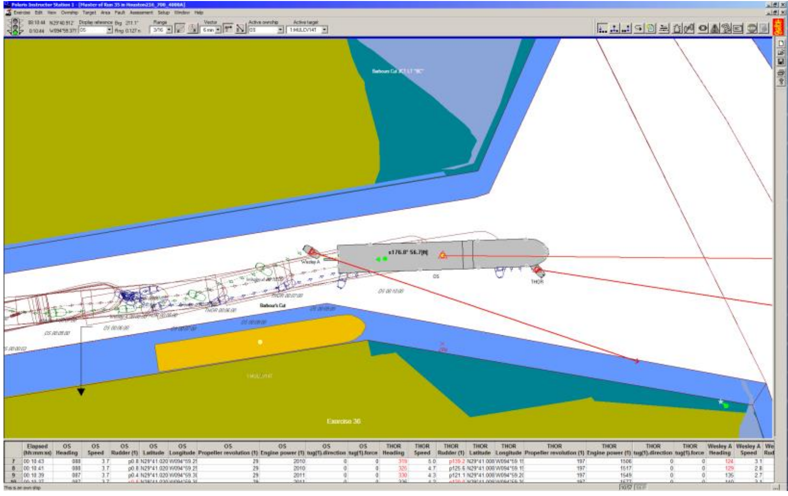

KONGSBERG

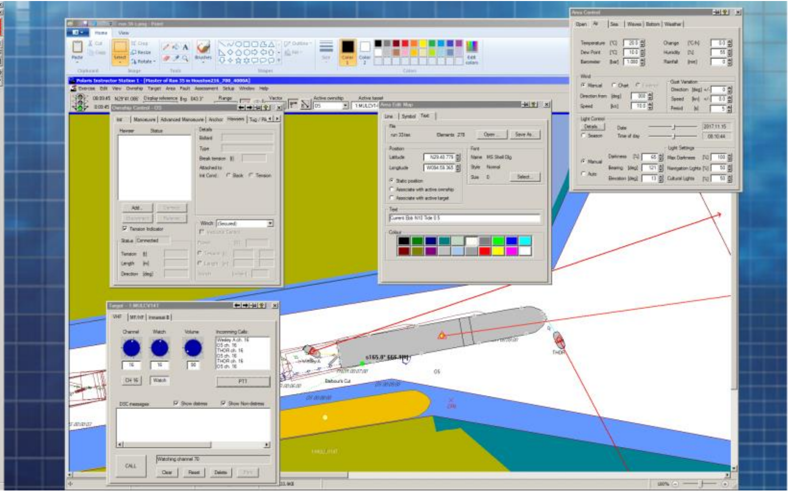

Balfour's Cut
Exercise 36
OS - MULCV14T
Thor - MS 7505
Wesley A - MZ 7505
Current Ebb N10 Tide 0.5

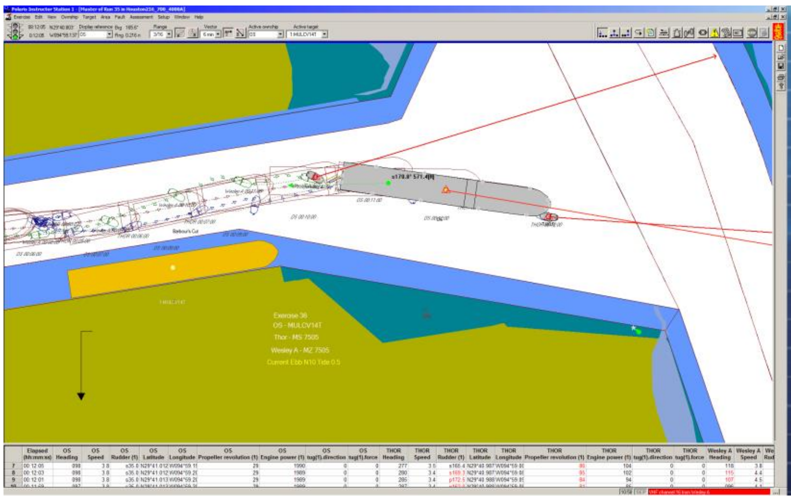

Exercise 36
OS - MULCV14T
Thor - MS 7505
Wesley A - MZ 7505
Current Ebb N10 Tide 0.5


Balfour's Cut
THOR
Exercise 36

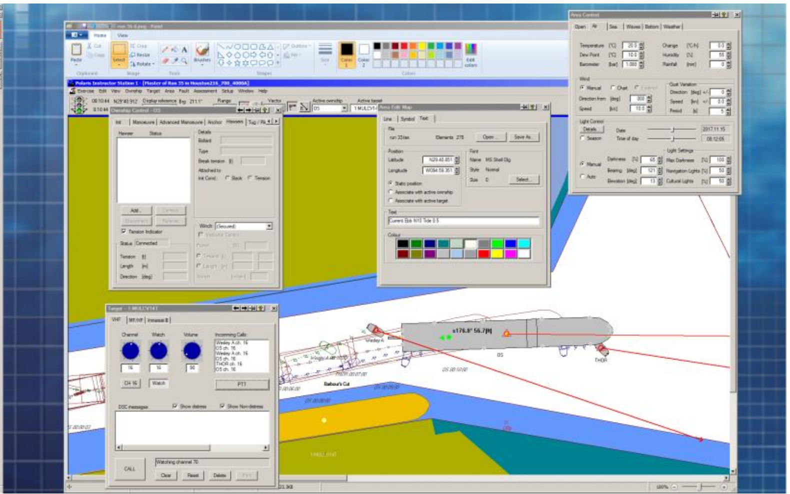

THOR

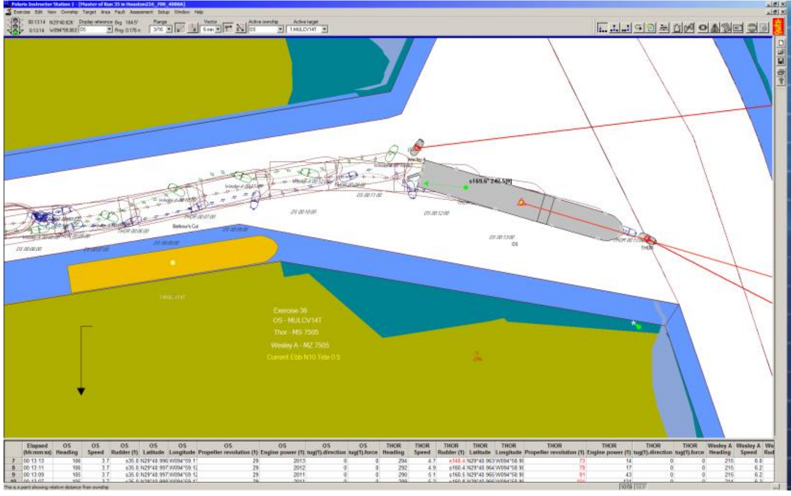

Balfour's Cut
THOR
Exercise 36


THOR



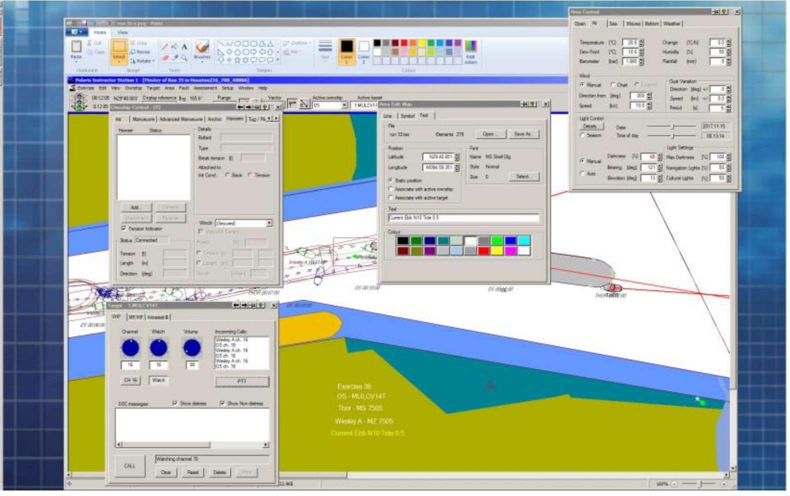
	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed
7	00:12:05	098	3.8	s35.0	N29°41.012	W094°59.1	29	1990	0	0	277	3.6	s166.4	N29°40.987	W094°59.0	80	104	0	0	116	3.8
8	00:12:03	098	3.8	s35.0	N29°41.012	W094°59.2	29	1989	0	0	280	3.4	s169.3	N29°40.987	W094°59.0	85	102	0	0	115	4.4
9	00:12:01	098	3.8	s35.0	N29°41.013	W094°59.2	29	1989	0	0	285	3.4	p172.5	N29°40.988	W094°59.0	84	94	0	0	107	4.5



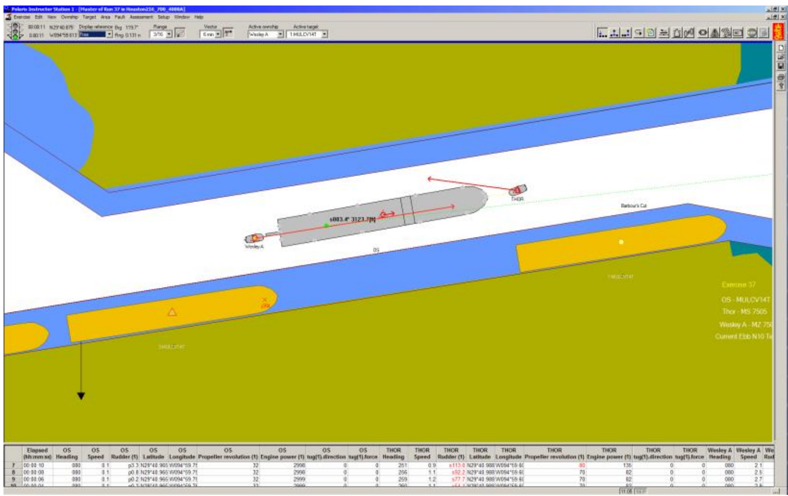


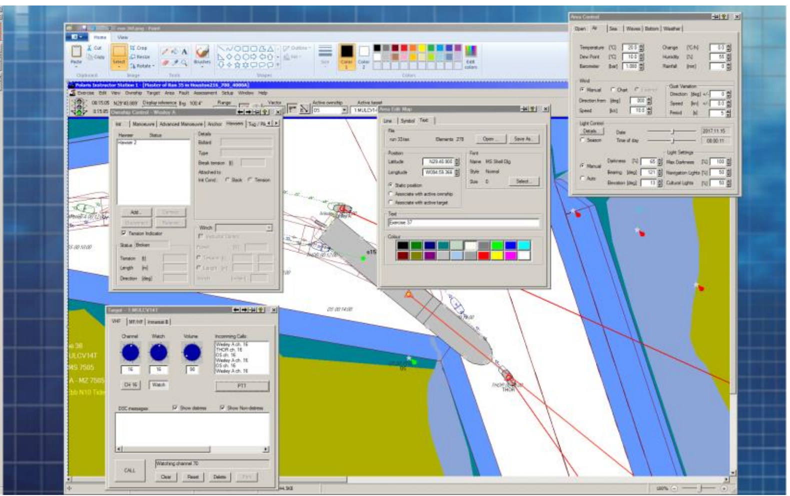
	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed
7	00:13:13	106	3.7	s35.0	N29°40.996	W094°59.1	29	2013	0	0	294	4.7	s148.4	N29°40.963	W094°58.9	73	14	0	0	215	6.0
8	00:13:11	106	3.7	s35.0	N29°40.997	W094°59.1	29	2012	0	0	292	4.9	s160.4	N29°40.964	W094°58.9	79	17	0	0	215	6.2
9	00:13:09	105	3.7	s35.0	N29°40.997	W094°59.1	29	2011	0	0	290	5.1	s160.5	N29°40.965	W094°58.9	91	43	0	0	215	6.2

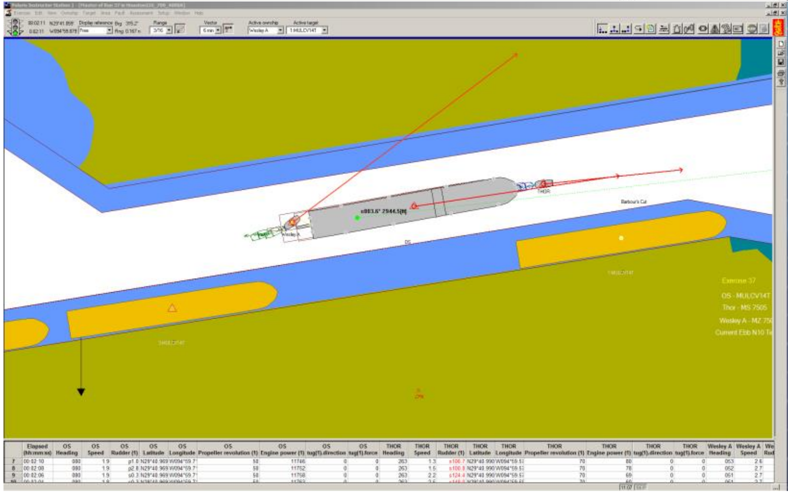
This is a point showing relative distance from ownship

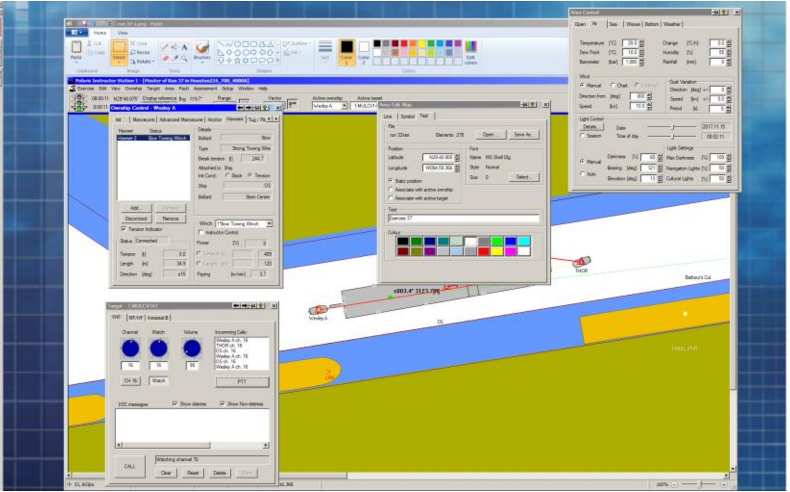


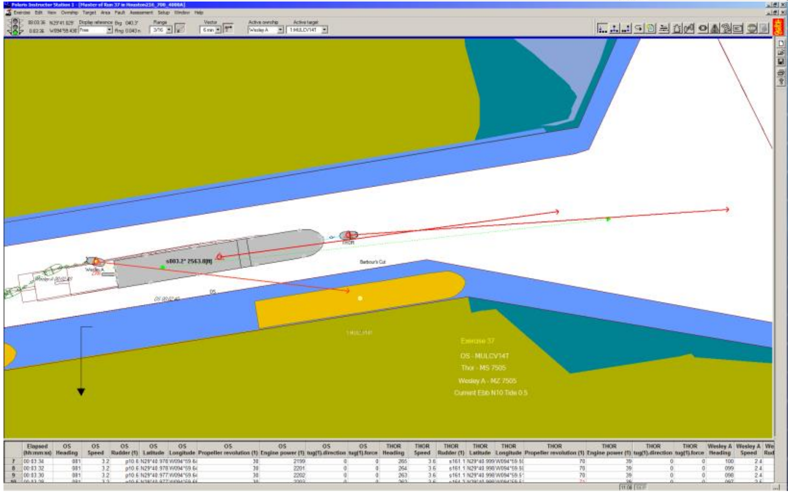
Run 37

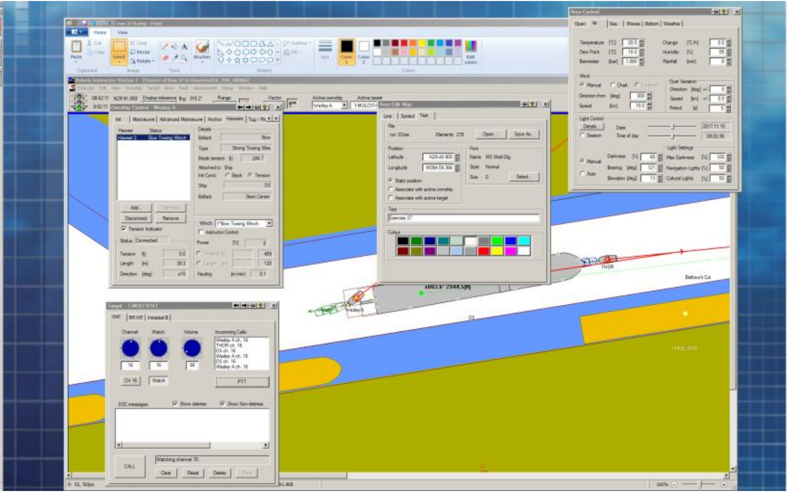

THOR
s003.4° 3123.7[m]
Wesley A
Barbour's Cut
Exercise 37
OS - MULCV14T
Thor - MS 7505
Wesley A - MZ 75
Current Ebb N10 Ti

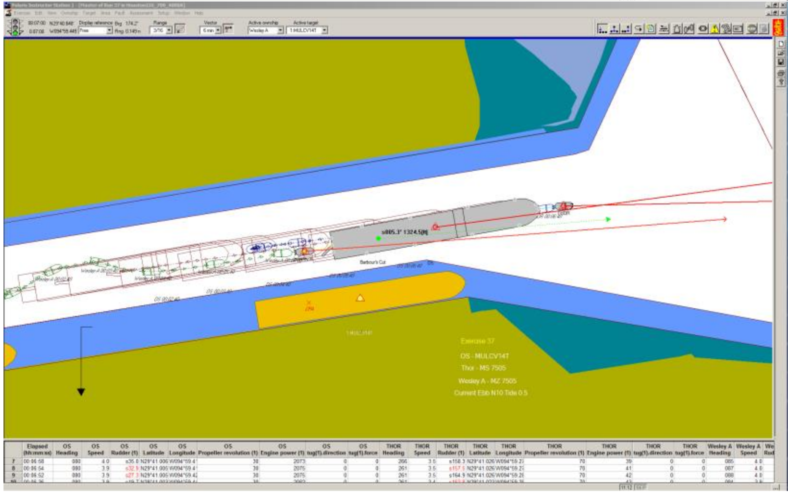


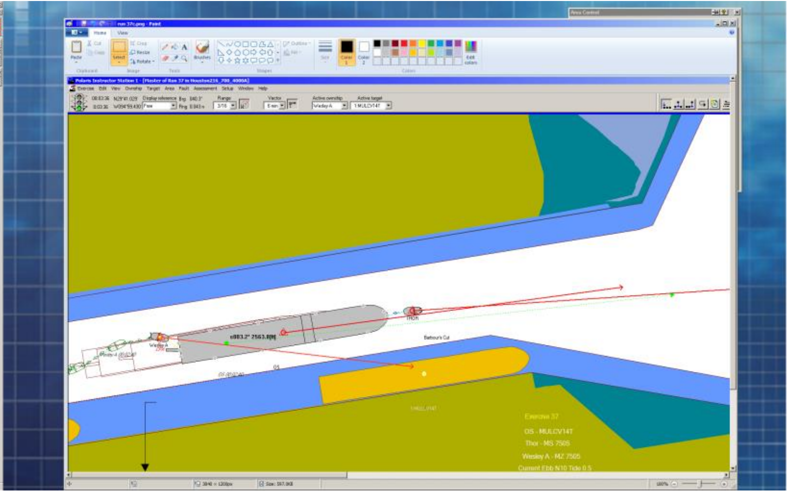

s003.6° 2544.5[m]
THOR
Barbour's Cut
Exercise 37
OS - MULCV14T
Thor - MS 7505
Wesley A - MZ 75
Current Ebb N10 Ti

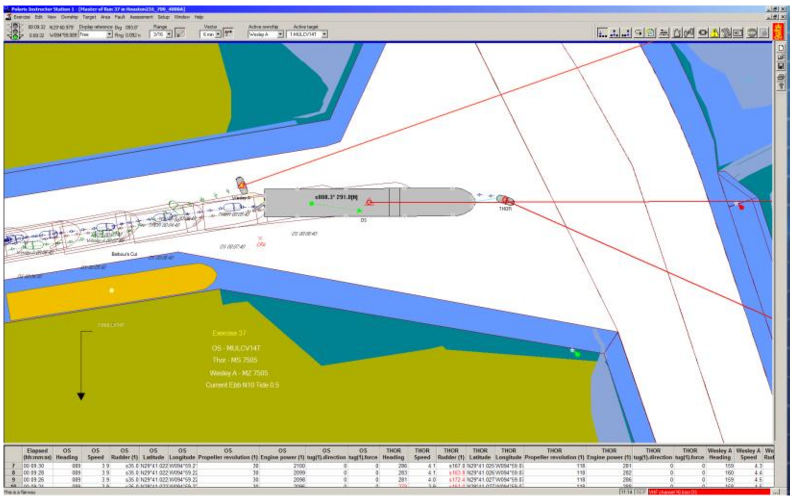

s003.4° 3123.7[m]
Wesley A
THOR
Barbour's Cut

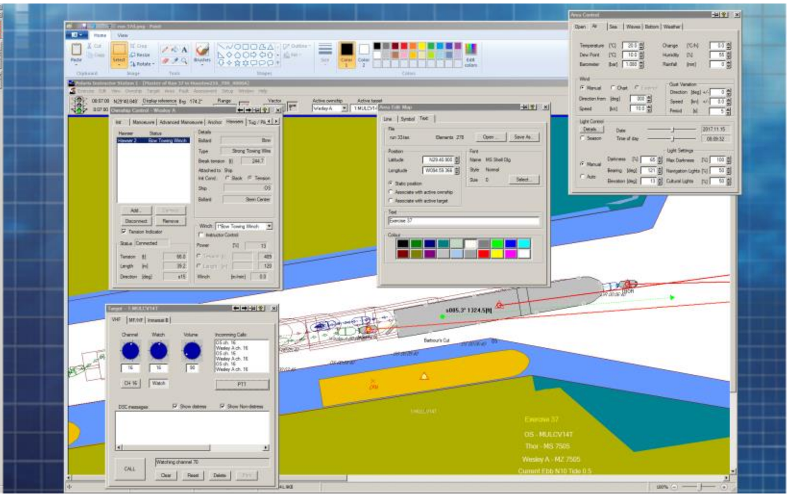

s003.2° 2563.8[m]
THOR
Barbour's Cut
Exercise 37
OS - MULCV14T
Thor - MS 7505
Wesley A - MZ 7505
Current Ebb N10 Tide 0.5

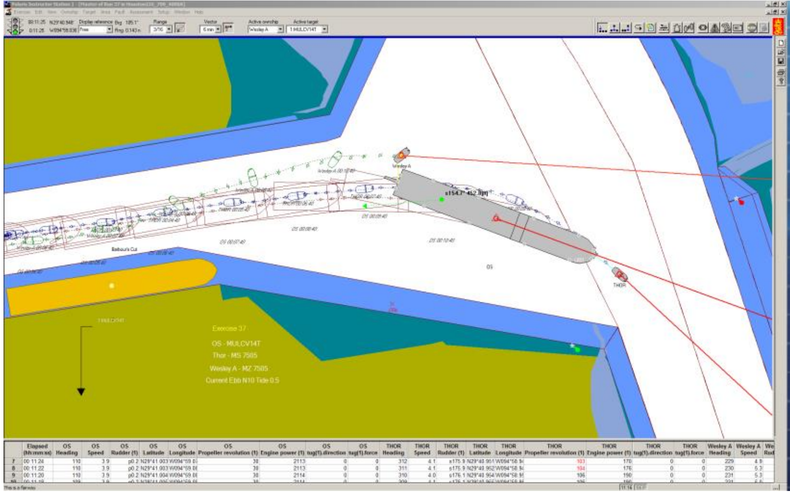

s003.6° 2544.5[m]
THOR
Barbour's Cut

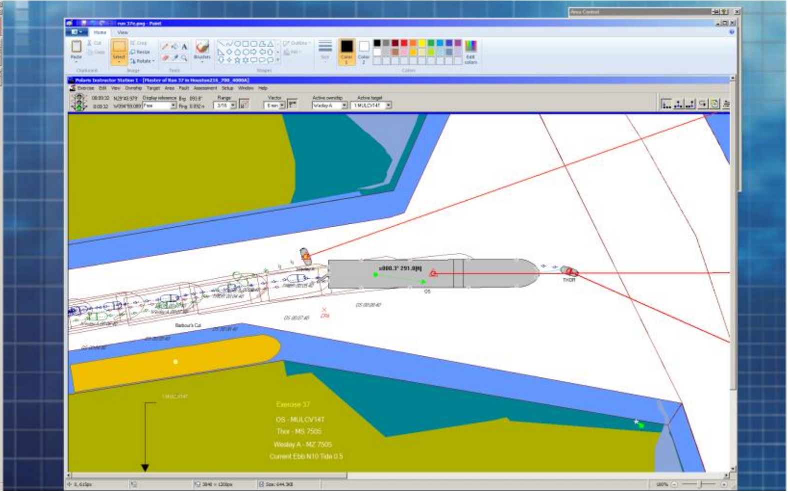

s005.3° 1324.5[m]
Barbour's Cut
Exercise 37
OS - MULCV14T
Thor - MS 7505
Wesley A - MZ 7505
Current Ebb N10 Tide 0.5

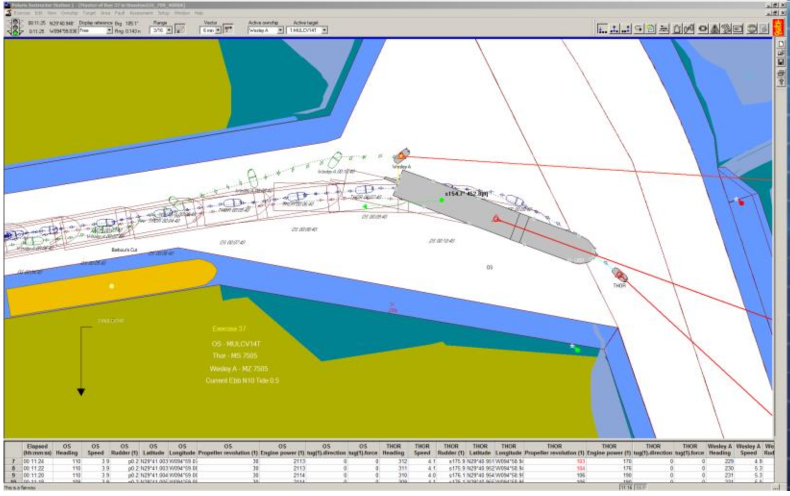

s003.2° 2563.8[m]
Barbour's Cut
Exercise 37
OS - MULCV14T
Thor - MS 7505
Wesley A - MZ 7505
Current Ebb N10 Tide 0.5

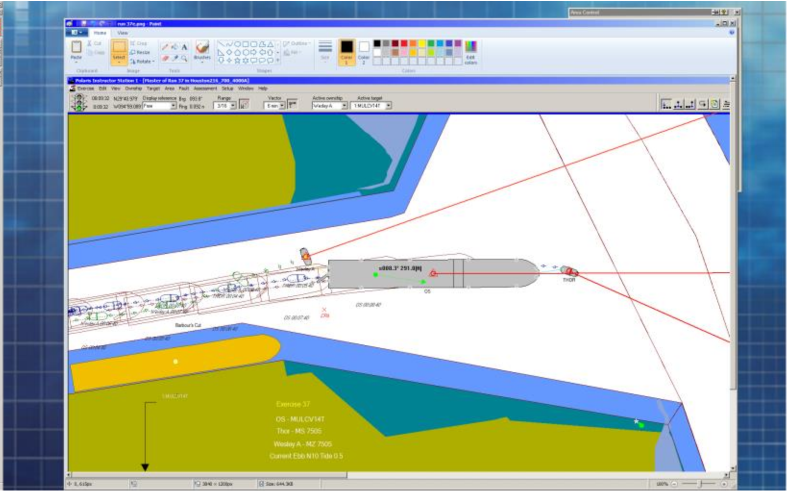

Barbours Cut
Exercise 37
OS - MULCV14T
Thor - MS 7505
Wesley A - MZ 7505
Current Ebb N10 Tide 0.5

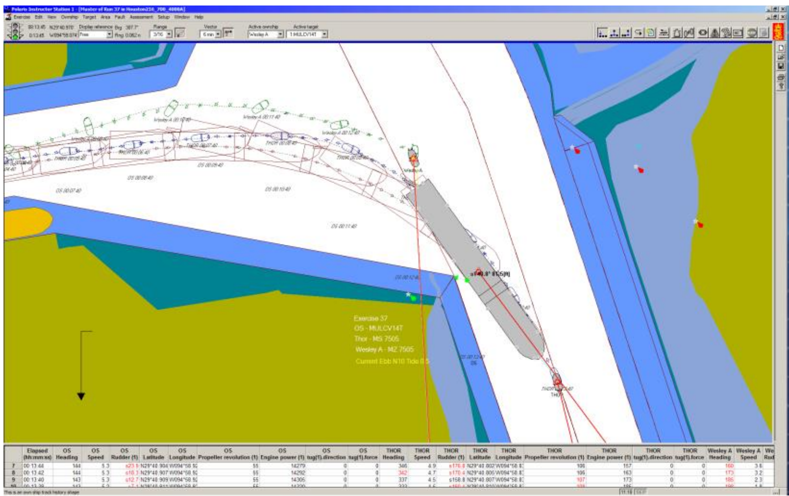

Barbours Cut
Exercise 37
OS - MULCV14T
Thor - MS 7505
Wesley A - MZ 7505
Current Ebb N10 Tide 0.5

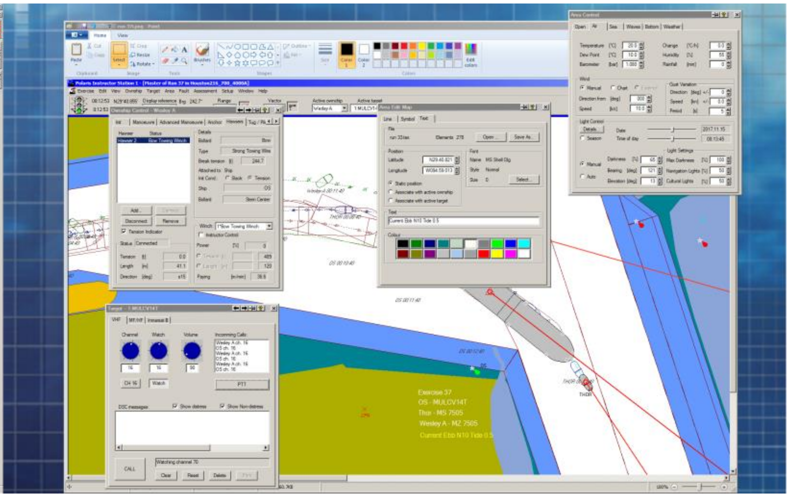

Barbours Cut
Exercise 37
OS - MULCV14T
Thor - MS 7505
Wesley A - MZ 7505
Current Ebb N10 Tide 0.5

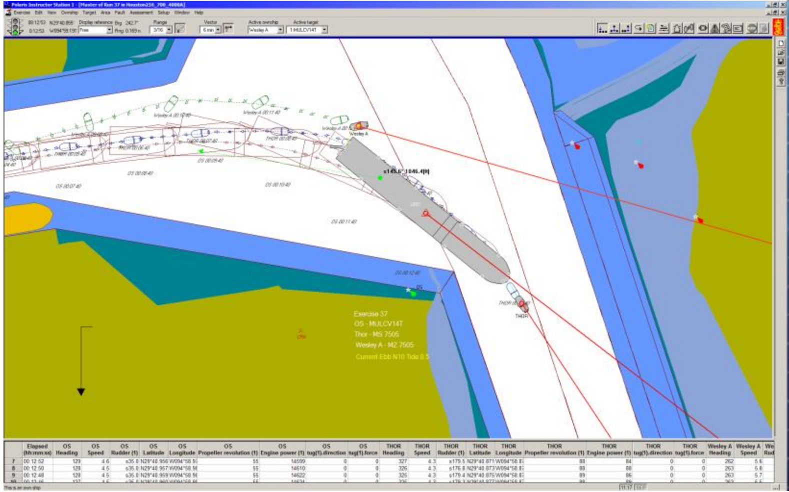

Barbours Cut
Exercise 37
OS - MULCV14T
Thor - MS 7505
Wesley A - MZ 7505
Current Ebb N10 Tide 0.5

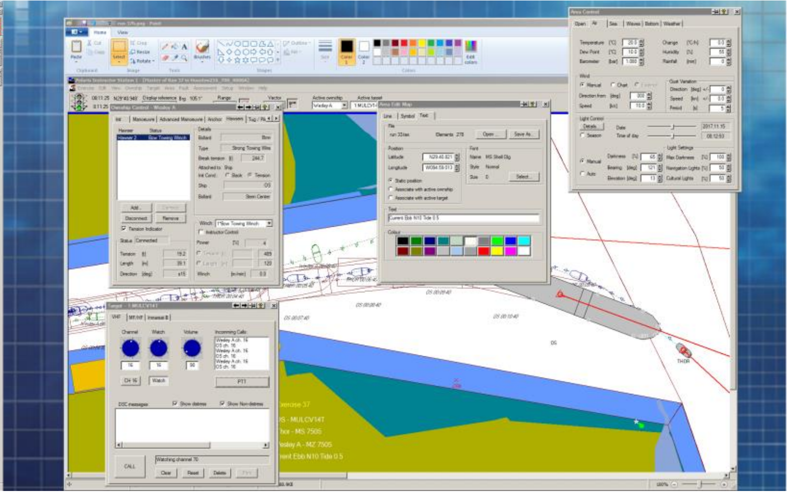

Barbours Cut
Exercise 37
OS - MULCV14T
Thor - MS 7505
Wesley A - MZ 7505
Current Ebb N10 Tide 0.5

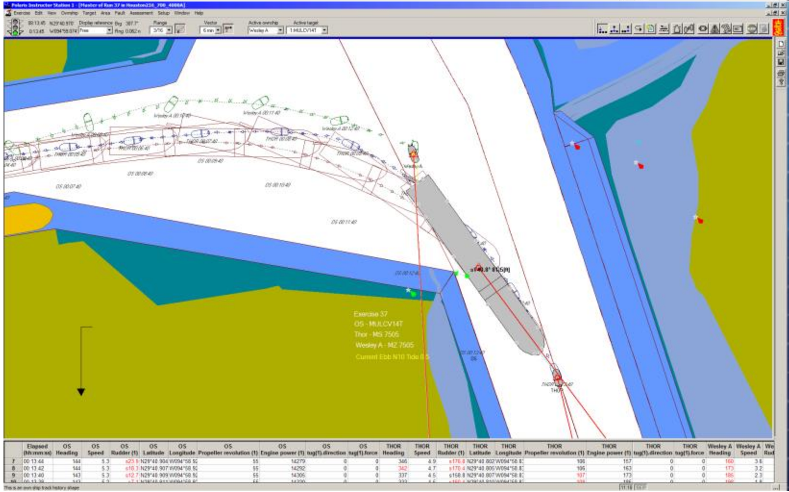

Barbours Cut
Exercise 37
OS - MULCV14T
Thor - MS 7505
Wesley A - MZ 7505
Current Ebb N10 Tide 0.5

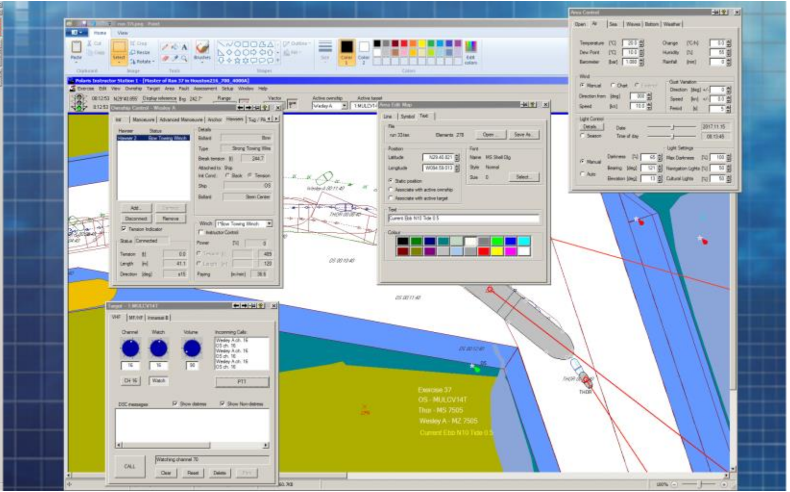

Exercise 37
OS - MULCV14T
Thor - MS 7505
Wesley A - MZ 7505
Current Ebb N10 Tide 0.5

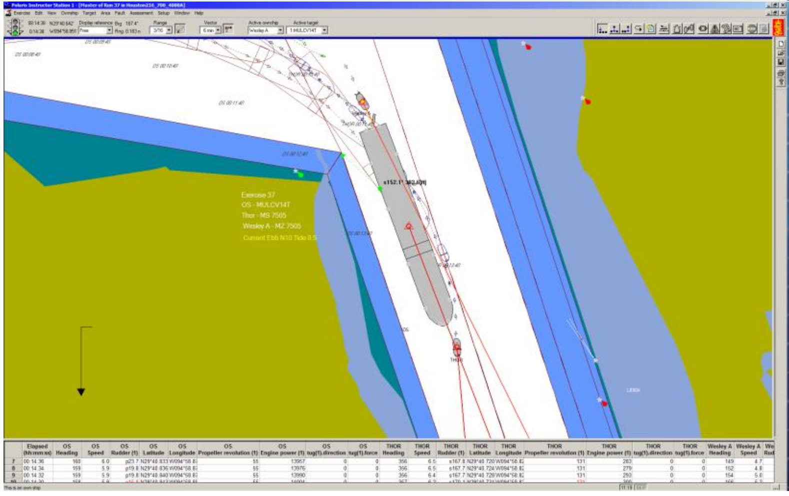

Exercise 37
OS - MULCV14T
Thor - MS 7505
Wesley A - MZ 7505
Current Ebb N10 Tide 0.5

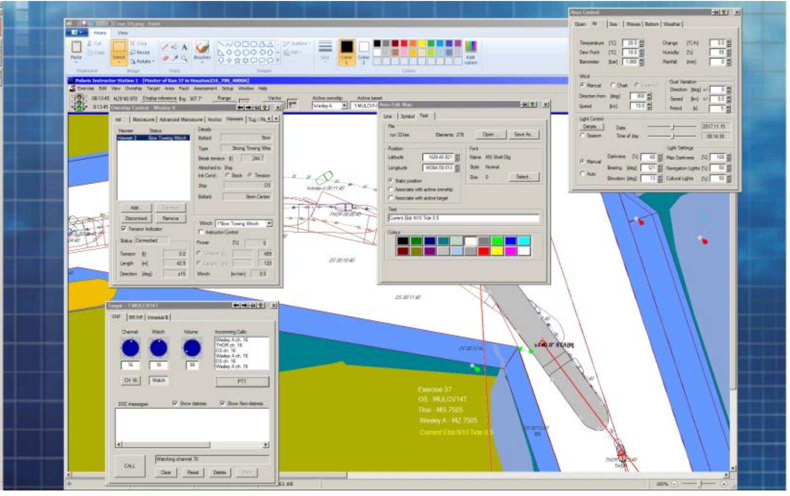

Exercise 37
OS - MULCV14T
Thor - MS 7505
Wesley A - MZ 7505
Current Ebb N10 Tide 0.5


Exercise 37
OS - MULCV14T
Thor - MS 7505
Wesley A - MZ 7505
Current Ebb N10 Tide 0.5

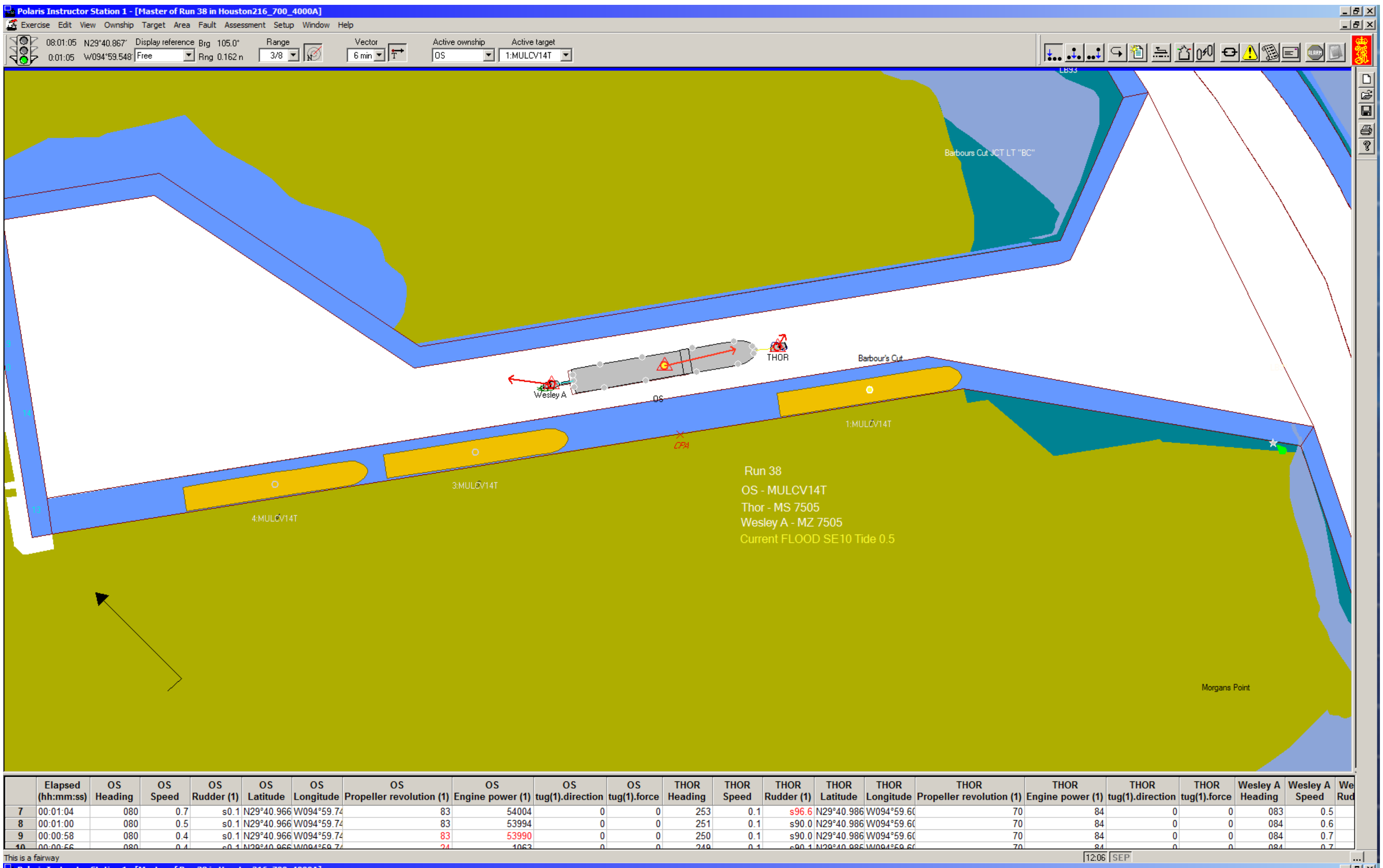

Exercise 37
OS - MULCV14T
Thor - MS 7505
Wesley A - MZ 7505
Current Ebb N10 Tide 0.5


Exercise 37
OS - MULCV14T
Thor - MS 7505
Wesley A - MZ 7505
Current Ebb N10 Tide 0.5


Exercise 37
OS - MULCV14T
Thor - MS 7505
Wesley A - MZ 7505
Current Ebb N10 Tide 0.5


Exercise 37
OS - MULCV14T
Thor - MS 7505
Wesley A - MZ 7505
Current Ebb N10 Tide 0.5

Run 38



Polaris Instructor Station 1 - [Master of Run 38 in Houston216_700_4000A]

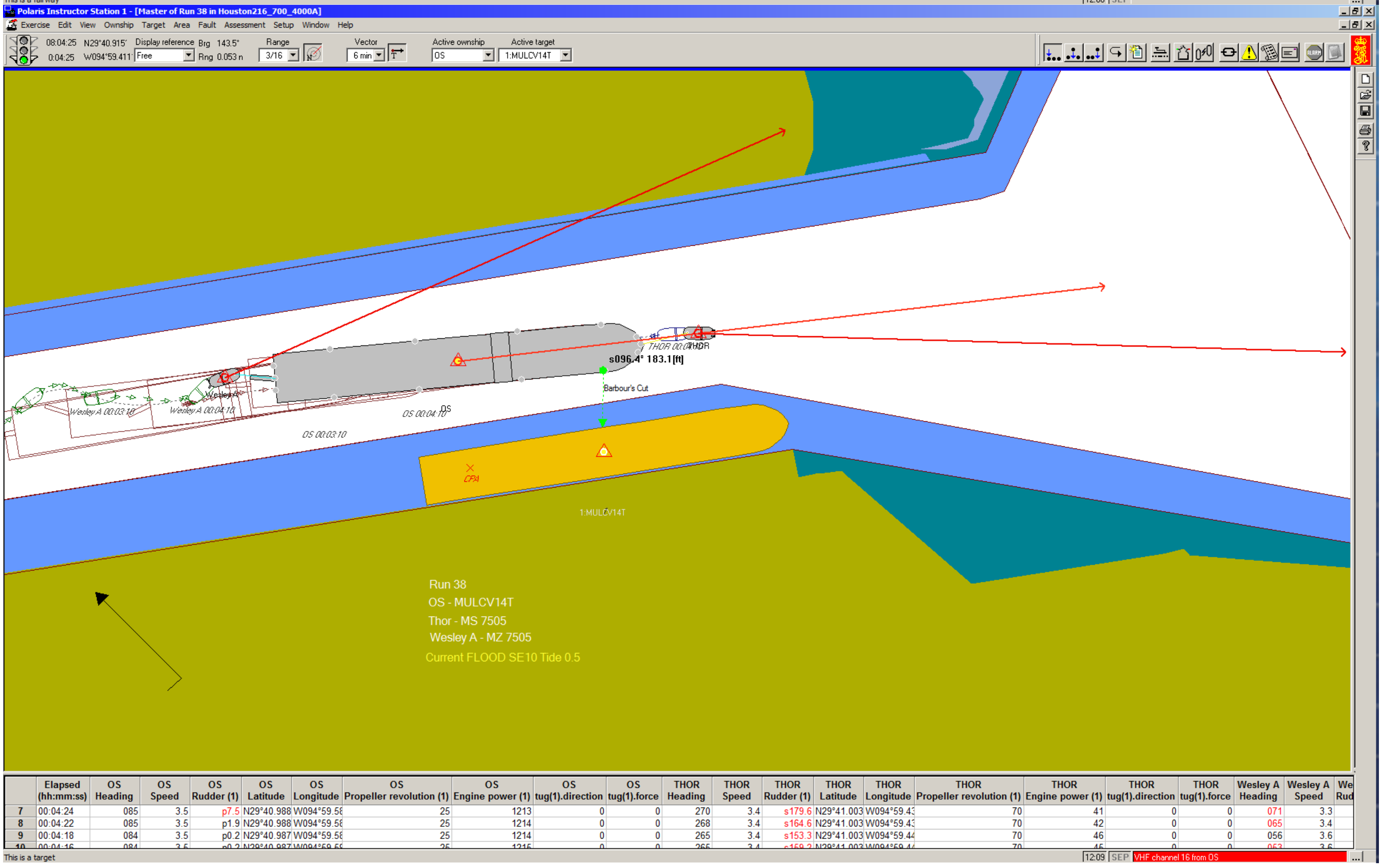
08:01:05 N29°40.867' Display reference Free Brg 105.0° Rng 0.162 n Range 3/8 Vector 6 min Active ownship OS Active target 1:MULCV14T

0:01:05 W094°59.548

Run 38
OS - MULCV14T
Thor - MS 7505
Wesley A - MZ 7505
Current FLOOD SE10 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:01:04	080	0.7	s0.1	N29°40.966	W094°59.74	83	54004	0	0	253	0.1	s96.6	N29°40.986	W094°59.60	70	84	0	0	083	0.5	
8	00:01:00	080	0.5	s0.1	N29°40.966	W094°59.74	83	53994	0	0	251	0.1	s90.0	N29°40.986	W094°59.60	70	84	0	0	084	0.6	
9	00:00:58	080	0.4	s0.1	N29°40.966	W094°59.74	83	53990	0	0	250	0.1	s90.0	N29°40.986	W094°59.60	70	84	0	0	084	0.7	
10	00:00:56	080	0.4	s0.1	N29°40.966	W094°59.74	24	1063	0	0	249	0.1	s90.1	N29°40.985	W094°59.60	70	84	0	0	084	0.7	

This is a fairway 12:06 SEP



Polaris Instructor Station 1 - [Master of Run 38 in Houston216_700_4000A]

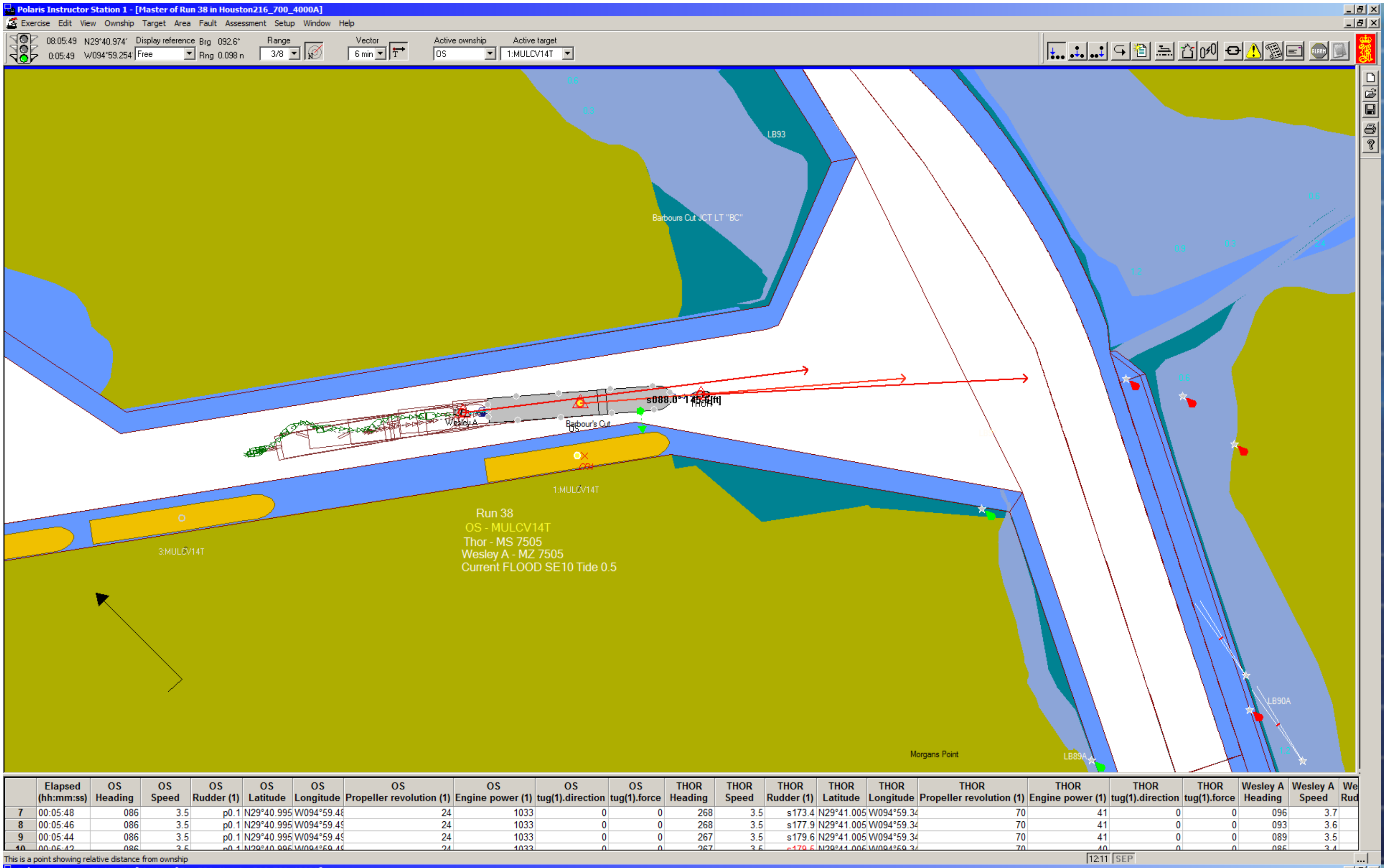
08:04:25 N29°40.915' Display reference Free Brg 143.5° Rng 0.053 n Range 3/16 Vector 6 min Active ownship OS Active target 1:MULCV14T

0:04:25 W094°59.411'

Run 38
OS - MULCV14T
Thor - MS 7505
Wesley A - MZ 7505
Current FLOOD SE10 Tide 0.5

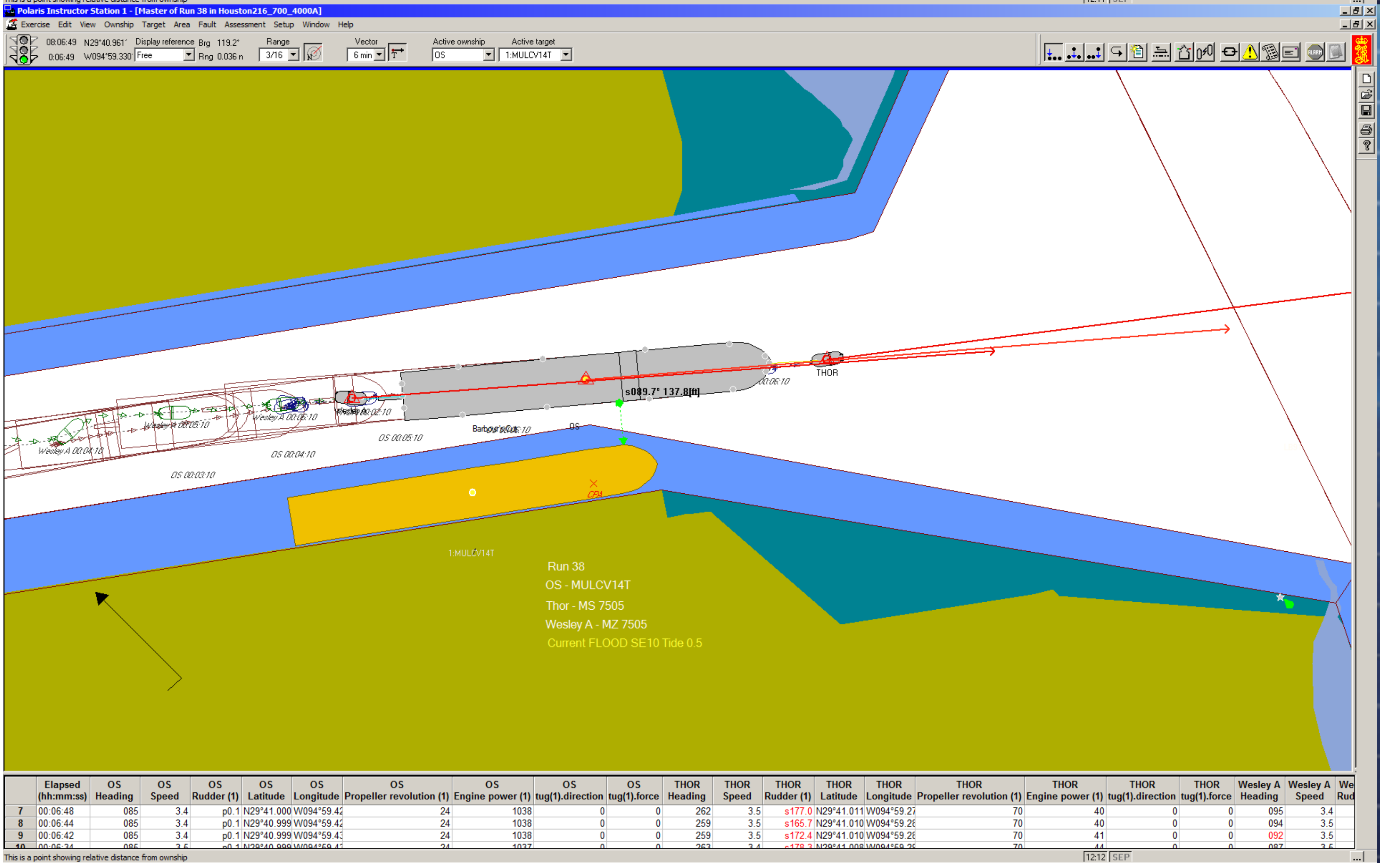
	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:04:24	085	3.5	p7.5	N29°40.988	W094°59.58	25	1213	0	0	270	3.4	s179.6	N29°41.003	W094°59.43	70	41	0	0	071	3.3	
8	00:04:22	085	3.5	p1.9	N29°40.988	W094°59.58	25	1214	0	0	268	3.4	s164.6	N29°41.003	W094°59.43	70	42	0	0	065	3.4	
9	00:04:18	084	3.5	p0.2	N29°40.987	W094°59.58	25	1214	0	0	265	3.4	s153.3	N29°41.003	W094°59.44	70	46	0	0	056	3.6	
10	00:04:16	084	3.5	p0.2	N29°40.987	W094°59.5	25	1215	0	0	265	3.4	s159.2	N29°41.003	W094°59.44	70	45	0	0	053	3.6	

This is a target 12:09 SEP VHF channel 16 from OS



	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:05:48	086	3.5	p0.1	N29°40.995	W094°59.48	24	1033	0	0	268	3.5	s173.4	N29°41.005	W094°59.34	70	41	0	0	096	3.7	
8	00:05:46	086	3.5	p0.1	N29°40.995	W094°59.4	24	1033	0	0	268	3.5	s177.9	N29°41.005	W094°59.34	70	41	0	0	093	3.6	
9	00:05:44	086	3.5	p0.1	N29°40.995	W094°59.4	24	1033	0	0	267	3.5	s179.6	N29°41.005	W094°59.34	70	41	0	0	089	3.5	

This is a point showing relative distance from ownship



	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:06:48	085	3.4	p0.1	N29°41.000	W094°59.42	24	1038	0	0	262	3.5	s177.0	N29°41.011	W094°59.27	70	40	0	0	095	3.4	
8	00:06:44	085	3.4	p0.1	N29°40.999	W094°59.42	24	1038	0	0	259	3.5	s165.7	N29°41.010	W094°59.28	70	40	0	0	094	3.5	
9	00:06:42	085	3.4	p0.1	N29°40.999	W094°59.43	24	1038	0	0	259	3.5	s172.4	N29°41.010	W094°59.28	70	41	0	0	092	3.5	

This is a point showing relative distance from ownship

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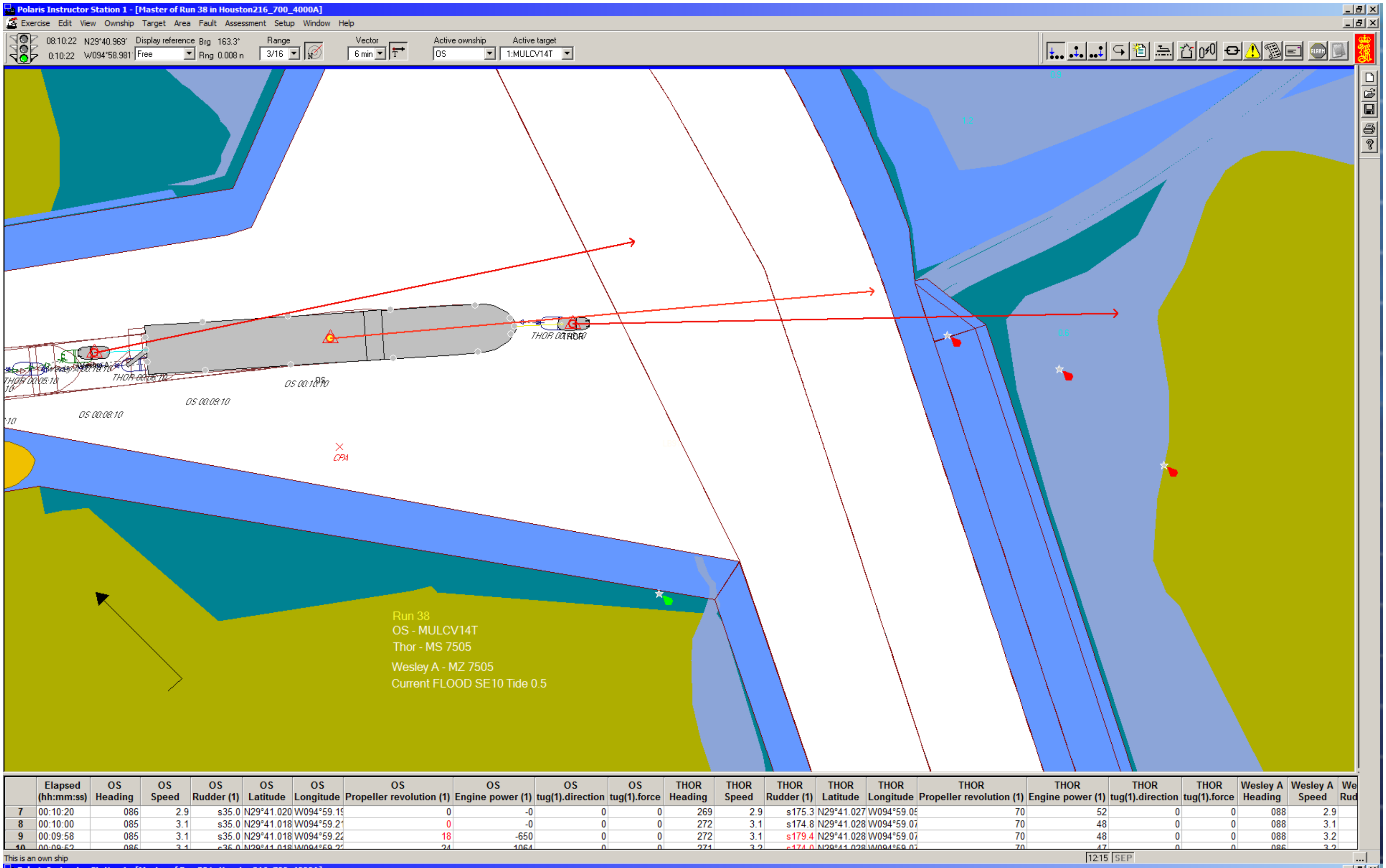


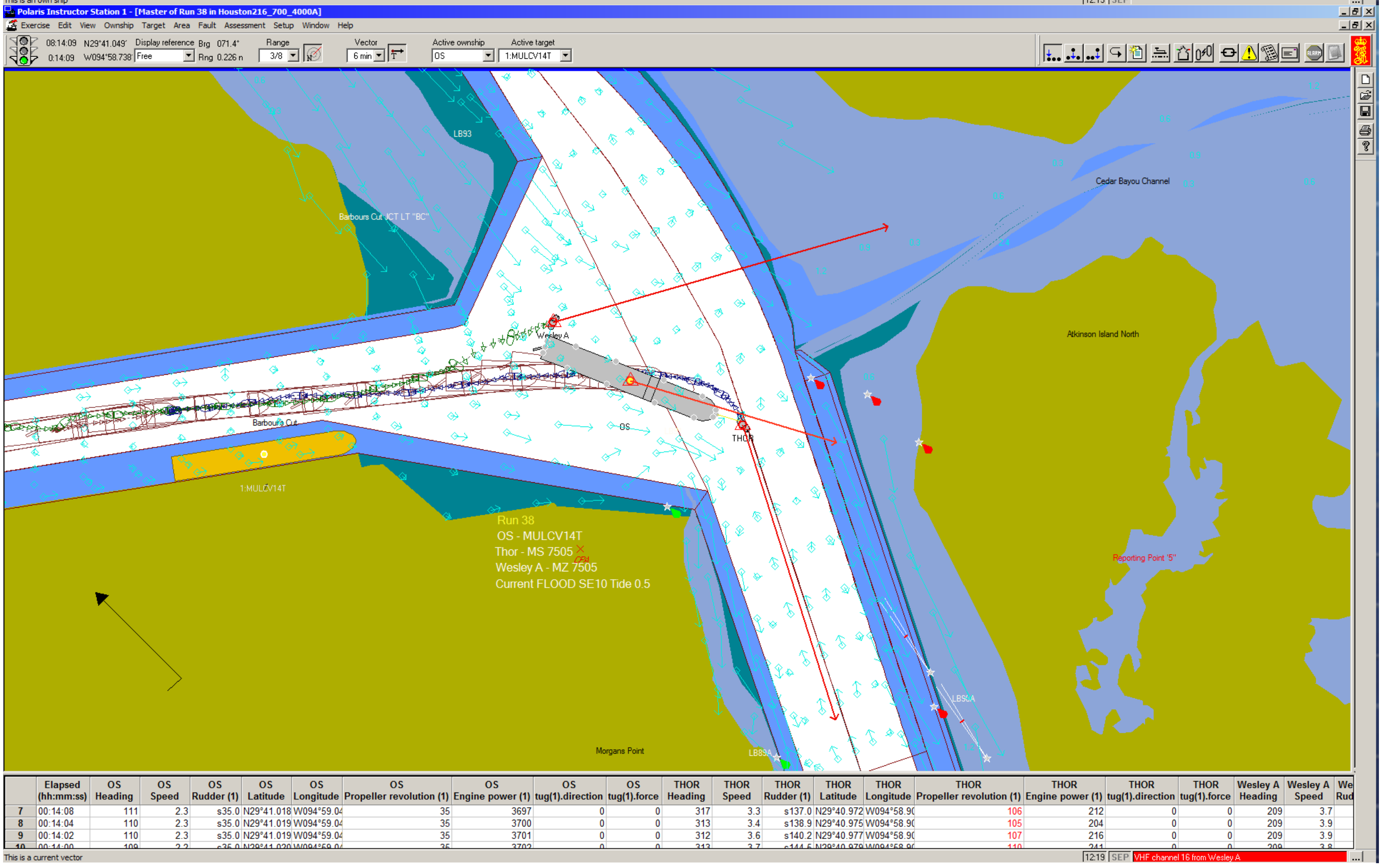
Polaris Instructor Station 1 - [Master of Run 38 in Houston216_700_4000A]

08:10:22 N29°40.969' 0:10:22 W094°58.981'
Display reference: Free
Brg 163.3° Rng 0.008 n
Range: 3/16
Vector: 6 min
Active ownship: OS
Active target: 1:MULCV14T

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:10:20	086	2.9	s35.0	N29°41.020	W094°59.19	0	-0	0	0	269	2.9	s175.3	N29°41.027	W094°59.05	70	52	0	0	088	2.9	
8	00:10:00	085	3.1	s35.0	N29°41.018	W094°59.21	0	-0	0	0	272	3.1	s174.8	N29°41.028	W094°59.07	70	48	0	0	088	3.1	
9	00:09:58	085	3.1	s35.0	N29°41.018	W094°59.22	18	-650	0	0	272	3.1	s179.4	N29°41.028	W094°59.07	70	48	0	0	088	3.2	

This is an own ship

12:15 SEP



Polaris Instructor Station 1 - [Master of Run 38 in Houston216_700_4000A]

08:14:09 N29°41.049' 0:14:09 W094°58.738'
Display reference: Free
Brg 071.4° Rng 0.226 n
Range: 3/8
Vector: 6 min
Active ownship: OS
Active target: 1:MULCV14T

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:14:08	111	2.3	s35.0	N29°41.018	W094°59.04	35	3697	0	0	317	3.3	s137.0	N29°40.972	W094°58.90	106	212	0	0	209	3.7	
8	00:14:04	110	2.3	s35.0	N29°41.019	W094°59.04	35	3700	0	0	313	3.4	s138.9	N29°40.975	W094°58.90	105	204	0	0	209	3.9	
9	00:14:02	110	2.3	s35.0	N29°41.019	W094°59.04	35	3701	0	0	312	3.6	s140.2	N29°40.977	W094°58.90	107	216	0	0	209	3.9	

This is a current vector

12:19 SEP VHF channel 16 from Wesley A

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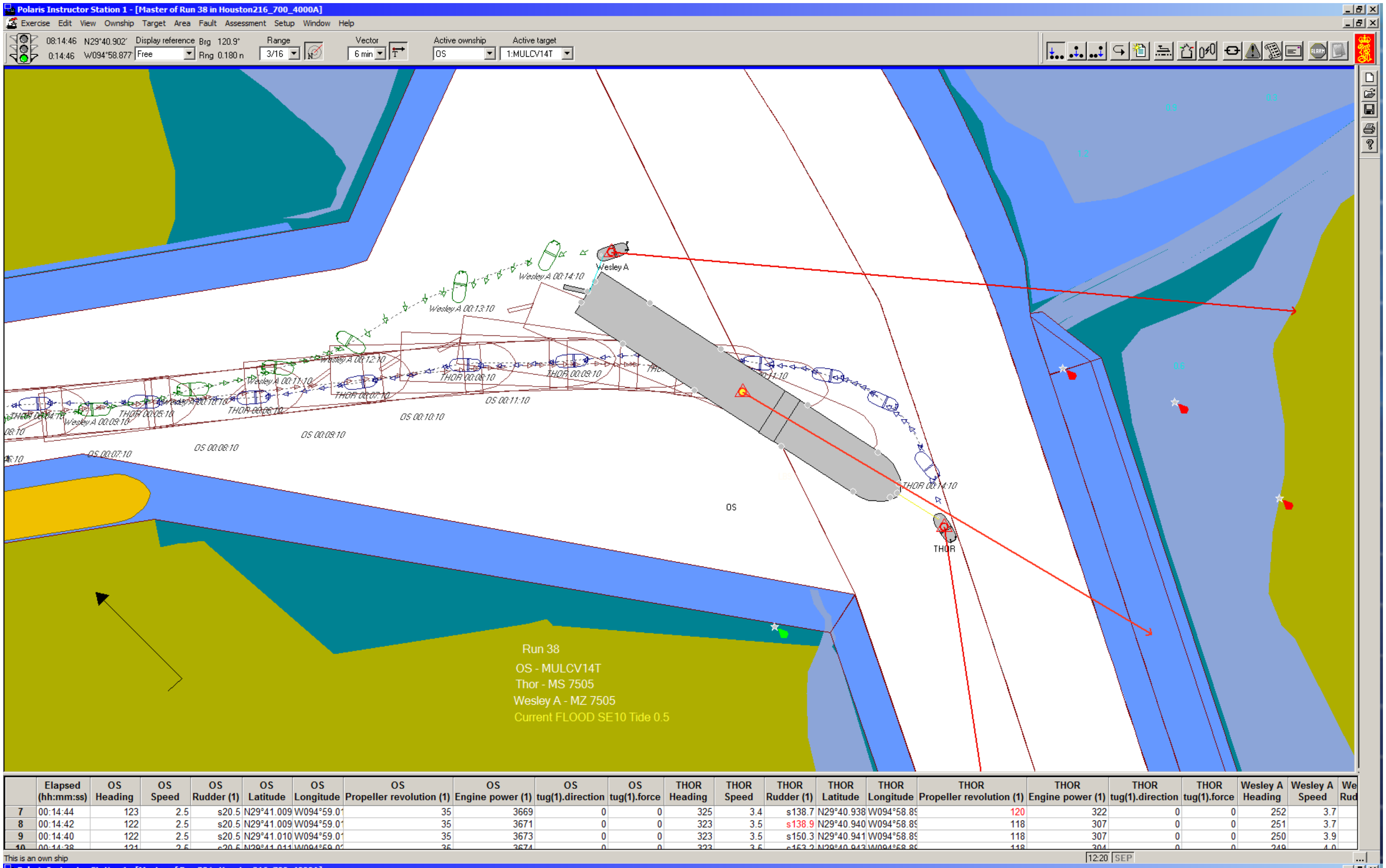
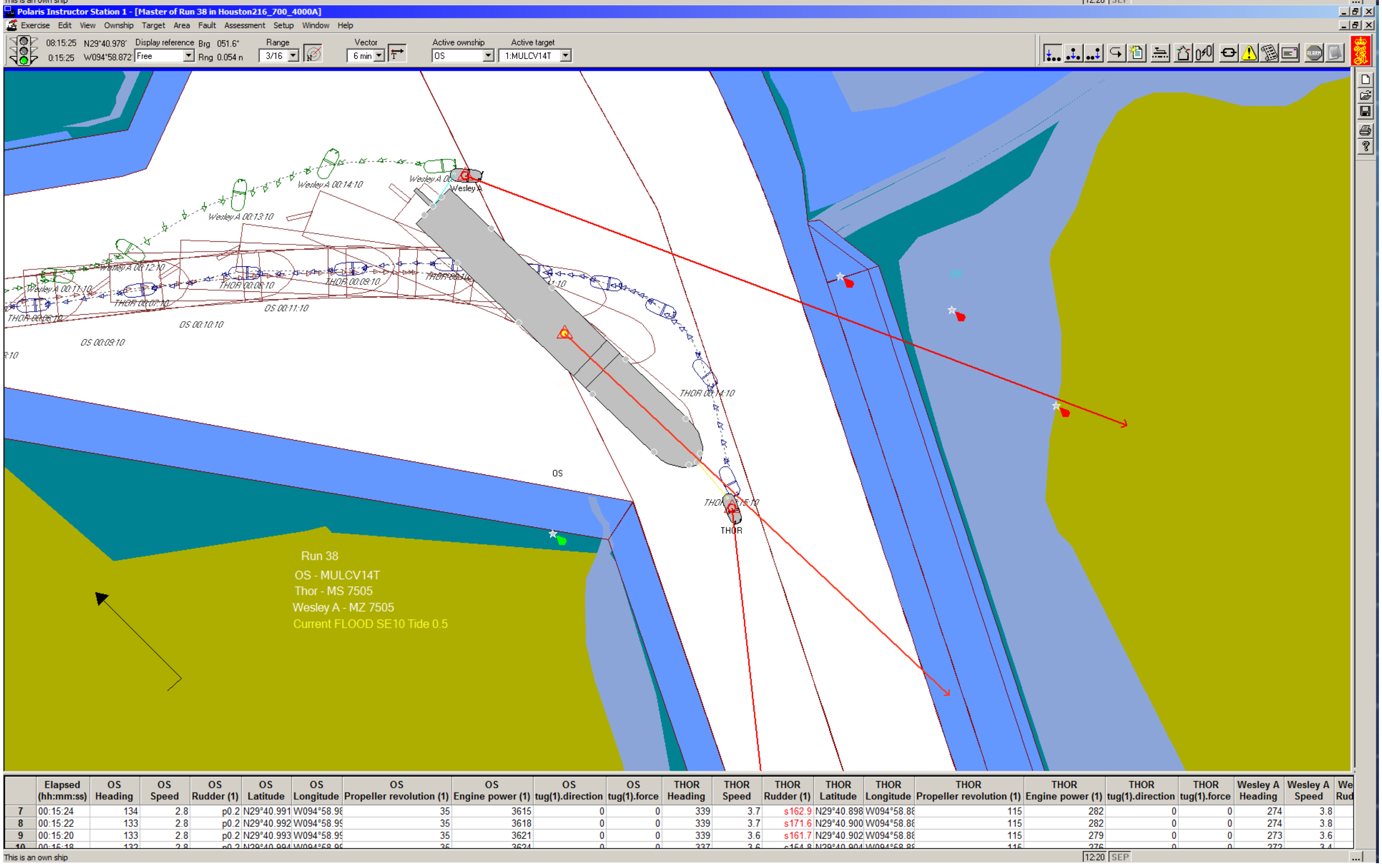


	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:14:44	123	2.5	s20.5	N29°41.009	W094°59.0	35	3669	0	0	325	3.4	s138.7	N29°40.938	W094°58.8	120	322	0	0	252	3.7	
8	00:14:42	122	2.5	s20.5	N29°41.009	W094°59.0	35	3671	0	0	323	3.5	s138.9	N29°40.940	W094°58.8	118	307	0	0	251	3.7	
9	00:14:40	122	2.5	s20.5	N29°41.010	W094°59.0	35	3673	0	0	323	3.5	s150.3	N29°40.941	W094°58.8	118	307	0	0	250	3.9	
10	00:14:38	121	2.5	s20.5	N29°41.011	W094°59.0	35	3674	0	0	323	3.5	s153.2	N29°40.943	W094°58.8	118	304	0	0	249	4.0	



	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:15:24	134	2.8	p0.2	N29°40.991	W094°58.9	35	3615	0	0	339	3.7	s162.9	N29°40.898	W094°58.8	115	282	0	0	274	3.8	
8	00:15:22	133	2.8	p0.2	N29°40.992	W094°58.9	35	3618	0	0	339	3.7	s171.6	N29°40.900	W094°58.8	115	282	0	0	274	3.8	
9	00:15:20	133	2.8	p0.2	N29°40.993	W094°58.9	35	3621	0	0	339	3.6	s161.7	N29°40.902	W094°58.8	115	279	0	0	273	3.6	
10	00:15:18	132	2.8	p0.2	N29°40.994	W094°58.9	35	3624	0	0	337	3.6	s154.8	N29°40.904	W094°58.8	116	276	0	0	272	3.4	

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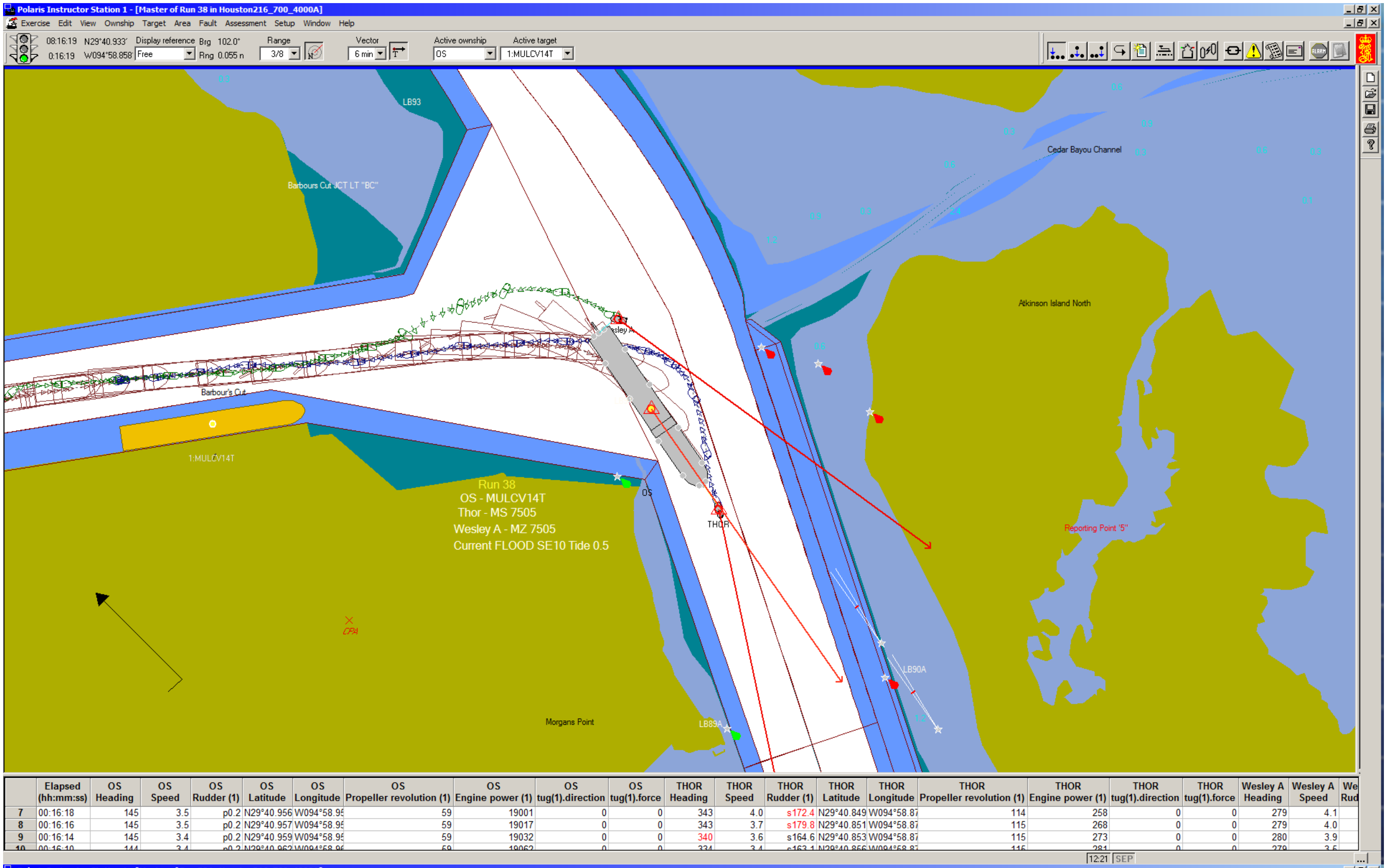
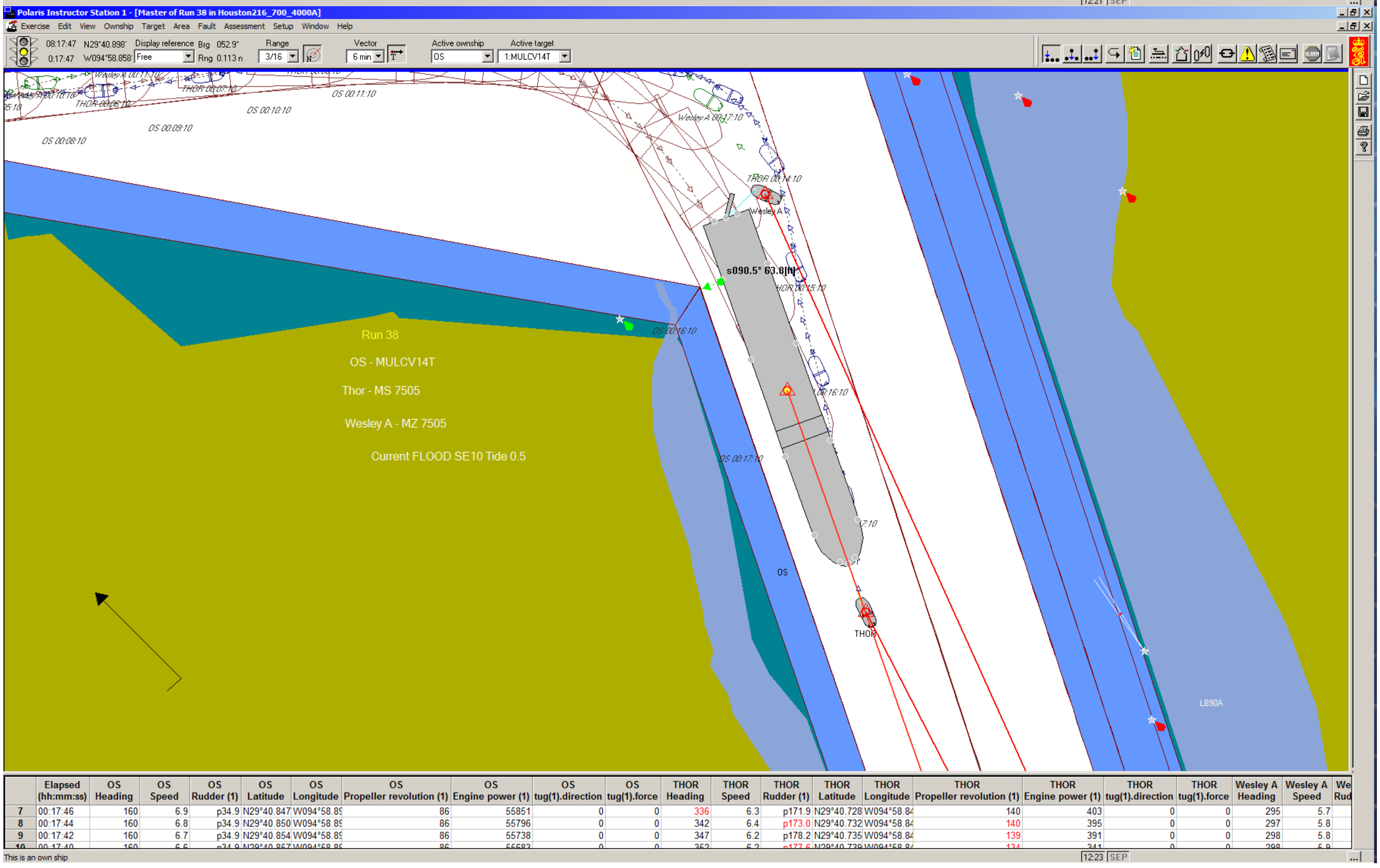


Polaris Instructor Station 1 - [Master of Run 38 in Houston216_700_4000A]

08:16:19 N29°40.933' Display reference Free Brg 102.0° Rng 0.055 n Range 3/8 Vector 6 min Active ownship OS Active target 1:MULCV14T
0:16:19 W094°58.858'

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed
7	00:16:18	145	3.5	p0.2	N29°40.956	W094°58.95	59	19001	0	0	343	4.0	s172.4	N29°40.849	W094°58.87	114	258	0	0	279	4.1
8	00:16:16	145	3.5	p0.2	N29°40.957	W094°58.95	59	19017	0	0	343	3.7	s179.8	N29°40.851	W094°58.87	115	268	0	0	279	4.0
9	00:16:14	145	3.4	p0.2	N29°40.959	W094°58.95	59	19032	0	0	340	3.6	s164.6	N29°40.853	W094°58.87	115	273	0	0	280	3.9



Polaris Instructor Station 1 - [Master of Run 38 in Houston216_700_4000A]

08:17:47 N29°40.898' Display reference Free Brg 052.9° Rng 0.113 n Range 3/16 Vector 6 min Active ownship OS Active target 1:MULCV14T
0:17:47 W094°58.858'

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed
7	00:17:46	160	6.9	p34.9	N29°40.847	W094°58.89	86	55851	0	0	336	6.3	p171.9	N29°40.728	W094°58.84	140	403	0	0	295	5.7
8	00:17:44	160	6.8	p34.9	N29°40.850	W094°58.89	86	55796	0	0	342	6.4	p173.0	N29°40.732	W094°58.84	140	395	0	0	297	5.8
9	00:17:42	160	6.7	p34.9	N29°40.854	W094°58.89	86	55738	0	0	347	6.2	p178.2	N29°40.735	W094°58.84	139	391	0	0	298	5.8

This is an own ship

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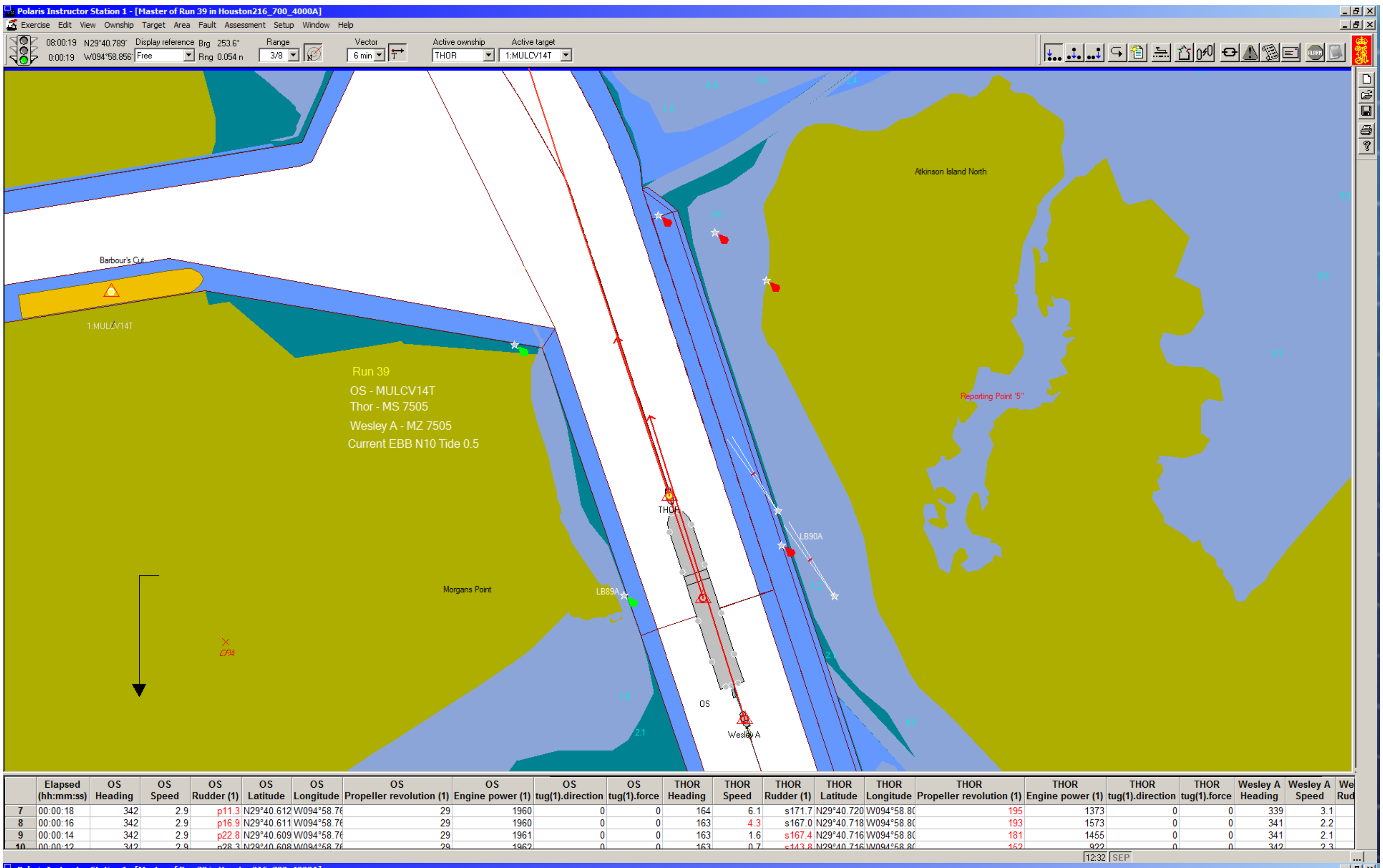
Run 39

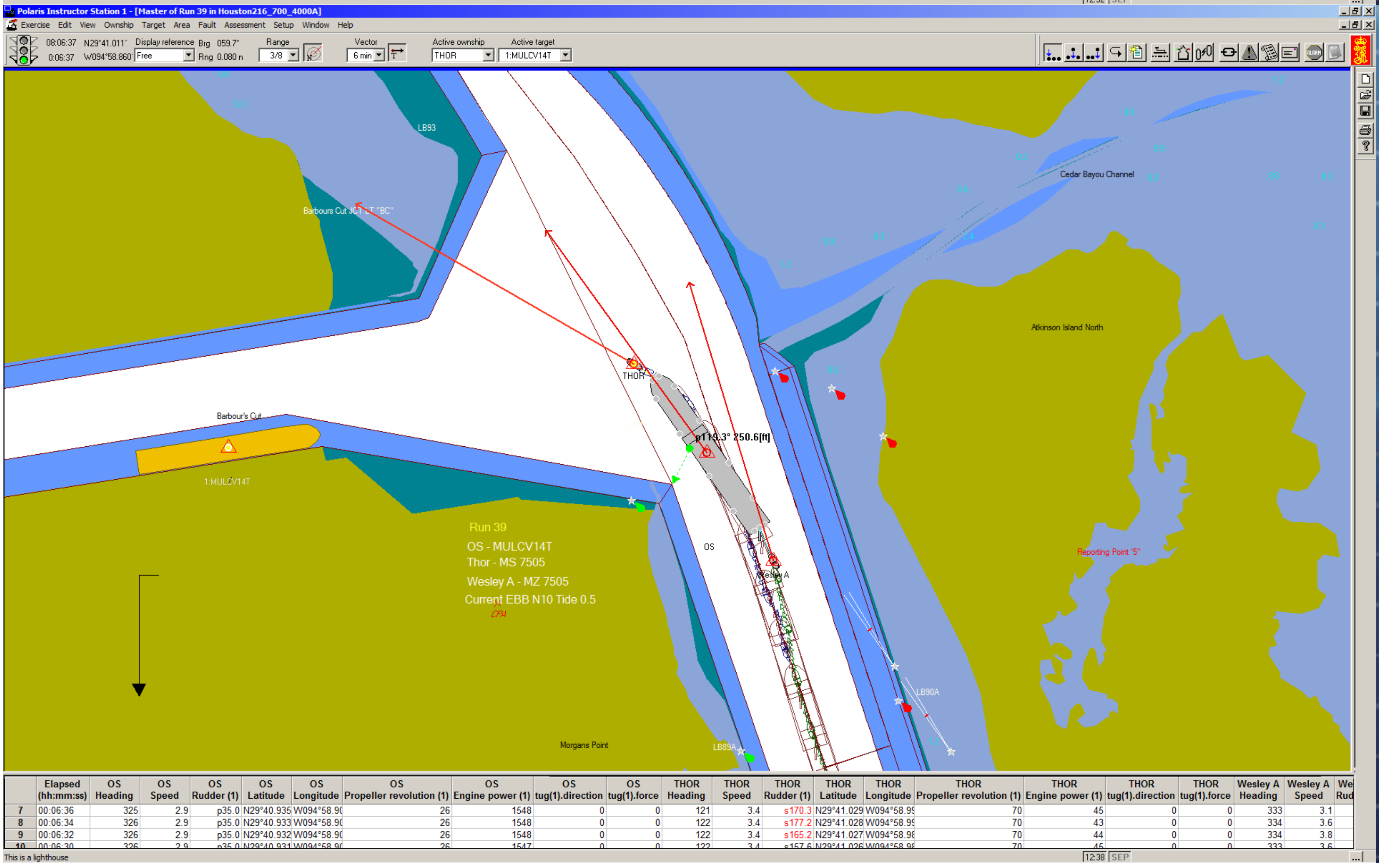

Polaris Instructor Station 1 - [Master of Run 39 in Houston216_700_4000A]

08:00:19 N29°40.789′ Display reference: Free Brg 253.6° Rng 0.054 n Range 3/8 Vector 6 min Active ownship THOR Active target 1:MULCV14T
0:00:19 W094°58.856′

Run 39
OS - MULCV14T
Thor - MS 7505
Wesley A - MZ 7505
Current EBB N10 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:00:18	342	2.9	p11.3	N29°40.612	W094°58.76	29	1960	0	0	164	6.1	s171.7	N29°40.720	W094°58.80	195	1373	0	0	339	3.1	
8	00:00:16	342	2.9	p16.9	N29°40.611	W094°58.76	29	1960	0	0	163	4.3	s167.0	N29°40.718	W094°58.80	193	1573	0	0	341	2.2	
9	00:00:14	342	2.9	p22.8	N29°40.609	W094°58.76	29	1961	0	0	163	1.6	s167.4	N29°40.716	W094°58.80	181	1455	0	0	341	2.1	
10	00:00:12	342	2.9	p28.3	N29°40.608	W094°58.76	29	1962	0	0	163	0.7	s143.8	N29°40.716	W094°58.80	152	922	0	0	342	2.3	

12:32 SEP


Polaris Instructor Station 1 - [Master of Run 39 in Houston216_700_4000A]

08:06:37 N29°41.011′ Display reference: Free Brg 059.7° Rng 0.080 n Range 3/8 Vector 6 min Active ownship THOR Active target 1:MULCV14T
0:06:37 W094°58.860′

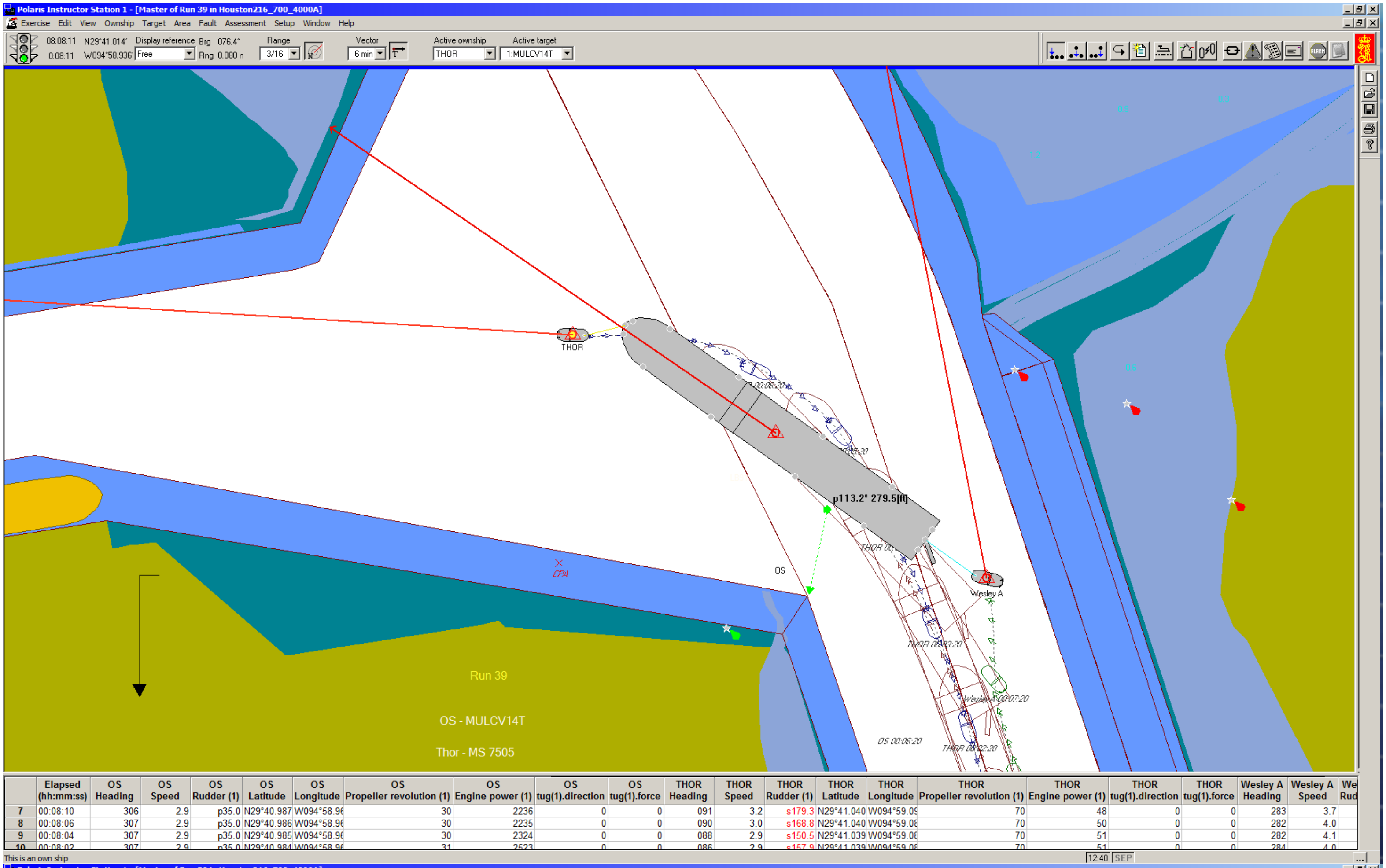
Run 39
OS - MULCV14T
Thor - MS 7505
Wesley A - MZ 7505
Current EBB N10 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:06:36	325	2.9	p35.0	N29°40.935	W094°58.90	26	1548	0	0	121	3.4	s170.3	N29°41.029	W094°58.99	70	45	0	0	333	3.1	
8	00:06:34	326	2.9	p35.0	N29°40.933	W094°58.90	26	1548	0	0	122	3.4	s177.2	N29°41.028	W094°58.99	70	43	0	0	334	3.6	
9	00:06:32	326	2.9	p35.0	N29°40.932	W094°58.90	26	1548	0	0	122	3.4	s165.2	N29°41.027	W094°58.98	70	44	0	0	334	3.8	
10	00:06:30	326	2.9	p35.0	N29°40.931	W094°58.90	26	1547	0	0	122	3.4	s157.6	N29°41.026	W094°58.98	70	45	0	0	333	3.6	

This is a lighthouse

12:38 SEP

June 26, 2019



Polaris Instructor Station 1 - [Master of Run 39 in Houston216_700_4000A]

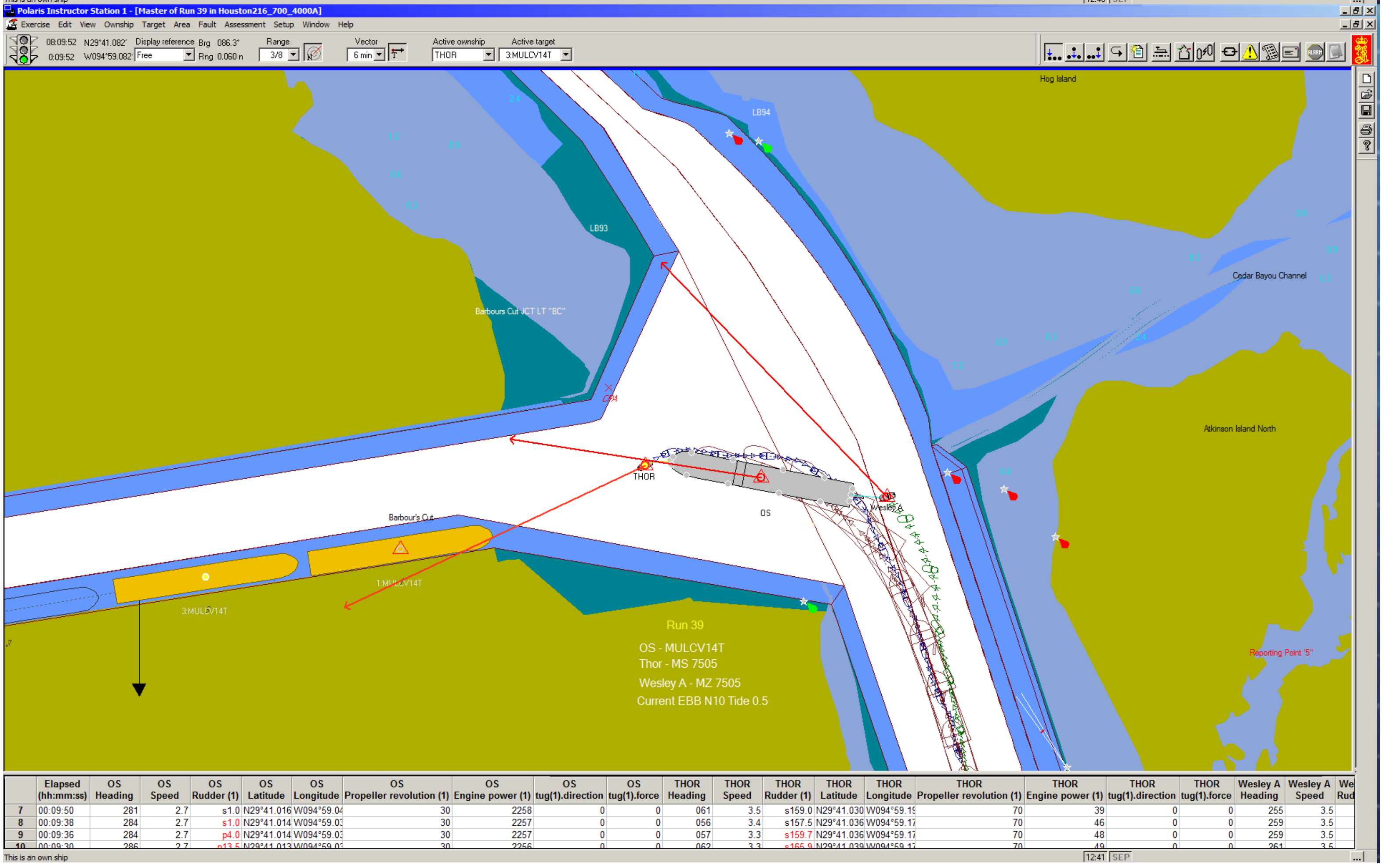
08:08:11 N29°41.014' Display reference Brg 076.4°
0:08:11 W094°58.936' Free Rng 0.080 n

Range 3/16
Vector 6 min
Active ownship THOR
Active target 1:MULCV14T

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:08:10	306	2.9	p35.0	N29°40.987	W094°58.96	30	2236	0	0	091	3.2	s179.3	N29°41.040	W094°59.09	70	48	0	0	283	3.7	
8	00:08:06	307	2.9	p35.0	N29°40.986	W094°58.96	30	2235	0	0	090	3.0	s168.8	N29°41.040	W094°59.08	70	50	0	0	282	4.0	
9	00:08:04	307	2.9	p35.0	N29°40.985	W094°58.96	30	2324	0	0	088	2.9	s150.5	N29°41.039	W094°59.08	70	51	0	0	282	4.1	
10	00:08:02	307	2.9	p35.0	N29°40.984	W094°58.96	31	2523	0	0	086	2.9	s157.9	N29°41.039	W094°59.08	70	51	0	0	284	4.0	

This is an own ship

12:40 SEP



Polaris Instructor Station 1 - [Master of Run 39 in Houston216_700_4000A]

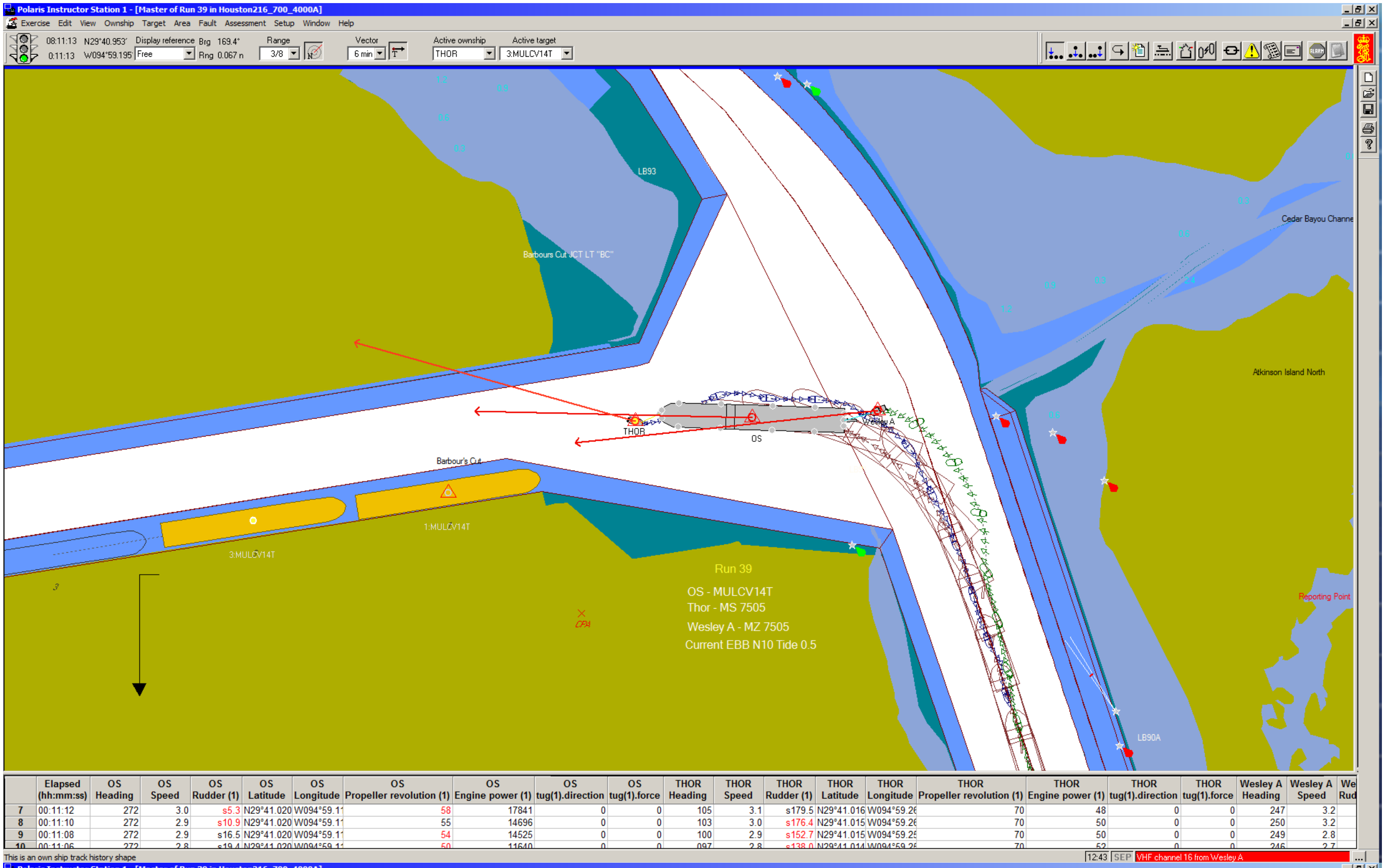
08:09:52 N29°41.082' Display reference Brg 086.3°
0:09:52 W094°59.082' Free Rng 0.060 n

Range 3/8
Vector 6 min
Active ownship THOR
Active target 3:MULCV14T

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:09:50	281	2.7	s1.0	N29°41.016	W094°59.04	30	2258	0	0	061	3.5	s159.0	N29°41.030	W094°59.19	70	39	0	0	255	3.5	
8	00:09:38	284	2.7	s1.0	N29°41.014	W094°59.03	30	2257	0	0	056	3.4	s157.5	N29°41.036	W094°59.17	70	46	0	0	259	3.5	
9	00:09:36	284	2.7	p4.0	N29°41.014	W094°59.03	30	2257	0	0	057	3.3	s159.7	N29°41.036	W094°59.17	70	48	0	0	259	3.5	
10	00:09:30	286	2.7	p13.5	N29°41.013	W094°59.03	30	2256	0	0	062	3.3	s165.9	N29°41.039	W094°59.17	70	49	0	0	261	3.5	

This is an own ship

12:41 SEP



Polaris Instructor Station 1 - [Master of Run 39 in Houston216_700_4000A]

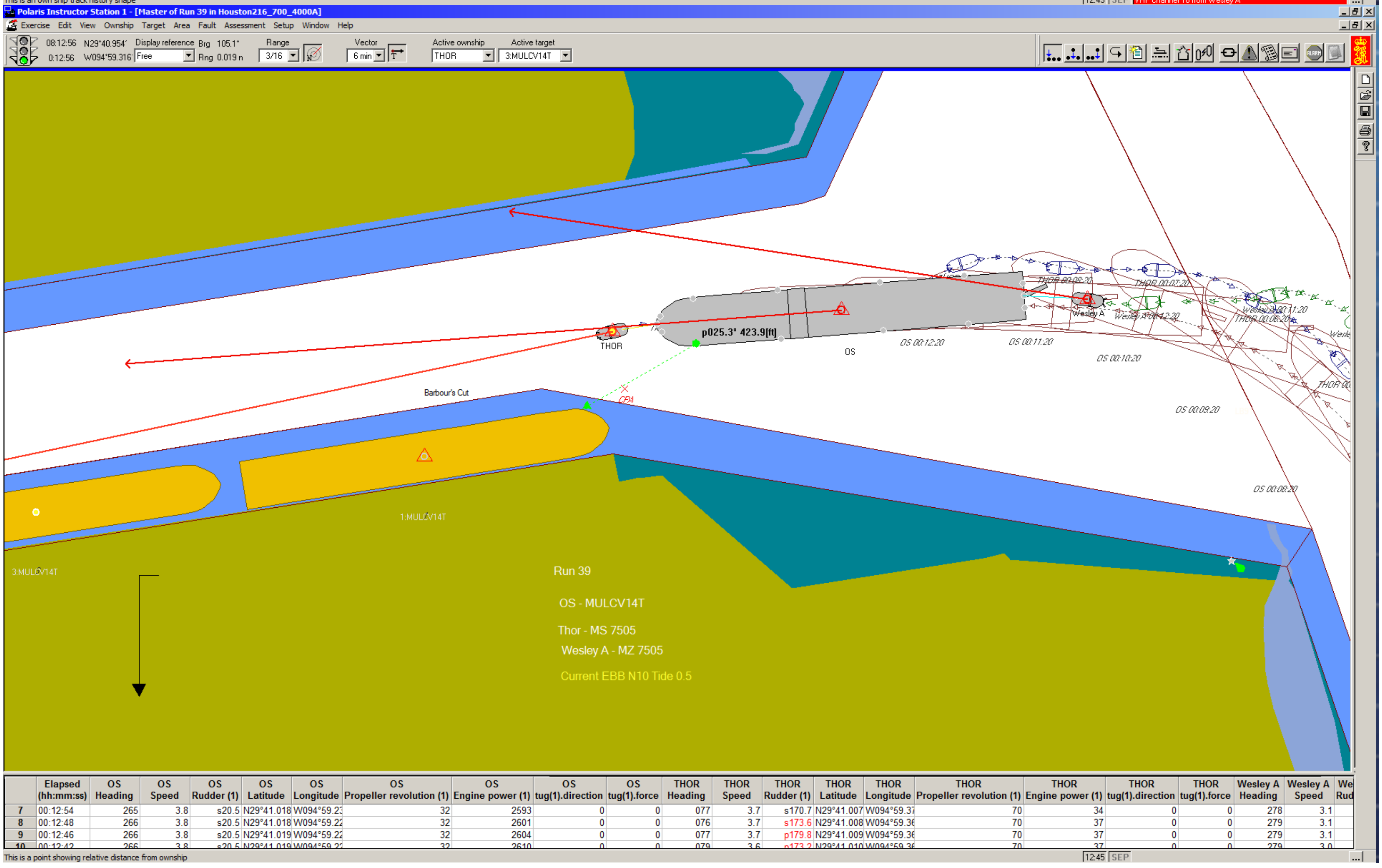
08:11:13 N29°40.953' Display reference Brg 169.4°
0:11:13 W094°59.195 Free Rng 0.067 n

Range 3/8 Vector 6 min Active ownship THOR Active target 3:MULCV14T

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:11:12	272	3.0	s5.3	N29°41.020	W094°59.1	58	17841	0	0	105	3.1	s179.5	N29°41.016	W094°59.26	70	48	0	0	247	3.2	
8	00:11:10	272	2.9	s10.9	N29°41.020	W094°59.1	55	14696	0	0	103	3.0	s176.4	N29°41.015	W094°59.26	70	50	0	0	250	3.2	
9	00:11:08	272	2.9	s16.5	N29°41.020	W094°59.1	54	14525	0	0	100	2.9	s152.7	N29°41.015	W094°59.25	70	50	0	0	249	2.8	
10	00:11:06	272	2.8	s19.4	N29°41.020	W094°59.1	50	11640	0	0	097	2.8	s138.0	N29°41.014	W094°59.2	70	52	0	0	246	2.7	

This is an own ship track history shape

12:43 SEP VHF channel 16 from Wesley A



Polaris Instructor Station 1 - [Master of Run 39 in Houston216_700_4000A]

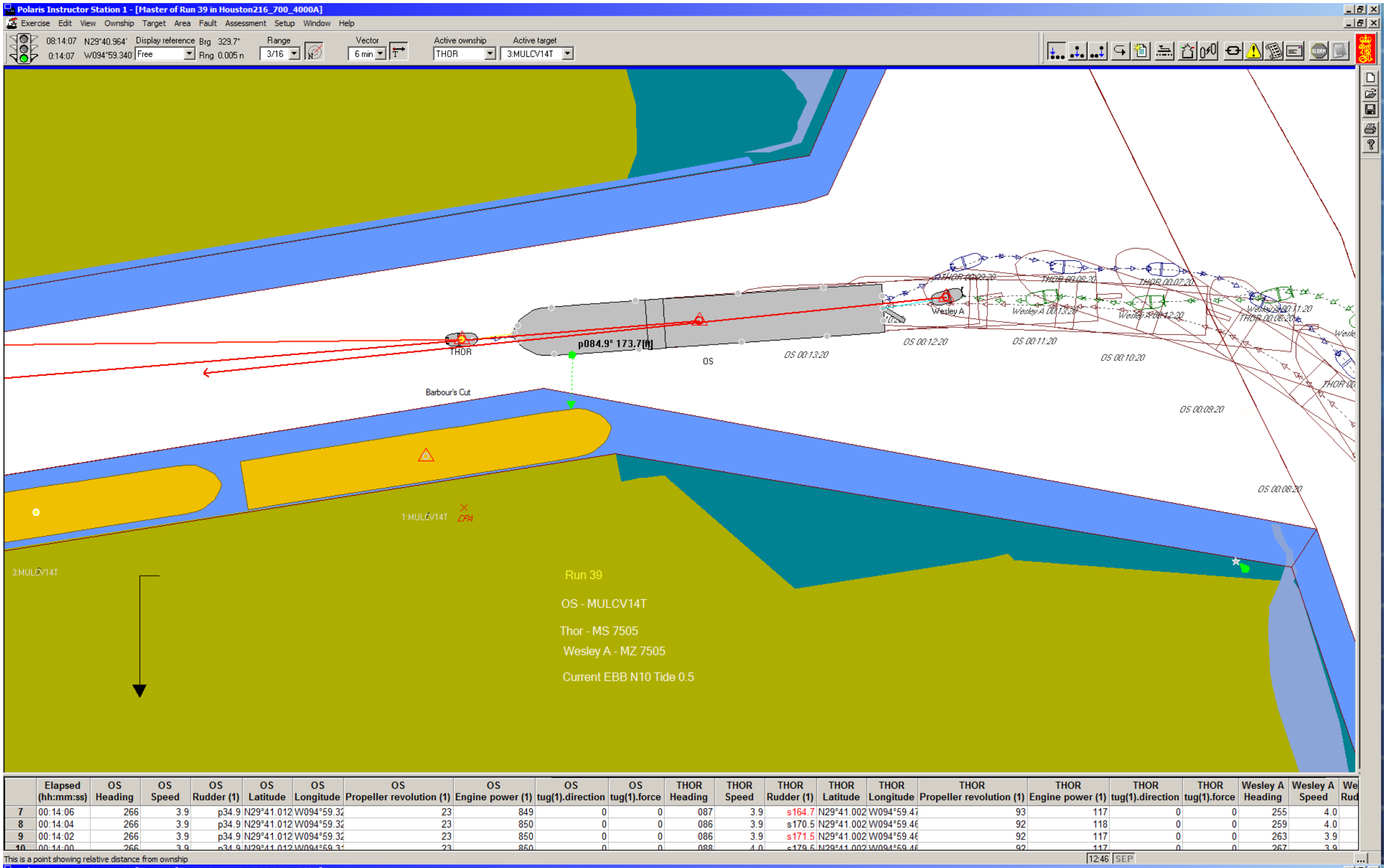
08:12:56 N29°40.954' Display reference Brg 105.1°
0:12:56 W094°59.316 Free Rng 0.019 n

Range 3/16 Vector 6 min Active ownship THOR Active target 3:MULCV14T

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:12:54	265	3.8	s20.5	N29°41.018	W094°59.23	32	2593	0	0	077	3.7	s170.7	N29°41.007	W094°59.37	70	34	0	0	278	3.1	
8	00:12:48	266	3.8	s20.5	N29°41.018	W094°59.22	32	2601	0	0	076	3.7	s173.6	N29°41.008	W094°59.36	70	37	0	0	279	3.1	
9	00:12:46	266	3.8	s20.5	N29°41.019	W094°59.22	32	2604	0	0	077	3.7	p179.8	N29°41.009	W094°59.36	70	37	0	0	279	3.1	
10	00:12:42	266	3.8	s20.5	N29°41.019	W094°59.22	32	2610	0	0	079	3.6	p173.2	N29°41.010	W094°59.36	70	37	0	0	279	3.0	

This is a point showing relative distance from ownship

12:45 SEP



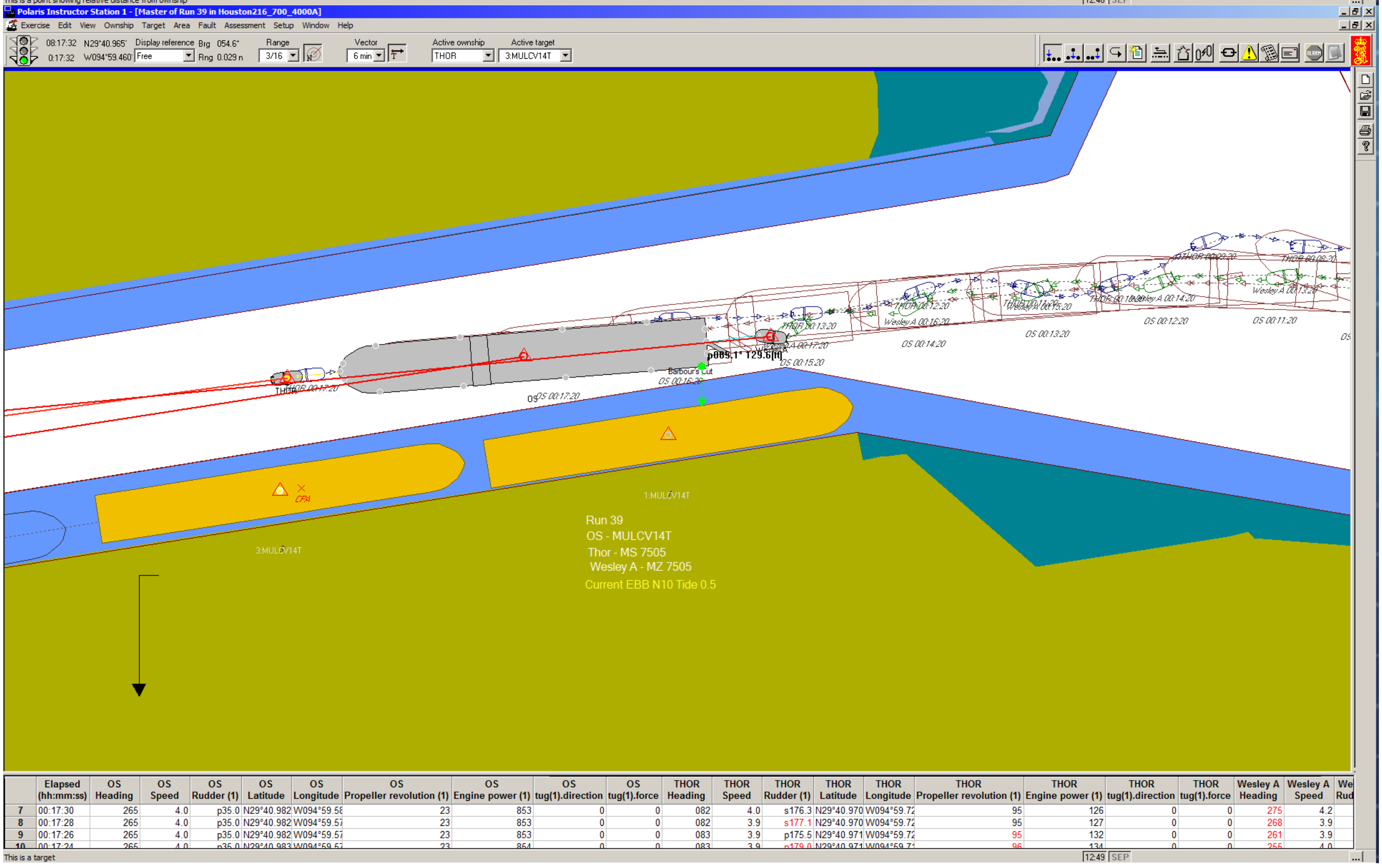
Polaris Instructor Station 1 - [Master of Run 39 in Houston216_700_4000A]

08:14:07 N29°40.964′ Display reference Free Brg 329.7° Rng 0.005 n Range 3/16 Vector 6 min Active ownship THOR Active target 3:MULCV14T

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:14:06	266	3.9	p34.9	N29°41.012	W094°59.32	23	849	0	0	087	3.9	s164.7	N29°41.002	W094°59.47	93	117	0	0	255	4.0	
8	00:14:04	266	3.9	p34.9	N29°41.012	W094°59.32	23	850	0	0	086	3.9	s170.5	N29°41.002	W094°59.46	92	118	0	0	259	4.0	
9	00:14:02	266	3.9	p34.9	N29°41.012	W094°59.32	23	850	0	0	086	3.9	s171.5	N29°41.002	W094°59.46	92	117	0	0	263	3.9	
10	00:14:00	266	3.9	p34.9	N29°41.012	W094°59.31	23	850	0	0	088	4.0	s179.5	N29°41.002	W094°59.46	92	117	0	0	267	3.9	

This is a point showing relative distance from ownship

12:46 SEP



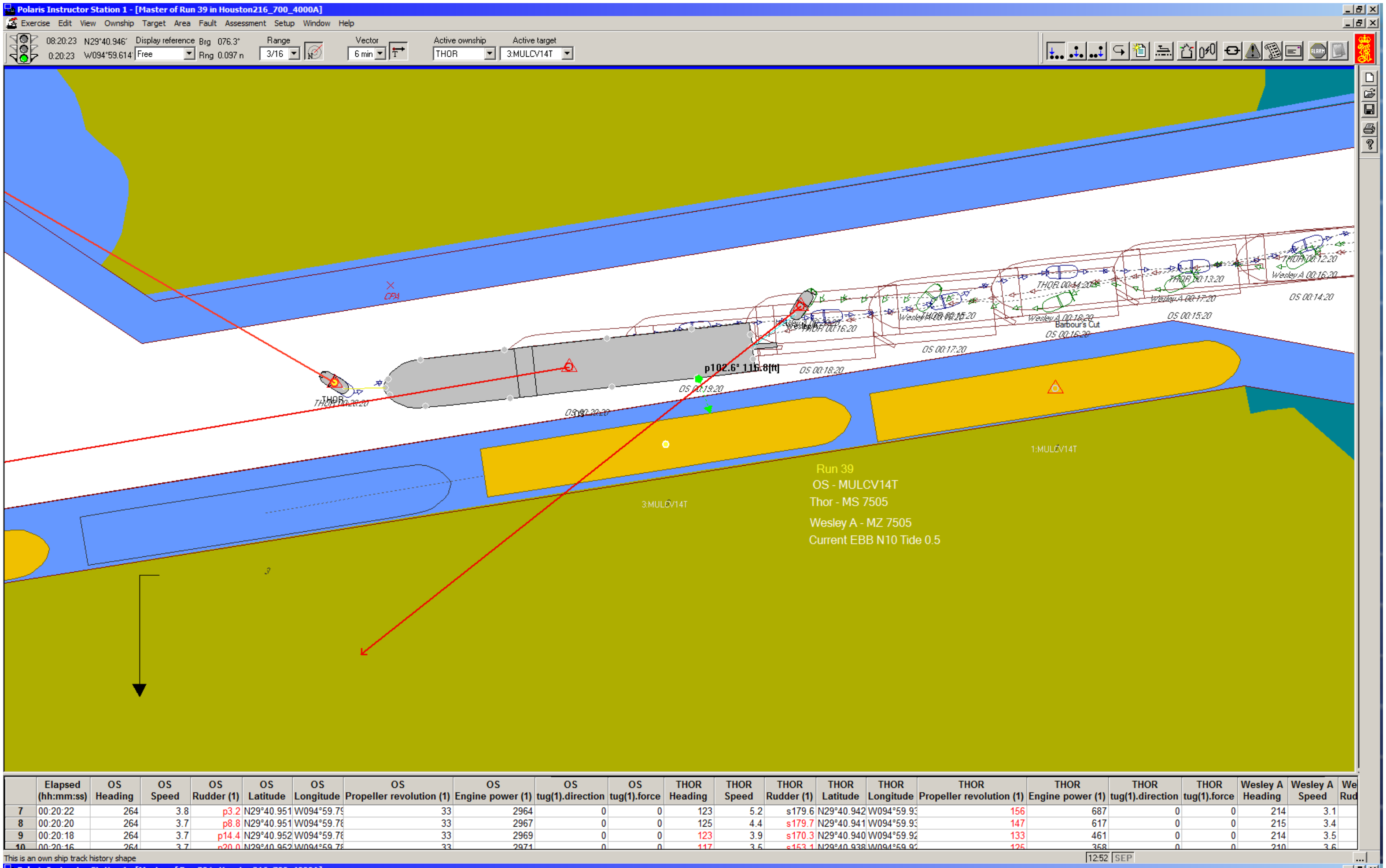
Polaris Instructor Station 1 - [Master of Run 39 in Houston216_700_4000A]

08:17:32 N29°40.965′ Display reference Free Brg 054.6° Rng 0.029 n Range 3/16 Vector 6 min Active ownship THOR Active target 3:MULCV14T

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:17:30	265	4.0	p35.0	N29°40.982	W094°59.58	23	853	0	0	082	4.0	s176.3	N29°40.970	W094°59.72	95	126	0	0	275	4.2	
8	00:17:28	265	4.0	p35.0	N29°40.982	W094°59.57	23	853	0	0	082	3.9	s177.1	N29°40.970	W094°59.72	95	127	0	0	268	3.9	
9	00:17:26	265	4.0	p35.0	N29°40.982	W094°59.57	23	853	0	0	083	3.9	p175.5	N29°40.971	W094°59.72	95	132	0	0	261	3.9	
10	00:17:24	265	4.0	p35.0	N29°40.983	W094°59.57	23	854	0	0	083	3.9	p179.0	N29°40.971	W094°59.71	96	134	0	0	255	4.0	

This is a target

12:49 SEP



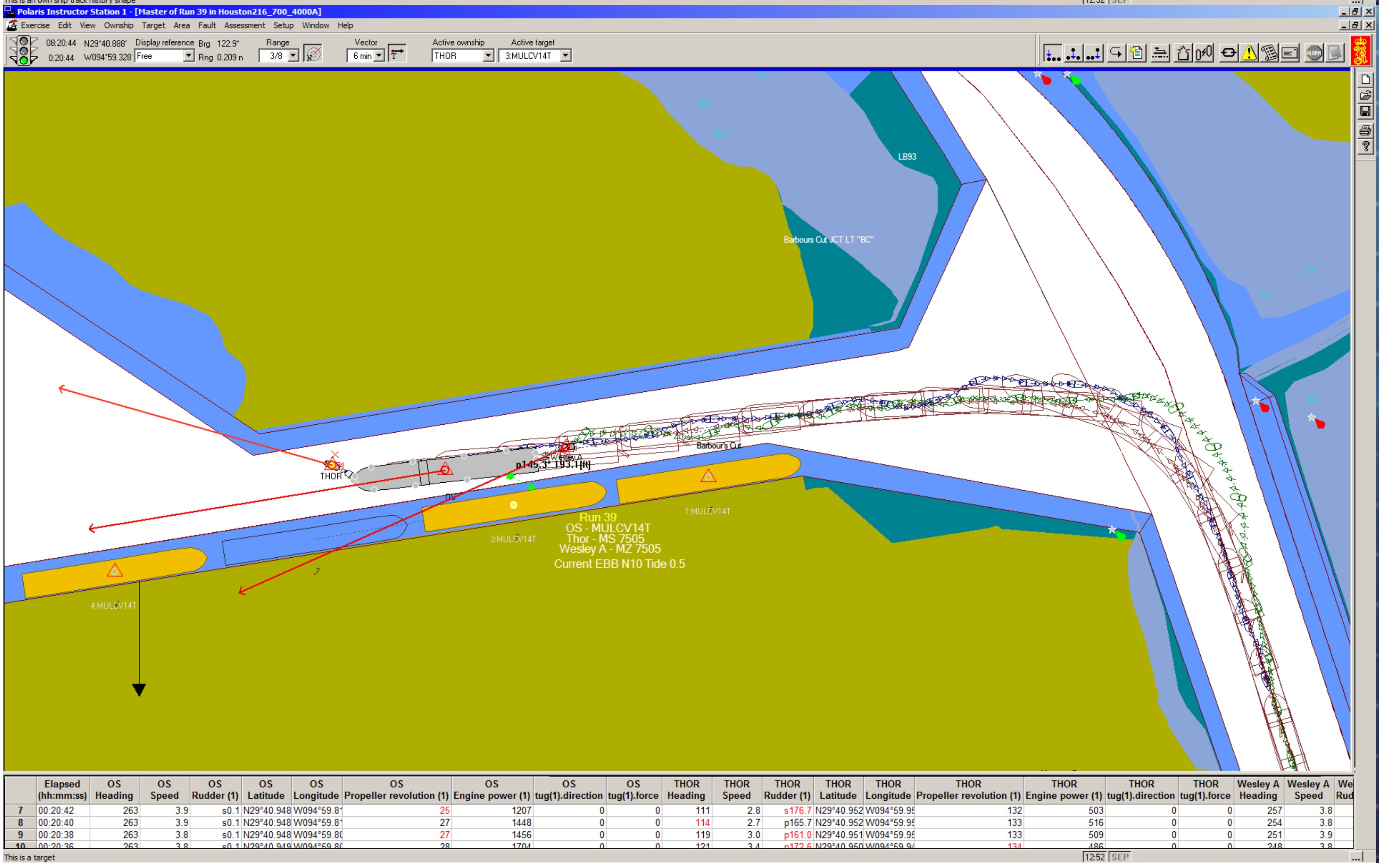
Polaris Instructor Station 1 - [Master of Run 39 in Houston216_700_4000A]

08:20:23 N29°40.946' W094°59.614'
0:20:23
Display reference: Free
Brg 076.3°
Rng 0.097 n
Range: 3/16
Vector: 6 min
Active ownship: THOR
Active target: 3:MULCV14T

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed
7	00:20:22	264	3.8	p3.2	N29°40.951	W094°59.79	33	2964	0	0	123	5.2	s179.6	N29°40.942	W094°59.93	156	687	0	0	214	3.1
8	00:20:20	264	3.7	p8.8	N29°40.951	W094°59.78	33	2967	0	0	125	4.4	s179.7	N29°40.941	W094°59.93	147	617	0	0	215	3.4
9	00:20:18	264	3.7	p14.4	N29°40.952	W094°59.78	33	2969	0	0	123	3.9	s170.3	N29°40.940	W094°59.92	133	461	0	0	214	3.5

This is an own ship track history shape

12:52 SEP



Polaris Instructor Station 1 - [Master of Run 39 in Houston216_700_4000A]

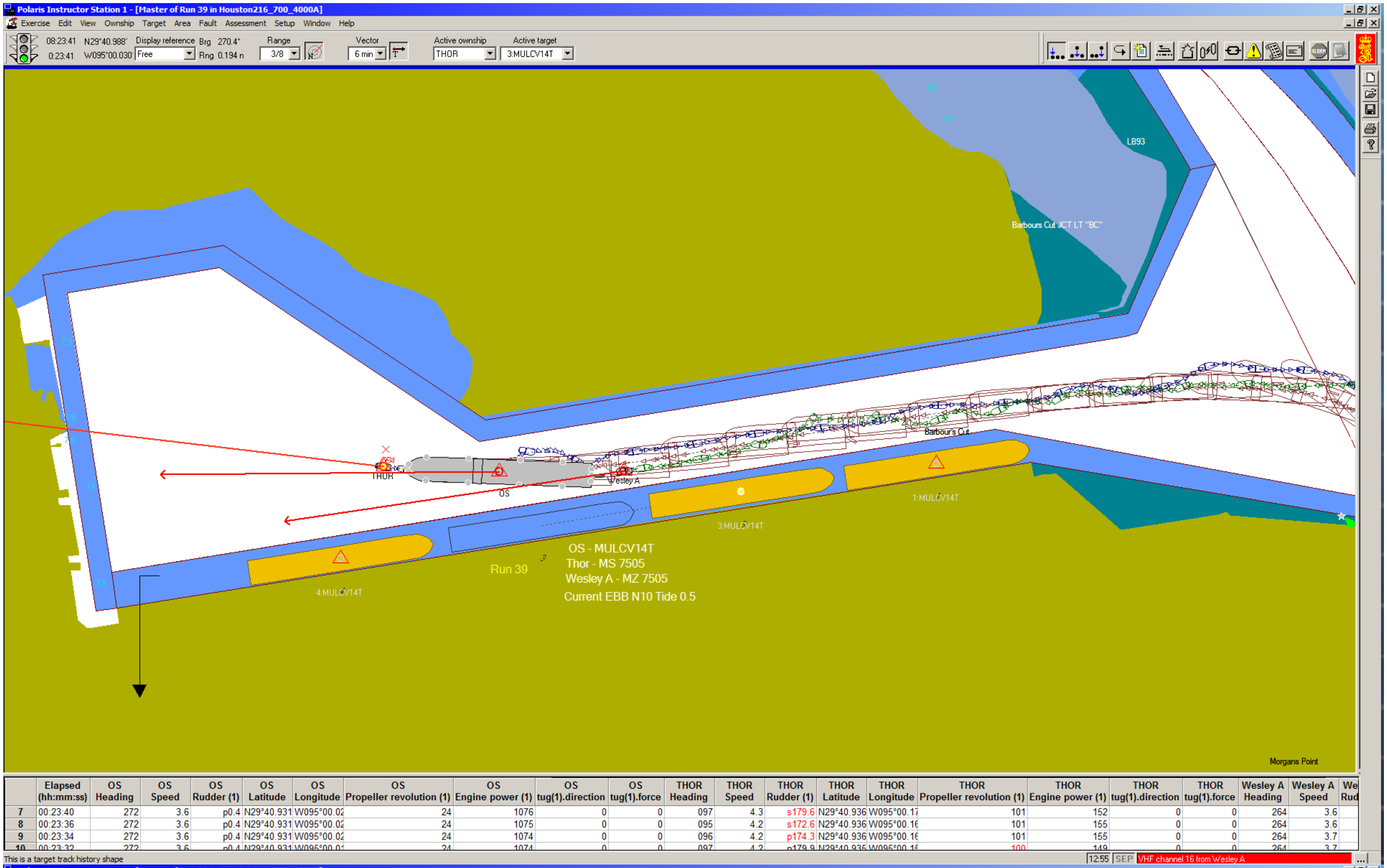
08:20:44 N29°40.888' W094°59.328'
0:20:44
Display reference: Free
Brg 122.9°
Rng 0.209 n
Range: 3/8
Vector: 6 min
Active ownship: THOR
Active target: 3:MULCV14T

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed
7	00:20:42	263	3.9	s0.1	N29°40.948	W094°59.81	25	1207	0	0	111	2.8	s176.7	N29°40.952	W094°59.95	132	503	0	0	257	3.8
8	00:20:40	263	3.9	s0.1	N29°40.948	W094°59.81	27	1448	0	0	114	2.7	p165.7	N29°40.952	W094°59.95	133	516	0	0	254	3.8
9	00:20:38	263	3.8	s0.1	N29°40.948	W094°59.80	27	1456	0	0	119	3.0	p161.0	N29°40.951	W094°59.95	133	509	0	0	251	3.9

This is a target

12:52 SEP

June 26, 2019

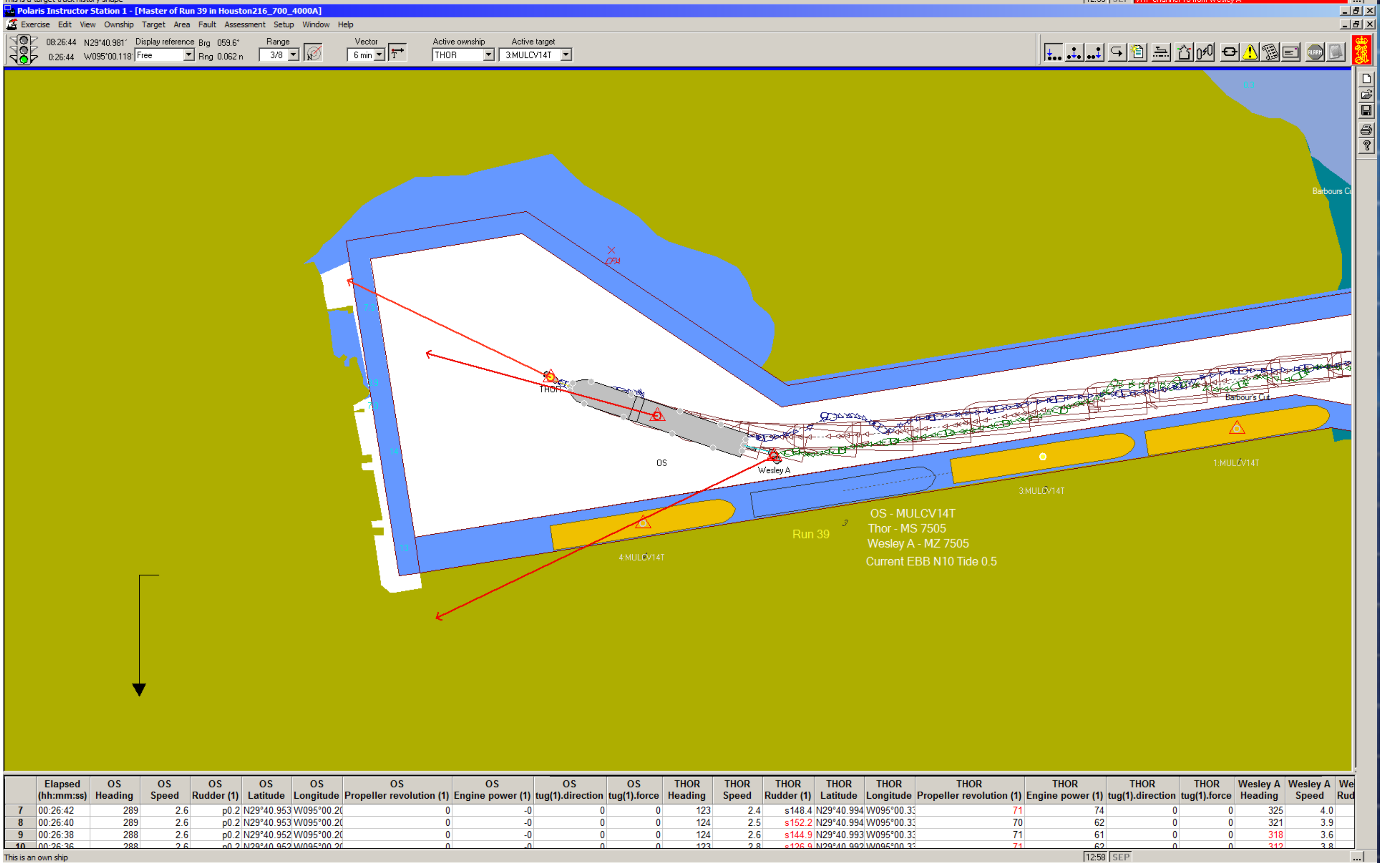


OS - MULCV14T
Thor - MS 7505
Wesley A - MZ 7505
Current EBB N10 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:23:40	272	3.6	p0.4	N29°40.931	W095°00.02	24	1076	0	0	097	4.3	s179.6	N29°40.936	W095°00.17	101	152	0	0	264	3.6	
8	00:23:36	272	3.6	p0.4	N29°40.931	W095°00.02	24	1075	0	0	095	4.2	s172.6	N29°40.936	W095°00.16	101	155	0	0	264	3.6	
9	00:23:34	272	3.6	p0.4	N29°40.931	W095°00.02	24	1074	0	0	096	4.2	p174.3	N29°40.936	W095°00.16	101	155	0	0	264	3.7	
10	00:23:32	272	3.6	p0.4	N29°40.931	W095°00.01	24	1074	0	0	097	4.2	p179.9	N29°40.935	W095°00.16	100	149	0	0	264	3.7	

This is a target track history shape

12:55 SEP VHF channel 16 from Wesley A



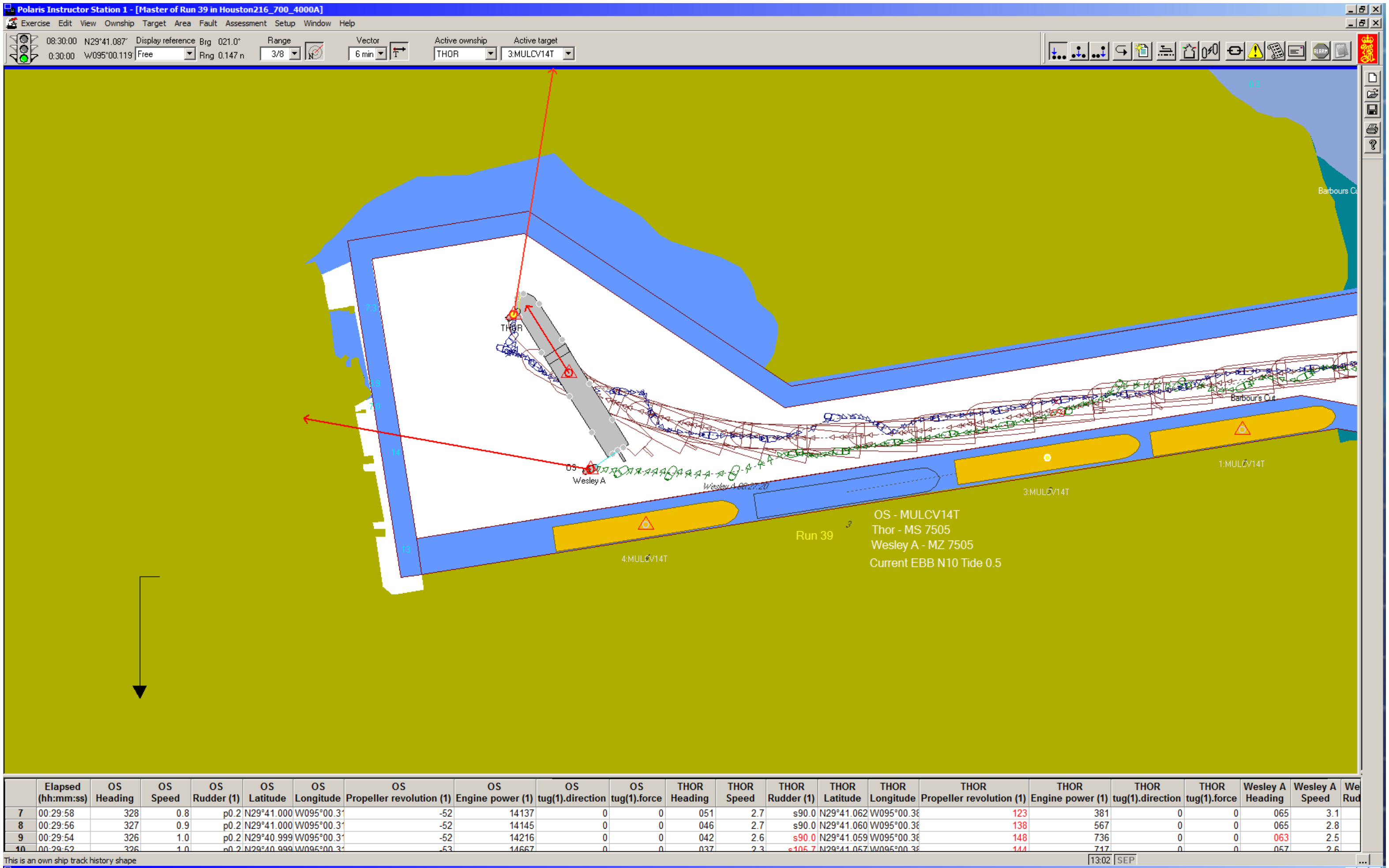
OS - MULCV14T
Thor - MS 7505
Wesley A - MZ 7505
Current EBB N10 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:26:42	289	2.6	p0.2	N29°40.953	W095°00.20	0	-0	0	0	123	2.4	s148.4	N29°40.994	W095°00.33	71	74	0	0	325	4.0	
8	00:26:40	289	2.6	p0.2	N29°40.953	W095°00.20	0	-0	0	0	124	2.5	s152.2	N29°40.994	W095°00.33	70	62	0	0	321	3.9	
9	00:26:38	288	2.6	p0.2	N29°40.952	W095°00.20	0	-0	0	0	124	2.6	s144.9	N29°40.993	W095°00.33	71	61	0	0	318	3.6	
10	00:26:36	288	2.6	p0.2	N29°40.952	W095°00.20	0	-0	0	0	123	2.8	s126.9	N29°40.992	W095°00.33	71	62	0	0	312	3.8	

This is an own ship

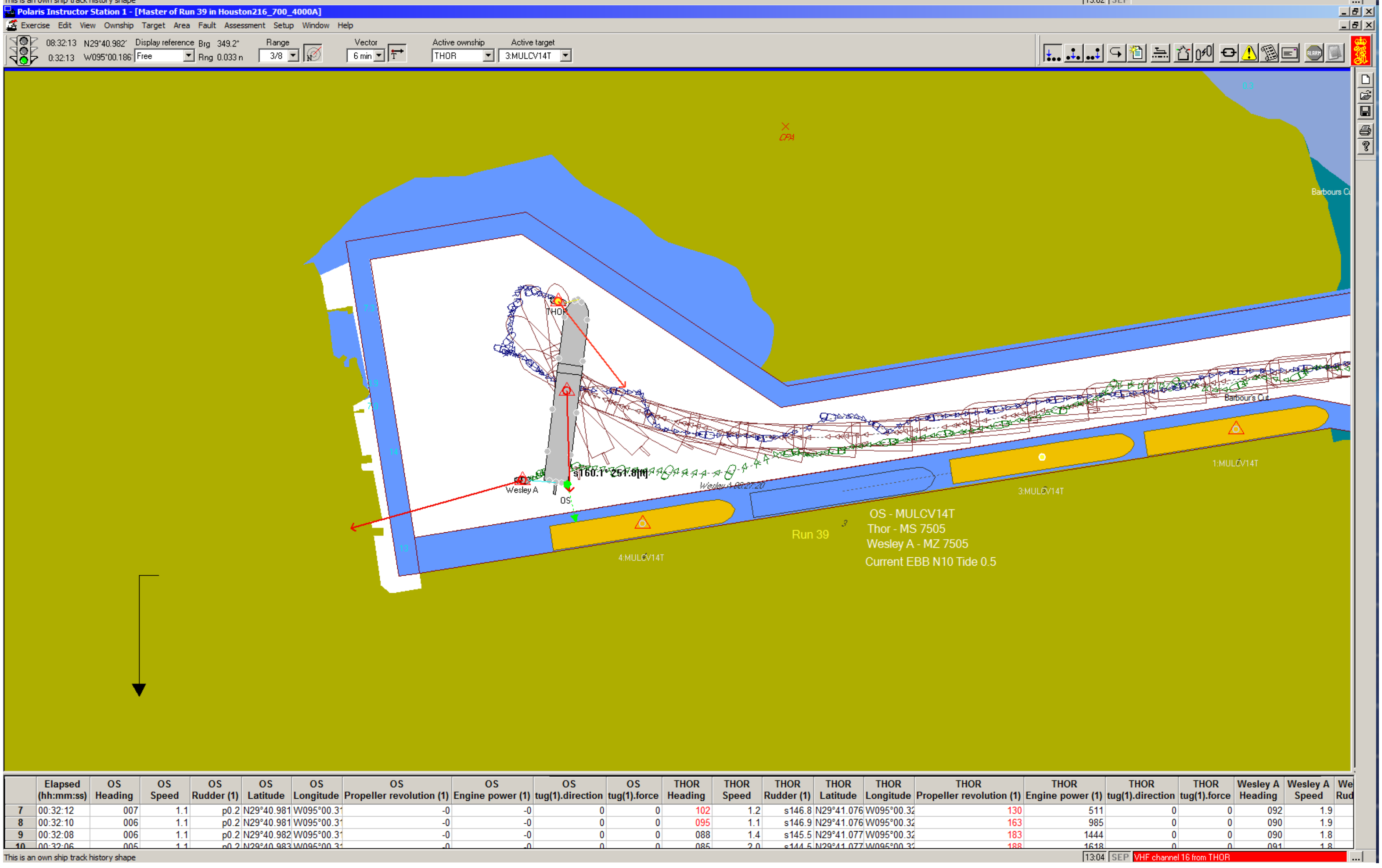
12:58 SEP

June 26, 2019



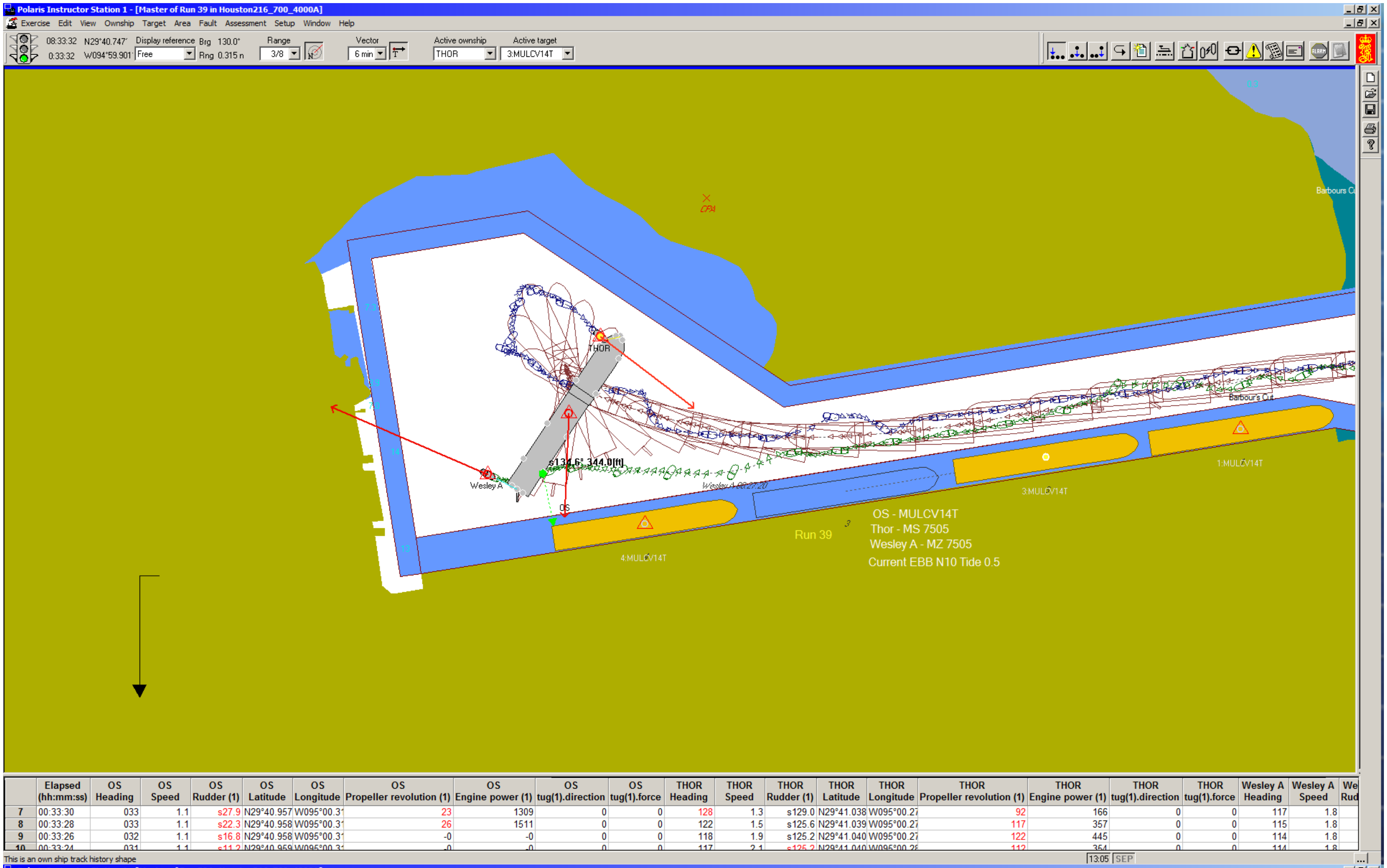
	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:29:58	328	0.8	p0.2	N29°41.000	W095°00.3	-52	14137	0	0	051	2.7	s90.0	N29°41.062	W095°00.3	123	381	0	0	065	3.1	
8	00:29:56	327	0.9	p0.2	N29°41.000	W095°00.3	-52	14145	0	0	046	2.7	s90.0	N29°41.060	W095°00.3	138	567	0	0	065	2.8	
9	00:29:54	326	1.0	p0.2	N29°40.999	W095°00.3	-52	14216	0	0	042	2.6	s90.0	N29°41.059	W095°00.3	148	736	0	0	063	2.5	
10	00:29:52	326	1.0	p0.2	N29°40.999	W095°00.3	-53	14667	0	0	037	2.3	s105.7	N29°41.057	W095°00.3	144	717	0	0	057	2.6	

This is an own ship track history shape



	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:32:12	007	1.1	p0.2	N29°40.981	W095°00.3	-0	-0	0	0	102	1.2	s146.8	N29°41.076	W095°00.3	130	511	0	0	092	1.9	
8	00:32:10	006	1.1	p0.2	N29°40.981	W095°00.3	-0	-0	0	0	095	1.1	s146.9	N29°41.076	W095°00.3	163	985	0	0	090	1.9	
9	00:32:08	006	1.1	p0.2	N29°40.982	W095°00.3	-0	-0	0	0	088	1.4	s145.5	N29°41.077	W095°00.3	183	1444	0	0	090	1.8	
10	00:32:06	005	1.1	p0.2	N29°40.983	W095°00.3	-0	-0	0	0	085	2.0	s144.5	N29°41.077	W095°00.3	188	1618	0	0	091	1.8	

This is an own ship track history shape



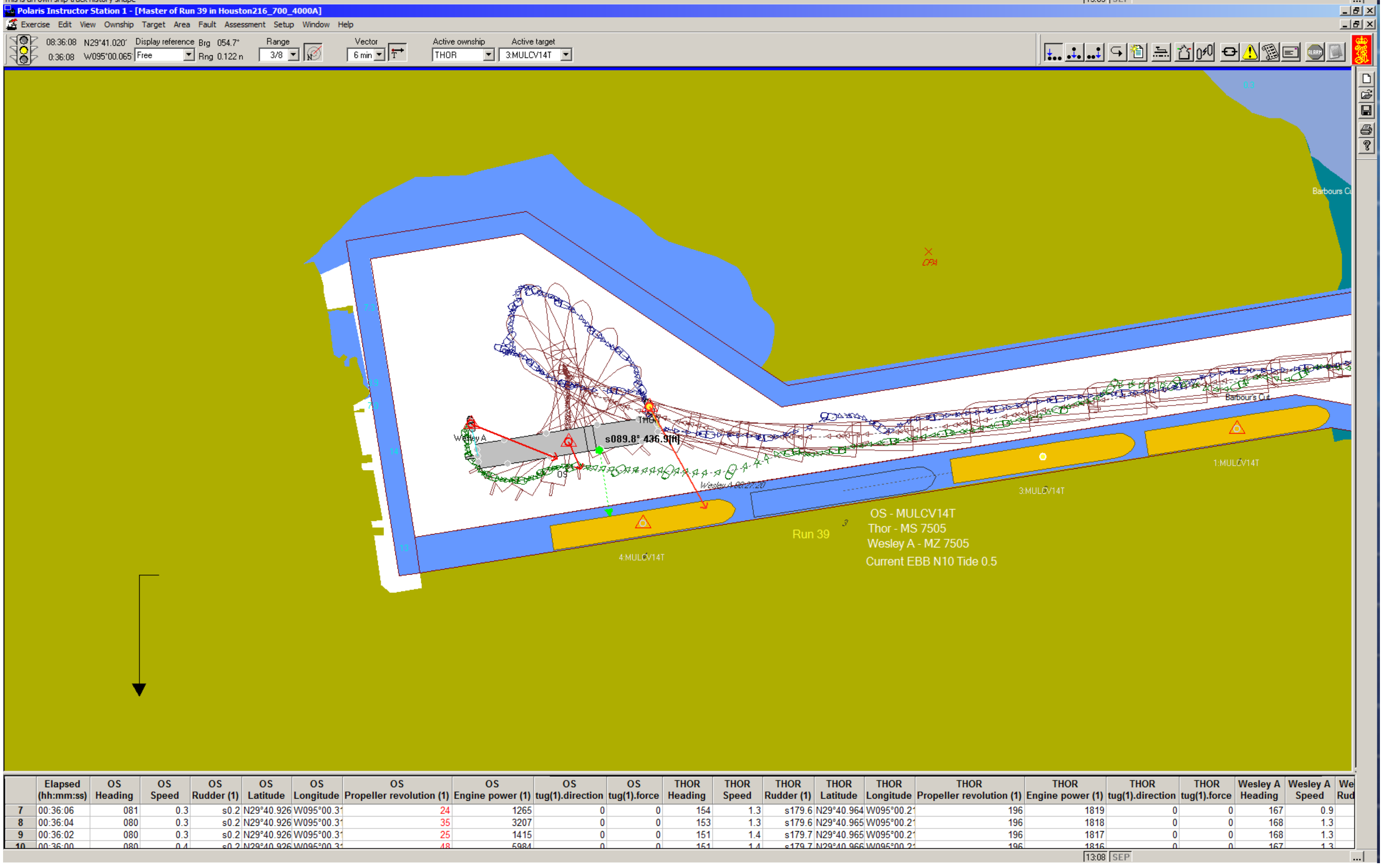
Polaris Instructor Station 1 - [Master of Run 39 in Houston216_700_4000A]

OS - MULCV14T
Thor - MS 7505
Wesley A - MZ 7505
Current EBB N10 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:33:30	033	1.1	s27.9	N29°40.957	W095°00.31	23	1309	0	0	128	1.3	s129.0	N29°41.038	W095°00.27	92	166	0	0	117	1.8	
8	00:33:28	033	1.1	s22.3	N29°40.958	W095°00.31	26	1511	0	0	122	1.5	s125.6	N29°41.039	W095°00.27	117	357	0	0	115	1.8	
9	00:33:26	032	1.1	s16.8	N29°40.958	W095°00.31	-0	-0	0	0	118	1.9	s125.2	N29°41.040	W095°00.27	122	445	0	0	114	1.8	
10	00:33:24	031	1.1	s11.2	N29°40.959	W095°00.31	-0	-0	0	0	117	2.1	s125.2	N29°41.040	W095°00.28	112	354	0	0	114	1.8	

This is an own ship track history shape

13:05 SEP



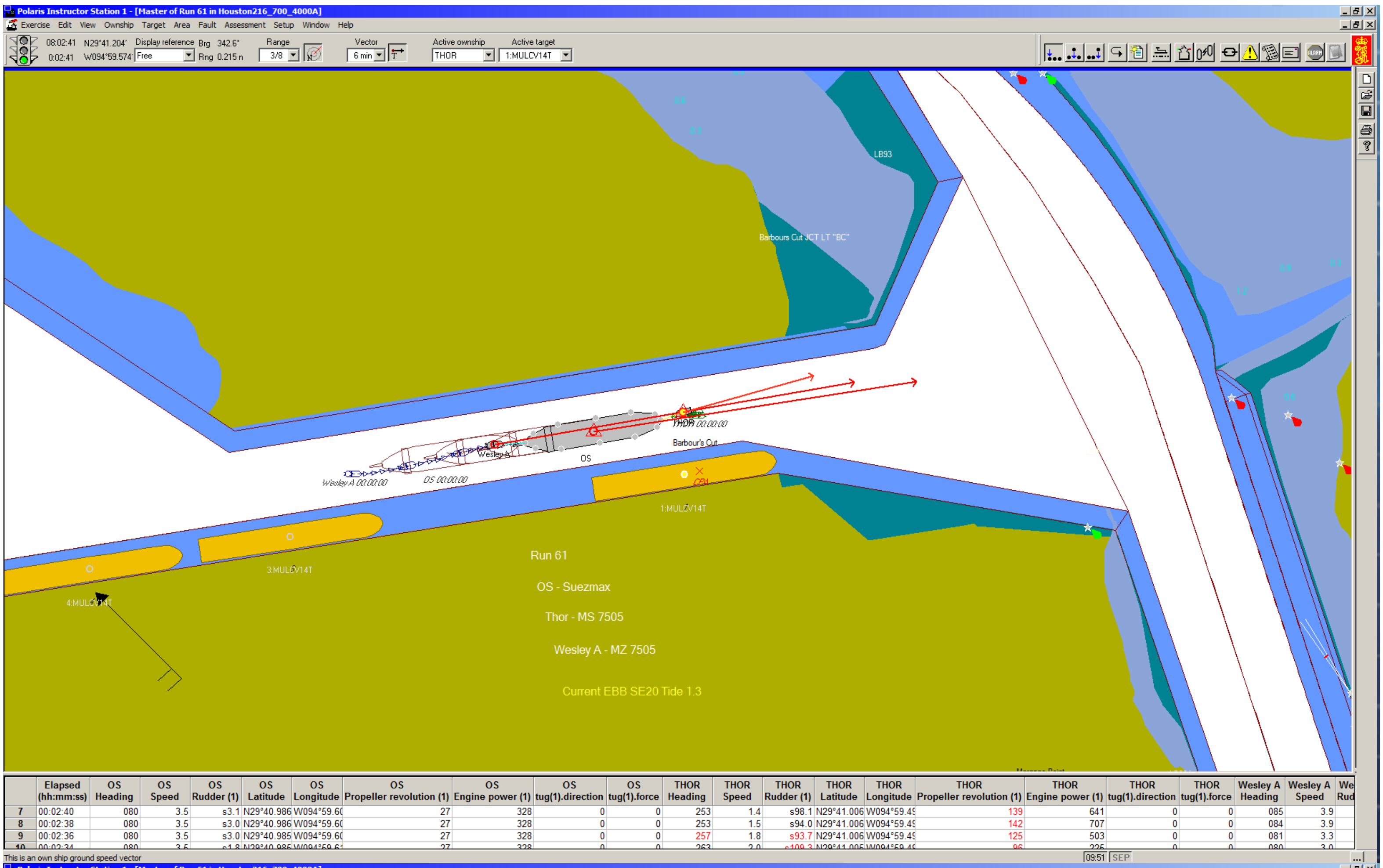
Polaris Instructor Station 1 - [Master of Run 39 in Houston216_700_4000A]

OS - MULCV14T
Thor - MS 7505
Wesley A - MZ 7505
Current EBB N10 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:36:06	081	0.3	s0.2	N29°40.926	W095°00.31	24	1265	0	0	154	1.3	s179.6	N29°40.964	W095°00.21	196	1819	0	0	167	0.9	
8	00:36:04	080	0.3	s0.2	N29°40.926	W095°00.31	35	3207	0	0	153	1.3	s179.6	N29°40.965	W095°00.21	196	1818	0	0	168	1.3	
9	00:36:02	080	0.3	s0.2	N29°40.926	W095°00.31	25	1415	0	0	151	1.4	s179.7	N29°40.965	W095°00.21	196	1817	0	0	168	1.3	
10	00:36:00	080	0.4	s0.2	N29°40.926	W095°00.31	48	5984	0	0	151	1.4	s179.7	N29°40.966	W095°00.21	196	1816	0	0	167	1.3	

13:08 SEP

Run 61



Polaris Instructor Station 1 - [Master of Run 61 in Houston216_700_4000A]

08:02:41 N29°41.204′ Display reference Free Brg 342.6° Rng 0.215 n
0:02:41 W094°59.574′
Range 3/8
Vector 6 min
Active ownship THOR
Active target 1:MULCV14T

Run 61

OS - Suezmax

Thor - MS 7505

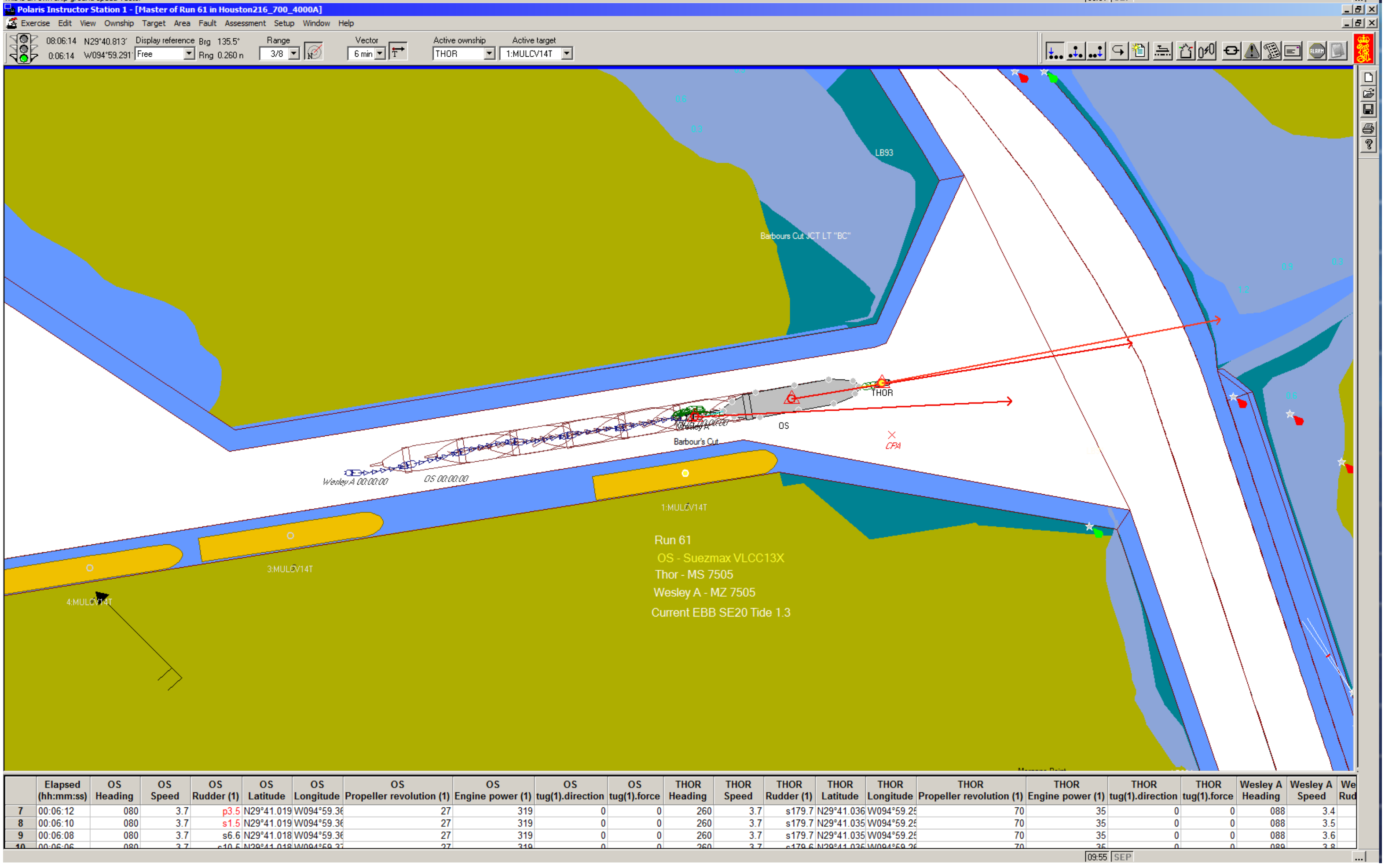
Wesley A - MZ 7505

Current EBB SE20 Tide 1.3

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:02:40	080	3.5	s3.1	N29°40.986	W094°59.60	27	328	0	0	253	1.4	s98.1	N29°41.006	W094°59.49	139	641	0	0	085	3.9	
8	00:02:38	080	3.5	s3.0	N29°40.986	W094°59.60	27	328	0	0	253	1.5	s94.0	N29°41.006	W094°59.49	142	707	0	0	084	3.9	
9	00:02:36	080	3.5	s3.0	N29°40.985	W094°59.60	27	328	0	0	257	1.8	s93.7	N29°41.006	W094°59.49	125	503	0	0	081	3.3	
10	00:02:34	080	3.5	s1.8	N29°40.985	W094°59.61	27	328	0	0	263	2.0	s109.3	N29°41.006	W094°59.49	96	225	0	0	080	3.0	

This is an own ship ground speed vector

09:51 SEP



Polaris Instructor Station 1 - [Master of Run 61 in Houston216_700_4000A]

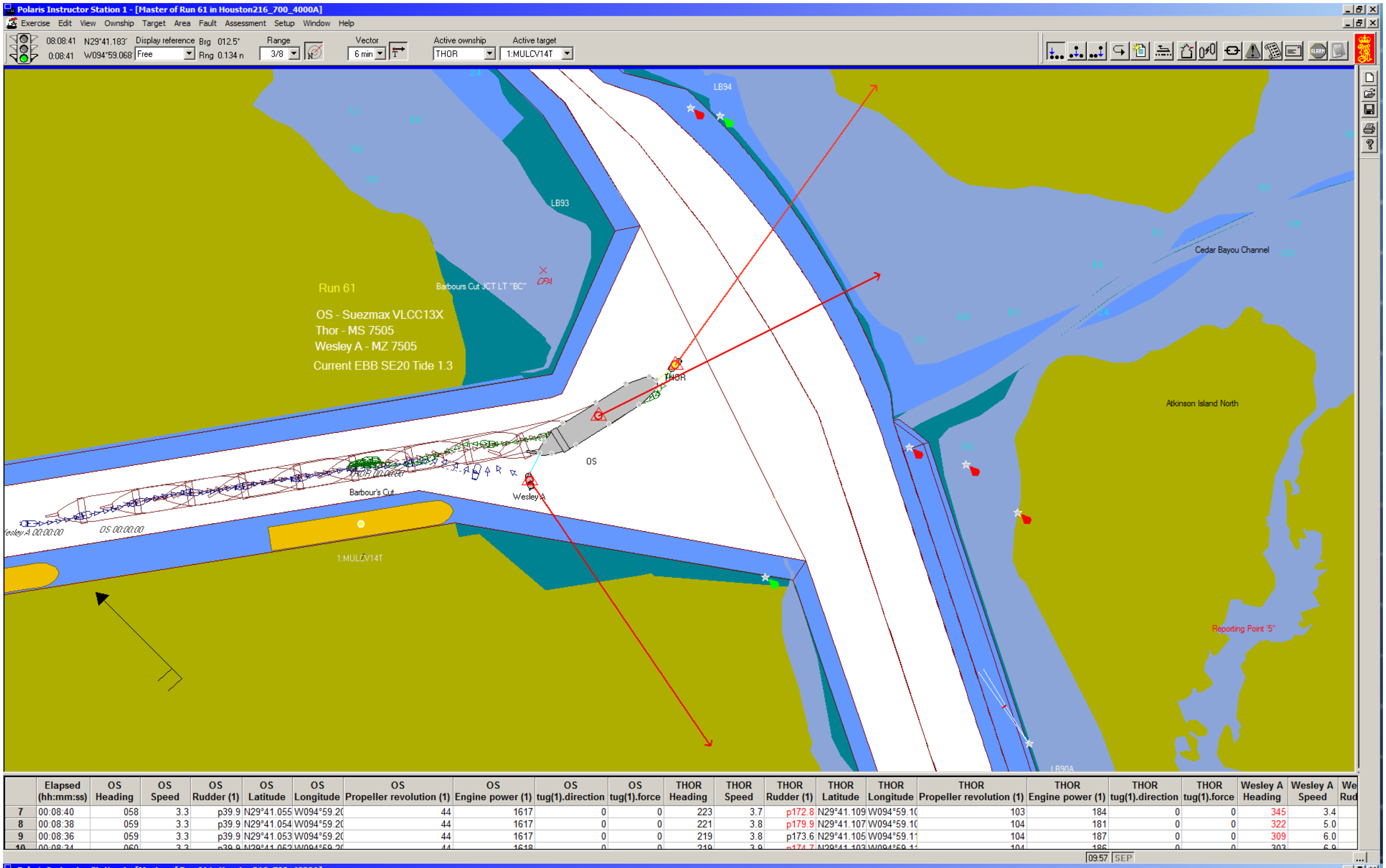
08:06:14 N29°40.813′ Display reference Free Brg 135.5° Rng 0.260 n
0:06:14 W094°59.291′
Range 3/8
Vector 6 min
Active ownship THOR
Active target 1:MULCV14T

Run 61
OS - Suezmax VLCC13X
Thor - MS 7505
Wesley A - MZ 7505
Current EBB SE20 Tide 1.3

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:06:12	080	3.7	p3.5	N29°41.019	W094°59.36	27	319	0	0	260	3.7	s179.7	N29°41.036	W094°59.25	70	35	0	0	088	3.4	
8	00:06:10	080	3.7	s1.5	N29°41.019	W094°59.36	27	319	0	0	260	3.7	s179.7	N29°41.035	W094°59.25	70	35	0	0	088	3.5	
9	00:06:08	080	3.7	s6.6	N29°41.018	W094°59.36	27	319	0	0	260	3.7	s179.7	N29°41.035	W094°59.25	70	35	0	0	088	3.6	
10	00:06:06	080	3.7	s10.5	N29°41.018	W094°59.37	27	319	0	0	260	3.7	s179.6	N29°41.035	W094°59.26	70	35	0	0	089	3.8	

09:55 SEP

June 26, 2019



Polaris Instructor Station 1 - [Master of Run 61 in Houston216_700_4000A]

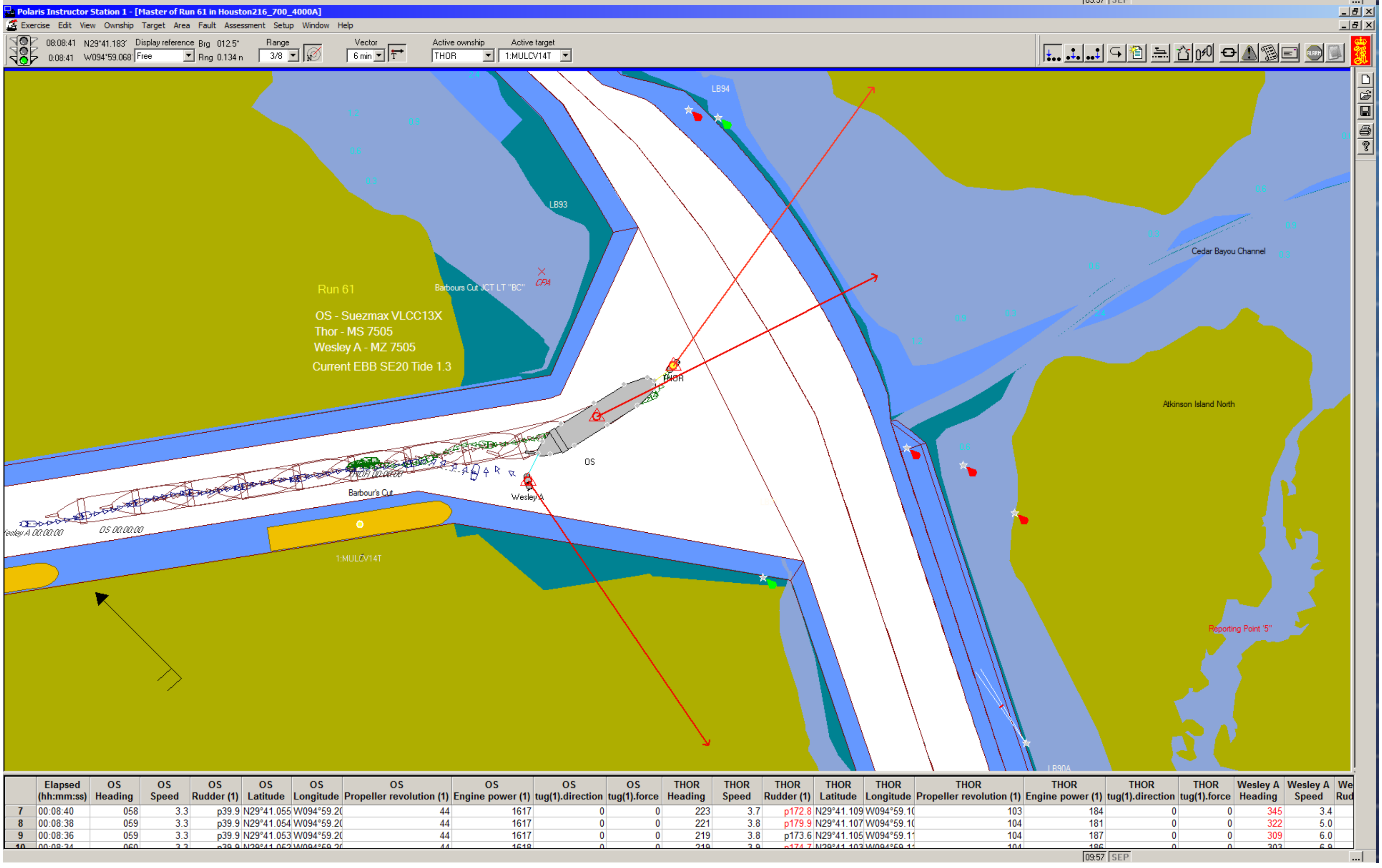
08:08:41 N29°41.183' 0:08:41 W094°59.068' Display reference: Free Brg 012.5° Rng 0.134 n Range: 3/8 Vector: 6 min Active ownship: THOR Active target: 1:MULCV14T

Run 61

OS - Suezmax VLCC13X
Thor - MS 7505
Wesley A - MZ 7505
Current EBB SE20 Tide 1.3

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:08:40	058	3.3	p39.9	N29°41.055	W094°59.20	44	1617	0	0	223	3.7	p172.8	N29°41.109	W094°59.10	103	184	0	0	345	3.4	
8	00:08:38	059	3.3	p39.9	N29°41.054	W094°59.20	44	1617	0	0	221	3.8	p179.9	N29°41.107	W094°59.10	104	181	0	0	322	5.0	
9	00:08:36	059	3.3	p39.9	N29°41.053	W094°59.20	44	1617	0	0	219	3.8	p173.6	N29°41.105	W094°59.11	104	187	0	0	309	6.0	
10	00:08:34	060	3.3	p39.9	N29°41.052	W094°59.20	44	1618	0	0	219	3.9	p174.7	N29°41.103	W094°59.11	104	186	0	0	303	6.9	

09:57 SEP



Polaris Instructor Station 1 - [Master of Run 61 in Houston216_700_4000A]

08:08:41 N29°41.183' 0:08:41 W094°59.068' Display reference: Free Brg 012.5° Rng 0.134 n Range: 3/8 Vector: 6 min Active ownship: THOR Active target: 1:MULCV14T

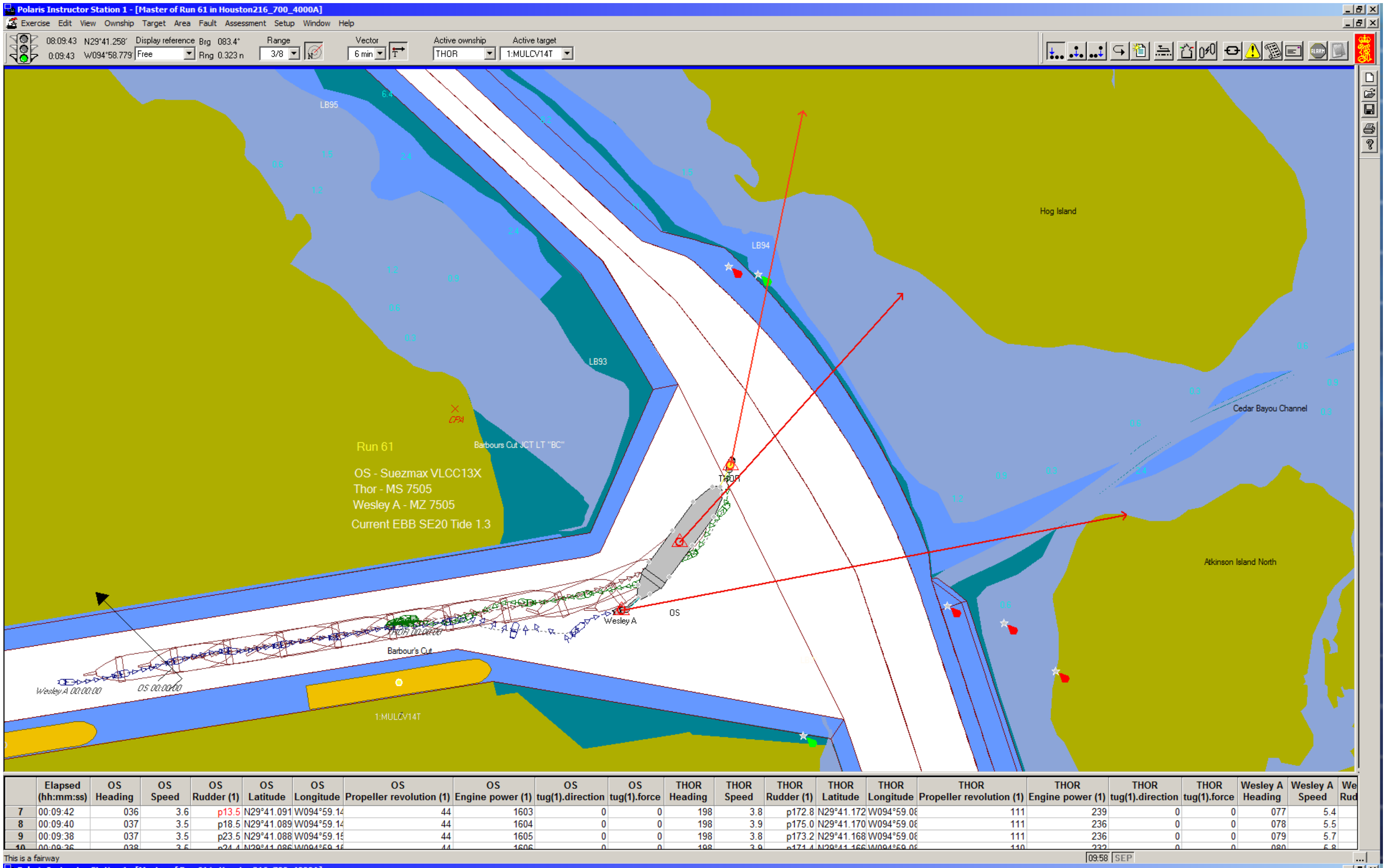
Run 61

OS - Suezmax VLCC13X
Thor - MS 7505
Wesley A - MZ 7505
Current EBB SE20 Tide 1.3

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:08:40	058	3.3	p39.9	N29°41.055	W094°59.20	44	1617	0	0	223	3.7	p172.8	N29°41.109	W094°59.10	103	184	0	0	345	3.4	
8	00:08:38	059	3.3	p39.9	N29°41.054	W094°59.20	44	1617	0	0	221	3.8	p179.9	N29°41.107	W094°59.10	104	181	0	0	322	5.0	
9	00:08:36	059	3.3	p39.9	N29°41.053	W094°59.20	44	1617	0	0	219	3.8	p173.6	N29°41.105	W094°59.11	104	187	0	0	309	6.0	
10	00:08:34	060	3.3	p39.9	N29°41.052	W094°59.20	44	1618	0	0	219	3.9	p174.7	N29°41.103	W094°59.11	104	186	0	0	303	6.9	

09:57 SEP

June 26, 2019



Polaris Instructor Station 1 - [Master of Run 61 in Houston216_700_4000A]

08:09:43 N29°41.258' Display reference: Free Brg 083.4°
0:09:43 W094°58.779' Rng 0.323 n
Range: 3/8
Vector: 6 min
Active ownship: THOR
Active target: 1:MULCV14T

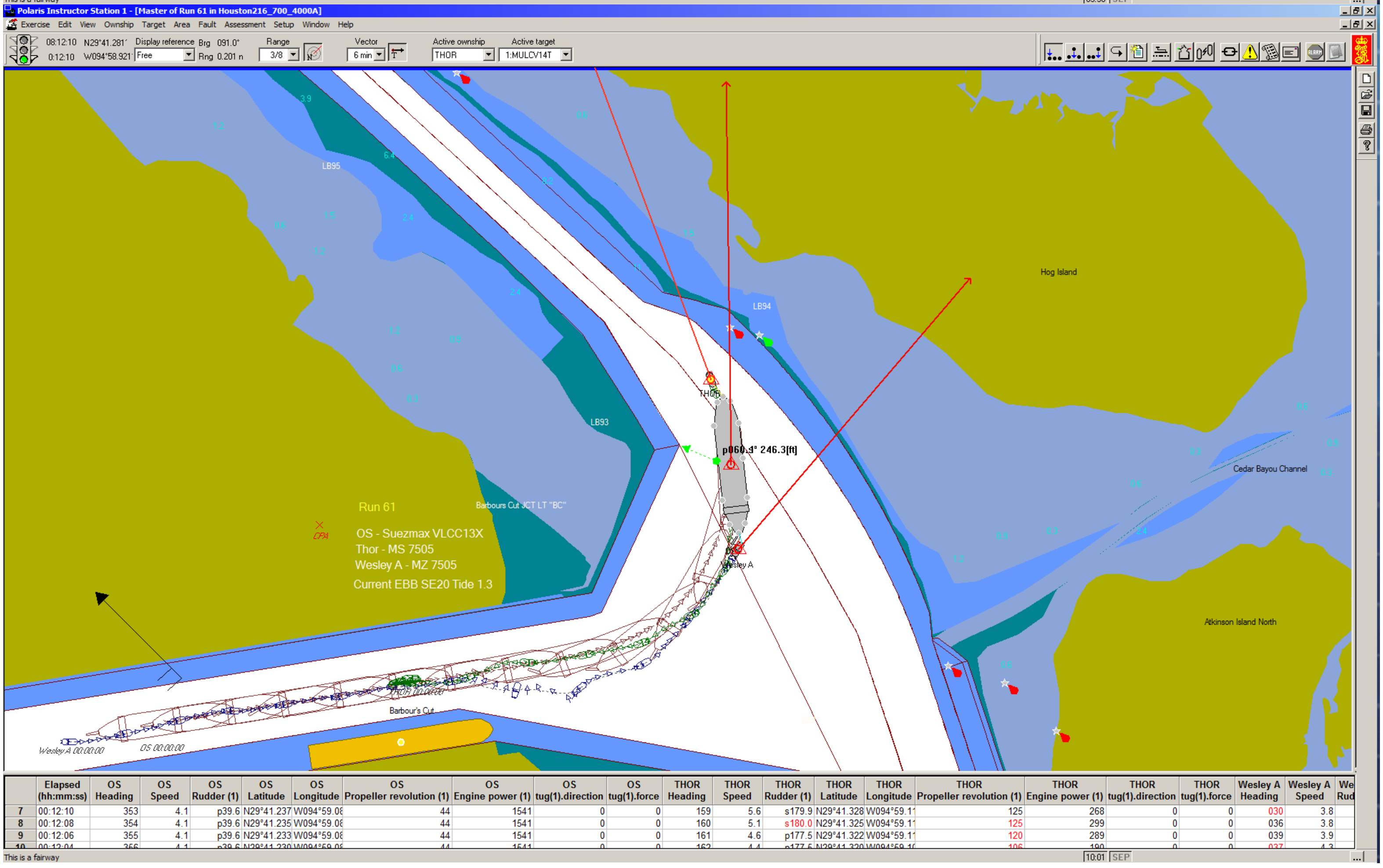
Run 61

OS - Suezmax VLCC13X
Thor - MS 7505
Wesley A - MZ 7505
Current EBB SE20 Tide 1.3

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed
7	00:09:42	036	3.6	p13.5	N29°41.091	W094°59.14	44	1603	0	0	198	3.8	p172.8	N29°41.172	W094°59.08	111	239	0	0	077	5.4
8	00:09:40	037	3.5	p18.5	N29°41.089	W094°59.14	44	1604	0	0	198	3.9	p175.0	N29°41.170	W094°59.08	111	236	0	0	078	5.5
9	00:09:38	037	3.5	p23.5	N29°41.088	W094°59.15	44	1605	0	0	198	3.8	p173.2	N29°41.168	W094°59.08	111	236	0	0	079	5.7

This is a fairway

09:58 SEP



Polaris Instructor Station 1 - [Master of Run 61 in Houston216_700_4000A]

08:12:10 N29°41.281' Display reference: Free Brg 091.0°
0:12:10 W094°58.921' Rng 0.201 n
Range: 3/8
Vector: 6 min
Active ownship: THOR
Active target: 1:MULCV14T

Run 61

OS - Suezmax VLCC13X
Thor - MS 7505
Wesley A - MZ 7505
Current EBB SE20 Tide 1.3

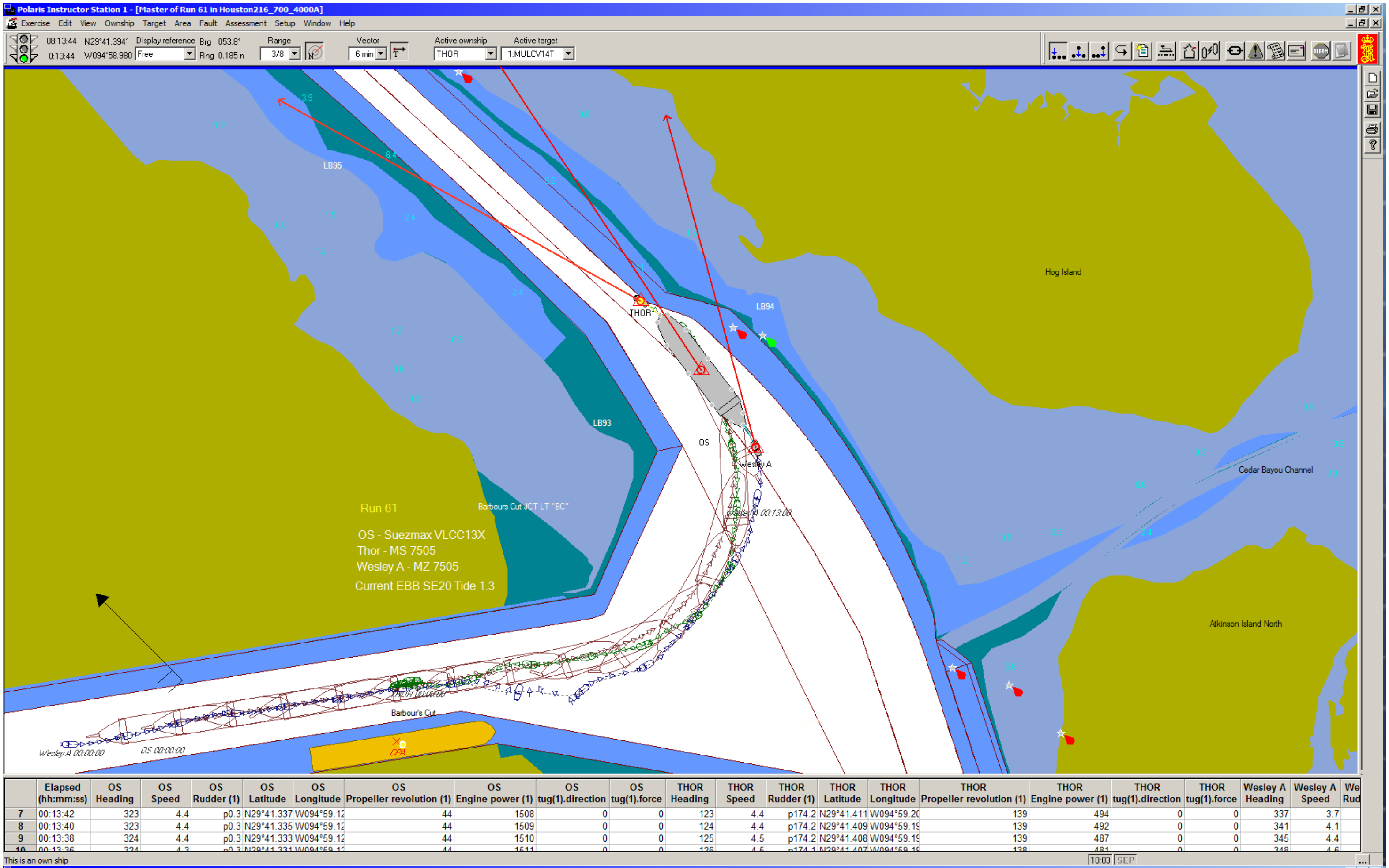
	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed
7	00:12:10	353	4.1	p39.6	N29°41.237	W094°59.08	44	1541	0	0	159	5.6	s179.9	N29°41.328	W094°59.11	125	268	0	0	030	3.8
8	00:12:08	354	4.1	p39.6	N29°41.235	W094°59.08	44	1541	0	0	160	5.1	s180.0	N29°41.325	W094°59.11	125	299	0	0	036	3.8
9	00:12:06	355	4.1	p39.6	N29°41.233	W094°59.08	44	1541	0	0	161	4.6	p177.5	N29°41.322	W094°59.11	120	289	0	0	039	3.9

This is a fairway

10:01 SEP

- Page 400

June 26, 2019



Polaris Instructor Station 1 - [Master of Run 61 in Houston216_700_4000A]

08:13:44 N29°41.394′ 0:13:44 W094°58.980′ Display reference Free Brg 053.8° Rng 0.185 n Range 3/8 Vector 6 min Active ownship THOR Active target 1:MULCV14T

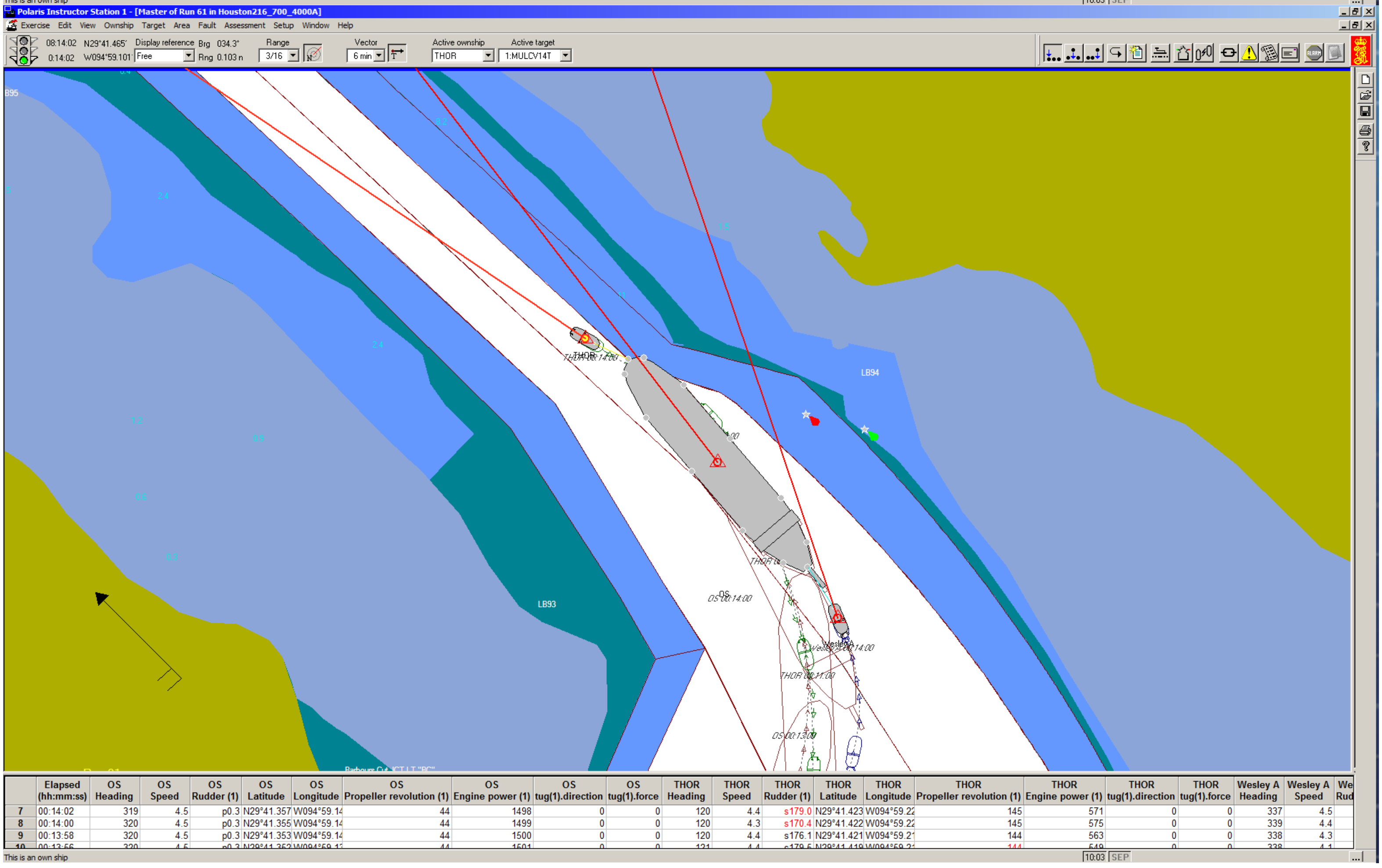
Run 61

OS - Suezmax VLCC13X
Thor - MS 7505
Wesley A - MZ 7505
Current EBB SE20 Tide 1.3

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:13:42	323	4.4	p0.3	N29°41.337	W094°59.12	44	1508	0	0	123	4.4	p174.2	N29°41.411	W094°59.20	139	494	0	0	337	3.7	
8	00:13:40	323	4.4	p0.3	N29°41.335	W094°59.12	44	1509	0	0	124	4.4	p174.2	N29°41.409	W094°59.19	139	492	0	0	341	4.1	
9	00:13:38	324	4.4	p0.3	N29°41.333	W094°59.12	44	1510	0	0	125	4.5	p174.2	N29°41.408	W094°59.19	139	487	0	0	345	4.4	
10	00:13:36	324	4.3	p0.3	N29°41.331	W094°59.12	44	1511	0	0	126	4.5	p174.1	N29°41.407	W094°59.19	138	481	0	0	348	4.6	

This is an own ship

10:03 SEP



Polaris Instructor Station 1 - [Master of Run 61 in Houston216_700_4000A]

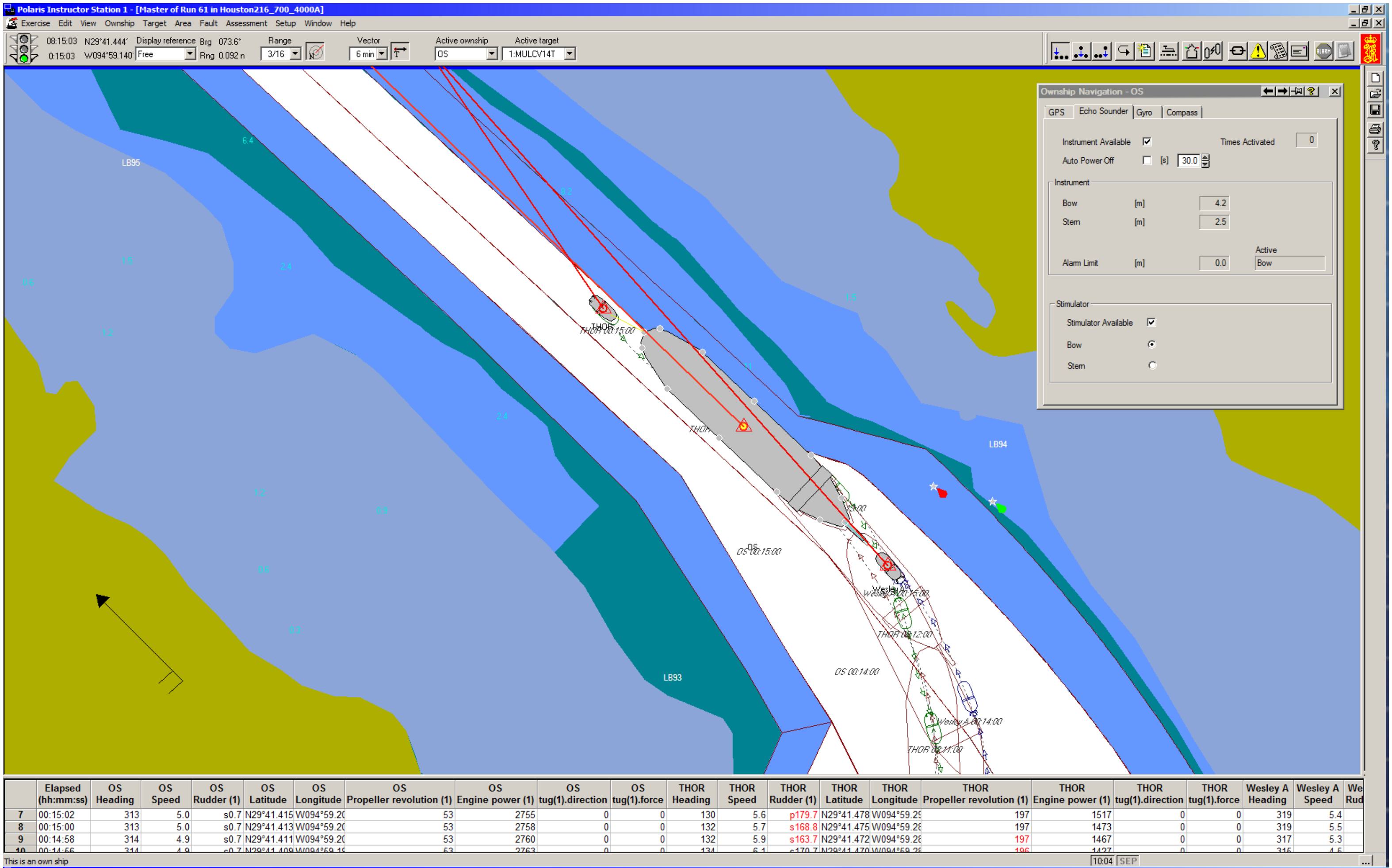
08:14:02 N29°41.465′ 0:14:02 W094°59.101′ Display reference Free Brg 034.3° Rng 0.103 n Range 3/16 Vector 6 min Active ownship THOR Active target 1:MULCV14T

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:14:02	319	4.5	p0.3	N29°41.357	W094°59.14	44	1498	0	0	120	4.4	s179.0	N29°41.423	W094°59.22	145	571	0	0	337	4.5	
8	00:14:00	320	4.5	p0.3	N29°41.355	W094°59.14	44	1499	0	0	120	4.3	s170.4	N29°41.422	W094°59.22	145	575	0	0	339	4.4	
9	00:13:58	320	4.5	p0.3	N29°41.353	W094°59.14	44	1500	0	0	120	4.4	s176.1	N29°41.421	W094°59.21	144	563	0	0	338	4.3	
10	00:13:56	320	4.5	p0.3	N29°41.352	W094°59.13	44	1501	0	0	121	4.4	s179.5	N29°41.419	W094°59.21	144	549	0	0	338	4.1	

This is an own ship

10:03 SEP

June 26, 2019



Polaris Instructor Station 1 - [Master of Run 61 in Houston216_700_4000A]

08:15:03 N29°41.444′ Display reference Free Brg 073.6° Range 3/16 Vector 6 min Active ownship OS Active target 1:MULCV14T

0:15:03 W094°59.140′ Rng 0.092 n

Ownship Navigation - OS

Instrument Available ☑ Times Activated 0

Auto Power Off ☐ [s] 30.0

Instrument

Bow [m] 4.2

Stem [m] 2.5

Alarm Limit [m] 0.0 Active Bow

Stimulator

Stimulator Available ☑

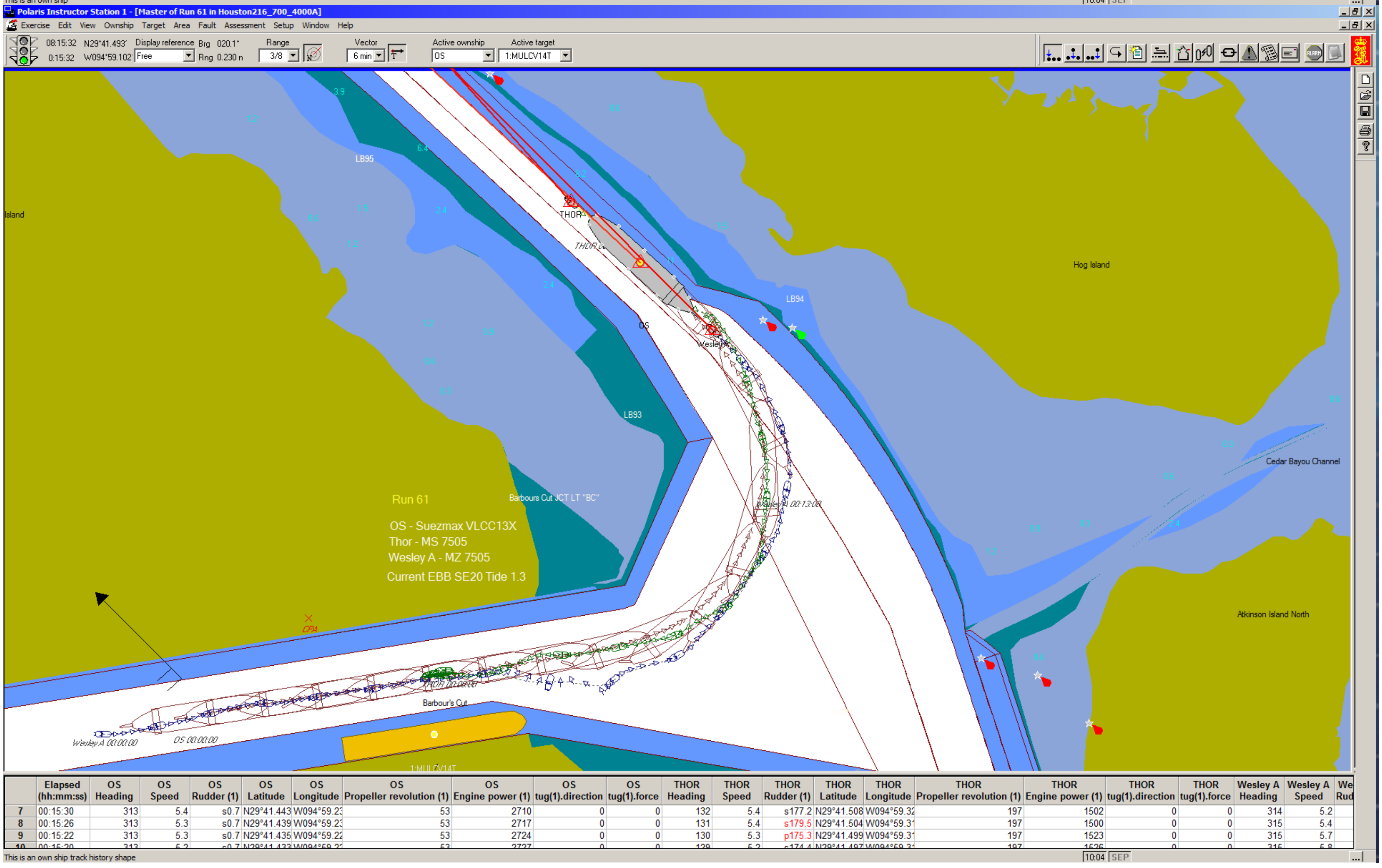
Bow ●

Stem ○

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:15:02	313	5.0	s0.7	N29°41.415	W094°59.20	53	2755	0	0	130	5.6	p179.7	N29°41.478	W094°59.29	197	1517	0	0	319	5.4	
8	00:15:00	313	5.0	s0.7	N29°41.413	W094°59.20	53	2758	0	0	132	5.7	s168.8	N29°41.475	W094°59.28	197	1473	0	0	319	5.5	
9	00:14:58	314	4.9	s0.7	N29°41.411	W094°59.20	53	2760	0	0	132	5.9	s163.7	N29°41.472	W094°59.28	197	1467	0	0	317	5.3	

This is an own ship

10:04 SEP



Polaris Instructor Station 1 - [Master of Run 61 in Houston216_700_4000A]

08:15:32 N29°41.493′ Display reference Free Brg 020.1° Range 3/8 Vector 6 min Active ownship OS Active target 1:MULCV14T

0:15:32 W094°59.102′ Rng 0.230 n

Run 61

OS - Suezmax VLCC13X

Thor - MS 7505

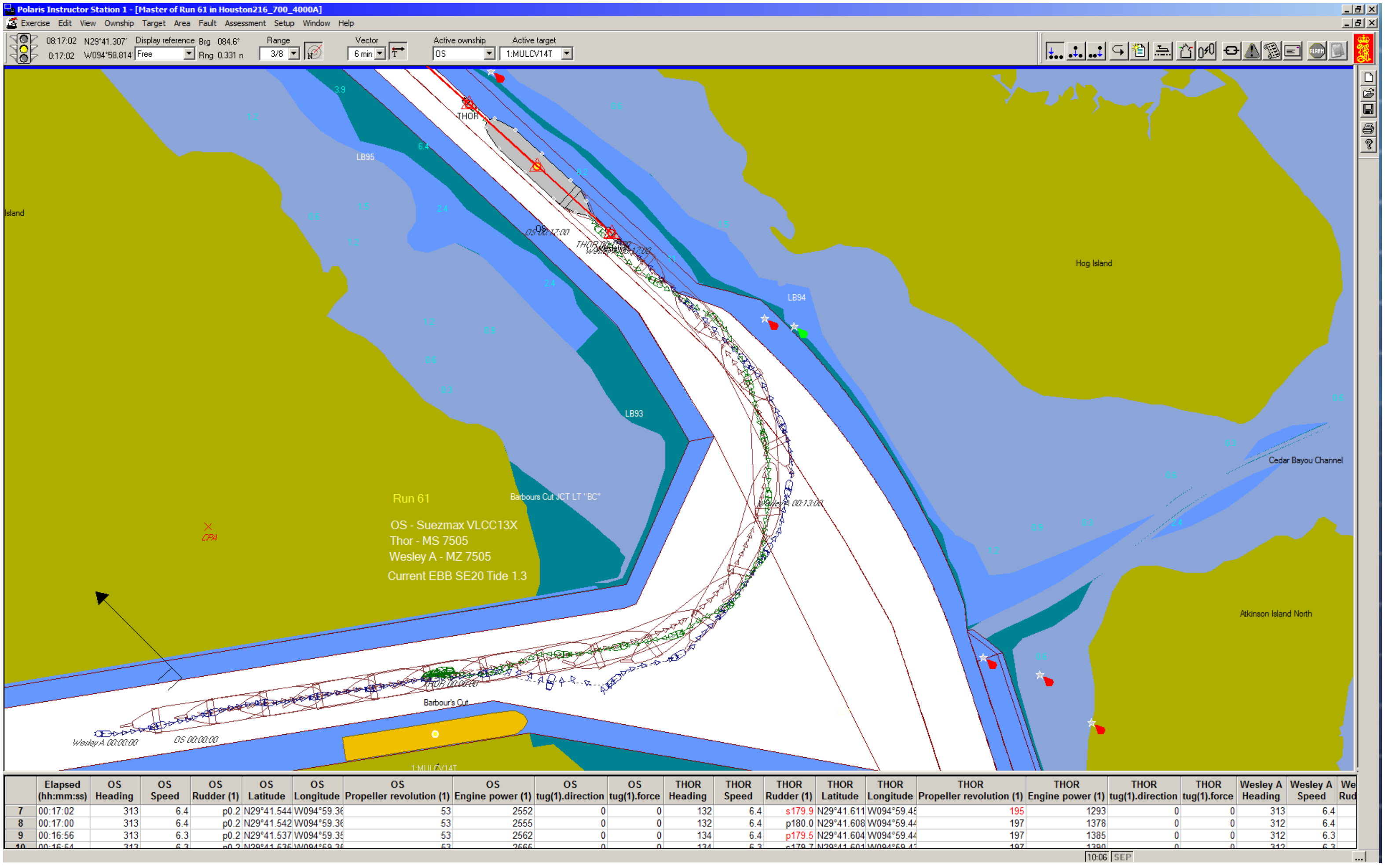
Wesley A - MZ 7505

Current EBB SE20 Tide 1.3

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:15:30	313	5.4	s0.7	N29°41.443	W094°59.23	53	2710	0	0	132	5.4	s177.2	N29°41.508	W094°59.32	197	1502	0	0	314	5.2	
8	00:15:26	313	5.3	s0.7	N29°41.439	W094°59.23	53	2717	0	0	131	5.4	s179.5	N29°41.504	W094°59.31	197	1500	0	0	315	5.4	
9	00:15:22	313	5.3	s0.7	N29°41.435	W094°59.22	53	2724	0	0	130	5.3	p175.3	N29°41.499	W094°59.31	197	1523	0	0	315	5.7	

This is an own ship track history shape

10:04 SEP



Polaris Instructor Station 1 - [Master of Run 61 in Houston216_700_4000A]

08:17:02 N29°41.307'
0:17:02 W094°58.814'
Display reference: Free
Brg 084.6°
Rng 0.331 n
Range: 3/8
Vector: 6 min
Active ownship: OS
Active target: 1:MULCV14T

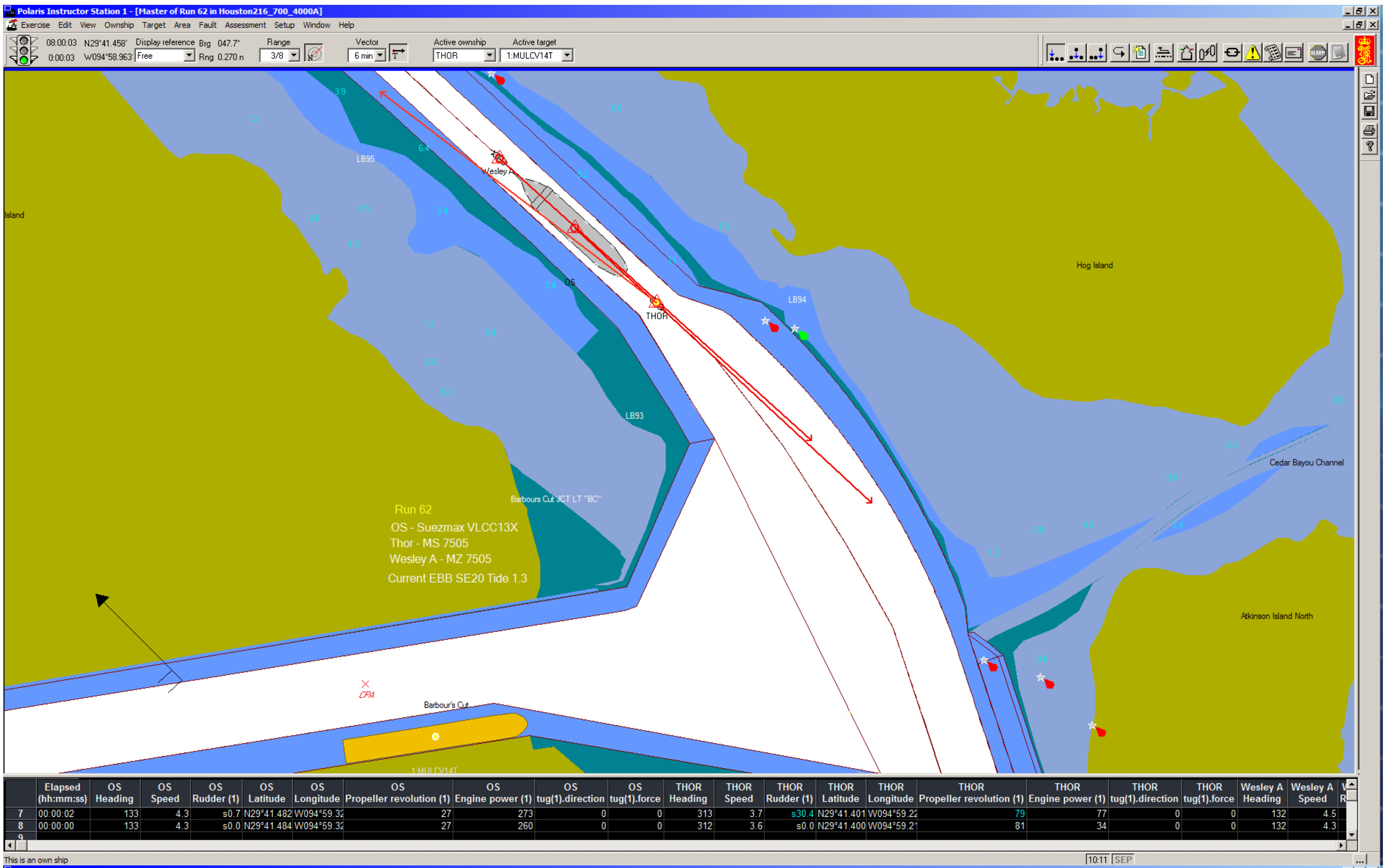
Run 61

OS - Suezmax VLCC13X
Thor - MS 7505
Wesley A - MZ 7505
Current EBB SE20 Tide 1.3

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:17:02	313	6.4	p0.2	N29°41.544	W094°59.36	53	2552	0	0	132	6.4	s179.9	N29°41.611	W094°59.45	195	1293	0	0	313	6.4	
8	00:17:00	313	6.4	p0.2	N29°41.542	W094°59.36	53	2555	0	0	132	6.4	p180.0	N29°41.608	W094°59.44	197	1378	0	0	312	6.4	
9	00:16:56	313	6.3	p0.2	N29°41.537	W094°59.35	53	2562	0	0	134	6.4	p179.5	N29°41.604	W094°59.44	197	1385	0	0	312	6.3	
10	00:16:54	313	6.3	p0.2	N29°41.535	W094°59.36	53	2565	0	0	134	6.3	s179.7	N29°41.601	W094°59.43	197	1390	0	0	312	6.3	

June 26, 2019

Run 62



Polaris Instructor Station 1 - [Master of Run 62 in Houston216_700_4000A]

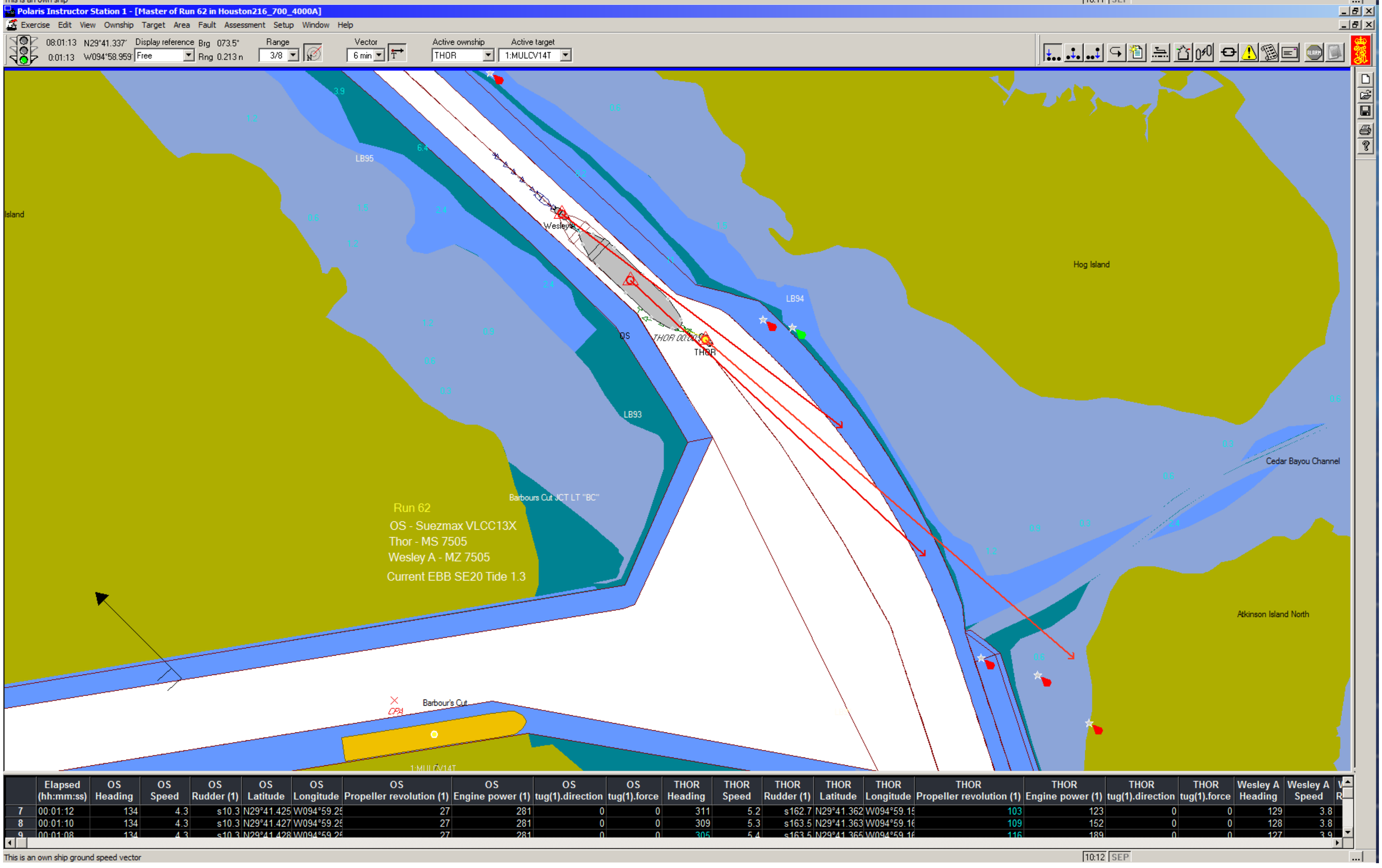
08:00:03 N29°41.458' Display reference Brg 047.7°
0:00:03 W094°58.963' Free Rng 0.270 n
Range 3/8
Vector 6 min
Active ownship THOR
Active target 1:MULCV14T

Run 62
OS - Suezmax VLCC13X
Thor - MS 7505
Wesley A - MZ 7505
Current EBB SE20 Tide 1.3

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed
7	00:00:02	133	4.3	s0.7	N29°41.482	W094°59.32	27	273	0	0	313	3.7	s30.4	N29°41.401	W094°59.22	79	77	0	0	132	4.5
8	00:00:00	133	4.3	s0.0	N29°41.484	W094°59.32	27	260	0	0	312	3.6	s0.0	N29°41.400	W094°59.21	81	34	0	0	132	4.3
9																					

This is an own ship

10:11 SEP



Polaris Instructor Station 1 - [Master of Run 62 in Houston216_700_4000A]

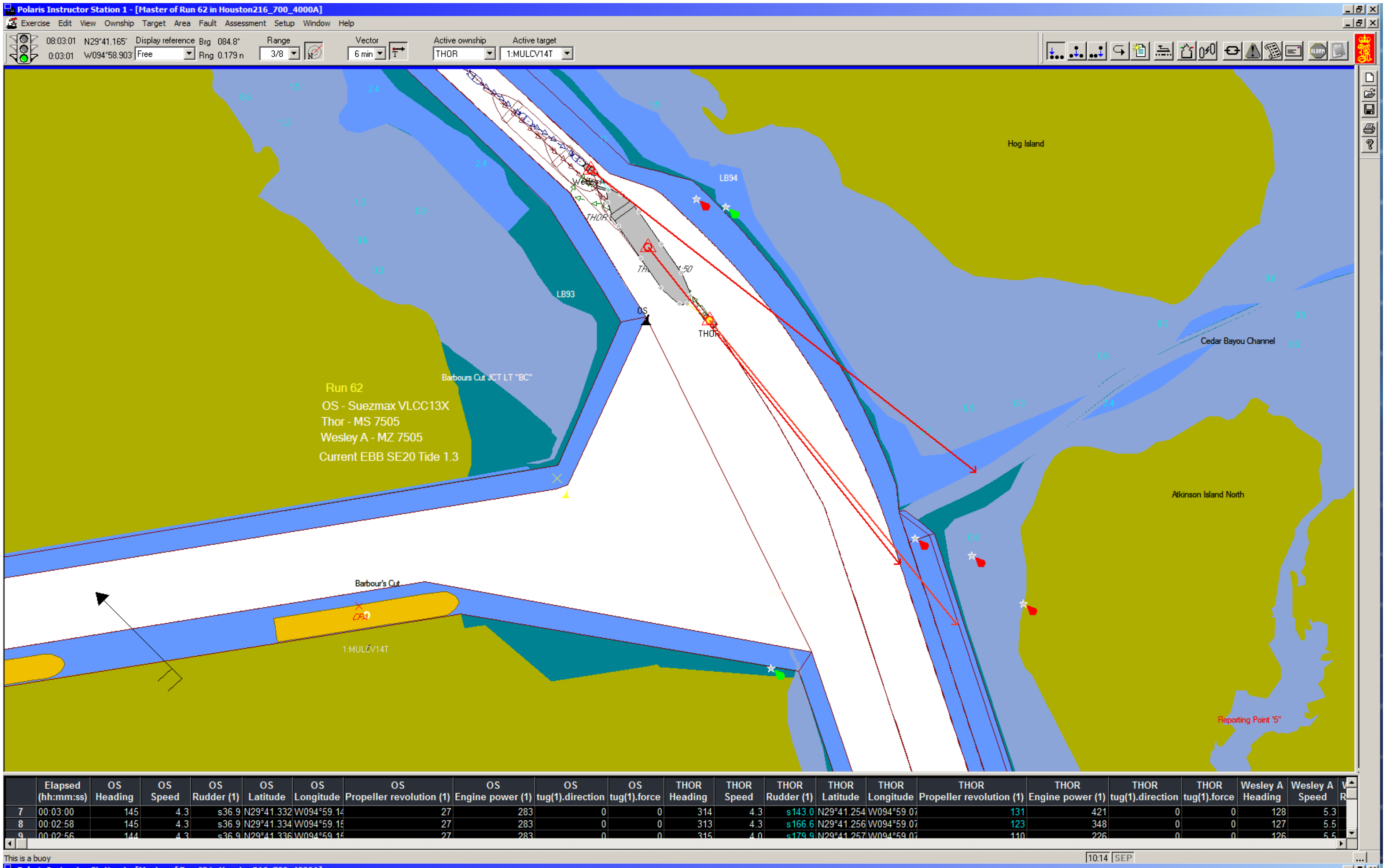
08:01:13 N29°41.337' Display reference Brg 073.5°
0:01:13 W094°58.959' Free Rng 0.213 n
Range 3/8
Vector 6 min
Active ownship THOR
Active target 1:MULCV14T

Run 62
OS - Suezmax VLCC13X
Thor - MS 7505
Wesley A - MZ 7505
Current EBB SE20 Tide 1.3

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed
7	00:01:12	134	4.3	s10.3	N29°41.425	W094°59.25	27	281	0	0	311	5.2	s162.7	N29°41.362	W094°59.15	103	123	0	0	129	3.8
8	00:01:10	134	4.3	s10.3	N29°41.427	W094°59.25	27	281	0	0	309	5.3	s163.5	N29°41.363	W094°59.16	109	152	0	0	128	3.8
9	00:01:08	134	4.3	s10.3	N29°41.428	W094°59.25	27	281	0	0	305	5.4	s163.5	N29°41.365	W094°59.16	116	189	0	0	127	3.9

This is an own ship ground speed vector

10:12 SEP



Polaris Instructor Station 1 - [Master of Run 62 in Houston216_700_4000A]

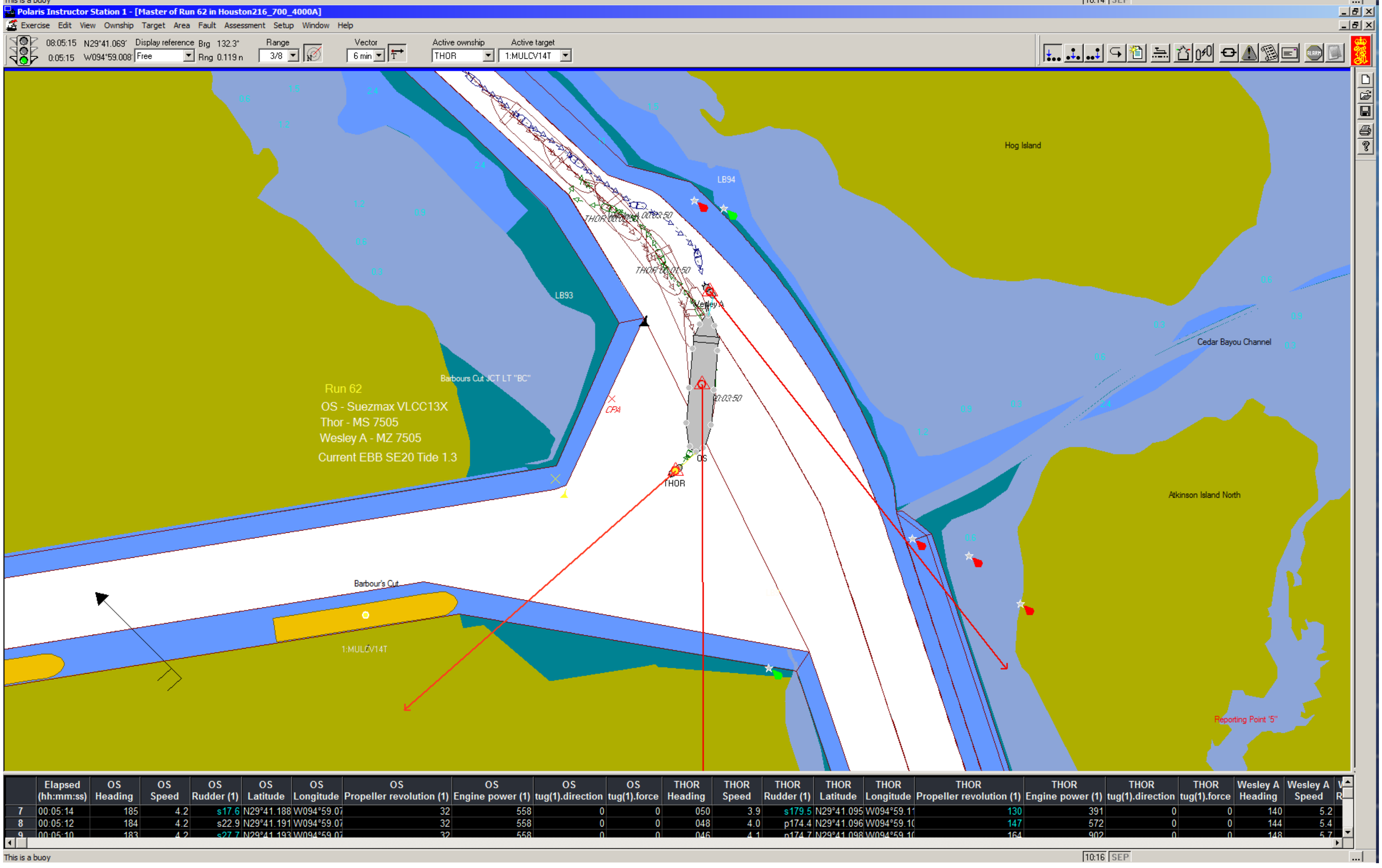
08:03:01 N29°41.165' Display reference Free Brg 084.8°
0:03:01 W094°58.903' Rng 0.179 n
Range 3/8
Vector 6 min
Active ownship THOR
Active target 1:MULCV14T

Run 62
OS - Suezmax VLCC13X
Thor - MS 7505
Wesley A - MZ 7505
Current EBB SE20 Tide 1.3

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed
7	00:03:00	145	4.3	s36.9	N29°41.332	W094°59.14	27	283	0	0	314	4.3	s143.0	N29°41.254	W094°59.07	131	421	0	0	128	5.3
8	00:02:58	145	4.3	s36.9	N29°41.334	W094°59.15	27	283	0	0	313	4.3	s166.6	N29°41.256	W094°59.07	123	348	0	0	127	5.5
9	00:02:56	144	4.3	s36.9	N29°41.336	W094°59.15	27	283	0	0	315	4.0	s179.9	N29°41.257	W094°59.07	110	226	0	0	126	5.5

This is a buoy

10:14 SEP



Polaris Instructor Station 1 - [Master of Run 62 in Houston216_700_4000A]

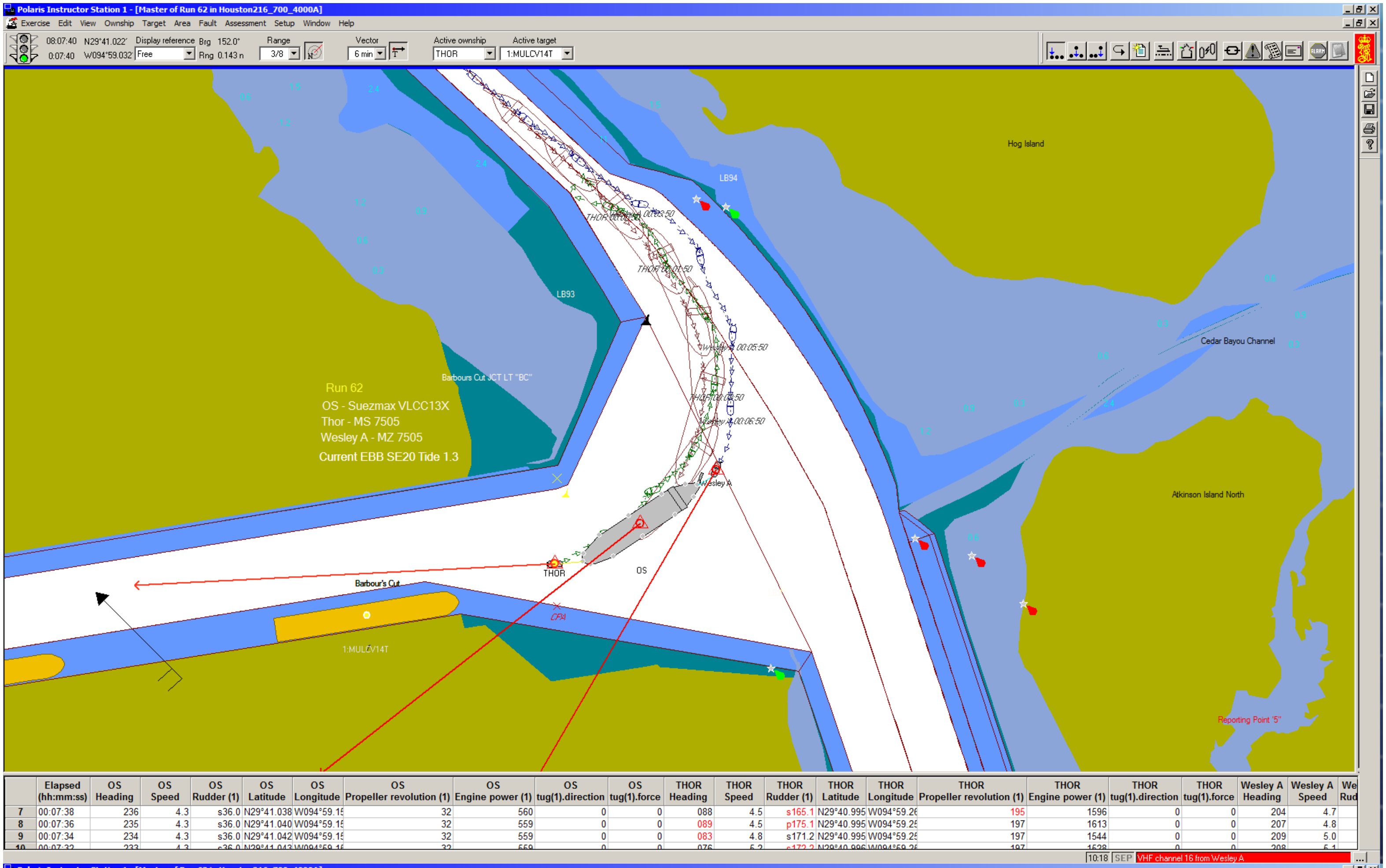
08:05:15 N29°41.069' Display reference Free Brg 132.3°
0:05:15 W094°59.008' Rng 0.119 n
Range 3/8
Vector 6 min
Active ownship THOR
Active target 1:MULCV14T

Run 62
OS - Suezmax VLCC13X
Thor - MS 7505
Wesley A - MZ 7505
Current EBB SE20 Tide 1.3

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed
7	00:05:14	185	4.2	s17.6	N29°41.188	W094°59.07	32	558	0	0	050	3.9	s179.5	N29°41.095	W094°59.11	130	391	0	0	140	5.2
8	00:05:12	184	4.2	s22.9	N29°41.191	W094°59.07	32	558	0	0	048	4.0	p174.4	N29°41.096	W094°59.10	147	572	0	0	144	5.4
9	00:05:10	183	4.2	s27.7	N29°41.193	W094°59.07	32	558	0	0	046	4.1	p174.7	N29°41.098	W094°59.10	164	902	0	0	148	5.7

This is a buoy

10:16 SEP



Polaris Instructor Station 1 - [Master of Run 62 in Houston216_700_4000A]

08:07:40 N29°41.022'
0:07:40 W094°59.032'

Display reference: Free

Brg 152.0°
Rng 0.143 n

Range: 3/8

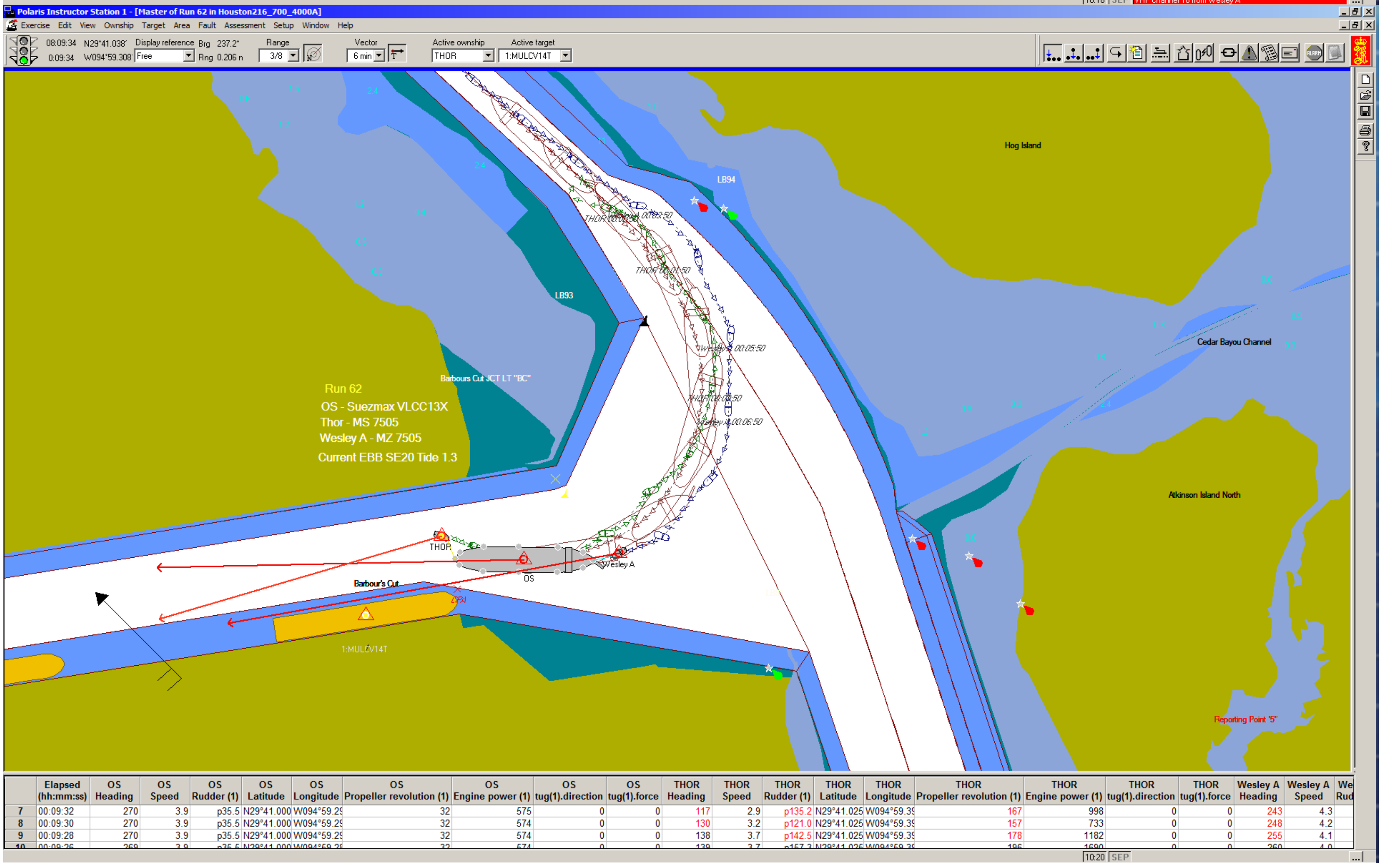
Vector: 6 min

Active ownship: THOR

Active target: 1:MULCV14T

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:07:38	236	4.3	s36.0	N29°41.038	W094°59.15	32	560	0	0	088	4.5	s165.1	N29°40.995	W094°59.26	195	1596	0	0	204	4.7	
8	00:07:36	235	4.3	s36.0	N29°41.040	W094°59.15	32	559	0	0	089	4.5	p175.1	N29°40.995	W094°59.25	197	1613	0	0	207	4.8	
9	00:07:34	234	4.3	s36.0	N29°41.042	W094°59.15	32	559	0	0	083	4.8	s171.2	N29°40.995	W094°59.25	197	1544	0	0	209	5.0	
10	00:07:32	233	4.3	s36.0	N29°41.043	W094°59.16	32	559	0	0	076	5.2	s172.2	N29°40.996	W094°59.26	197	1528	0	0	208	5.1	

10:18 SEP VHF channel 16 from Wesley A



Polaris Instructor Station 1 - [Master of Run 62 in Houston216_700_4000A]

08:09:34 N29°41.038'
0:09:34 W094°59.308'

Display reference: Free

Brg 237.2°
Rng 0.206 n

Range: 3/8

Vector: 6 min

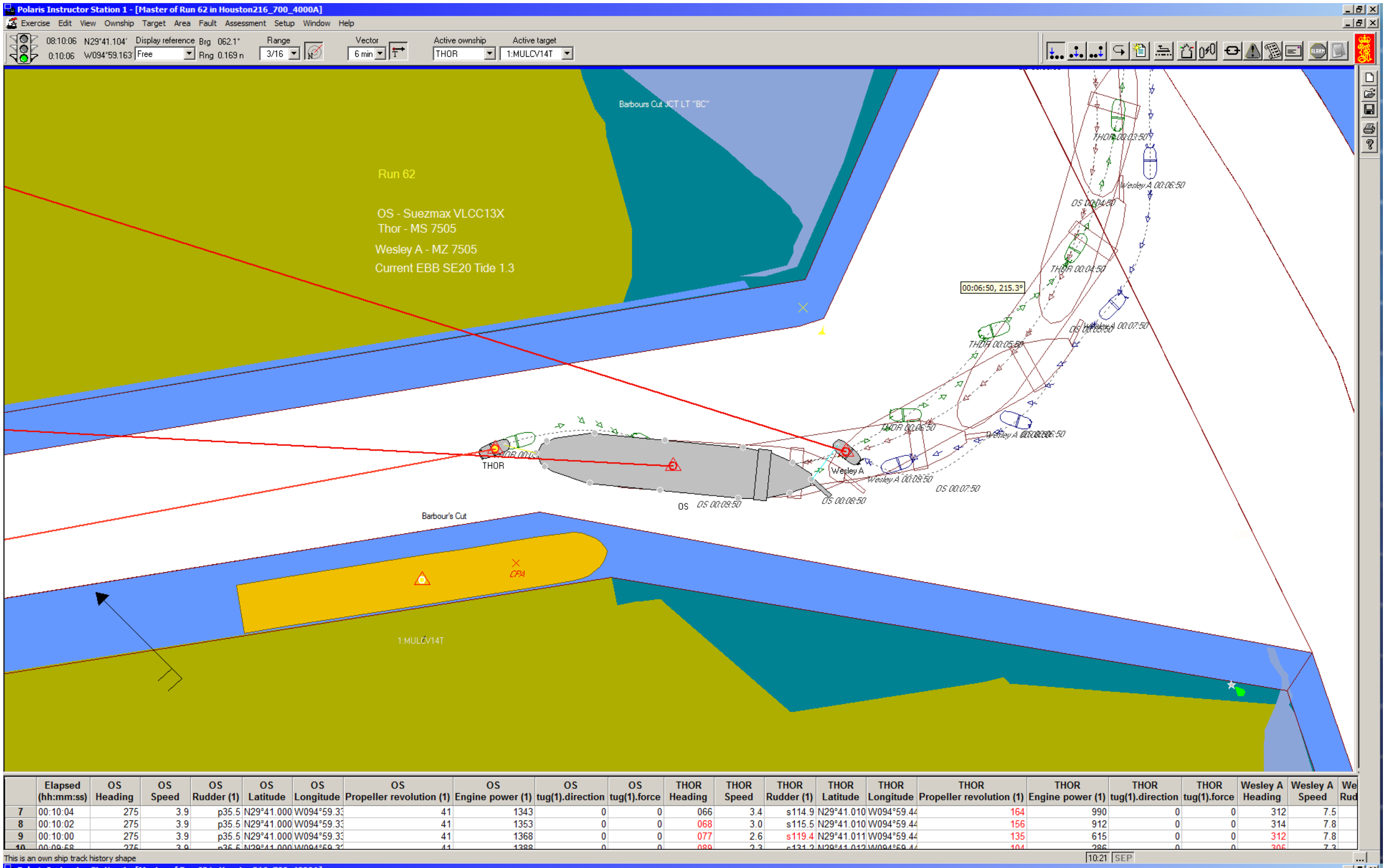
Active ownship: THOR

Active target: 1:MULCV14T

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:09:32	270	3.9	p35.5	N29°41.000	W094°59.29	32	575	0	0	117	2.9	p135.2	N29°41.025	W094°59.39	167	998	0	0	243	4.3	
8	00:09:30	270	3.9	p35.5	N29°41.000	W094°59.29	32	574	0	0	130	3.2	p121.0	N29°41.025	W094°59.39	157	733	0	0	248	4.2	
9	00:09:28	270	3.9	p35.5	N29°41.000	W094°59.29	32	574	0	0	138	3.7	p142.5	N29°41.025	W094°59.39	178	1182	0	0	255	4.1	
10	00:09:26	269	3.9	p35.5	N29°41.000	W094°59.28	32	574	0	0	139	3.7	p157.3	N29°41.025	W094°59.39	196	1690	0	0	260	4.0	

10:20 SEP

June 26, 2019



Polaris Instructor Station 1 - [Master of Run 62 in Houston216_700_4000A]

08:10:06 N29°41.104' Display reference: Free Brg 062.1° Rng 0.169 n
0:10:06 W094°59.163
Range: 3/16
Vector: 6 min
Active ownship: THOR
Active target: 1:MULCV14T

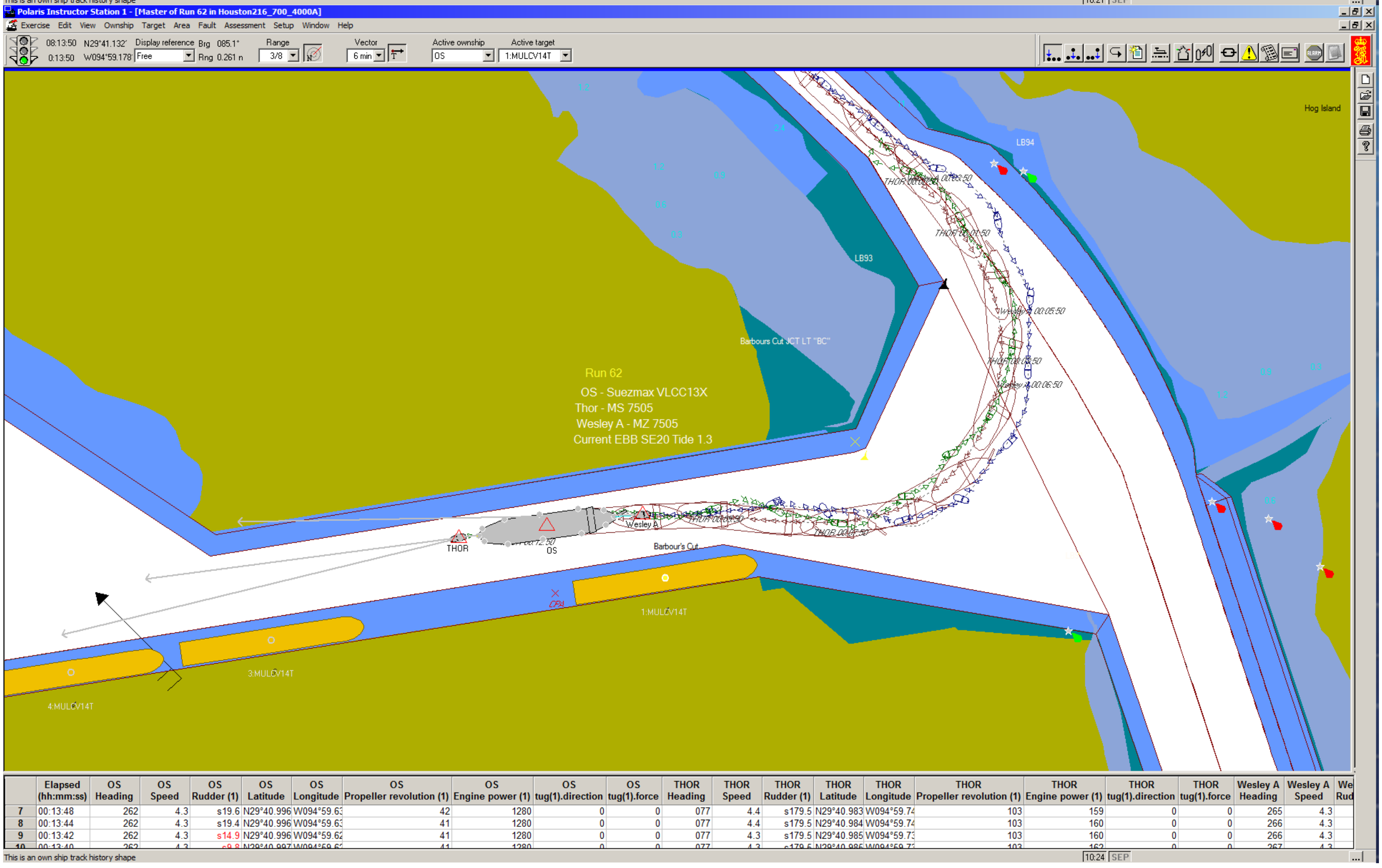
Run 62

OS - Suezmax VLCC13X
Thor - MS 7505
Wesley A - MZ 7505
Current EBB SE20 Tide 1.3

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:10:04	275	3.9	p35.5	N29°41.000	W094°59.33	41	1343	0	0	066	3.4	s114.9	N29°41.010	W094°59.44	164	990	0	0	312	7.5	
8	00:10:02	275	3.9	p35.5	N29°41.000	W094°59.33	41	1353	0	0	068	3.0	s115.5	N29°41.010	W094°59.44	156	912	0	0	314	7.8	
9	00:10:00	275	3.9	p35.5	N29°41.000	W094°59.33	41	1368	0	0	077	2.6	s119.4	N29°41.011	W094°59.44	135	615	0	0	312	7.8	
10	00:09:58	275	3.9	p35.5	N29°41.000	W094°59.33	41	1388	0	0	089	2.3	s131.2	N29°41.012	W094°59.44	104	286	0	0	305	7.3	

This is an own ship track history shape

10:21 SEP



Polaris Instructor Station 1 - [Master of Run 62 in Houston216_700_4000A]

08:13:50 N29°41.132' Display reference: Free Brg 085.1° Rng 0.261 n
0:13:50 W094°59.178'
Range: 3/8
Vector: 6 min
Active ownship: OS
Active target: 1:MULCV14T

Run 62

OS - Suezmax VLCC13X
Thor - MS 7505
Wesley A - MZ 7505
Current EBB SE20 Tide 1.3

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:13:48	262	4.3	s19.6	N29°40.996	W094°59.63	42	1280	0	0	077	4.4	s179.5	N29°40.983	W094°59.74	103	159	0	0	265	4.3	
8	00:13:44	262	4.3	s19.4	N29°40.996	W094°59.63	41	1280	0	0	077	4.4	s179.5	N29°40.984	W094°59.74	103	160	0	0	266	4.3	
9	00:13:42	262	4.3	s14.9	N29°40.996	W094°59.62	41	1280	0	0	077	4.3	s179.5	N29°40.985	W094°59.73	103	160	0	0	266	4.3	
10	00:13:40	262	4.3	s9.8	N29°40.997	W094°59.62	41	1280	0	0	077	4.3	s179.5	N29°40.985	W094°59.73	103	162	0	0	267	4.3	

This is an own ship track history shape

10:24 SEP

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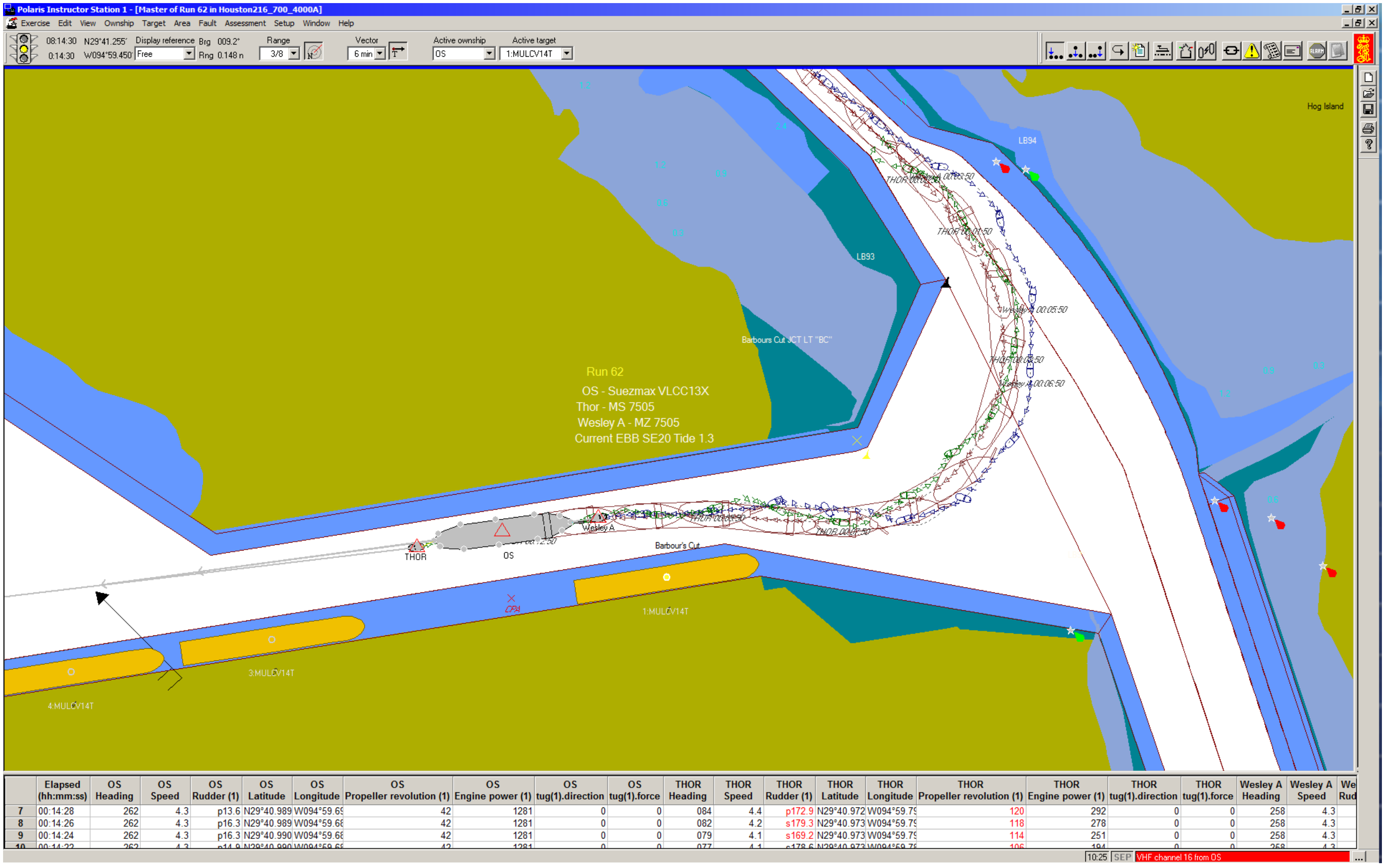


Polaris Instructor Station 1 - [Master of Run 62 in Houston216_700_4000A]

08:14:30 N29°41.255′ Display reference: Free Brg 009.2° Range: 3/8 Vector: 6 min Active ownship: OS Active target: 1:MULCV14T

0:14:30 W094°59.450′ Rng 0.148 n

Run 62

OS - Suezmax VLCC13X
Thor - MS 7505
Wesley A - MZ 7505
Current EBB SE20 Tide 1.3

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:14:28	262	4.3	p13.6	N29°40.989	W094°59.69	42	1281	0	0	084	4.4	p172.9	N29°40.972	W094°59.79	120	292	0	0	258	4.3	
8	00:14:26	262	4.3	p16.3	N29°40.989	W094°59.68	42	1281	0	0	082	4.2	s179.3	N29°40.973	W094°59.79	118	278	0	0	258	4.3	
9	00:14:24	262	4.3	p16.3	N29°40.990	W094°59.68	42	1281	0	0	079	4.1	s169.2	N29°40.973	W094°59.79	114	251	0	0	258	4.3	
10	00:14:22	262	4.3	p14.9	N29°40.990	W094°59.68	42	1281	0	0	077	4.1	s178.6	N29°40.973	W094°59.78	106	194	0	0	258	4.3	

10:25 SEP VHF channel 16 from OS

Appendix N: HSC – Bayport Ship Channel Simulations

Run 40

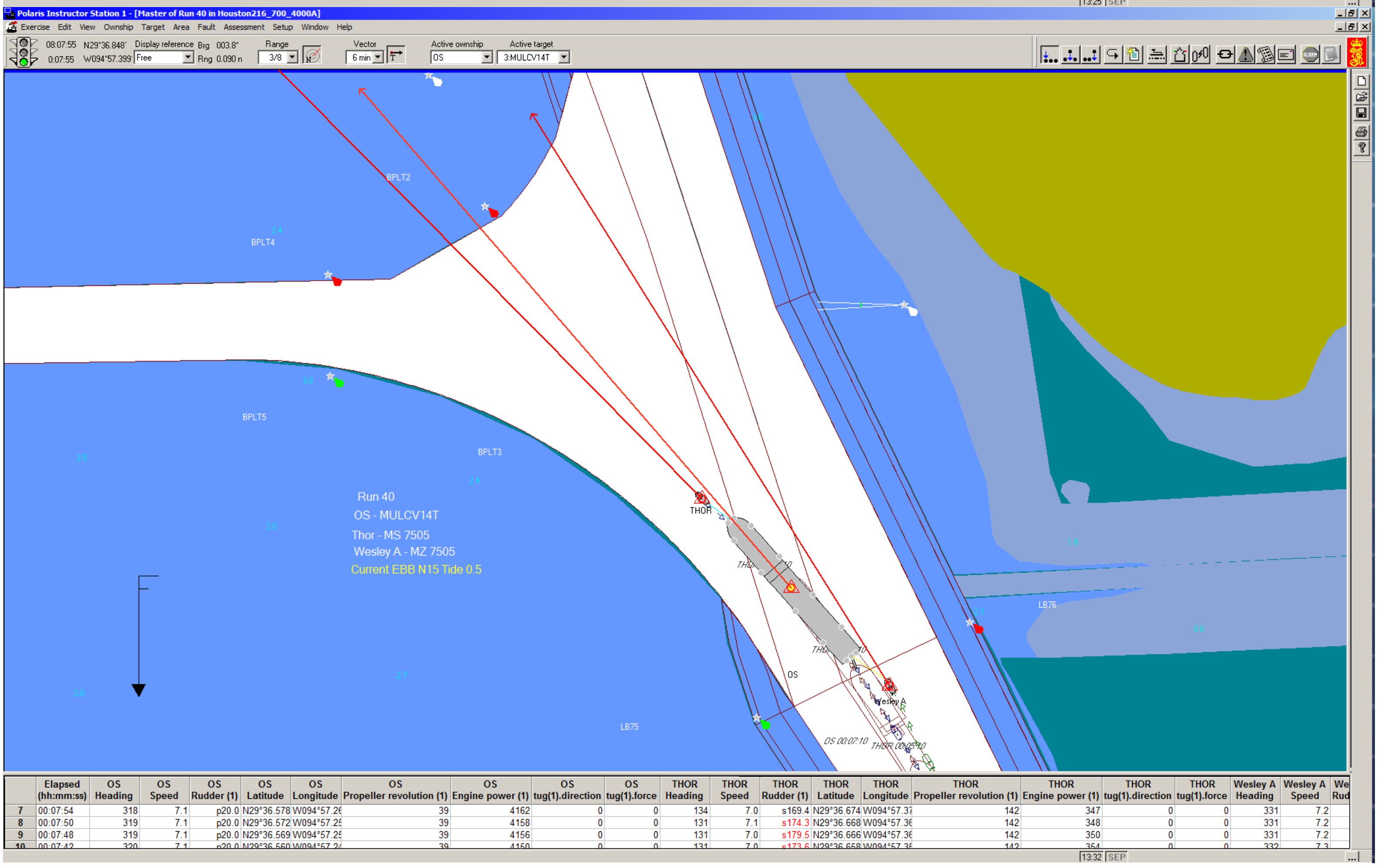
Polaris Instructor Station 1 - [Master of Run 40 in Houston216_700_4000A]

Exercise Edit View Ownship Target Area Fault Assessment Setup Window Help

08:00:49 N29°36.338′ Display reference Brg 086.7°
0:00:49 W094°56.619′ Free Rng 0.355 n
Range 3/4
Vector 6 min
Active ownship OS
Active target 3:MULCV14T

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:00:48	326	7.6	s9.9	N29°35.854	W094°56.72	39	4001	0	0	149	9.0	s178.0	N29°35.952	W094°56.79	188	874	0	0	303	6.5	
8	00:00:46	326	7.6	s9.9	N29°35.851	W094°56.71	39	3999	0	0	149	8.6	s177.9	N29°35.948	W094°56.79	172	598	0	0	308	6.3	
9	00:00:44	326	7.6	s9.9	N29°35.847	W094°56.71	39	3998	0	0	148	8.6	s173.3	N29°35.944	W094°56.79	160	384	0	0	318	7.2	
10	00:00:42	326	7.6	s9.9	N29°35.844	W094°56.71	39	3997	0	0	148	8.8	s173.7	N29°35.940	W094°56.79	159	352	0	0	330	8.5	

13:25 SEP



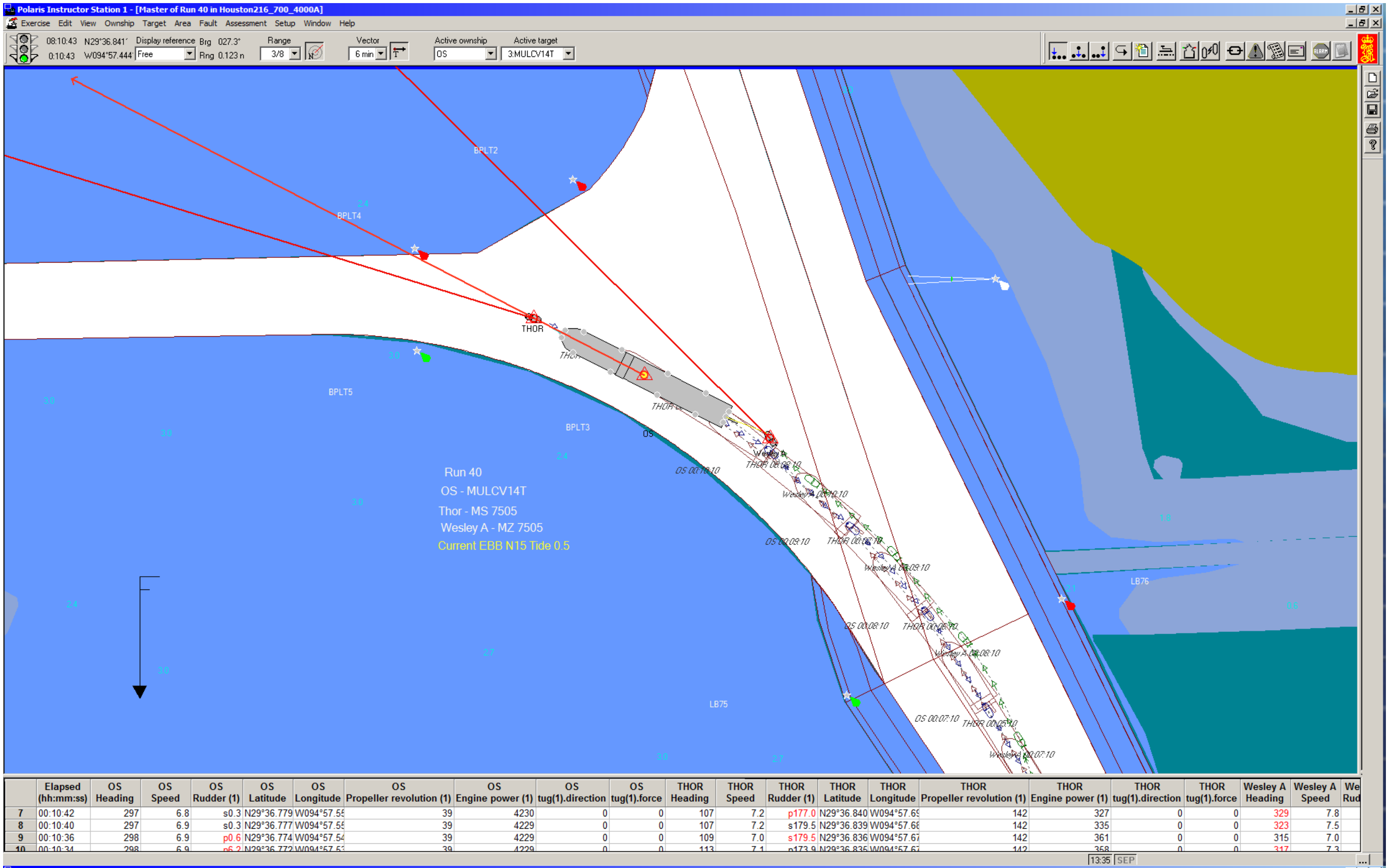
Polaris Instructor Station 1 - [Master of Run 40 in Houston216_700_4000A]

Exercise Edit View Ownship Target Area Fault Assessment Setup Window Help

08:07:55 N29°36.848′ Display reference Brg 003.8°
0:07:55 W094°57.399′ Free Rng 0.090 n
Range 3/8
Vector 6 min
Active ownship OS
Active target 3:MULCV14T

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:07:54	318	7.1	p20.0	N29°36.578	W094°57.26	39	4162	0	0	134	7.0	s169.4	N29°36.674	W094°57.37	142	347	0	0	331	7.2	
8	00:07:50	319	7.1	p20.0	N29°36.572	W094°57.25	39	4158	0	0	131	7.1	s174.3	N29°36.668	W094°57.36	142	348	0	0	331	7.2	
9	00:07:48	319	7.1	p20.0	N29°36.569	W094°57.25	39	4156	0	0	131	7.0	s179.5	N29°36.666	W094°57.36	142	350	0	0	331	7.2	
10	00:07:42	320	7.1	p20.0	N29°36.560	W094°57.24	39	4150	0	0	131	7.0	s173.6	N29°36.658	W094°57.35	142	354	0	0	332	7.3	

13:32 SEP

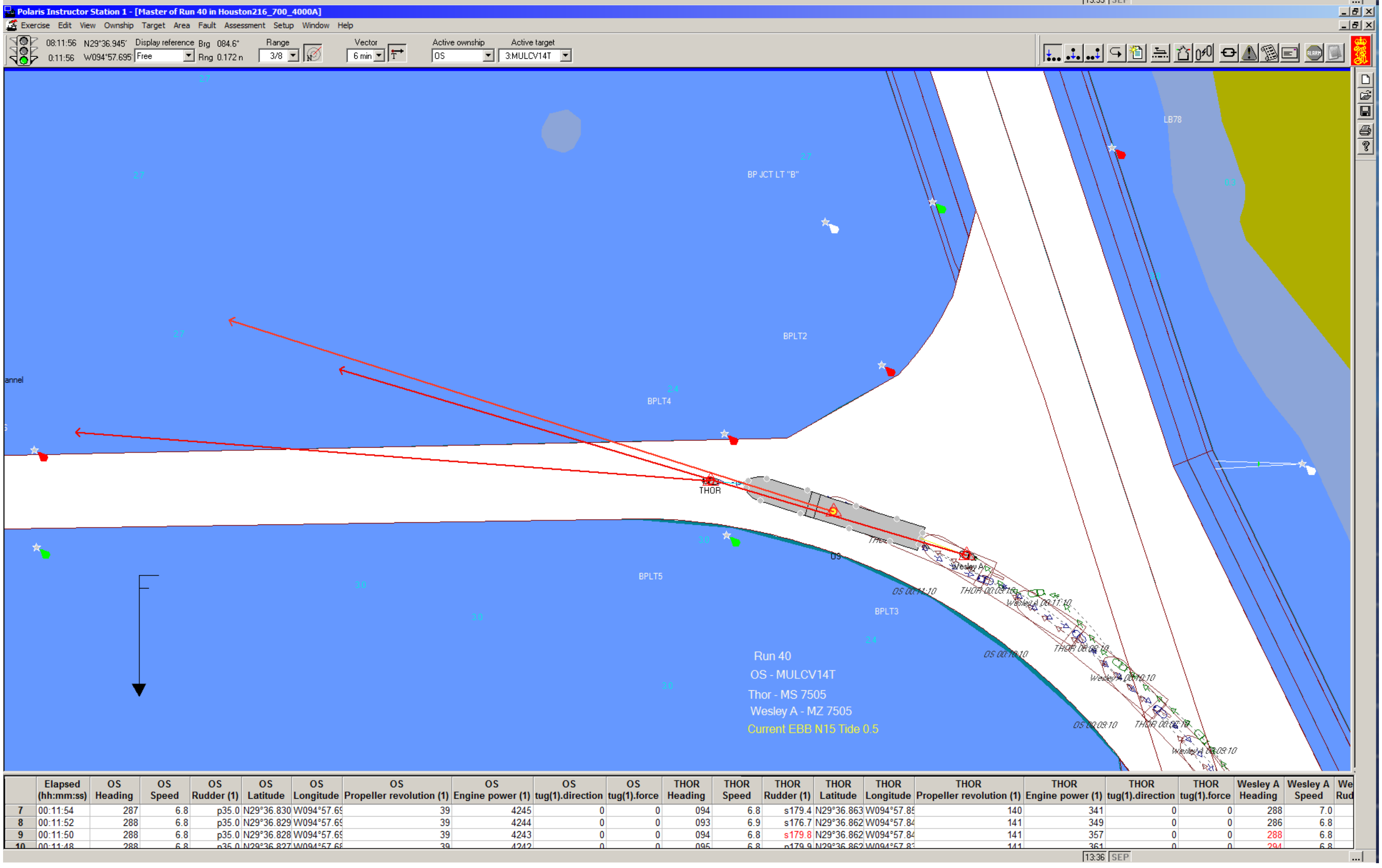


Polaris Instructor Station 1 - [Master of Run 40 in Houston216_700_4000A]

08:10:43 N29°36.841' 0:10:43 W094°57.444' Display reference Free Brg 027.3° Rng 0.123 n Range 3/8 Vector 6 min Active ownship OS Active target 3:MULCV14T

Run 40
OS - MULCV14T
Thor - MS 7505
Wesley A - MZ 7505
Current EBB N15 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:10:42	297	6.8	s0.3	N29°36.779	W094°57.55	39	4230	0	0	107	7.2	p177.0	N29°36.840	W094°57.69	142	327	0	0	329	7.8	
8	00:10:40	297	6.9	s0.3	N29°36.777	W094°57.55	39	4229	0	0	107	7.2	s179.5	N29°36.839	W094°57.68	142	335	0	0	323	7.5	
9	00:10:36	298	6.9	p0.6	N29°36.774	W094°57.54	39	4229	0	0	109	7.0	s179.5	N29°36.836	W094°57.67	142	361	0	0	315	7.0	
10	00:10:34	298	6.9	p6.2	N29°36.772	W094°57.53	39	4229	0	0	113	7.1	p173.9	N29°36.835	W094°57.67	142	358	0	0	317	7.3	



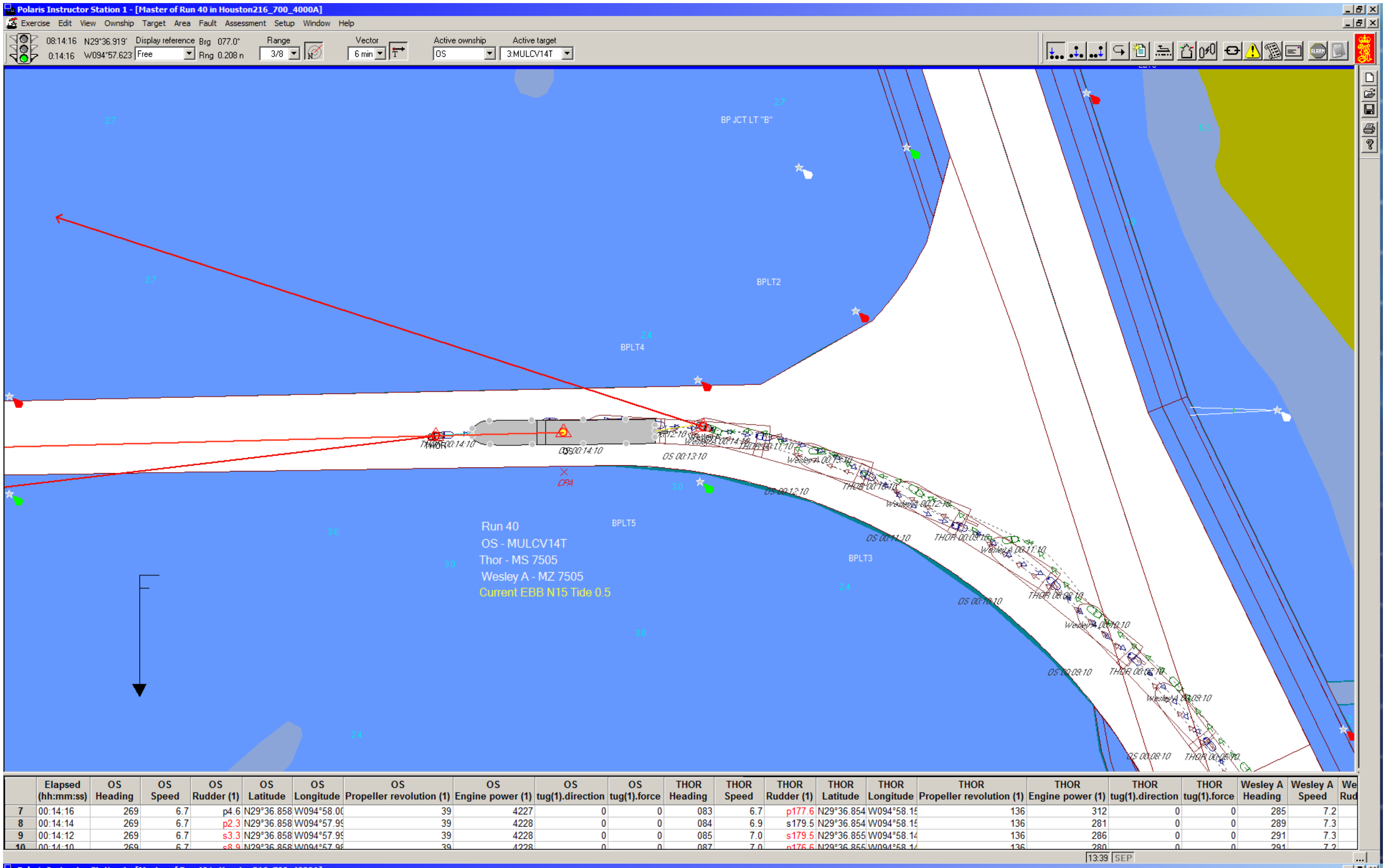
Polaris Instructor Station 1 - [Master of Run 40 in Houston216_700_4000A]

08:11:56 N29°36.945' 0:11:56 W094°57.695' Display reference Free Brg 084.6° Rng 0.172 n Range 3/8 Vector 6 min Active ownship OS Active target 3:MULCV14T

Run 40
OS - MULCV14T
Thor - MS 7505
Wesley A - MZ 7505
Current EBB N15 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:11:54	287	6.8	p35.0	N29°36.830	W094°57.69	39	4245	0	0	094	6.8	s179.4	N29°36.863	W094°57.85	140	341	0	0	288	7.0	
8	00:11:52	288	6.8	p35.0	N29°36.829	W094°57.69	39	4244	0	0	093	6.9	s176.7	N29°36.862	W094°57.84	141	349	0	0	286	6.8	
9	00:11:50	288	6.8	p35.0	N29°36.828	W094°57.69	39	4243	0	0	094	6.8	s179.8	N29°36.862	W094°57.84	141	357	0	0	288	6.8	
10	00:11:48	288	6.8	p35.0	N29°36.827	W094°57.68	39	4242	0	0	095	6.8	p179.9	N29°36.862	W094°57.83	141	361	0	0	294	6.8	

June 26, 2019



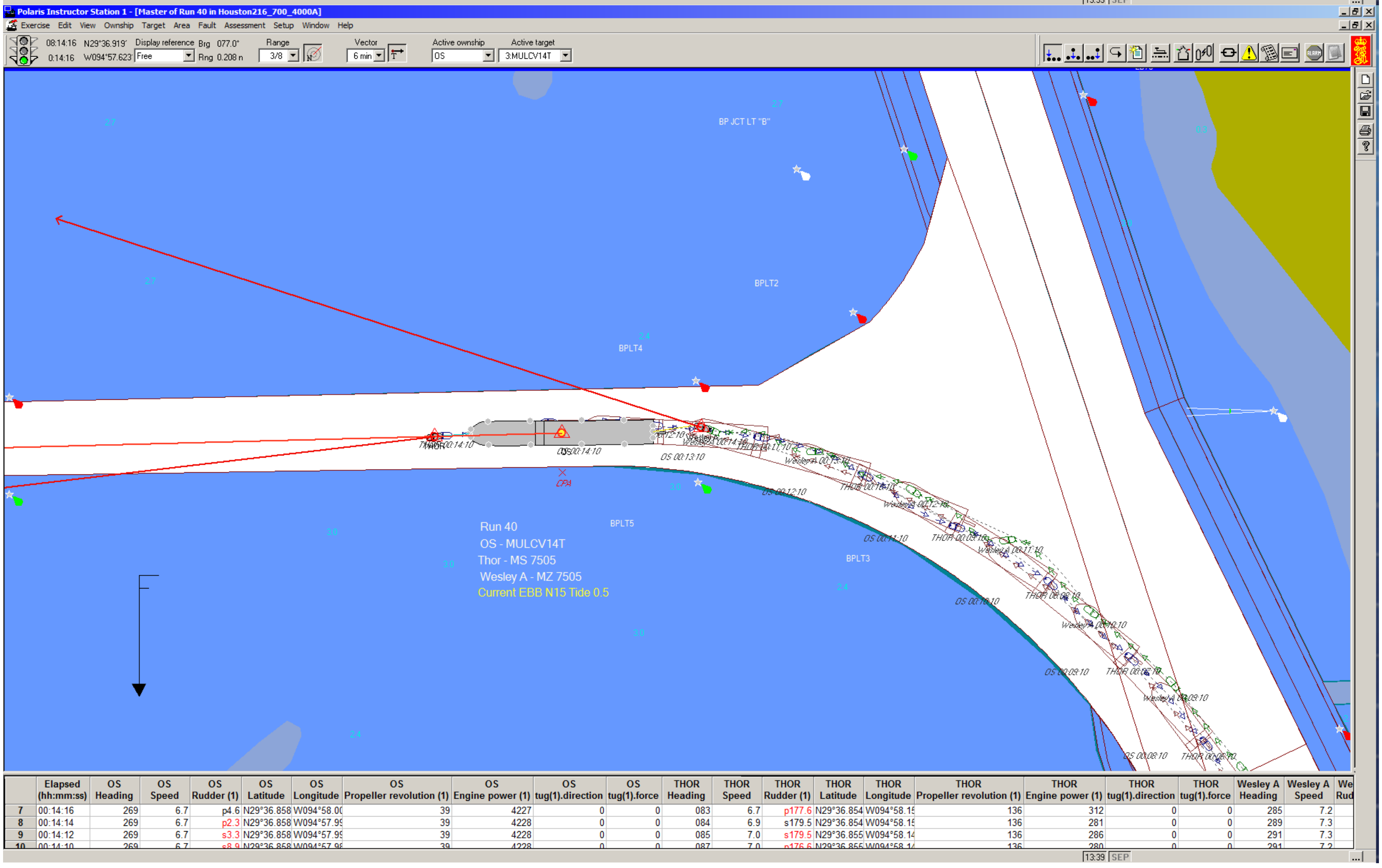
Polaris Instructor Station 1 - [Master of Run 40 in Houston216_700_4000A]

08:14:16 N29°36.919' Display reference: Free Brg 077.0°
0:14:16 W094°57.623' Rng 0.208 n
Range: 3/8
Vector: 6 min
Active ownship: OS
Active target: 3:MULCV14T

Run 40
OS - MULCV14T
Thor - MS 7505
Wesley A - MZ 7505
Current EBB N15 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:14:16	269	6.7	p4.6	N29°36.858	W094°58.00	39	4227	0	0	083	6.7	p177.6	N29°36.854	W094°58.15	136	312	0	0	285	7.2	
8	00:14:14	269	6.7	p2.3	N29°36.858	W094°57.99	39	4228	0	0	084	6.9	s179.5	N29°36.854	W094°58.15	136	281	0	0	289	7.3	
9	00:14:12	269	6.7	s3.3	N29°36.858	W094°57.99	39	4228	0	0	085	7.0	s179.5	N29°36.855	W094°58.14	136	286	0	0	291	7.3	
10	00:14:10	269	6.7	s8.9	N29°36.858	W094°57.98	39	4228	0	0	087	7.0	p176.6	N29°36.855	W094°58.14	136	280	0	0	291	7.2	

13:39 SEP



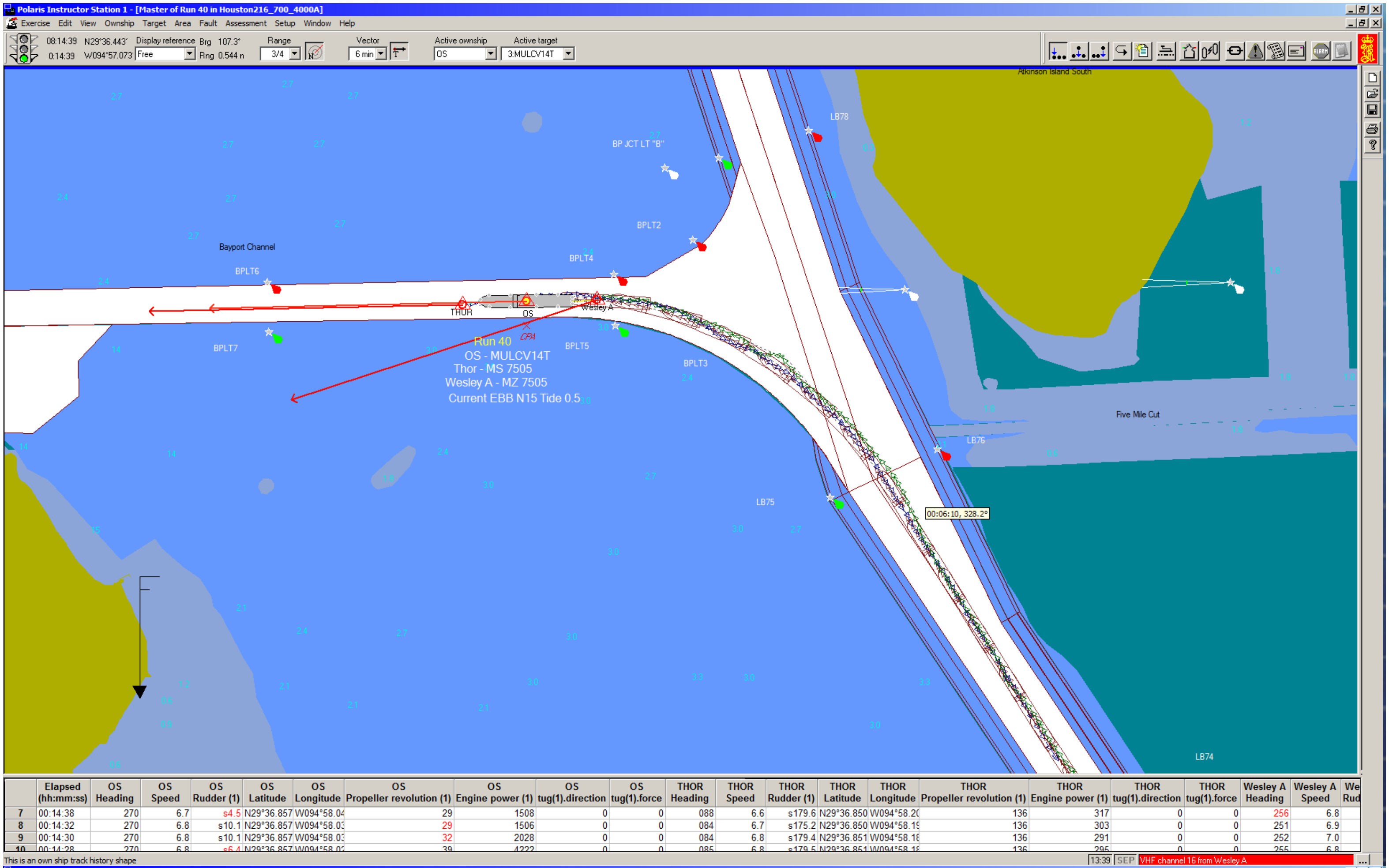
Polaris Instructor Station 1 - [Master of Run 40 in Houston216_700_4000A]

08:14:16 N29°36.919' Display reference: Free Brg 077.0°
0:14:16 W094°57.623' Rng 0.208 n
Range: 3/8
Vector: 6 min
Active ownship: OS
Active target: 3:MULCV14T

Run 40
OS - MULCV14T
Thor - MS 7505
Wesley A - MZ 7505
Current EBB N15 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:14:16	269	6.7	p4.6	N29°36.858	W094°58.00	39	4227	0	0	083	6.7	p177.6	N29°36.854	W094°58.15	136	312	0	0	285	7.2	
8	00:14:14	269	6.7	p2.3	N29°36.858	W094°57.99	39	4228	0	0	084	6.9	s179.5	N29°36.854	W094°58.15	136	281	0	0	289	7.3	
9	00:14:12	269	6.7	s3.3	N29°36.858	W094°57.99	39	4228	0	0	085	7.0	s179.5	N29°36.855	W094°58.14	136	286	0	0	291	7.3	
10	00:14:10	269	6.7	s8.9	N29°36.858	W094°57.98	39	4228	0	0	087	7.0	p176.6	N29°36.855	W094°58.14	136	280	0	0	291	7.2	

13:39 SEP



Polaris Instructor Station 1 - [Master of Run 40 in Houston216_700_4000A]

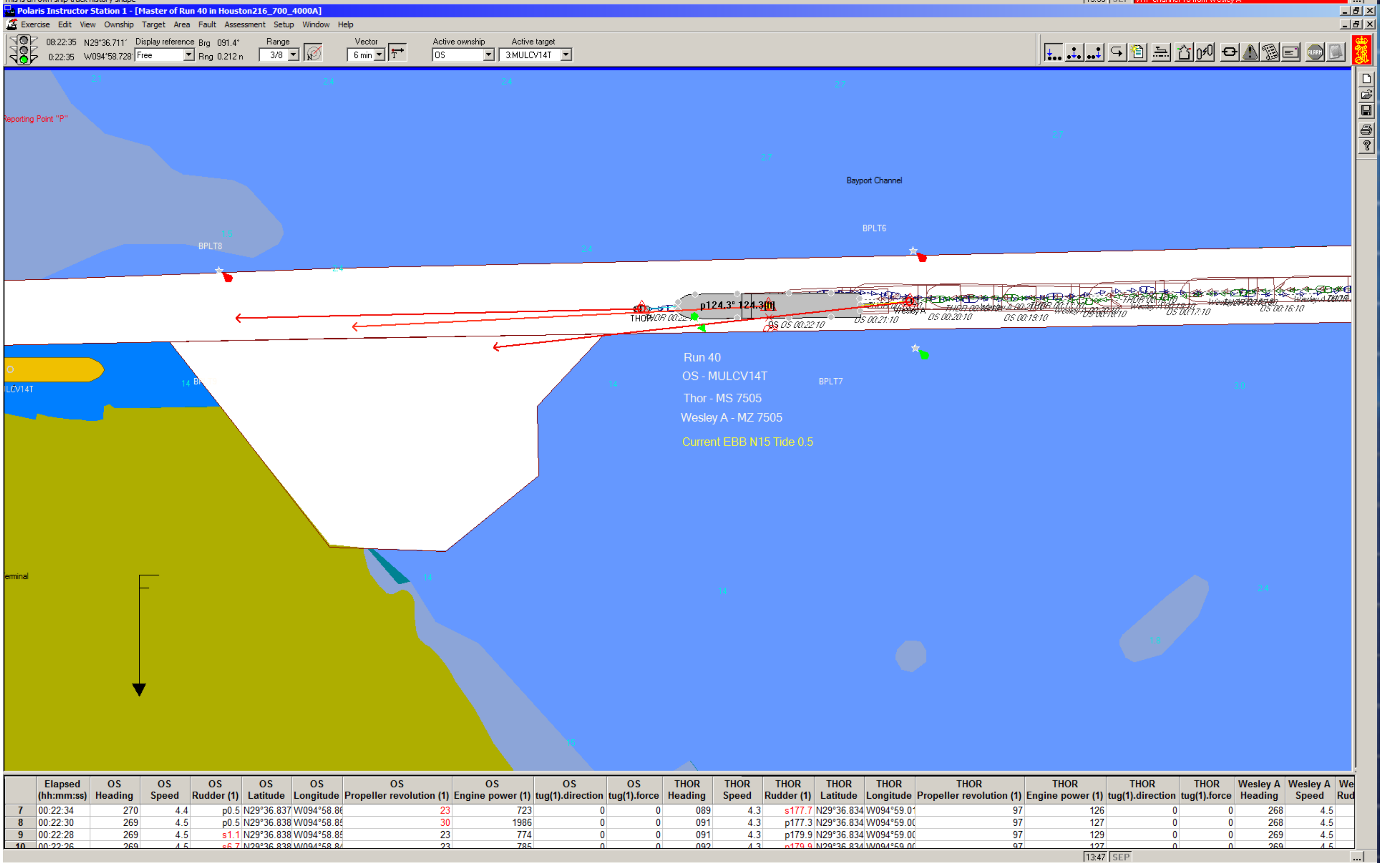
08:14:39 N29°36.443′ 0:14:39 W094°57.073′ Display reference Free Brg 107.3° Rng 0.544 n Range 3/4 Vector 6 min Active ownship OS Active target 3:MULCV14T

Run 40
OS - MULCV14T
Thor - MS 7505
Wesley A - MZ 7505
Current EBB N15 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:14:38	270	6.7	s4.5	N29°36.857	W094°58.04	29	1508	0	0	088	6.6	s179.6	N29°36.850	W094°58.20	136	317	0	0	256	6.8	
8	00:14:32	270	6.8	s10.1	N29°36.857	W094°58.03	29	1506	0	0	084	6.7	s175.2	N29°36.850	W094°58.19	136	303	0	0	251	6.9	
9	00:14:30	270	6.8	s10.1	N29°36.857	W094°58.03	32	2028	0	0	084	6.8	s179.4	N29°36.851	W094°58.18	136	291	0	0	252	7.0	
10	00:14:28	270	6.8	s6.4	N29°36.857	W094°58.02	39	4222	0	0	085	6.8	s179.5	N29°36.851	W094°58.18	136	295	0	0	255	6.8	

This is an own ship track history shape

13:39 SEP VHF channel 16 from Wesley A



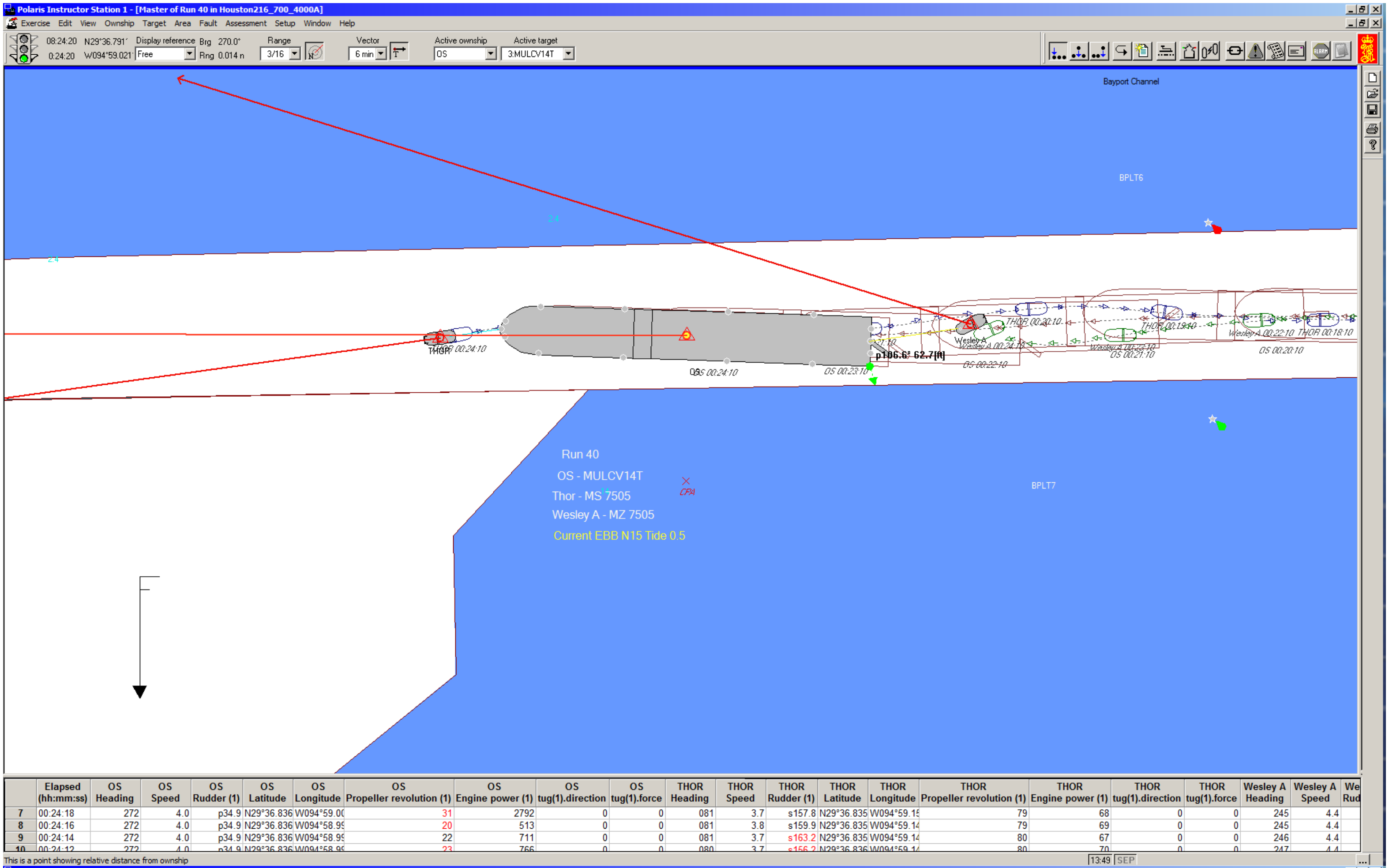
Polaris Instructor Station 1 - [Master of Run 40 in Houston216_700_4000A]

08:22:35 N29°36.711′ 0:22:35 W094°58.728′ Display reference Free Brg 091.4° Rng 0.212 n Range 3/8 Vector 6 min Active ownship OS Active target 3:MULCV14T

Run 40
OS - MULCV14T
Thor - MS 7505
Wesley A - MZ 7505
Current EBB N15 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:22:34	270	4.4	p0.5	N29°36.837	W094°58.86	23	723	0	0	089	4.3	s177.7	N29°36.834	W094°59.01	97	126	0	0	268	4.5	
8	00:22:30	269	4.5	p0.5	N29°36.838	W094°58.85	30	1986	0	0	091	4.3	p177.3	N29°36.834	W094°59.00	97	127	0	0	268	4.5	
9	00:22:28	269	4.5	s1.1	N29°36.838	W094°58.85	23	774	0	0	091	4.3	p179.9	N29°36.834	W094°59.00	97	129	0	0	269	4.5	
10	00:22:26	269	4.5	s6.7	N29°36.838	W094°58.84	23	785	0	0	092	4.3	p179.9	N29°36.834	W094°59.00	97	127	0	0	269	4.5	

13:47 SEP

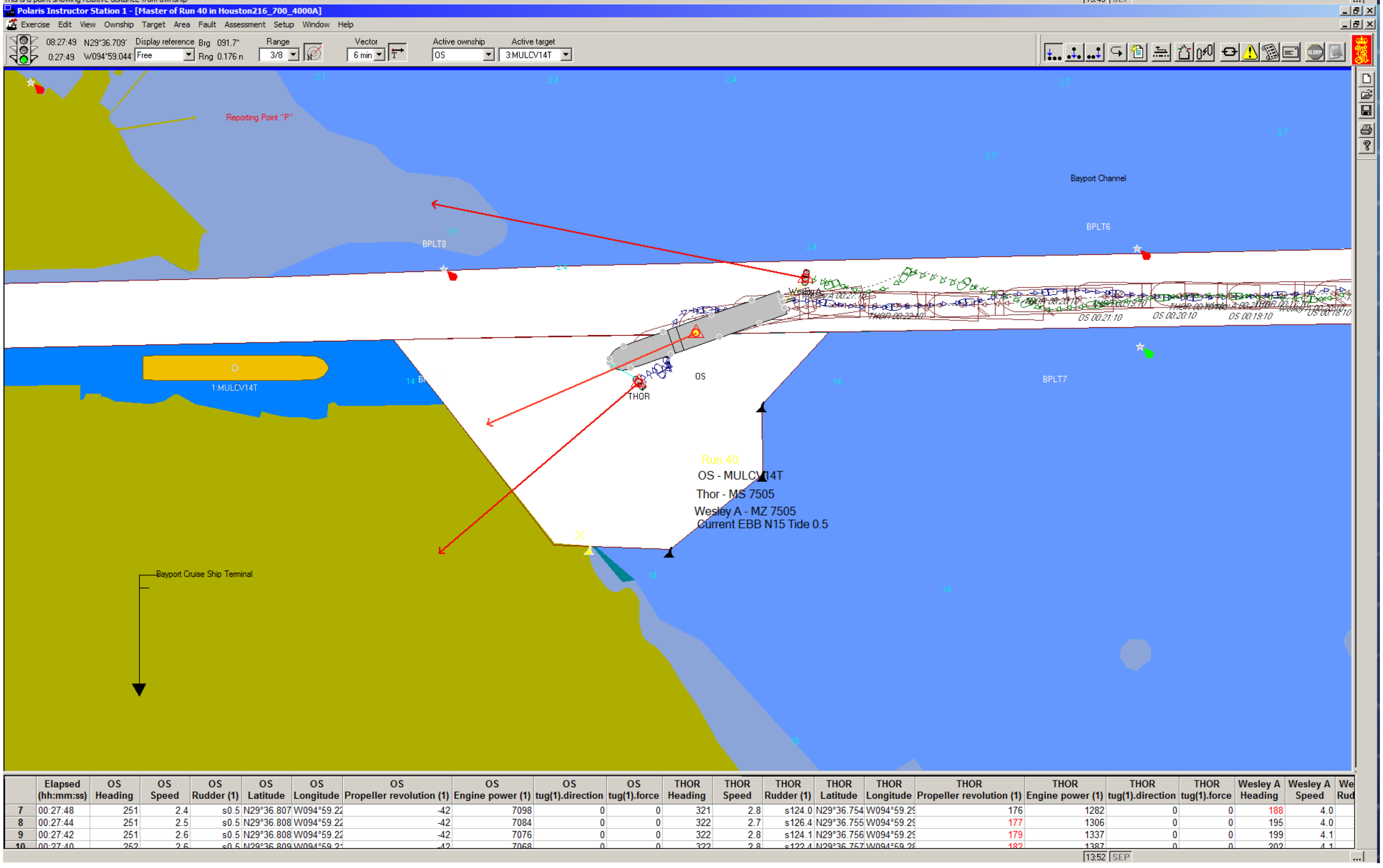


Polaris Instructor Station 1 - [Master of Run 40 in Houston216_700_4000A]

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:24:18	272	4.0	p34.9	N29°36.836	W094°59.0	31	2792	0	0	081	3.7	s157.8	N29°36.835	W094°59.1	79	68	0	0	245	4.4	
8	00:24:16	272	4.0	p34.9	N29°36.836	W094°58.9	20	513	0	0	081	3.8	s159.9	N29°36.835	W094°59.1	79	69	0	0	245	4.4	
9	00:24:14	272	4.0	p34.9	N29°36.836	W094°58.9	22	711	0	0	081	3.7	s163.2	N29°36.835	W094°59.1	80	67	0	0	246	4.4	
10	00:24:12	272	4.0	p34.9	N29°36.836	W094°58.9	23	766	0	0	080	3.7	s156.2	N29°36.836	W094°59.1	80	70	0	0	247	4.4	

This is a point showing relative distance from ownship

13:49 SEP

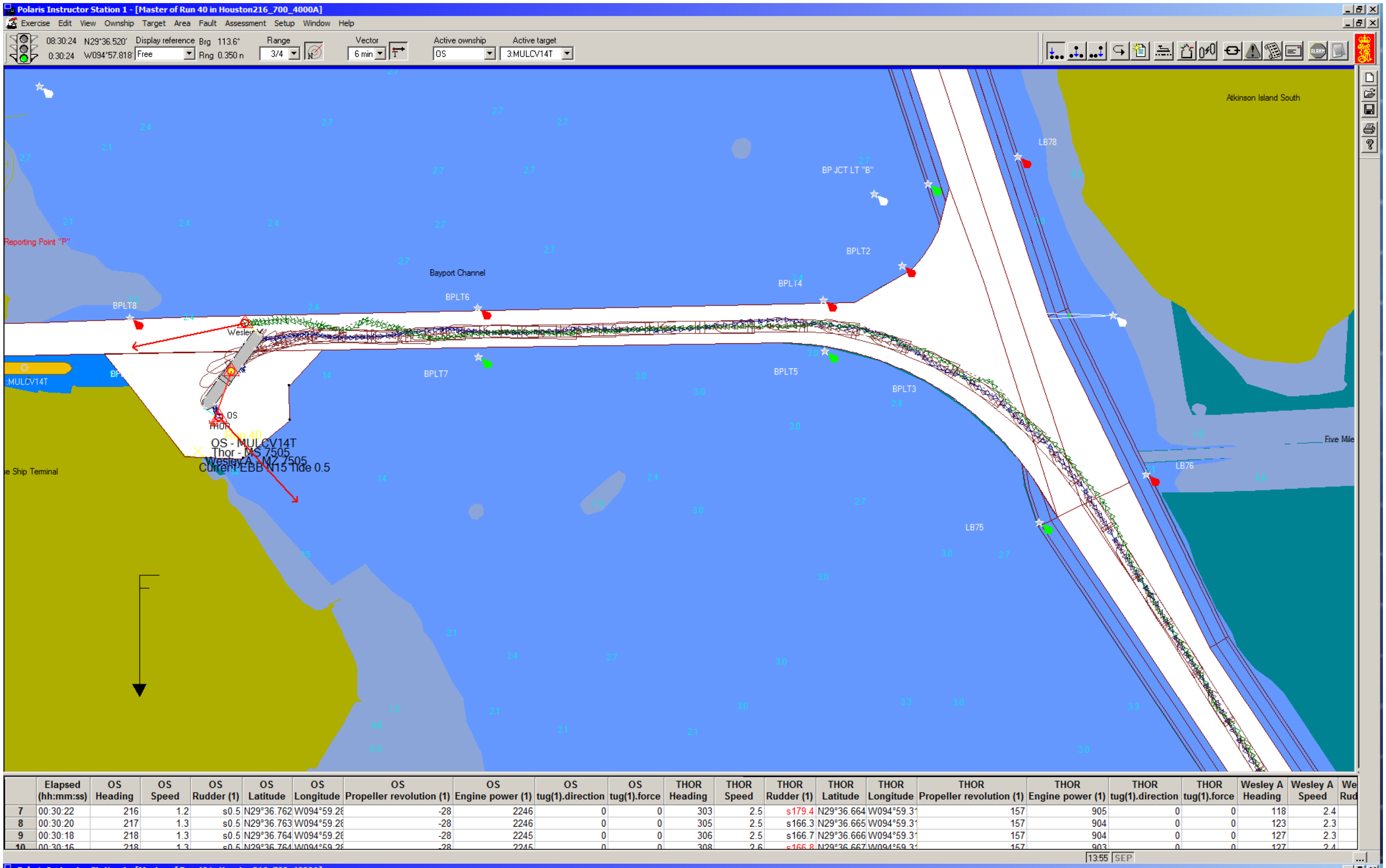


Polaris Instructor Station 1 - [Master of Run 40 in Houston216_700_4000A]

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:27:48	251	2.4	s0.5	N29°36.807	W094°59.2	-42	7098	0	0	321	2.8	s124.0	N29°36.754	W094°59.2	176	1282	0	0	188	4.0	
8	00:27:44	251	2.5	s0.5	N29°36.808	W094°59.2	-42	7084	0	0	322	2.7	s126.4	N29°36.755	W094°59.2	177	1306	0	0	195	4.0	
9	00:27:42	251	2.6	s0.5	N29°36.808	W094°59.2	-42	7076	0	0	322	2.8	s124.1	N29°36.756	W094°59.2	179	1337	0	0	199	4.1	
10	00:27:40	252	2.6	s0.5	N29°36.809	W094°59.2	-42	7068	0	0	322	2.8	s122.4	N29°36.757	W094°59.2	182	1387	0	0	202	4.1	

13:52 SEP

June 26, 2019

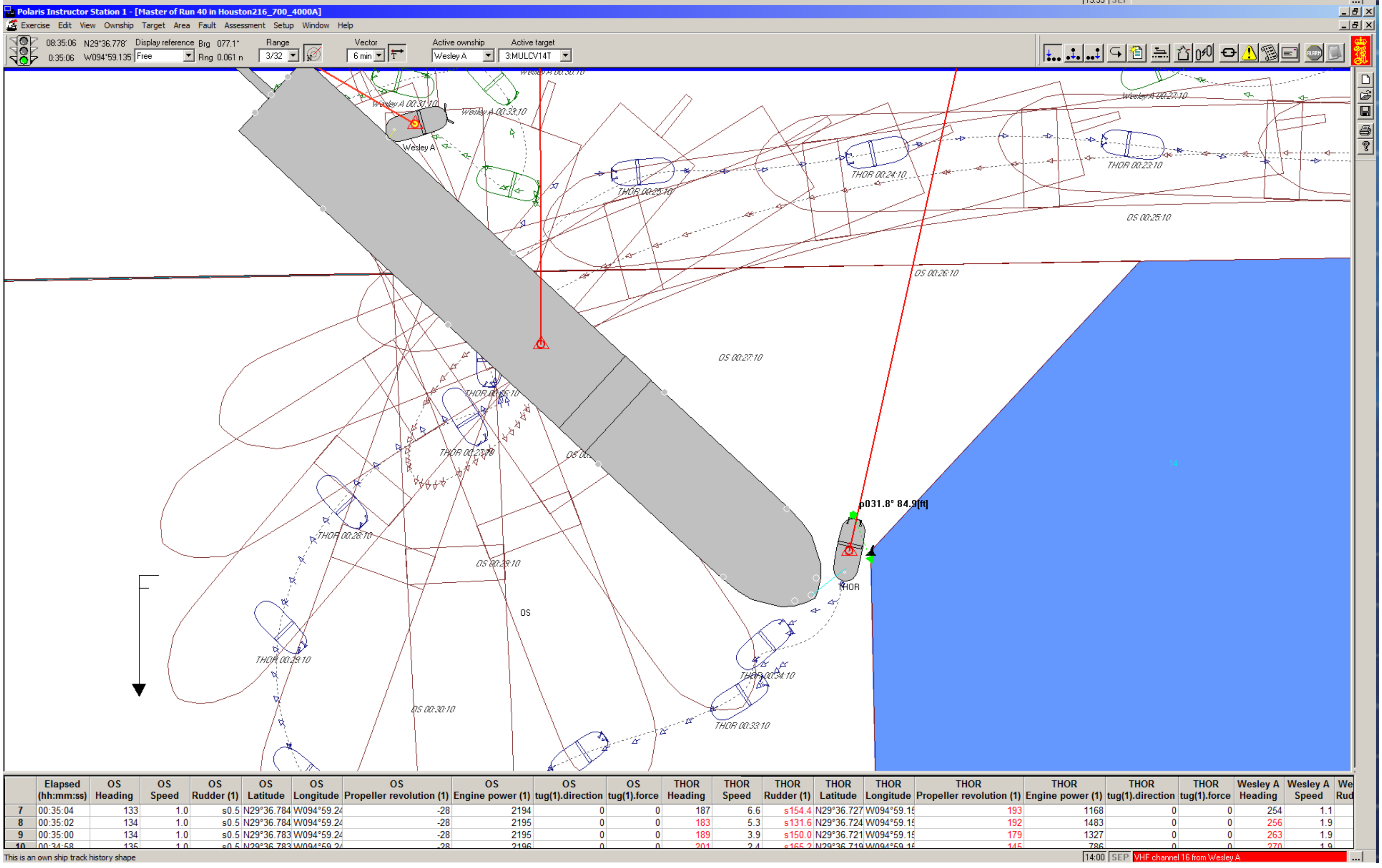


Polaris Instructor Station 1 - [Master of Run 40 in Houston216_700_4000A]

08:30:24 N29°36.520' 0:30:24 W094°57.818 Display reference Free Brg 113.6° Rng 0.350 n Range 3/4 Vector 6 min Active ownship OS Active target 3:MULCV14T

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:30:22	216	1.2	s0.5	N29°36.762	W094°59.28	-28	2246	0	0	303	2.5	s179.4	N29°36.664	W094°59.31	157	905	0	0	118	2.4	
8	00:30:20	217	1.3	s0.5	N29°36.763	W094°59.28	-28	2246	0	0	305	2.5	s166.3	N29°36.665	W094°59.31	157	904	0	0	123	2.3	
9	00:30:18	218	1.3	s0.5	N29°36.764	W094°59.28	-28	2245	0	0	306	2.5	s166.7	N29°36.666	W094°59.31	157	904	0	0	127	2.3	
10	00:30:16	218	1.3	s0.5	N29°36.764	W094°59.28	-28	2245	0	0	308	2.6	s166.8	N29°36.667	W094°59.31	157	903	0	0	127	2.4	

13:55 SEP



Polaris Instructor Station 1 - [Master of Run 40 in Houston216_700_4000A]

08:35:06 N29°36.778' 0:35:06 W094°59.135 Display reference Free Brg 077.1° Rng 0.061 n Range 3/32 Vector 6 min Active ownship Wesley A Active target 3:MULCV14T

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:35:04	133	1.0	s0.5	N29°36.784	W094°59.24	-28	2194	0	0	187	6.6	s154.4	N29°36.727	W094°59.15	193	1168	0	0	254	1.1	
8	00:35:02	134	1.0	s0.5	N29°36.784	W094°59.24	-28	2195	0	0	183	5.3	s131.6	N29°36.724	W094°59.15	192	1483	0	0	256	1.9	
9	00:35:00	134	1.0	s0.5	N29°36.783	W094°59.24	-28	2195	0	0	189	3.9	s150.0	N29°36.721	W094°59.15	179	1327	0	0	263	1.9	
10	00:34:58	135	1.0	s0.5	N29°36.783	W094°59.24	-28	2196	0	0	201	2.4	s165.2	N29°36.719	W094°59.15	145	786	0	0	270	1.9	

This is an own ship track history shape

14:00 SEP VHF channel 16 from Wesley A

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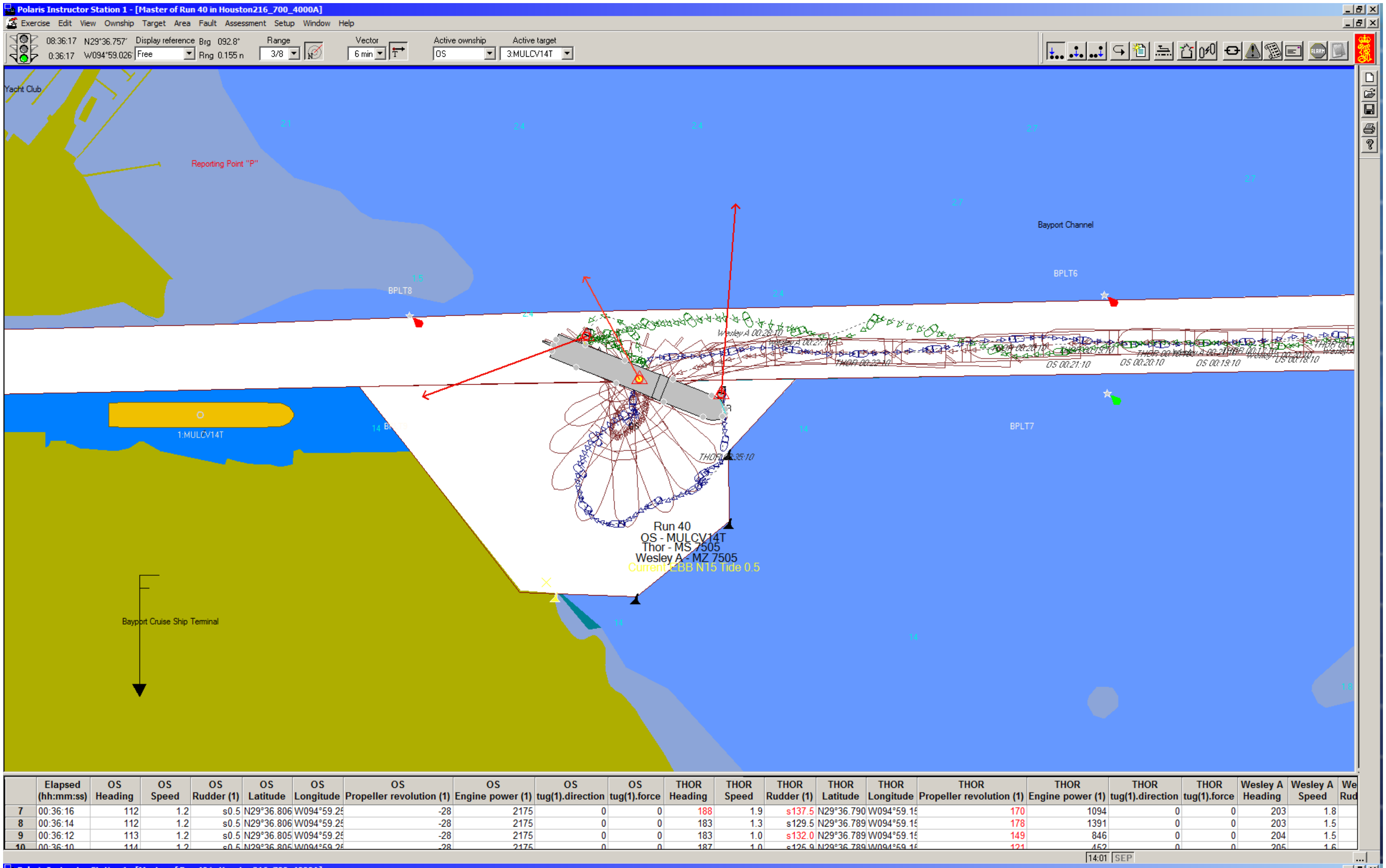
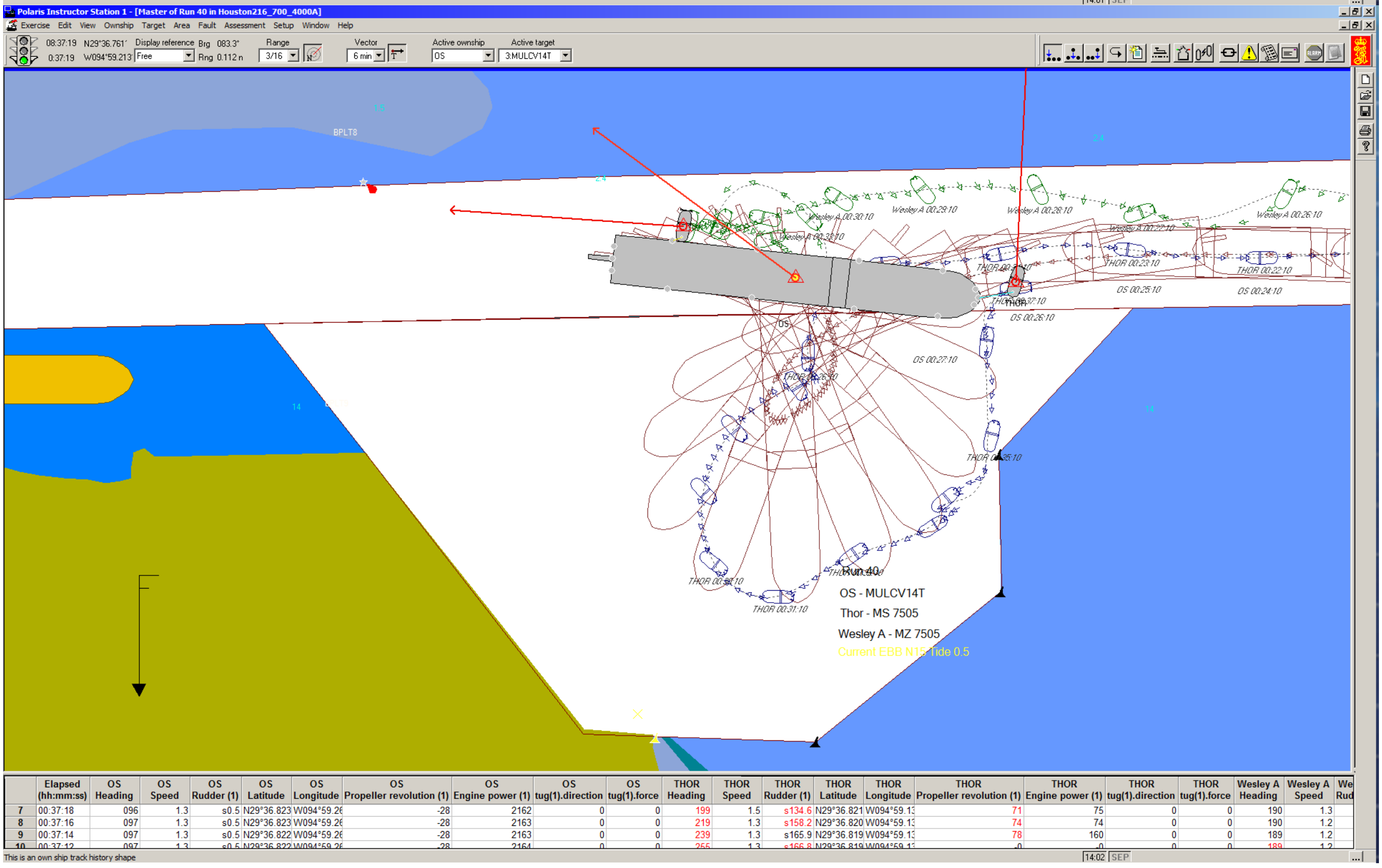


Polaris Instructor Station 1 - [Master of Run 40 in Houston216_700_4000A]

08:36:17 N29°36.757′ Display reference: Free Brg 092.8° Range: 3/8 Vector: 6 min Active ownship: OS Active target: 3:MULCV14T
0:36:17 W094°59.026′ Rng 0.155 n

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:36:16	112	1.2	s0.5	N29°36.806	W094°59.25	-28	2175	0	0	188	1.9	s137.5	N29°36.790	W094°59.15	170	1094	0	0	203	1.8	
8	00:36:14	112	1.2	s0.5	N29°36.806	W094°59.25	-28	2175	0	0	183	1.3	s129.5	N29°36.789	W094°59.15	178	1391	0	0	203	1.5	
9	00:36:12	113	1.2	s0.5	N29°36.805	W094°59.25	-28	2175	0	0	183	1.0	s132.0	N29°36.789	W094°59.15	149	846	0	0	204	1.5	
10	00:36:10	114	1.2	s0.5	N29°36.805	W094°59.25	-28	2175	0	0	187	1.0	s125.9	N29°36.789	W094°59.15	121	452	0	0	205	1.6	

14:01 SEP



Polaris Instructor Station 1 - [Master of Run 40 in Houston216_700_4000A]

08:37:19 N29°36.761′ Display reference: Free Brg 083.3° Range: 3/16 Vector: 6 min Active ownship: OS Active target: 3:MULCV14T
0:37:19 W094°59.213′ Rng 0.112 n

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	Wesley A Heading	Wesley A Speed	We Rud
7	00:37:18	096	1.3	s0.5	N29°36.823	W094°59.26	-28	2162	0	0	199	1.5	s134.6	N29°36.821	W094°59.13	71	75	0	0	190	1.3	
8	00:37:16	097	1.3	s0.5	N29°36.823	W094°59.26	-28	2163	0	0	219	1.3	s158.2	N29°36.820	W094°59.13	74	74	0	0	190	1.2	
9	00:37:14	097	1.3	s0.5	N29°36.822	W094°59.26	-28	2163	0	0	239	1.3	s165.9	N29°36.819	W094°59.13	78	160	0	0	189	1.2	
10	00:37:12	097	1.3	s0.5	N29°36.822	W094°59.26	-28	2164	0	0	255	1.3	s166.8	N29°36.819	W094°59.13	-0	-0	0	0	189	1.2	

This is an own ship track history shape

14:02 SEP

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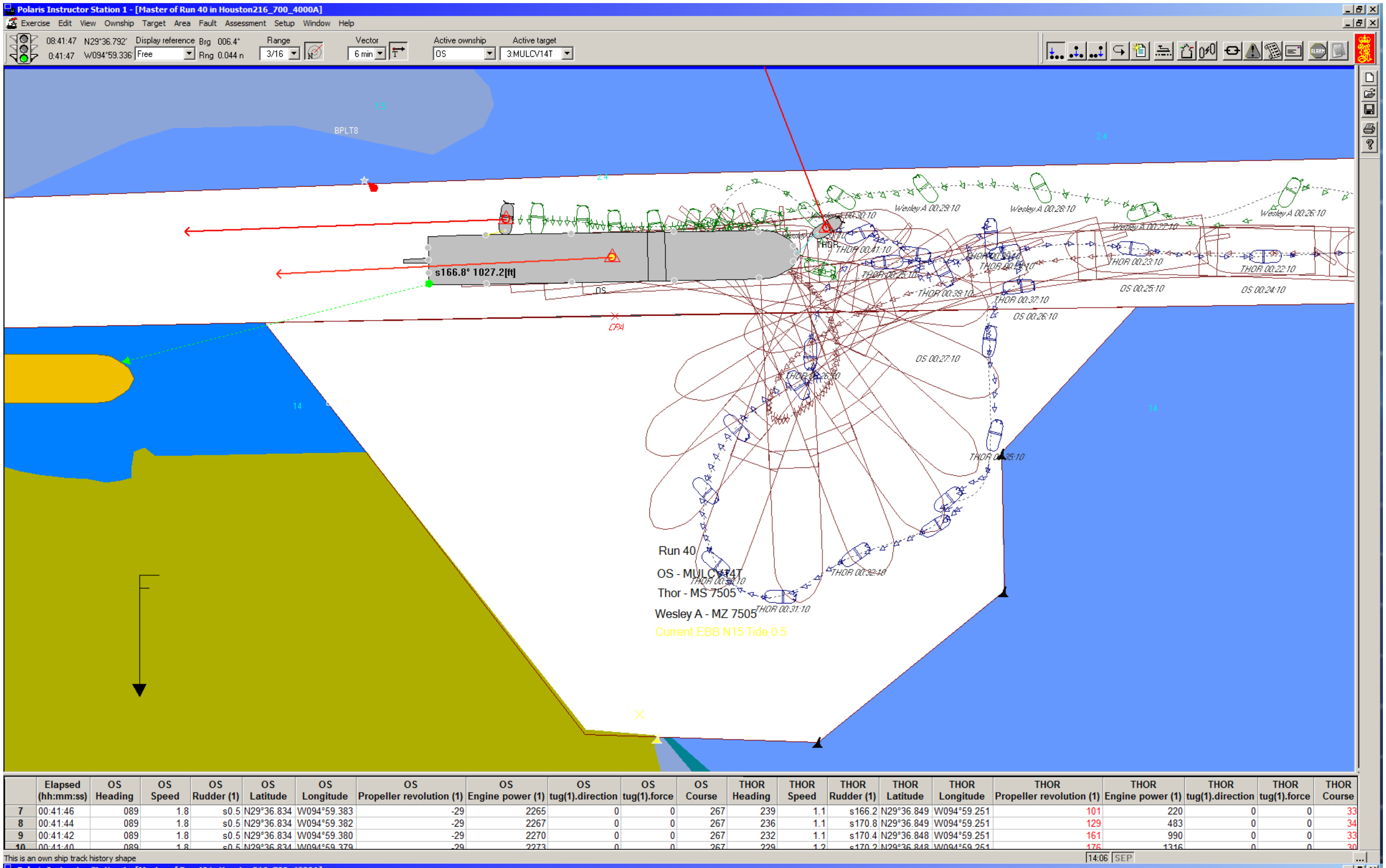


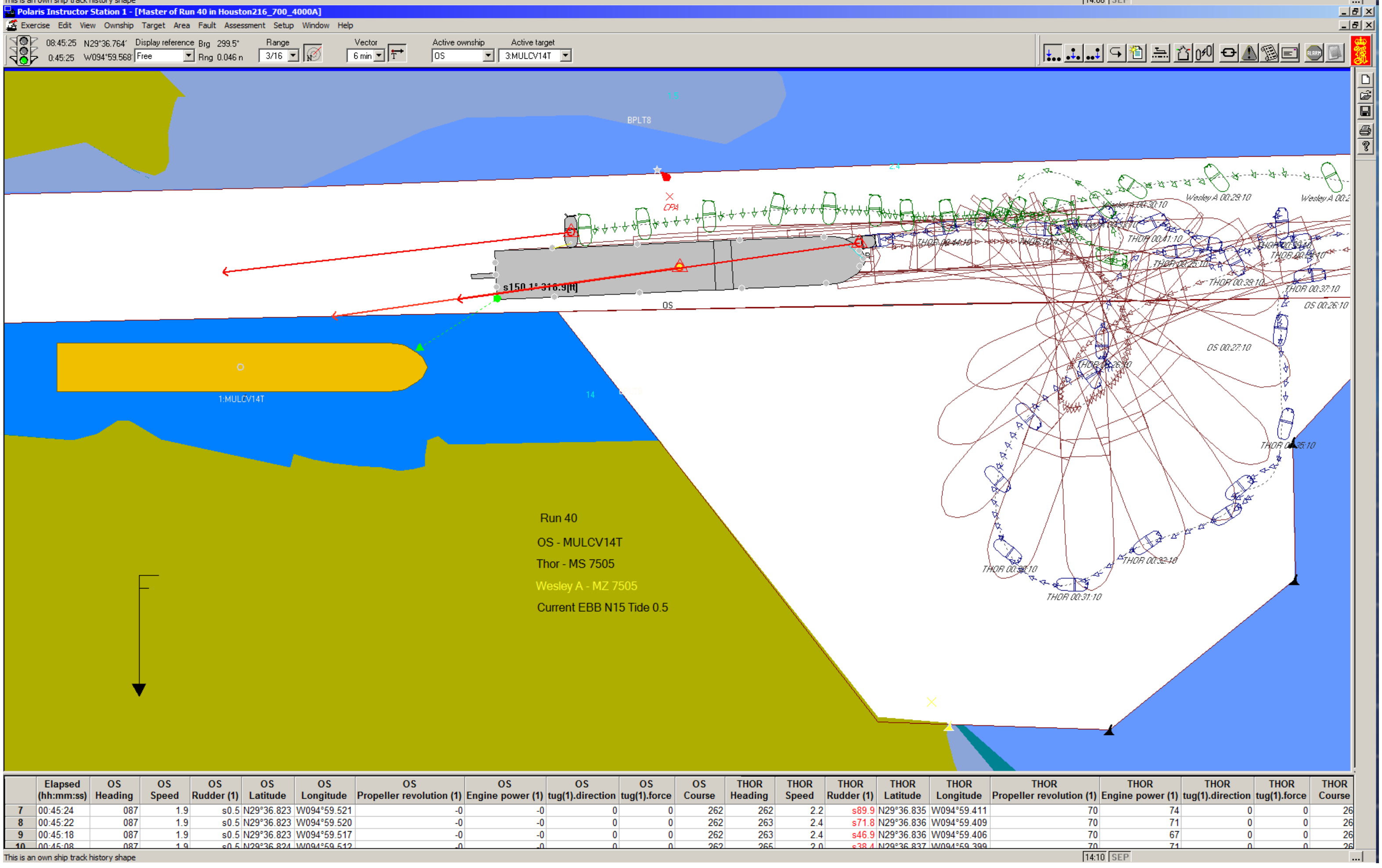
Polaris Instructor Station 1 - [Master of Run 40 in Houston216_700_4000A]

08:41:47 N29°36.792′ Display reference Brg 006.4°
0:41:47 W094°59.336′ Free Rng 0.044 n
Range 3/16
Vector 6 min
Active ownship OS
Active target 3:MULCV14T

s166.8° 1027.2[ft]

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	THOR Course
7	00:41:46	089	1.8	s0.5	N29°36.834	W094°59.383	-29	2265	0	0	267	239	1.1	s166.2	N29°36.849	W094°59.251	101	220	0	0	33
8	00:41:44	089	1.8	s0.5	N29°36.834	W094°59.382	-29	2267	0	0	267	236	1.1	s170.8	N29°36.849	W094°59.251	129	483	0	0	34
9	00:41:42	089	1.8	s0.5	N29°36.834	W094°59.380	-29	2270	0	0	267	232	1.1	s170.4	N29°36.848	W094°59.251	161	990	0	0	33
10	00:41:40	089	1.8	s0.5	N29°36.834	W094°59.379	-29	2273	0	0	267	229	1.2	s170.2	N29°36.848	W094°59.251	176	1316	0	0	30

This is an own ship track history shape 14:06 SEP



Polaris Instructor Station 1 - [Master of Run 40 in Houston216_700_4000A]

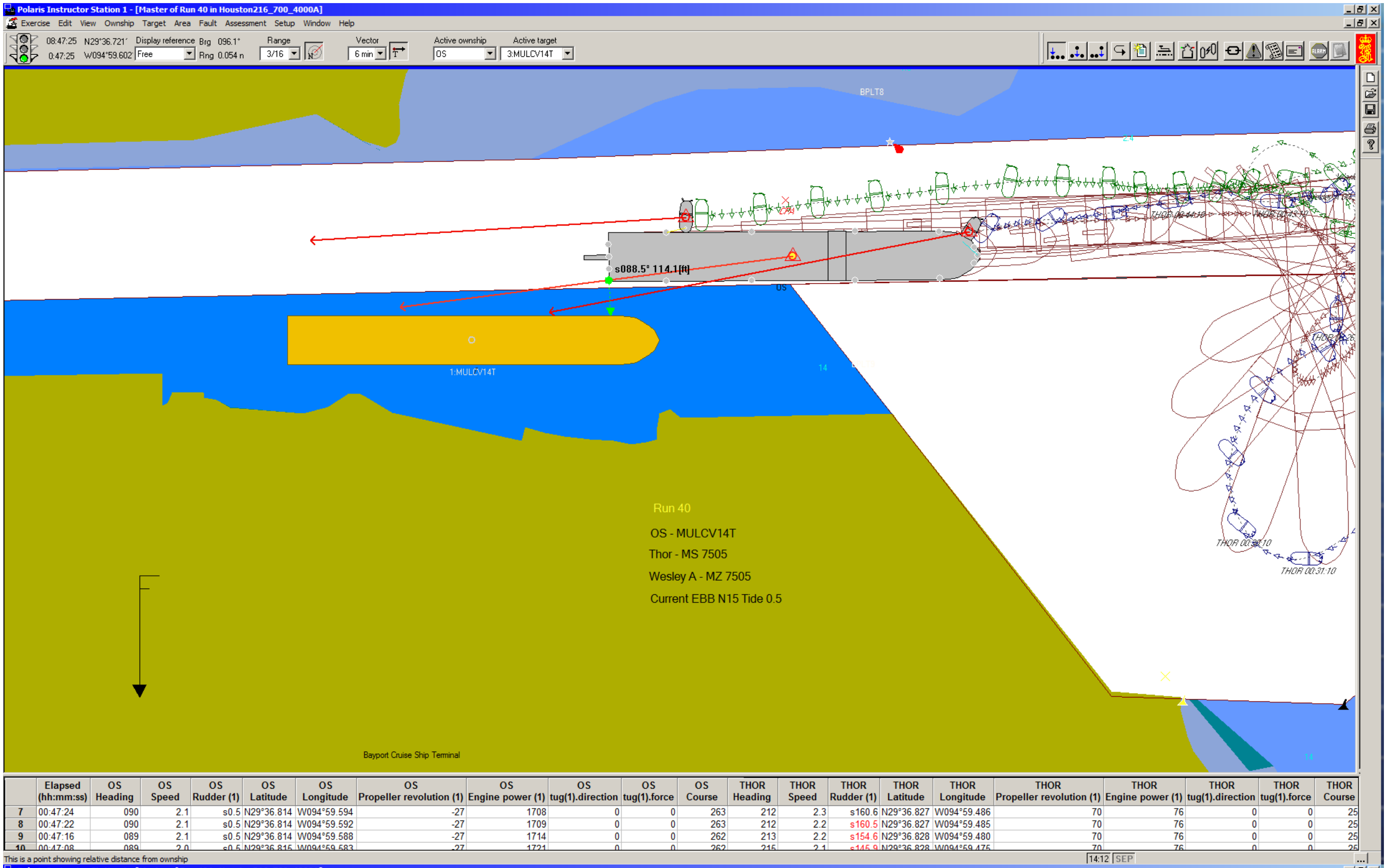
08:45:25 N29°36.764′ Display reference Brg 299.5°
0:45:25 W094°59.568′ Free Rng 0.046 n
Range 3/16
Vector 6 min
Active ownship OS
Active target 3:MULCV14T

s150.1° 316.9[ft]

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	THOR Course
7	00:45:24	087	1.9	s0.5	N29°36.823	W094°59.521	-0	-0	0	0	262	262	2.2	s89.9	N29°36.835	W094°59.411	70	74	0	0	26
8	00:45:22	087	1.9	s0.5	N29°36.823	W094°59.520	-0	-0	0	0	262	263	2.4	s71.8	N29°36.836	W094°59.409	70	71	0	0	26
9	00:45:18	087	1.9	s0.5	N29°36.823	W094°59.517	-0	-0	0	0	262	263	2.4	s46.9	N29°36.836	W094°59.406	70	67	0	0	26
10	00:45:08	087	1.9	s0.5	N29°36.824	W094°59.512	-0	-0	0	0	262	265	2.0	s38.4	N29°36.837	W094°59.399	70	71	0	0	26

This is an own ship track history shape 14:10 SEP

June 26, 2019



08:47:25 N29°36.721′ Display reference: Free Brg 096.1° Range 3/16 Vector 6 min Active ownship OS Active target 3:MULCV14T
0:47:25 W094°59.602′ Rng 0.054 n

Run 40

OS - MULCV14T

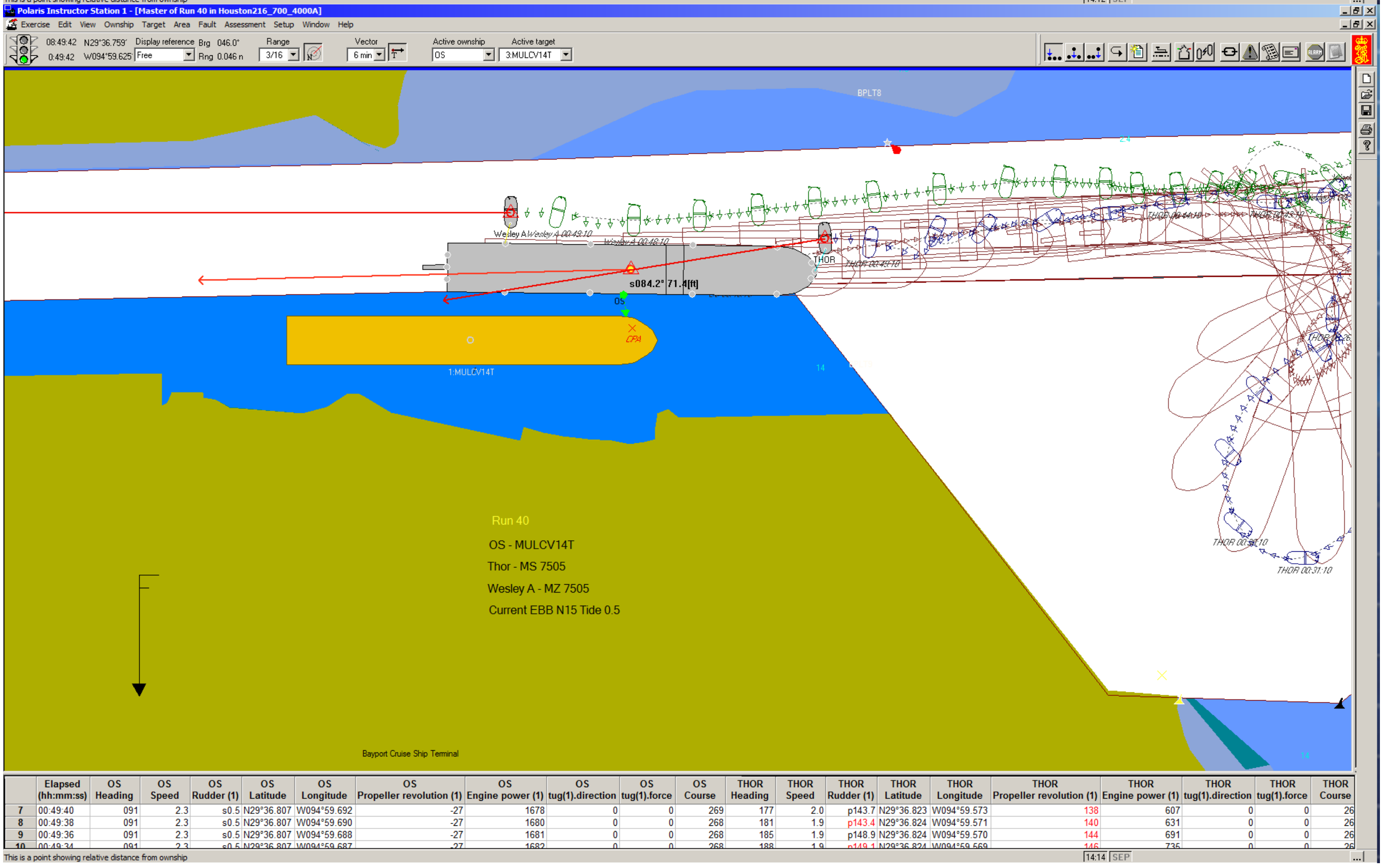
Thor - MS 7505

Wesley A - MZ 7505

Current EBB N15 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	THOR Course
7	00:47:24	090	2.1	s0.5	N29°36.814	W094°59.594	-27	1708	0	0	263	212	2.3	s160.6	N29°36.827	W094°59.486	70	76	0	0	25
8	00:47:22	090	2.1	s0.5	N29°36.814	W094°59.592	-27	1709	0	0	263	212	2.2	s160.5	N29°36.827	W094°59.485	70	76	0	0	25
9	00:47:16	089	2.1	s0.5	N29°36.814	W094°59.588	-27	1714	0	0	262	213	2.2	s154.6	N29°36.828	W094°59.480	70	76	0	0	25
10	00:47:08	089	2.0	s0.5	N29°36.815	W094°59.583	-27	1721	0	0	262	215	2.1	s145.9	N29°36.828	W094°59.475	70	76	0	0	25

This is a point showing relative distance from ownship



08:49:42 N29°36.759′ Display reference: Free Brg 046.0° Range 3/16 Vector 6 min Active ownship OS Active target 3:MULCV14T
0:49:42 W094°59.625′ Rng 0.046 n

Run 40

OS - MULCV14T

Thor - MS 7505

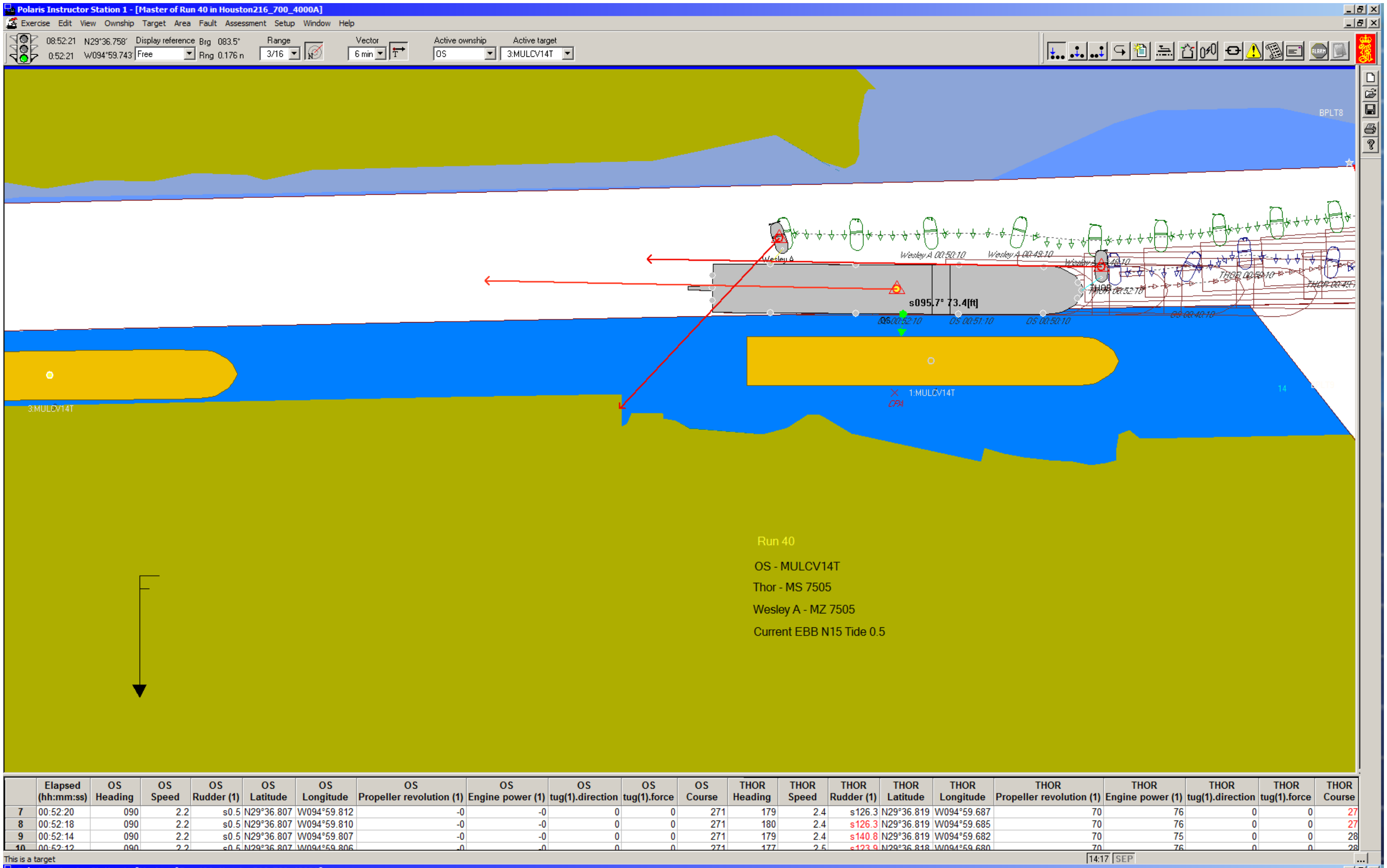
Wesley A - MZ 7505

Current EBB N15 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	THOR Course
7	00:49:40	091	2.3	s0.5	N29°36.807	W094°59.692	-27	1678	0	0	269	177	2.0	p143.7	N29°36.823	W094°59.573	138	607	0	0	26
8	00:49:38	091	2.3	s0.5	N29°36.807	W094°59.690	-27	1680	0	0	268	181	1.9	p143.4	N29°36.824	W094°59.571	140	631	0	0	26
9	00:49:36	091	2.3	s0.5	N29°36.807	W094°59.688	-27	1681	0	0	268	185	1.9	p148.9	N29°36.824	W094°59.570	144	691	0	0	26
10	00:49:34	091	2.3	s0.5	N29°36.807	W094°59.687	-27	1682	0	0	268	188	1.9	p149.1	N29°36.824	W094°59.569	146	735	0	0	26

This is a point showing relative distance from ownship

June 26, 2019



Run 40

OS - MULCV14T

Thor - MS 7505

Wesley A - MZ 7505

Current EBB N15 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	THOR Course
7	00:52:20	090	2.2	s0.5	N29°36.807	W094°59.812	-0	-0	0	0	271	179	2.4	s126.3	N29°36.819	W094°59.687	70	76	0	0	27
8	00:52:18	090	2.2	s0.5	N29°36.807	W094°59.810	-0	-0	0	0	271	180	2.4	s126.3	N29°36.819	W094°59.685	70	76	0	0	27
9	00:52:14	090	2.2	s0.5	N29°36.807	W094°59.807	-0	-0	0	0	271	179	2.4	s140.8	N29°36.819	W094°59.682	70	75	0	0	28
10	00:52:12	090	2.2	s0.5	N29°36.807	W094°59.806	-0	-0	0	0	271	177	2.5	s123.9	N29°36.818	W094°59.680	70	76	0	0	28

This is a target

14:17 SEP

Run 40

OS - MULCV14T

Thor - MS 7505

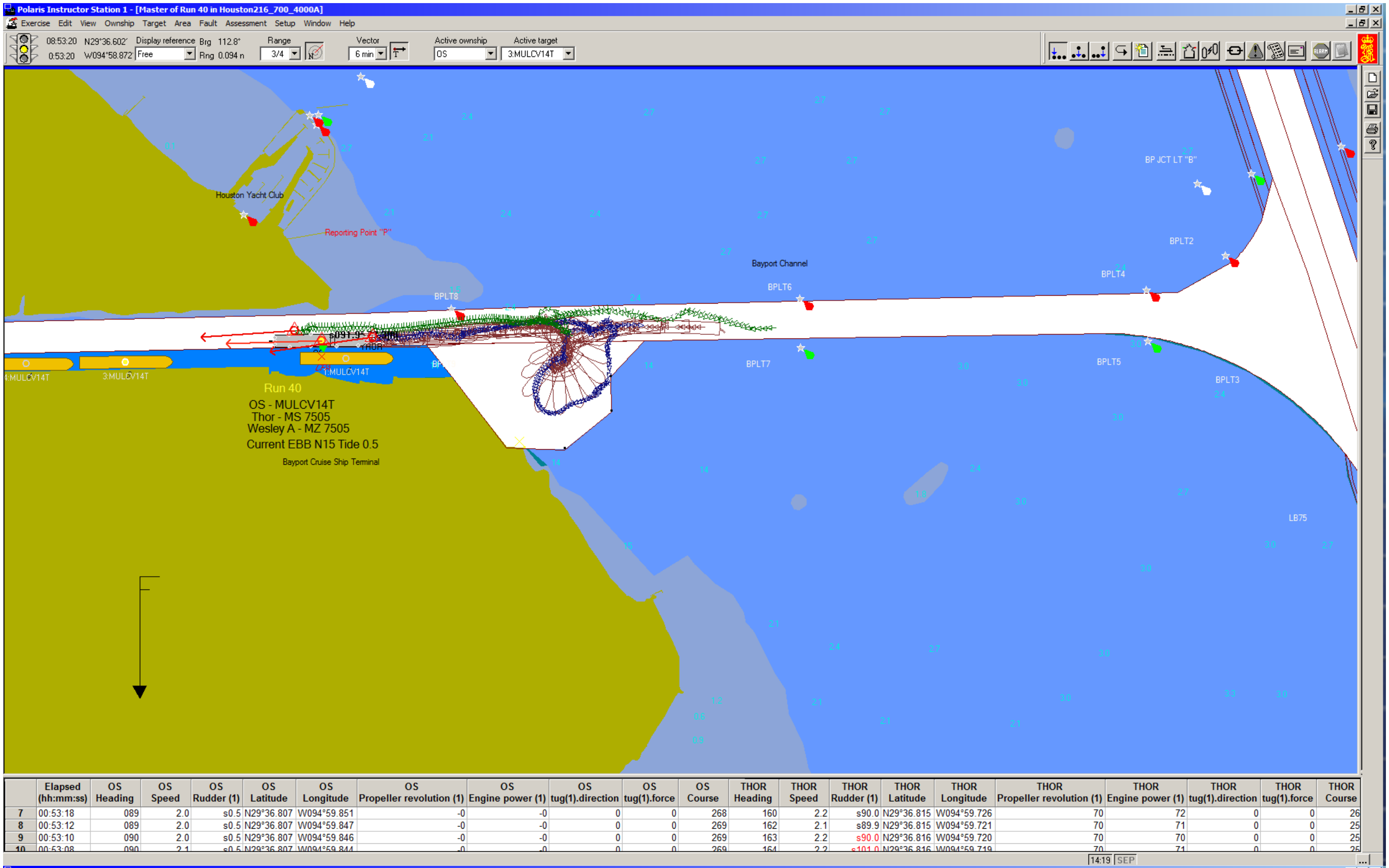
Wesley A - MZ 7505

Current EBB N15 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	THOR Course
7	00:53:18	089	2.0	s0.5	N29°36.807	W094°59.851	-0	-0	0	0	268	160	2.2	s90.0	N29°36.815	W094°59.726	70	72	0	0	26
8	00:53:12	089	2.0	s0.5	N29°36.807	W094°59.847	-0	-0	0	0	269	162	2.1	s89.9	N29°36.815	W094°59.721	70	71	0	0	25
9	00:53:10	090	2.0	s0.5	N29°36.807	W094°59.846	-0	-0	0	0	269	163	2.2	s90.0	N29°36.816	W094°59.720	70	70	0	0	25
10	00:53:08	090	2.1	s0.5	N29°36.807	W094°59.844	-0	-0	0	0	269	164	2.2	s101.0	N29°36.816	W094°59.719	70	71	0	0	25

This is a point showing relative distance from ownship

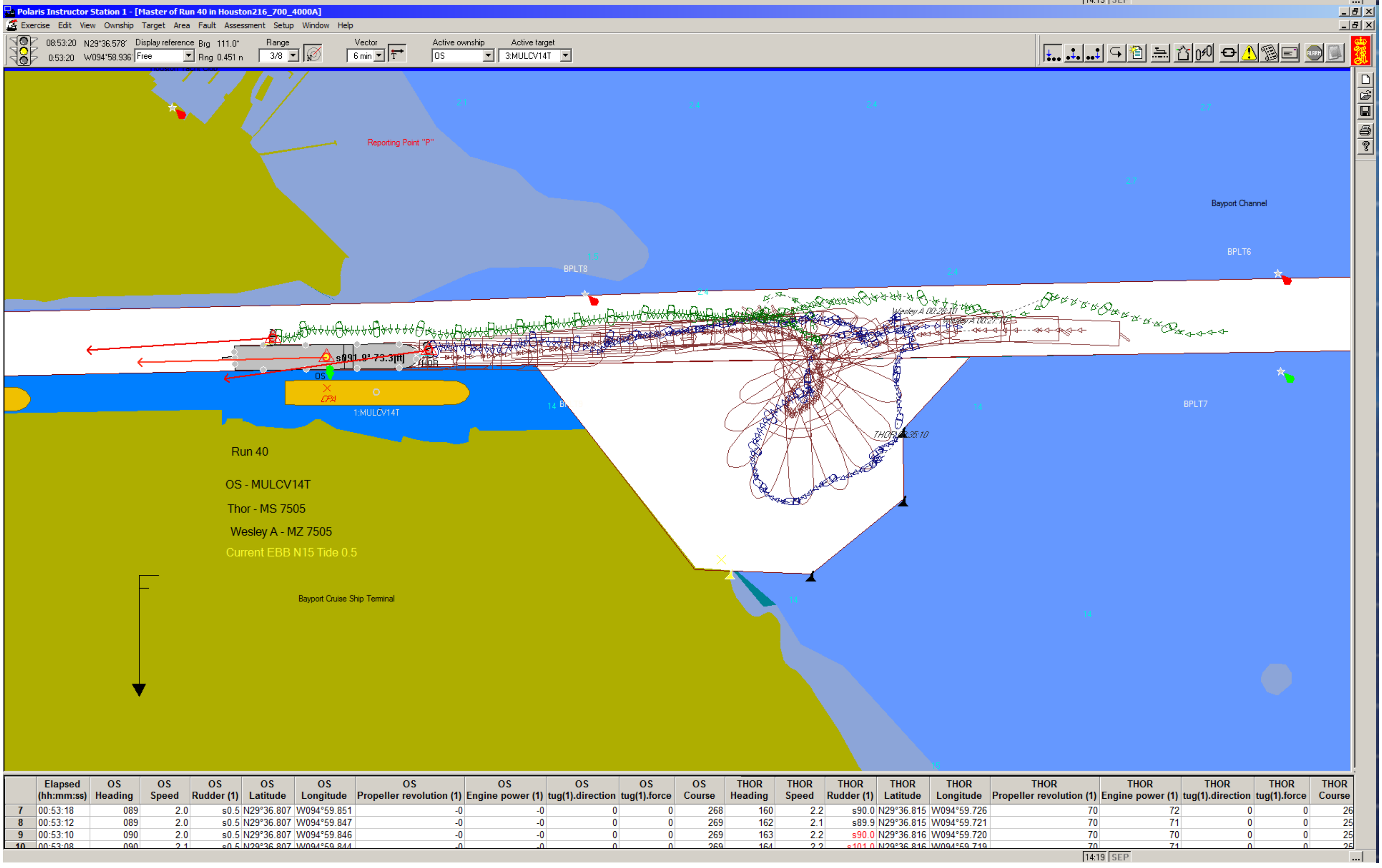
14:18 SEP



Polaris Instructor Station 1 - [Master of Run 40 in Houston216_700_4000A]

08:53:20 N29°36.602' Display reference: Free Brg 112.8° Rng 0.094 n Range 3/4 Vector 6 min Active ownship OS Active target 3:MULCV14T
0:53:20 W094°58.872

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	THOR Course
7	00:53:18	089	2.0	s0.5	N29°36.807	W094°59.851	-0	-0	0	0	268	160	2.2	s90.0	N29°36.815	W094°59.726	70	72	0	0	26
8	00:53:12	089	2.0	s0.5	N29°36.807	W094°59.847	-0	-0	0	0	269	162	2.1	s89.9	N29°36.815	W094°59.721	70	71	0	0	25
9	00:53:10	090	2.0	s0.5	N29°36.807	W094°59.846	-0	-0	0	0	269	163	2.2	s90.0	N29°36.816	W094°59.720	70	70	0	0	25
10	00:53:08	090	2.1	s0.5	N29°36.807	W094°59.844	-0	-0	0	0	269	164	2.2	s101.0	N29°36.816	W094°59.719	70	71	0	0	25

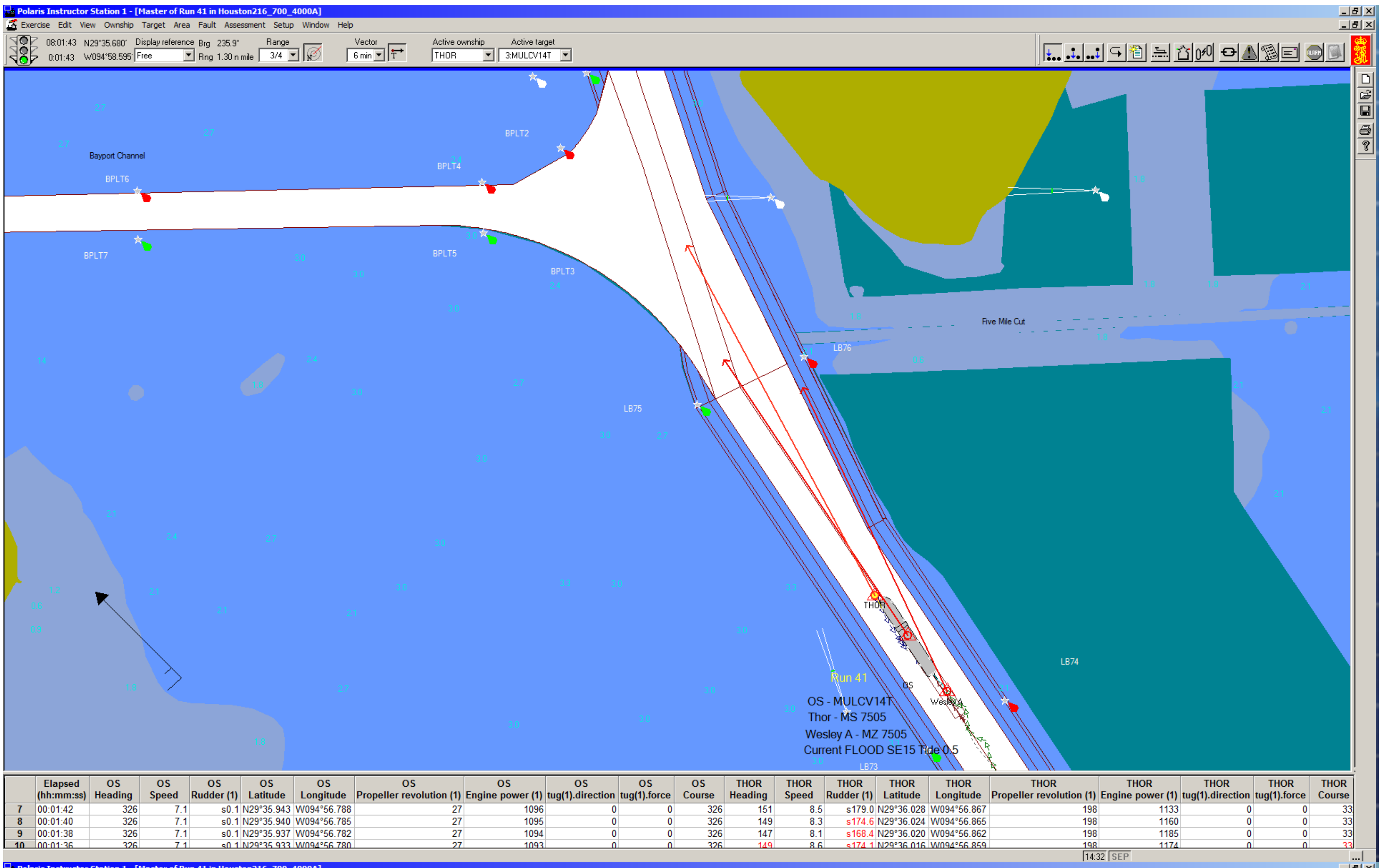


Polaris Instructor Station 1 - [Master of Run 40 in Houston216_700_4000A]

08:53:20 N29°36.578' Display reference: Free Brg 111.0° Rng 0.451 n Range 3/8 Vector 6 min Active ownship OS Active target 3:MULCV14T
0:53:20 W094°58.936

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	THOR Course
7	00:53:18	089	2.0	s0.5	N29°36.807	W094°59.851	-0	-0	0	0	268	160	2.2	s90.0	N29°36.815	W094°59.726	70	72	0	0	26
8	00:53:12	089	2.0	s0.5	N29°36.807	W094°59.847	-0	-0	0	0	269	162	2.1	s89.9	N29°36.815	W094°59.721	70	71	0	0	25
9	00:53:10	090	2.0	s0.5	N29°36.807	W094°59.846	-0	-0	0	0	269	163	2.2	s90.0	N29°36.816	W094°59.720	70	70	0	0	25
10	00:53:08	090	2.1	s0.5	N29°36.807	W094°59.844	-0	-0	0	0	269	164	2.2	s101.0	N29°36.816	W094°59.719	70	71	0	0	25

Run 41



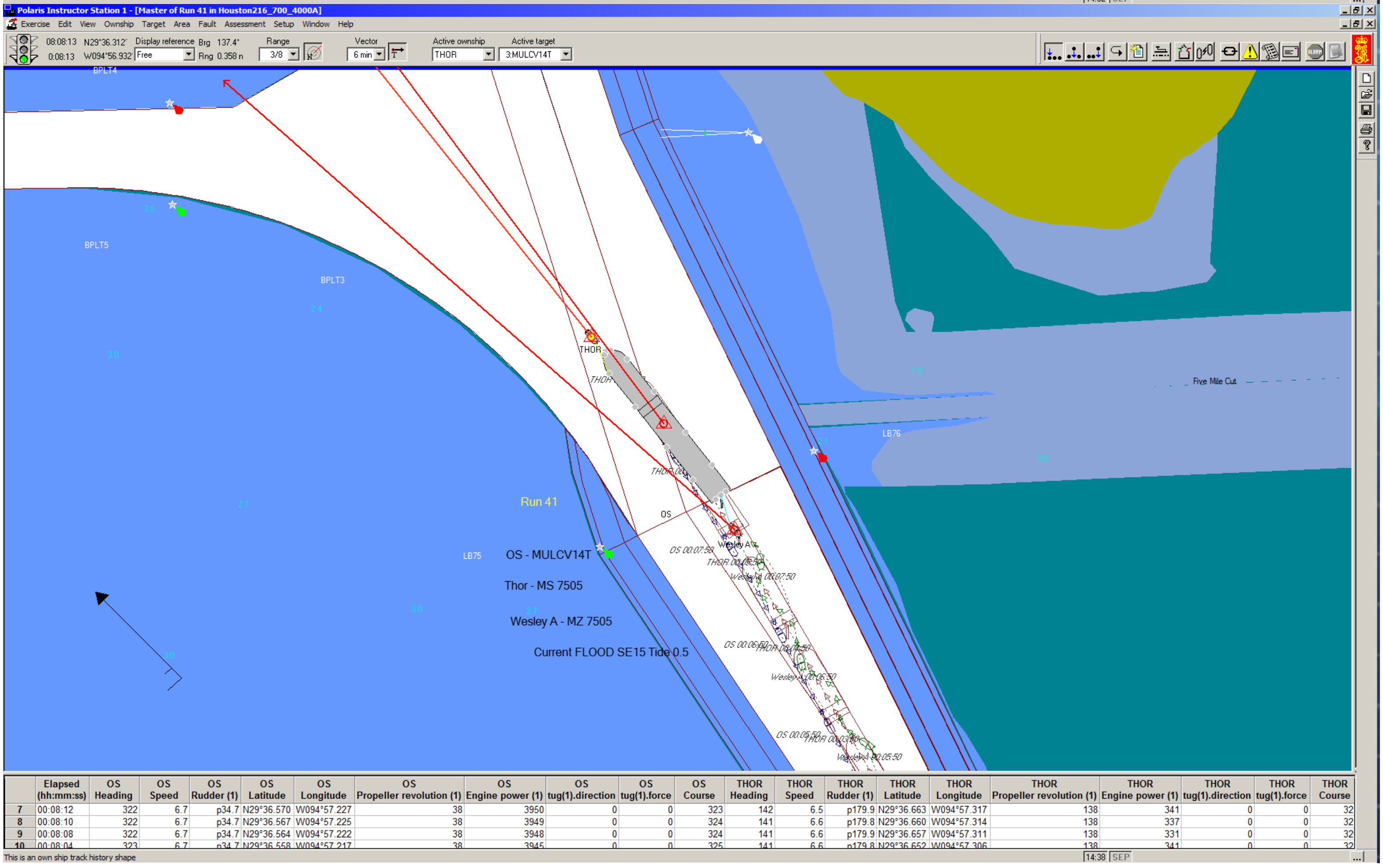
Polaris Instructor Station 1 - [Master of Run 41 in Houston216_700_4000A]

08:01:43 N29°35.680′ 0:01:43 W094°58.595′ Display reference Free Brg 235.9° Rng 1.30 n mile Range 3/4 Vector 6 min Active ownship THOR Active target 3:MULCV14T

OS - MULCV14T
Thor - MS 7505
Wesley A - MZ 7505
Current FLOOD SE15 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	THOR Course
7	00:01:42	326	7.1	s0.1	N29°35.943	W094°56.788	27	1096	0	0	326	151	8.5	s179.0	N29°36.028	W094°56.867	198	1133	0	0	33
8	00:01:40	326	7.1	s0.1	N29°35.940	W094°56.785	27	1095	0	0	326	149	8.3	s174.6	N29°36.024	W094°56.865	198	1160	0	0	33
9	00:01:38	326	7.1	s0.1	N29°35.937	W094°56.782	27	1094	0	0	326	147	8.1	s168.4	N29°36.020	W094°56.862	198	1185	0	0	33
10	00:01:36	326	7.1	s0.1	N29°35.933	W094°56.780	27	1093	0	0	326	149	8.6	s174.1	N29°36.016	W094°56.859	198	1174	0	0	33

14:32 SEP



Polaris Instructor Station 1 - [Master of Run 41 in Houston216_700_4000A]

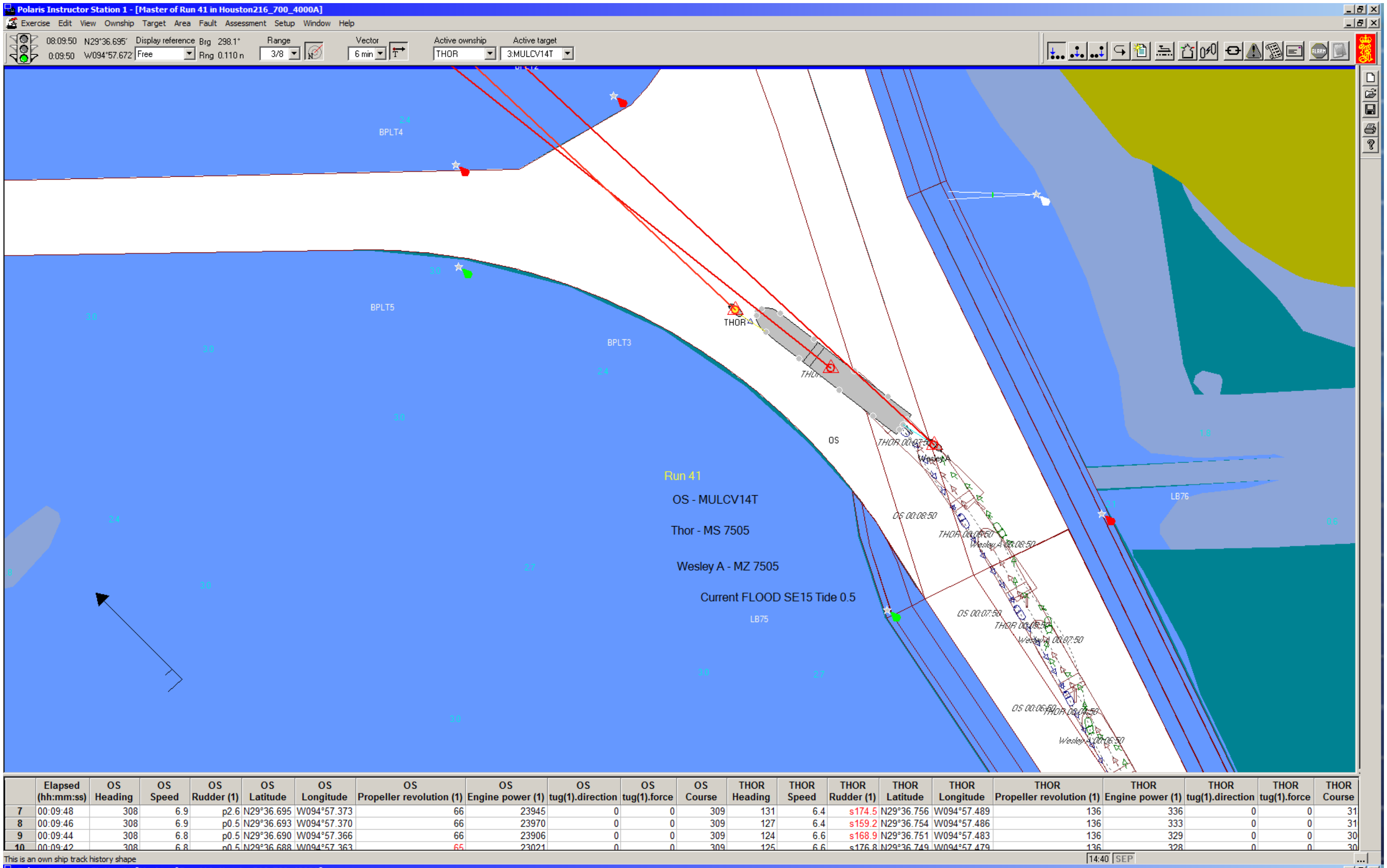
08:08:13 N29°36.312′ 0:08:13 W094°56.932′ Display reference Free Brg 137.4° Rng 0.358 n Range 3/8 Vector 6 min Active ownship THOR Active target 3:MULCV14T

OS - MULCV14T
Thor - MS 7505
Wesley A - MZ 7505
Current FLOOD SE15 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	THOR Course
7	00:08:12	322	6.7	p34.7	N29°36.570	W094°57.227	38	3950	0	0	323	142	6.5	p179.9	N29°36.663	W094°57.317	138	341	0	0	32
8	00:08:10	322	6.7	p34.7	N29°36.567	W094°57.225	38	3949	0	0	324	141	6.6	p179.8	N29°36.660	W094°57.314	138	337	0	0	32
9	00:08:08	322	6.7	p34.7	N29°36.564	W094°57.222	38	3948	0	0	324	141	6.6	p179.9	N29°36.657	W094°57.311	138	331	0	0	32
10	00:08:04	323	6.7	p34.7	N29°36.558	W094°57.217	38	3945	0	0	325	141	6.6	p179.8	N29°36.652	W094°57.306	138	341	0	0	32

This is an own ship track history shape

14:38 SEP

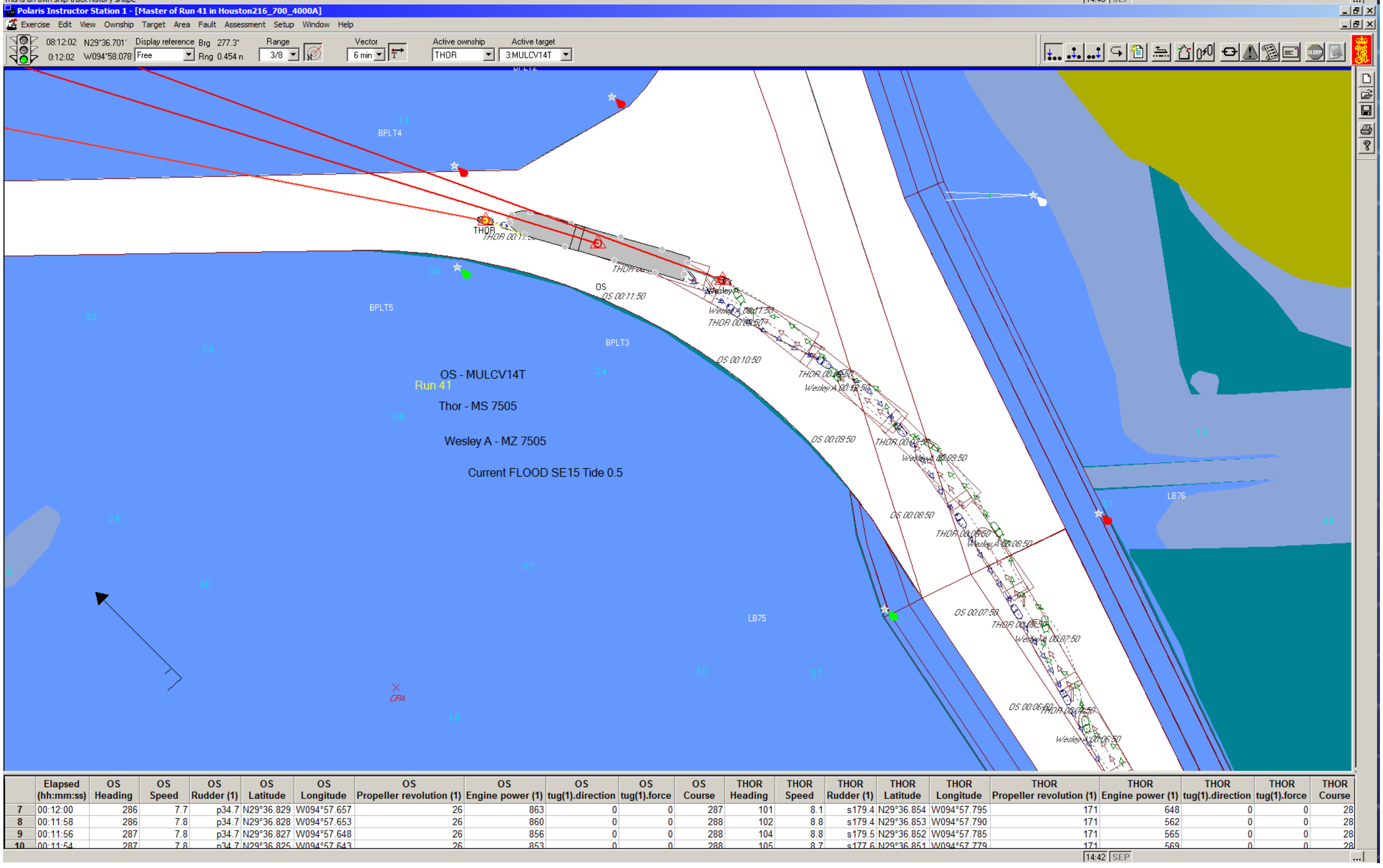


08:09:50 N29°36.695′ Display reference: Free Brg 298.1°
0:09:50 W094°57.672′ Rng 0.110 n
Range: 3/8
Vector: 6 min
Active ownship: THOR
Active target: 3:MULCV14T

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	THOR Course
7	00:09:48	308	6.9	p2.6	N29°36.695	W094°57.373	66	23945	0	0	309	131	6.4	s174.5	N29°36.756	W094°57.489	136	336	0	0	31
8	00:09:46	308	6.9	p0.5	N29°36.693	W094°57.370	66	23970	0	0	309	127	6.4	s159.2	N29°36.754	W094°57.486	136	333	0	0	31
9	00:09:44	308	6.8	p0.5	N29°36.690	W094°57.366	66	23906	0	0	309	124	6.6	s168.9	N29°36.751	W094°57.483	136	329	0	0	30
10	00:09:42	308	6.8	p0.5	N29°36.688	W094°57.363	65	23021	0	0	309	125	6.6	s176.8	N29°36.749	W094°57.479	136	328	0	0	30

This is an own ship track history shape

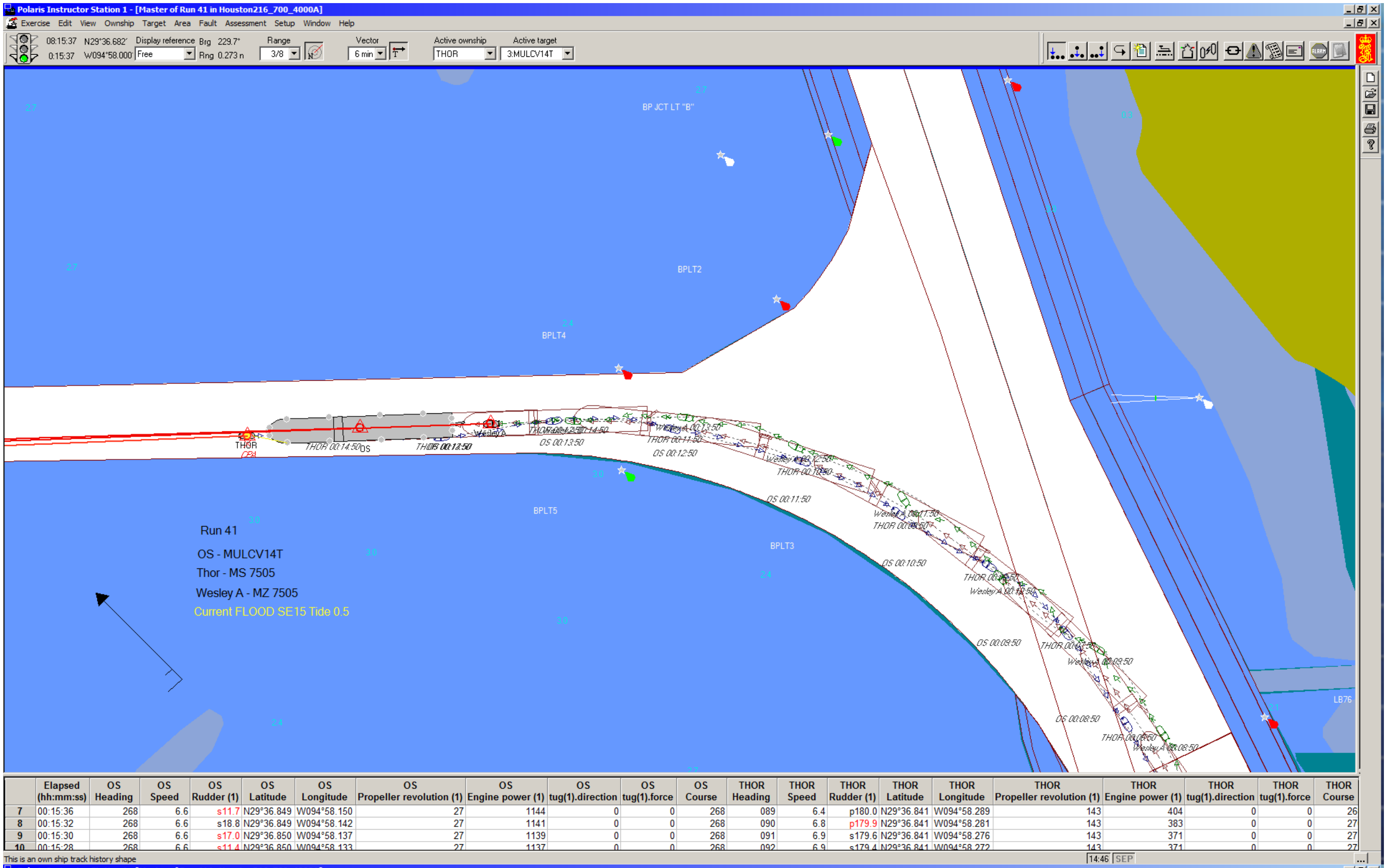
14:40 SEP



08:12:02 N29°36.701′ Display reference: Free Brg 277.3°
0:12:02 W094°58.078′ Rng 0.454 n
Range: 3/8
Vector: 6 min
Active ownship: THOR
Active target: 3:MULCV14T

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	THOR Course
7	00:12:00	286	7.7	p34.7	N29°36.829	W094°57.657	26	863	0	0	287	101	8.1	s179.4	N29°36.854	W094°57.795	171	648	0	0	28
8	00:11:58	286	7.8	p34.7	N29°36.828	W094°57.653	26	860	0	0	288	102	8.8	s179.4	N29°36.853	W094°57.790	171	562	0	0	28
9	00:11:56	287	7.8	p34.7	N29°36.827	W094°57.648	26	856	0	0	288	104	8.8	s179.5	N29°36.852	W094°57.785	171	565	0	0	28
10	00:11:54	287	7.8	p34.7	N29°36.825	W094°57.643	26	853	0	0	288	105	8.7	s177.6	N29°36.851	W094°57.779	171	569	0	0	28

14:42 SEP



Polaris Instructor Station 1 - [Master of Run 41 in Houston216_700_4000A]

08:15:37 N29°36.682' Display reference Free Brg 229.7° Rng 0.273 n
0:15:37 W094°58.000'
Range 3/8
Vector 6 min
Active ownship THOR
Active target 3:MULCV14T

Run 41

OS - MULCV14T

Thor - MS 7505

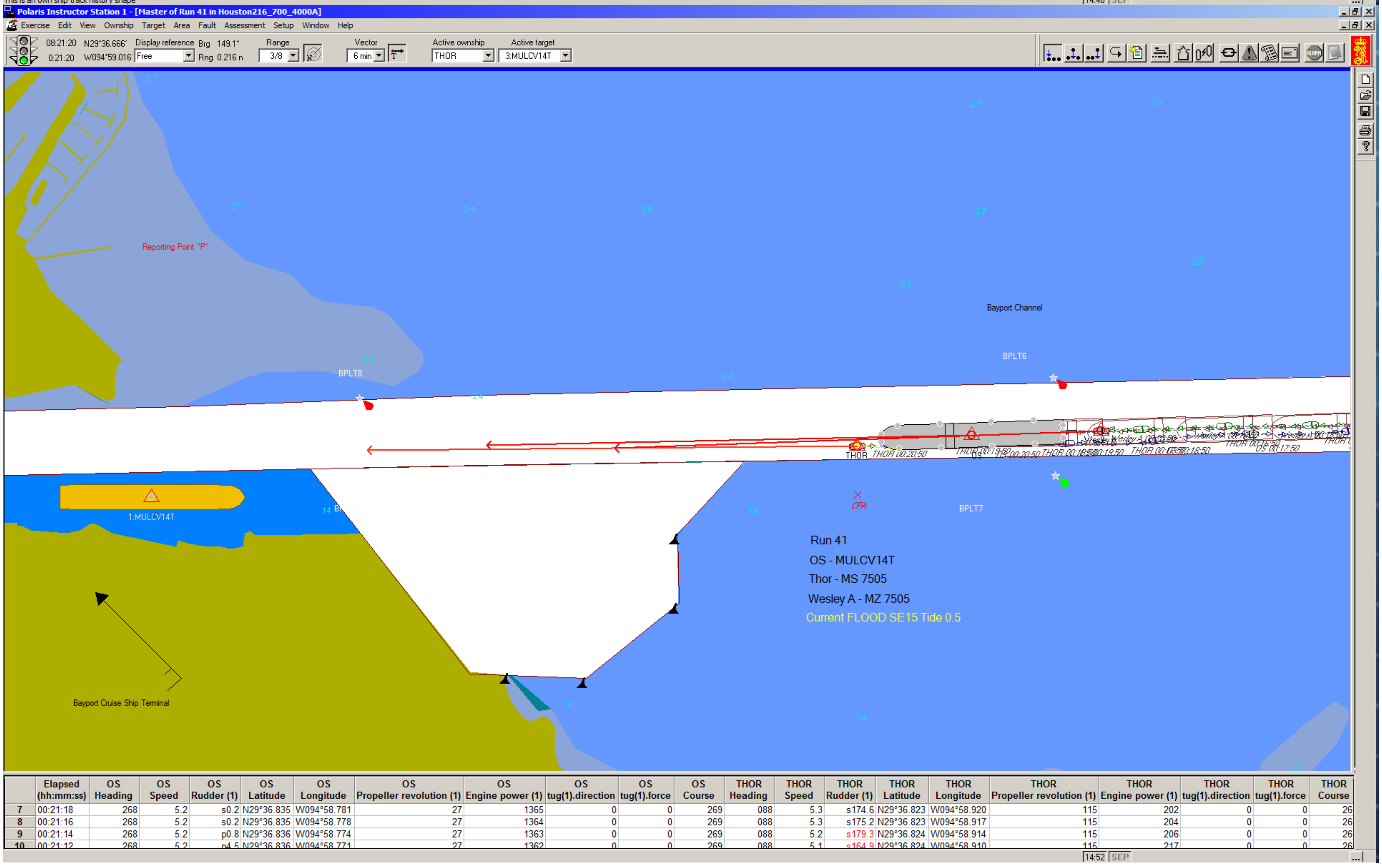
Wesley A - MZ 7505

Current FLOOD SE15 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	THOR Course
7	00:15:36	268	6.6	s11.7	N29°36.849	W094°58.150	27	1144	0	0	268	089	6.4	p180.0	N29°36.841	W094°58.289	143	404	0	0	26
8	00:15:32	268	6.6	s18.8	N29°36.849	W094°58.142	27	1141	0	0	268	090	6.8	p179.9	N29°36.841	W094°58.281	143	383	0	0	27
9	00:15:30	268	6.6	s17.0	N29°36.850	W094°58.137	27	1139	0	0	268	091	6.9	s179.6	N29°36.841	W094°58.276	143	371	0	0	27
10	00:15:28	268	6.6	s11.4	N29°36.850	W094°58.133	27	1137	0	0	268	092	6.9	s179.4	N29°36.841	W094°58.272	143	371	0	0	27

This is an own ship track history shape

14:46 SEP



Polaris Instructor Station 1 - [Master of Run 41 in Houston216_700_4000A]

08:21:20 N29°36.666' Display reference Free Brg 149.1° Rng 0.216 n
0:21:20 W094°59.016'
Range 3/8
Vector 6 min
Active ownship THOR
Active target 3:MULCV14T

Run 41

OS - MULCV14T

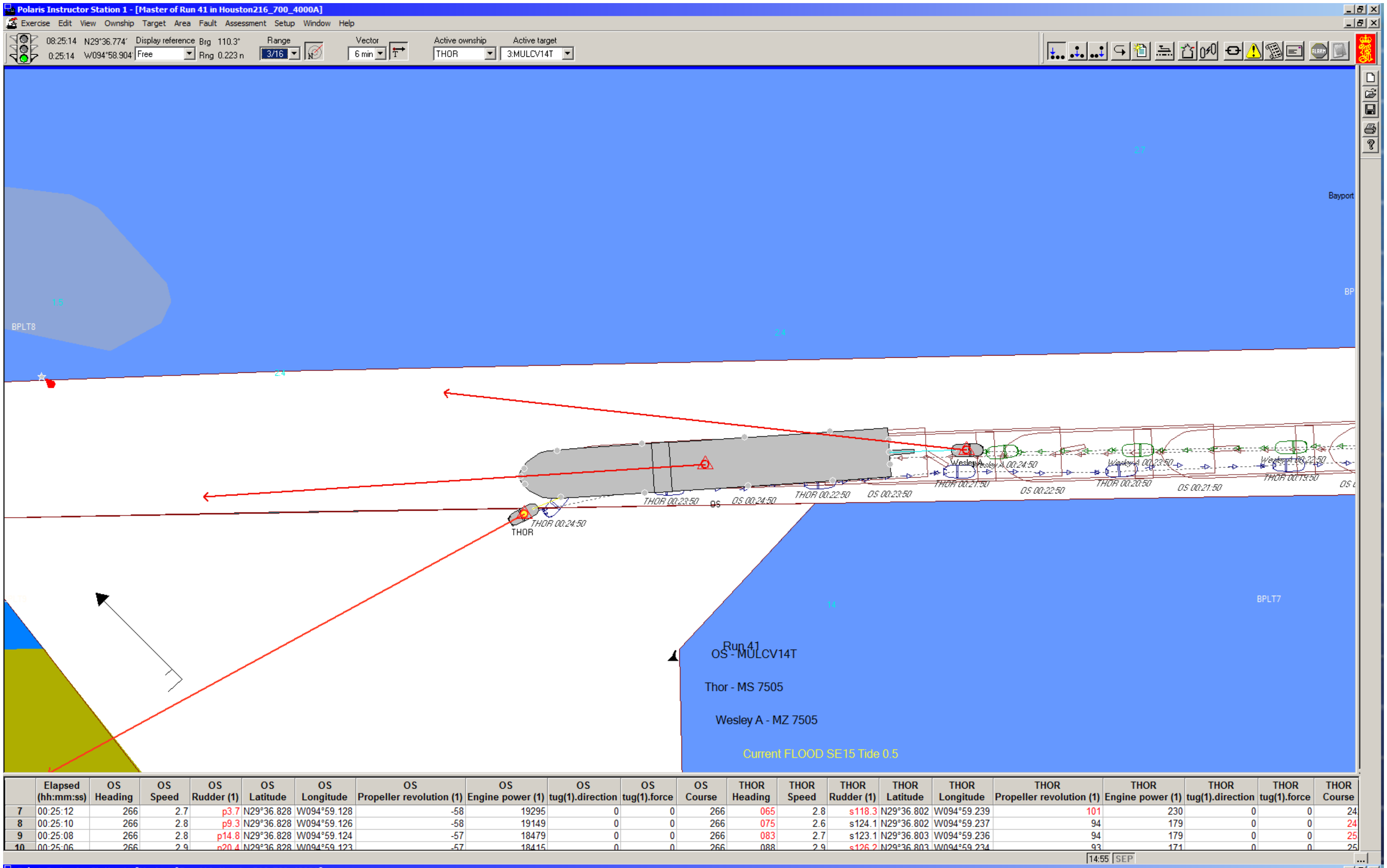
Thor - MS 7505

Wesley A - MZ 7505

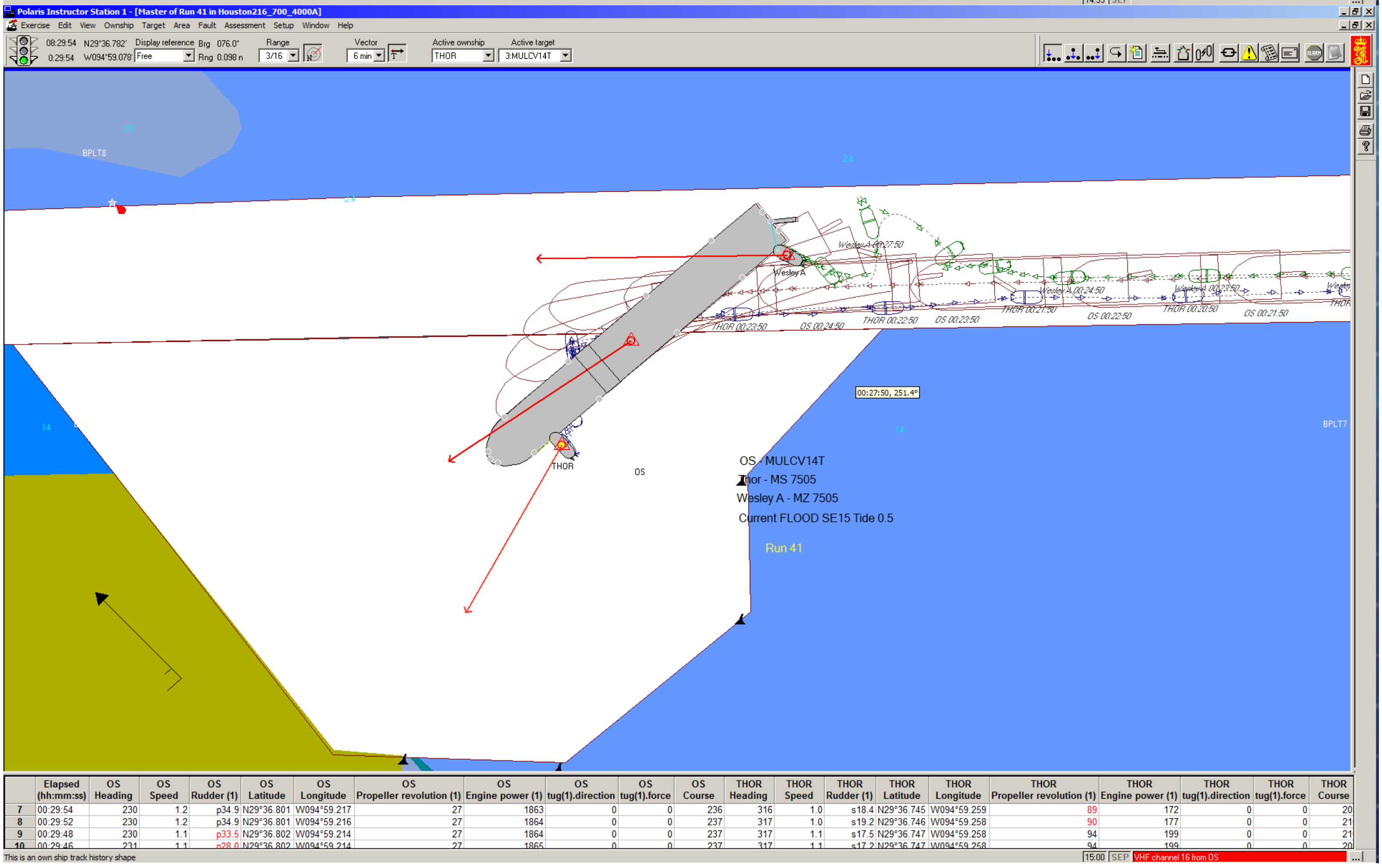
Current FLOOD SE15 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	THOR Course
7	00:21:18	268	5.2	s0.2	N29°36.835	W094°58.781	27	1365	0	0	269	088	5.3	s174.6	N29°36.823	W094°58.920	115	202	0	0	26
8	00:21:16	268	5.2	s0.2	N29°36.835	W094°58.778	27	1364	0	0	269	088	5.3	s175.2	N29°36.823	W094°58.917	115	204	0	0	26
9	00:21:14	268	5.2	p0.8	N29°36.836	W094°58.774	27	1363	0	0	269	088	5.2	s179.3	N29°36.824	W094°58.914	115	206	0	0	26
10	00:21:12	268	5.2	p4.5	N29°36.836	W094°58.771	27	1362	0	0	269	088	5.1	s164.9	N29°36.824	W094°58.910	115	217	0	0	26

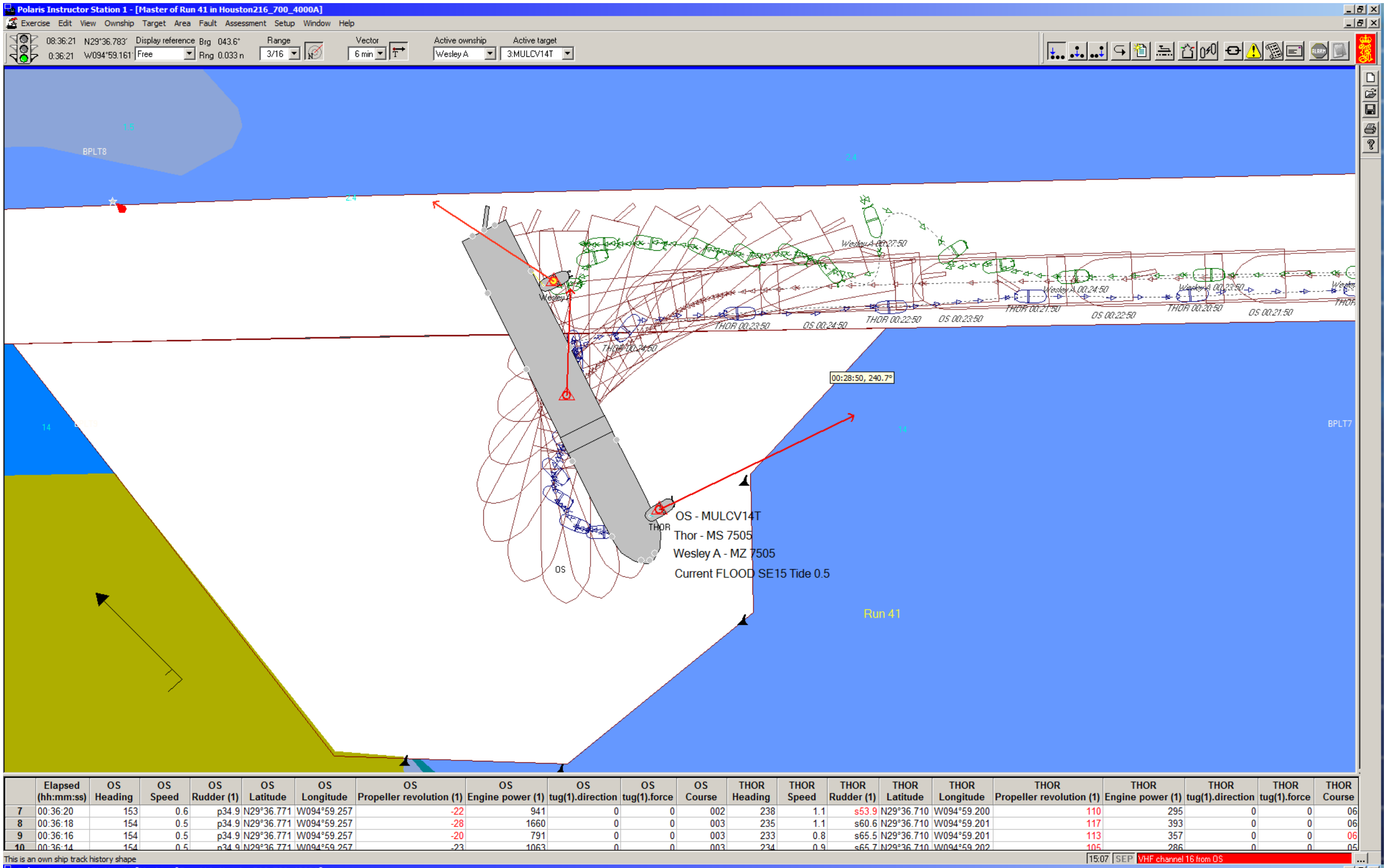
14:52 SEP



	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	THOR Course
7	00:25:12	266	2.7	p3.7	N29°36.828	W094°59.128	-58	19295	0	0	266	065	2.8	s118.3	N29°36.802	W094°59.239	101	230	0	0	24
8	00:25:10	266	2.8	p9.3	N29°36.828	W094°59.126	-58	19149	0	0	266	075	2.6	s124.1	N29°36.802	W094°59.237	94	179	0	0	24
9	00:25:08	266	2.8	p14.8	N29°36.828	W094°59.124	-57	18479	0	0	266	083	2.7	s123.1	N29°36.803	W094°59.236	94	179	0	0	25
10	00:25:06	266	2.9	p20.4	N29°36.828	W094°59.123	-57	18415	0	0	266	088	2.9	s126.2	N29°36.803	W094°59.234	93	171	0	0	25



	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	THOR Course
7	00:29:54	230	1.2	p34.9	N29°36.801	W094°59.217	27	1863	0	0	236	316	1.0	s18.4	N29°36.745	W094°59.259	89	172	0	0	20
8	00:29:52	230	1.2	p34.9	N29°36.801	W094°59.216	27	1864	0	0	237	317	1.0	s19.2	N29°36.746	W094°59.258	90	177	0	0	21
9	00:29:48	230	1.1	p33.5	N29°36.802	W094°59.214	27	1864	0	0	237	317	1.1	s17.5	N29°36.747	W094°59.258	94	199	0	0	21
10	00:29:46	231	1.1	p28.0	N29°36.802	W094°59.214	27	1865	0	0	237	317	1.1	s17.2	N29°36.747	W094°59.258	94	199	0	0	20



Polaris Instructor Station 1 - [Master of Run 41 in Houston216_700_4000A]

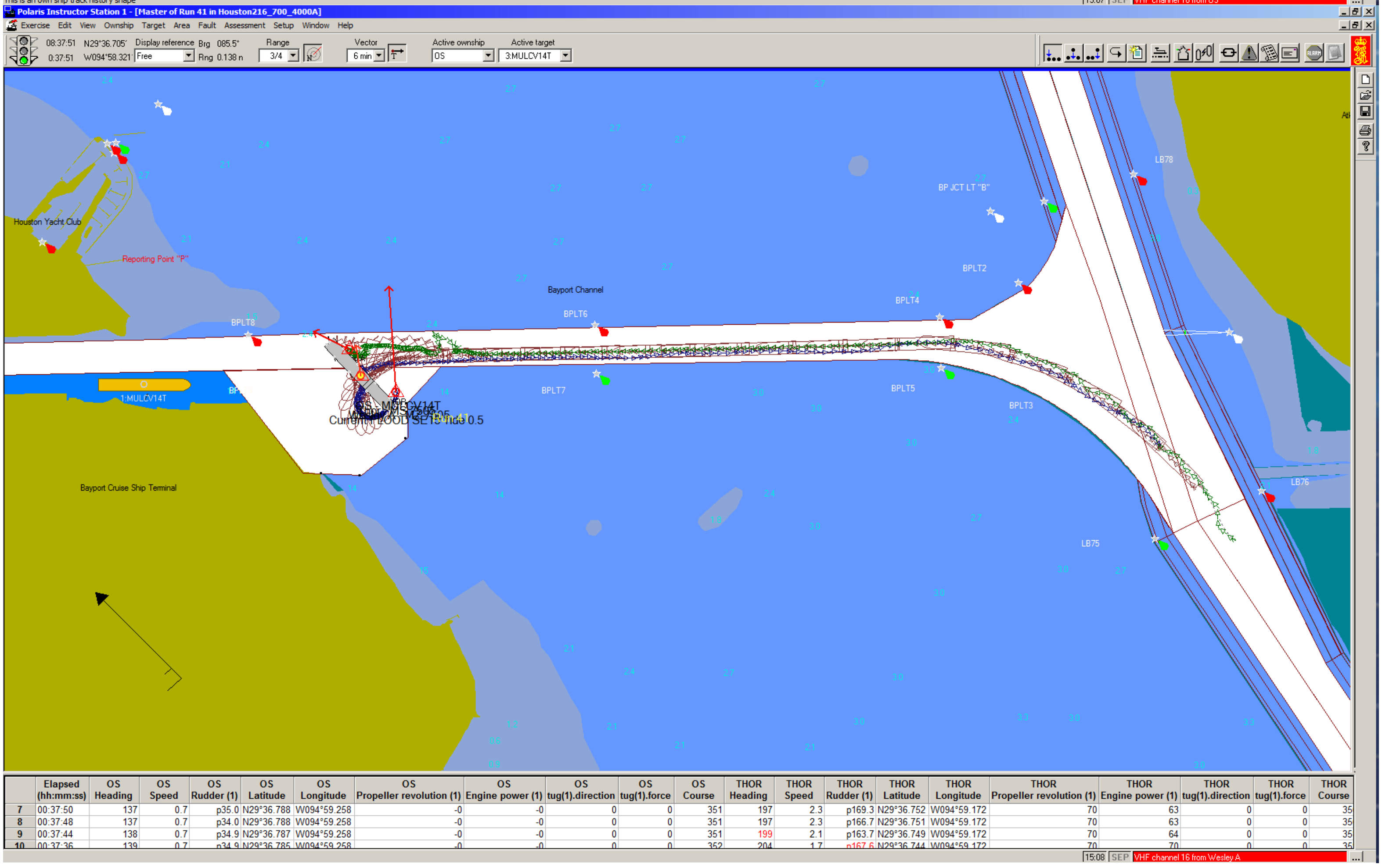
08:36:21 N29°36.783' Display reference Free Brg 043.6° Rng 0.033 n Range 3/16 Vector 6 min Active ownship Wesley A Active target 3:MULCV14T
0:36:21 W094°59.161'

OS - MULCV14T
Thor - MS 7505
Wesley A - MZ 7505
Current FLOOD SE15 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	THOR Course
7	00:36:20	153	0.6	p34.9	N29°36.771	W094°59.257	-22	941	0	0	002	238	1.1	s53.9	N29°36.710	W094°59.200	110	295	0	0	06
8	00:36:18	154	0.5	p34.9	N29°36.771	W094°59.257	-28	1660	0	0	003	235	1.1	s60.6	N29°36.710	W094°59.201	117	393	0	0	06
9	00:36:16	154	0.5	p34.9	N29°36.771	W094°59.257	-20	791	0	0	003	233	0.8	s65.5	N29°36.710	W094°59.201	113	357	0	0	06
10	00:36:14	154	0.5	p34.9	N29°36.771	W094°59.257	-23	1063	0	0	003	234	0.9	s65.7	N29°36.710	W094°59.202	105	286	0	0	05

This is an own ship track history shape

15:07 SEP VHF channel 16 from OS



Polaris Instructor Station 1 - [Master of Run 41 in Houston216_700_4000A]

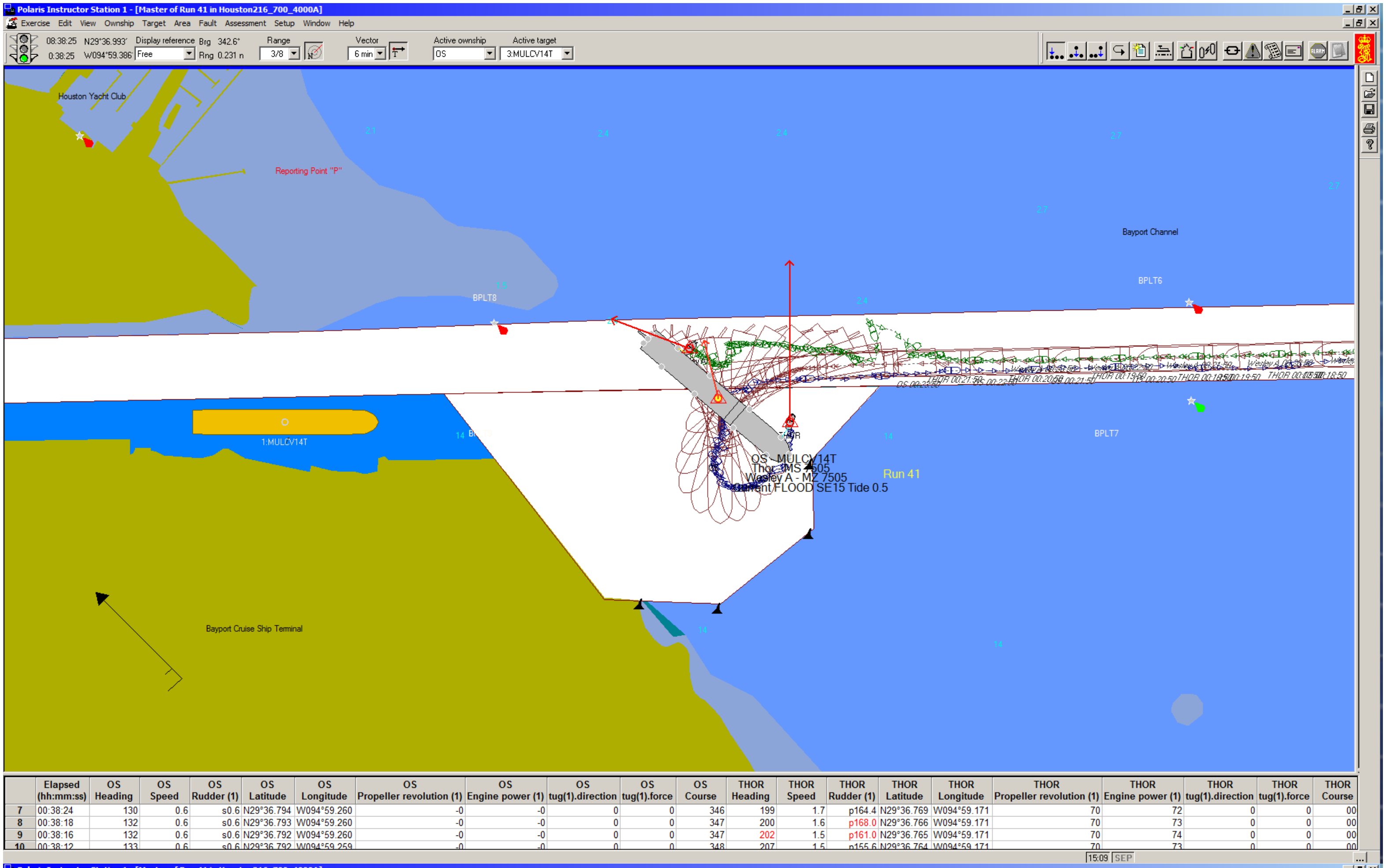
08:37:51 N29°36.705' Display reference Free Brg 085.5° Rng 0.138 n Range 3/4 Vector 6 min Active ownship OS Active target 3:MULCV14T
0:37:51 W094°58.321'

OS - MULCV14T
Current FLOOD SE15 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	THOR Course
7	00:37:50	137	0.7	p35.0	N29°36.788	W094°59.258	-0	-0	0	0	351	197	2.3	p169.3	N29°36.752	W094°59.172	70	63	0	0	35
8	00:37:48	137	0.7	p34.0	N29°36.788	W094°59.258	-0	-0	0	0	351	197	2.3	p166.7	N29°36.751	W094°59.172	70	63	0	0	35
9	00:37:44	138	0.7	p34.9	N29°36.787	W094°59.258	-0	-0	0	0	351	199	2.1	p163.7	N29°36.749	W094°59.172	70	64	0	0	35
10	00:37:36	139	0.7	p34.9	N29°36.785	W094°59.258	-0	-0	0	0	352	204	1.7	p167.6	N29°36.744	W094°59.172	70	70	0	0	35

15:08 SEP VHF channel 16 from Wesley A

June 26, 2019

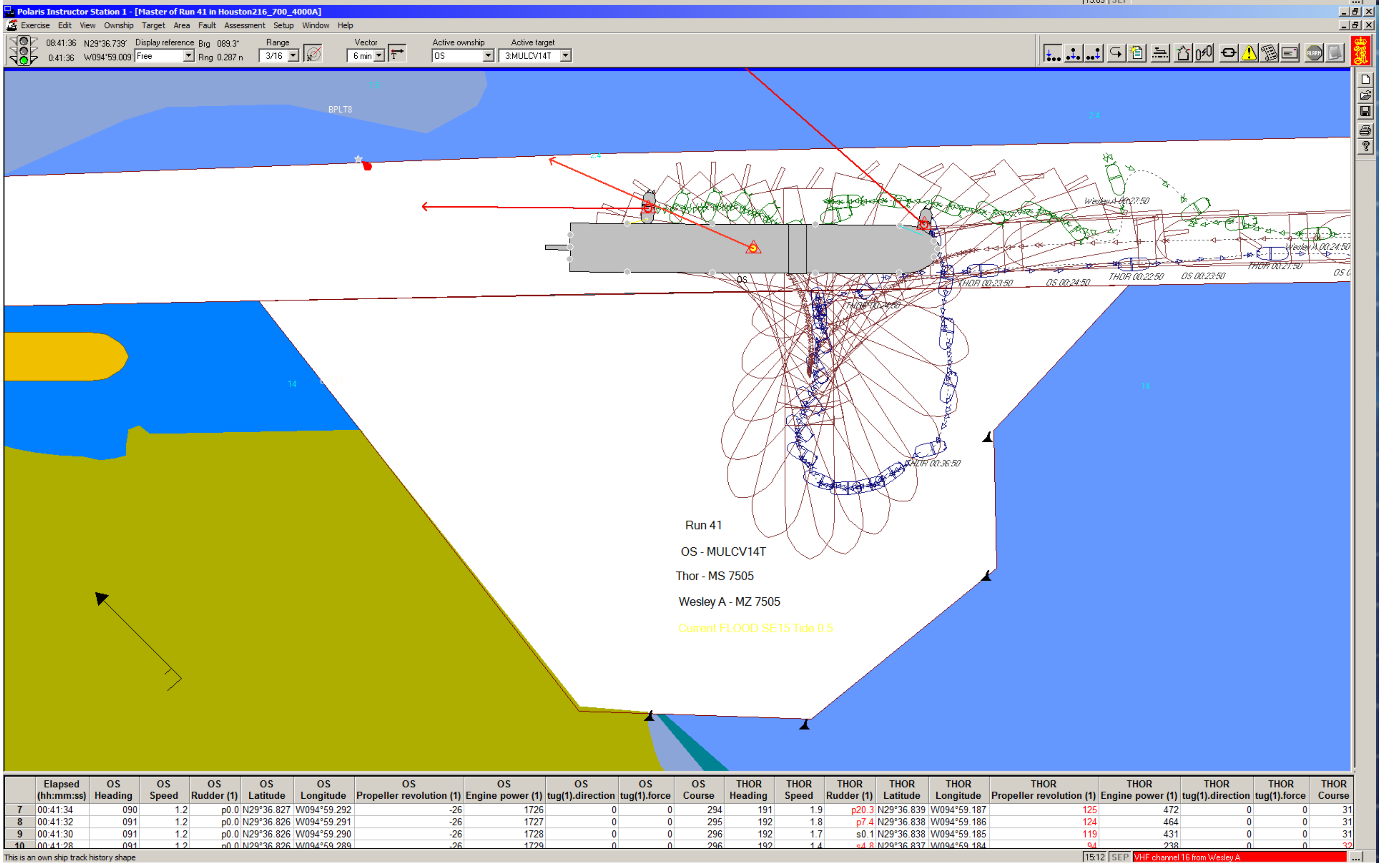


Polaris Instructor Station 1 - [Master of Run 41 in Houston216_700_4000A]

08:38:25 N29°36.993' Display reference Brg 342.6°
0:38:25 W094°59.386' Free Rng 0.231 n
Range 3/8
Vector 6 min
Active ownship OS
Active target 3:MULCV14T

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	THOR Course
7	00:38:24	130	0.6	s0.6	N29°36.794	W094°59.260	-0	-0	0	0	346	199	1.7	p164.4	N29°36.769	W094°59.171	70	72	0	0	00
8	00:38:18	132	0.6	s0.6	N29°36.793	W094°59.260	-0	-0	0	0	347	200	1.6	p168.0	N29°36.766	W094°59.171	70	73	0	0	00
9	00:38:16	132	0.6	s0.6	N29°36.792	W094°59.260	-0	-0	0	0	347	202	1.5	p161.0	N29°36.765	W094°59.171	70	74	0	0	00
10	00:38:12	133	0.6	s0.6	N29°36.792	W094°59.259	-0	-0	0	0	348	207	1.5	p155.6	N29°36.764	W094°59.171	70	73	0	0	00

15:09 SEP



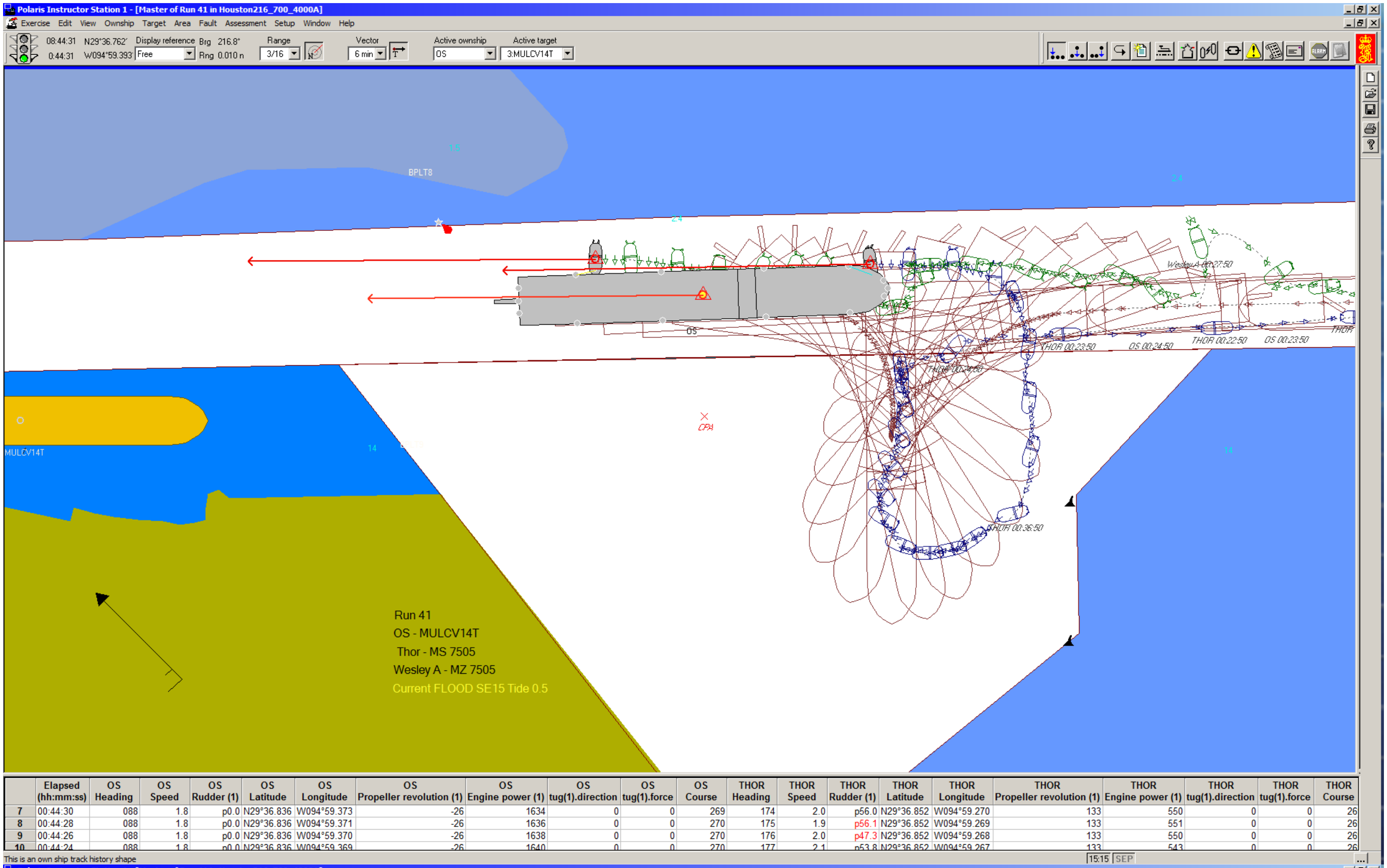
Polaris Instructor Station 1 - [Master of Run 41 in Houston216_700_4000A]

08:41:36 N29°36.739' Display reference Brg 089.3°
0:41:36 W094°59.009' Free Rng 0.287 n
Range 3/16
Vector 6 min
Active ownship OS
Active target 3:MULCV14T

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	THOR Course
7	00:41:34	090	1.2	p0.0	N29°36.827	W094°59.292	-26	1726	0	0	294	191	1.9	p20.3	N29°36.839	W094°59.187	125	472	0	0	31
8	00:41:32	091	1.2	p0.0	N29°36.826	W094°59.291	-26	1727	0	0	295	192	1.8	p7.4	N29°36.838	W094°59.186	124	464	0	0	31
9	00:41:30	091	1.2	p0.0	N29°36.826	W094°59.290	-26	1728	0	0	296	192	1.7	s0.1	N29°36.838	W094°59.185	119	431	0	0	31
10	00:41:28	091	1.2	p0.0	N29°36.826	W094°59.289	-26	1729	0	0	296	192	1.4	s4.8	N29°36.837	W094°59.184	94	238	0	0	32

This is an own ship track history shape

15:12 SEP VHF channel 16 from Wesley A



08:44:31 N29°36.762' Display reference Brg 216.8°
0:44:31 W094°59.393 Free Rng 0.010 n

Range 3/16

Vector 6 min

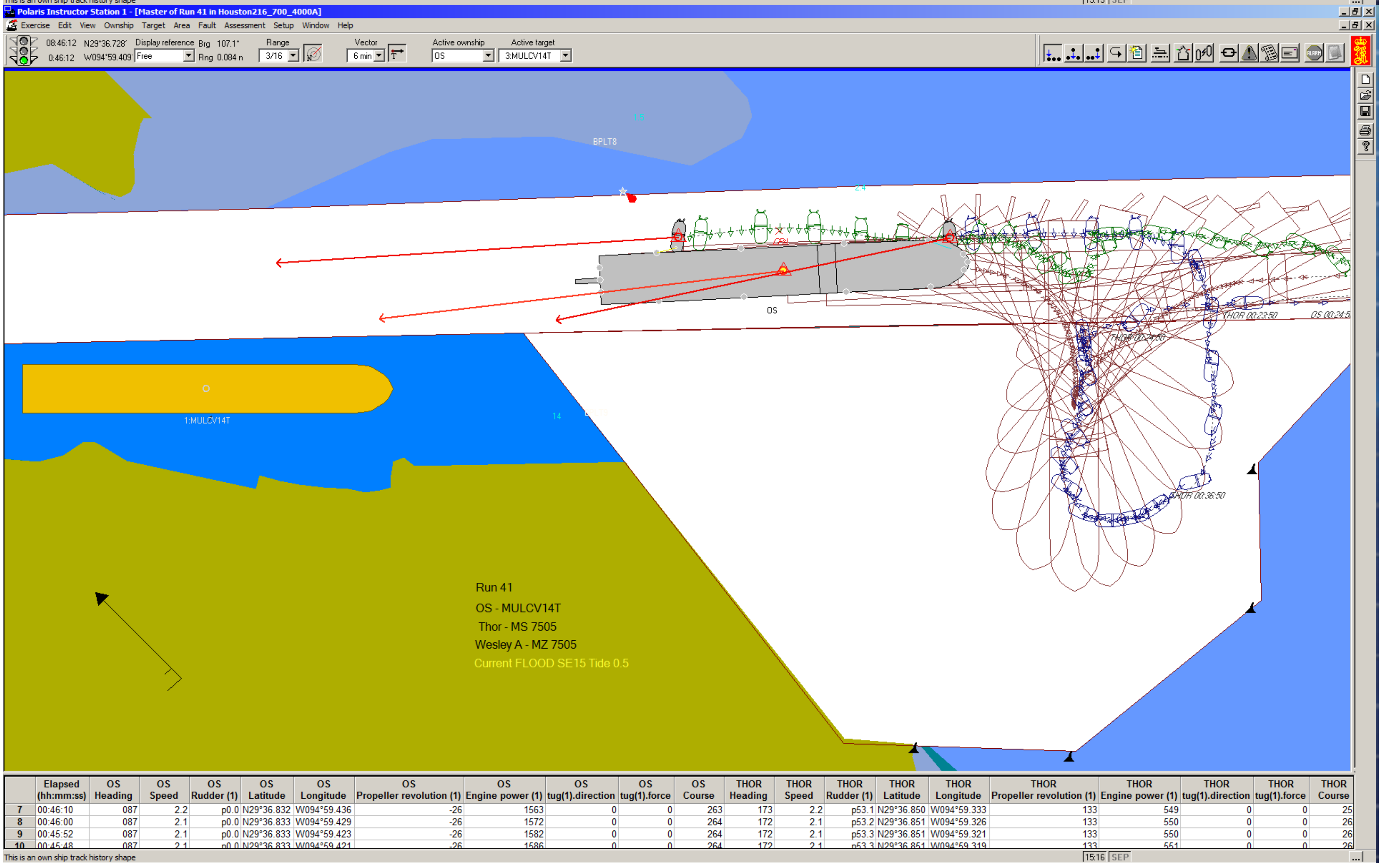
Active ownship OS

Active target 3:MULCV14T

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	THOR Course
7	00:44:30	088	1.8	p0.0	N29°36.836	W094°59.373	-26	1634	0	0	269	174	2.0	p56.0	N29°36.852	W094°59.270	133	550	0	0	26
8	00:44:28	088	1.8	p0.0	N29°36.836	W094°59.371	-26	1636	0	0	270	175	1.9	p56.1	N29°36.852	W094°59.269	133	551	0	0	26
9	00:44:26	088	1.8	p0.0	N29°36.836	W094°59.370	-26	1638	0	0	270	176	2.0	p47.3	N29°36.852	W094°59.268	133	550	0	0	26
10	00:44:24	088	1.8	p0.0	N29°36.836	W094°59.369	-26	1640	0	0	270	177	2.1	p53.8	N29°36.852	W094°59.267	133	543	0	0	26

This is an own ship track history shape

15:15 SEP



08:46:12 N29°36.728' Display reference Brg 107.1°
0:46:12 W094°59.409 Free Rng 0.084 n

Range 3/16

Vector 6 min

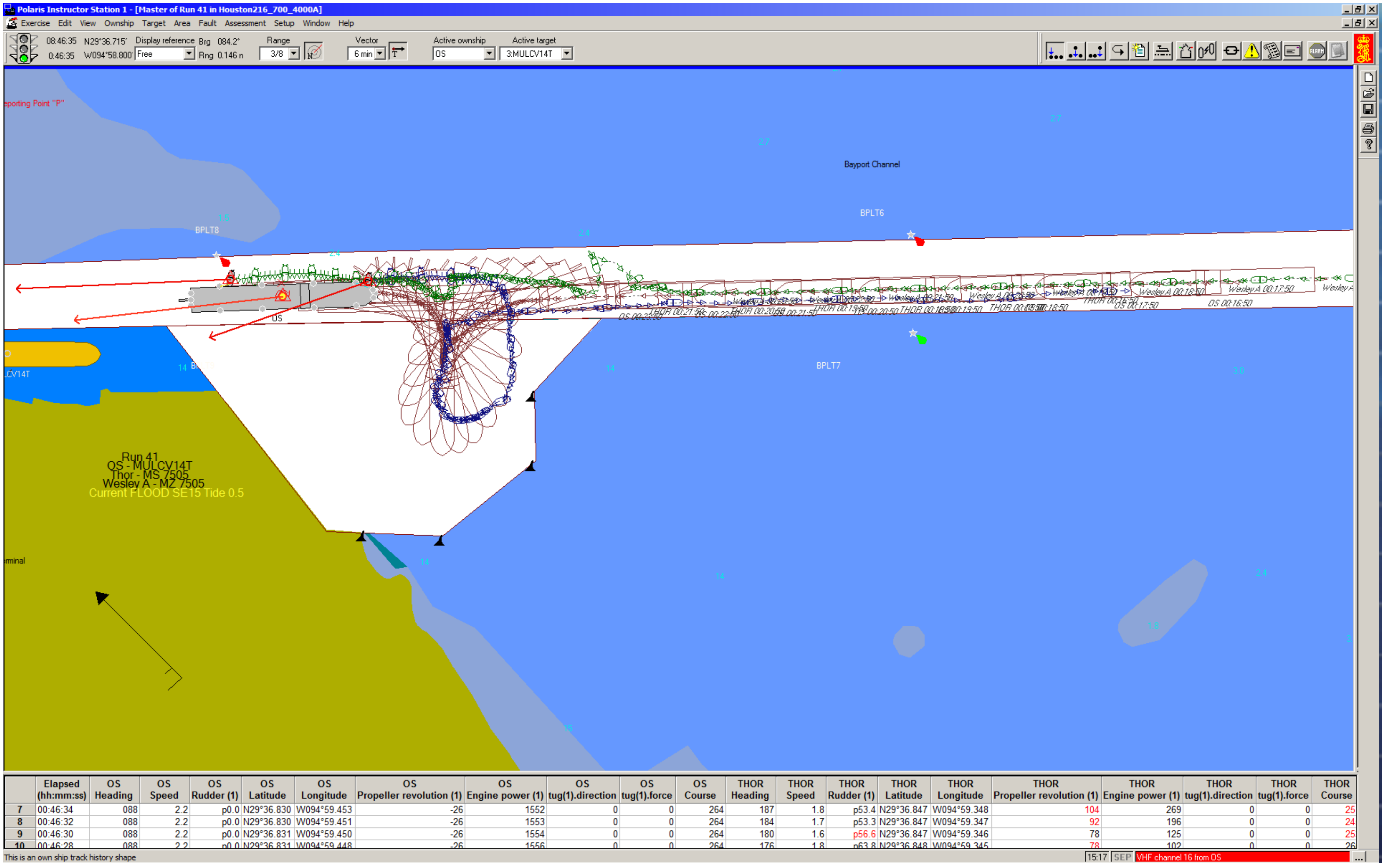
Active ownship OS

Active target 3:MULCV14T

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	THOR Course
7	00:46:10	087	2.2	p0.0	N29°36.832	W094°59.436	-26	1563	0	0	263	173	2.2	p53.1	N29°36.850	W094°59.333	133	549	0	0	25
8	00:46:00	087	2.1	p0.0	N29°36.833	W094°59.429	-26	1572	0	0	264	172	2.1	p53.2	N29°36.851	W094°59.326	133	550	0	0	26
9	00:45:52	087	2.1	p0.0	N29°36.833	W094°59.423	-26	1582	0	0	264	172	2.1	p53.3	N29°36.851	W094°59.321	133	550	0	0	26
10	00:45:48	087	2.1	p0.0	N29°36.833	W094°59.421	-26	1586	0	0	264	172	2.1	p53.3	N29°36.851	W094°59.319	133	551	0	0	26

This is an own ship track history shape

15:16 SEP



Polaris Instructor Station 1 - [Master of Run 41 in Houston216_700_4000A]

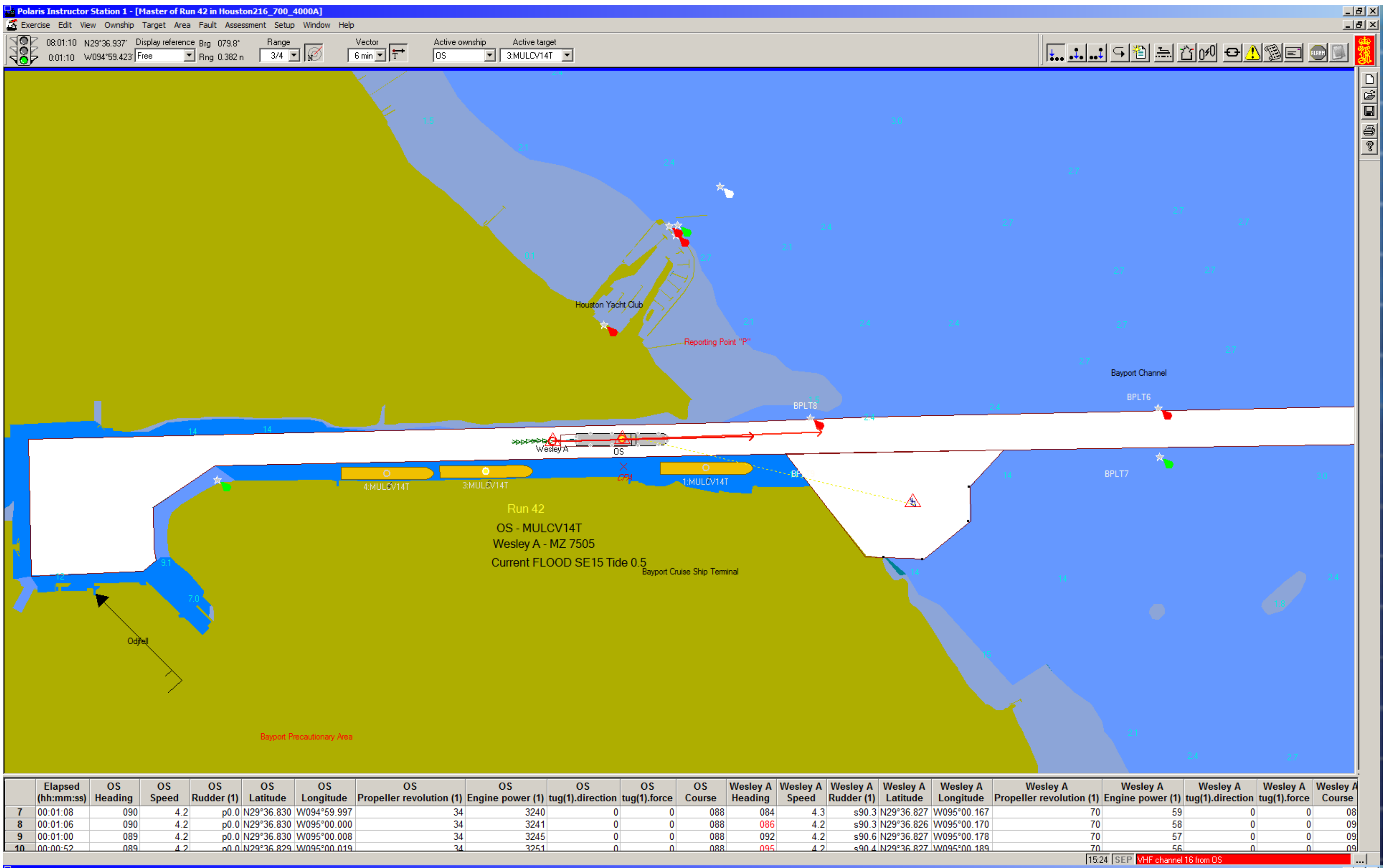
08:46:35 N29°36.715′
0:46:35 W094°58.800′
Display reference: Free
Brg 084.2°
Rng 0.146 n
Range: 3/8
Vector: 6 min
Active ownship: OS
Active target: 3:MULCV14T

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	THOR Heading	THOR Speed	THOR Rudder (1)	THOR Latitude	THOR Longitude	THOR Propeller revolution (1)	THOR Engine power (1)	THOR tug(1).direction	THOR tug(1).force	THOR Course
7	00:46:34	088	2.2	p0.0	N29°36.830	W094°59.453	-26	1552	0	0	264	187	1.8	p53.4	N29°36.847	W094°59.348	104	269	0	0	25
8	00:46:32	088	2.2	p0.0	N29°36.830	W094°59.451	-26	1553	0	0	264	184	1.7	p53.3	N29°36.847	W094°59.347	92	196	0	0	24
9	00:46:30	088	2.2	p0.0	N29°36.831	W094°59.450	-26	1554	0	0	264	180	1.6	p56.6	N29°36.847	W094°59.346	78	125	0	0	25
10	00:46:28	088	2.2	p0.0	N29°36.831	W094°59.448	-26	1556	0	0	264	176	1.8	p63.8	N29°36.848	W094°59.345	78	102	0	0	26

This is an own ship track history shape

15:17 SEP VHF channel 16 from OS

Run 42



Polaris Instructor Station 1 - [Master of Run 42 in Houston216_700_4000A]

08:01:10 N29°36.937′ 0:01:10 W094°59.423′ Display reference Free Brg 079.8° Rng 0.382 n Range 3/4 Vector 6 min Active ownship OS Active target 3:MULCV14T

Run 42

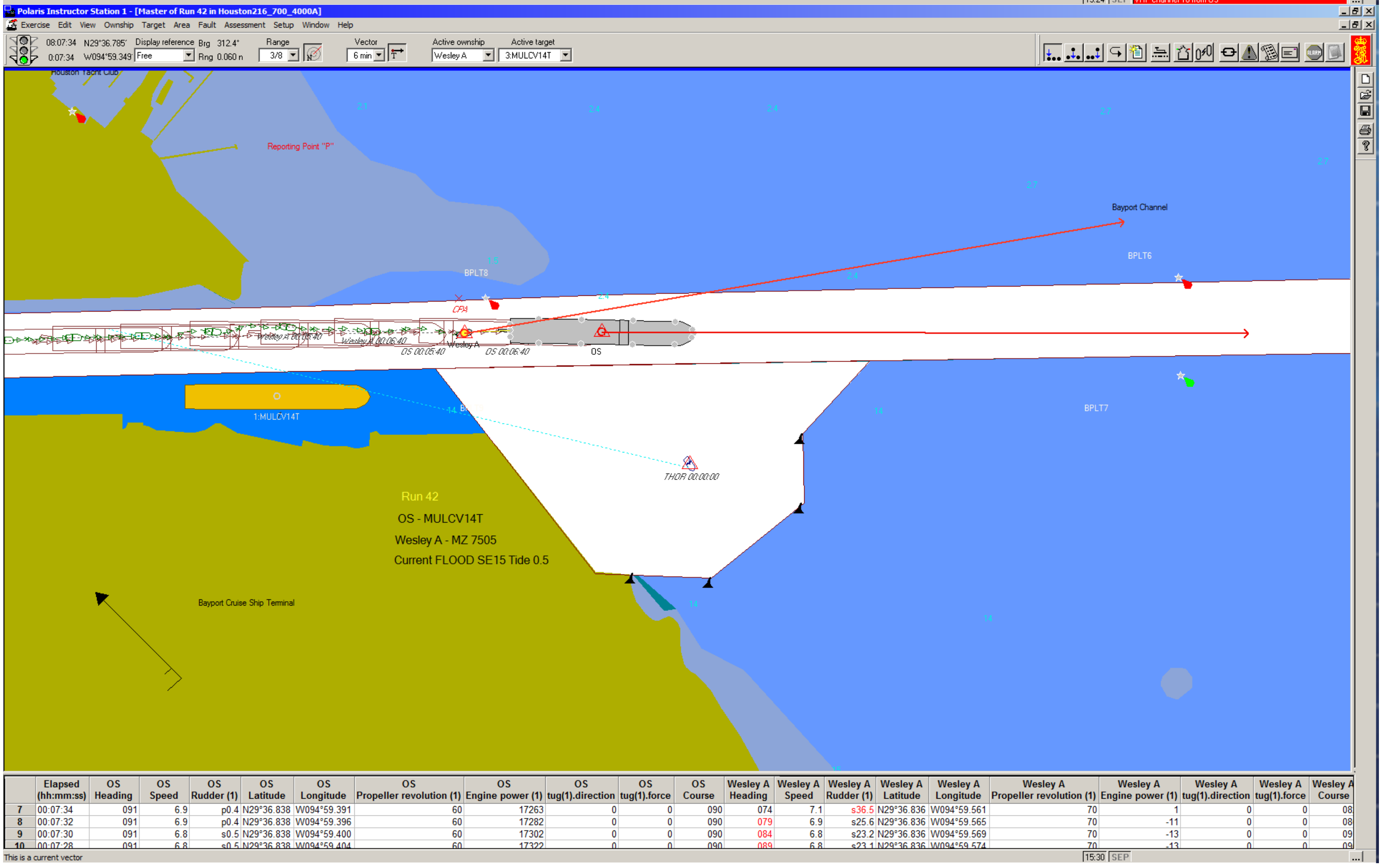
OS - MULCV14T

Wesley A - MZ 7505

Current FLOOD SE15 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	Wesley A Heading	Wesley A Speed	Wesley A Rudder (1)	Wesley A Latitude	Wesley A Longitude	Wesley A Propeller revolution (1)	Wesley A Engine power (1)	Wesley A tug(1).direction	Wesley A tug(1).force	Wesley A Course
7	00:01:08	090	4.2	p0.0	N29°36.830	W094°59.997	34	3240	0	0	088	084	4.3	s90.3	N29°36.827	W095°00.167	70	59	0	0	08
8	00:01:06	090	4.2	p0.0	N29°36.830	W095°00.000	34	3241	0	0	088	086	4.2	s90.3	N29°36.826	W095°00.170	70	58	0	0	09
9	00:01:00	089	4.2	p0.0	N29°36.830	W095°00.008	34	3245	0	0	088	092	4.2	s90.6	N29°36.827	W095°00.178	70	57	0	0	09
10	00:00:52	089	4.2	p0.0	N29°36.829	W095°00.019	34	3251	0	0	088	095	4.2	s90.4	N29°36.827	W095°00.189	70	56	0	0	09

15:24 SEP VHF channel 16 from OS



Polaris Instructor Station 1 - [Master of Run 42 in Houston216_700_4000A]

08:07:34 N29°36.785′ 0:07:34 W094°59.349′ Display reference Free Brg 312.4° Rng 0.060 n Range 3/8 Vector 6 min Active ownship Wesley A Active target 3:MULCV14T

Run 42

OS - MULCV14T

Wesley A - MZ 7505

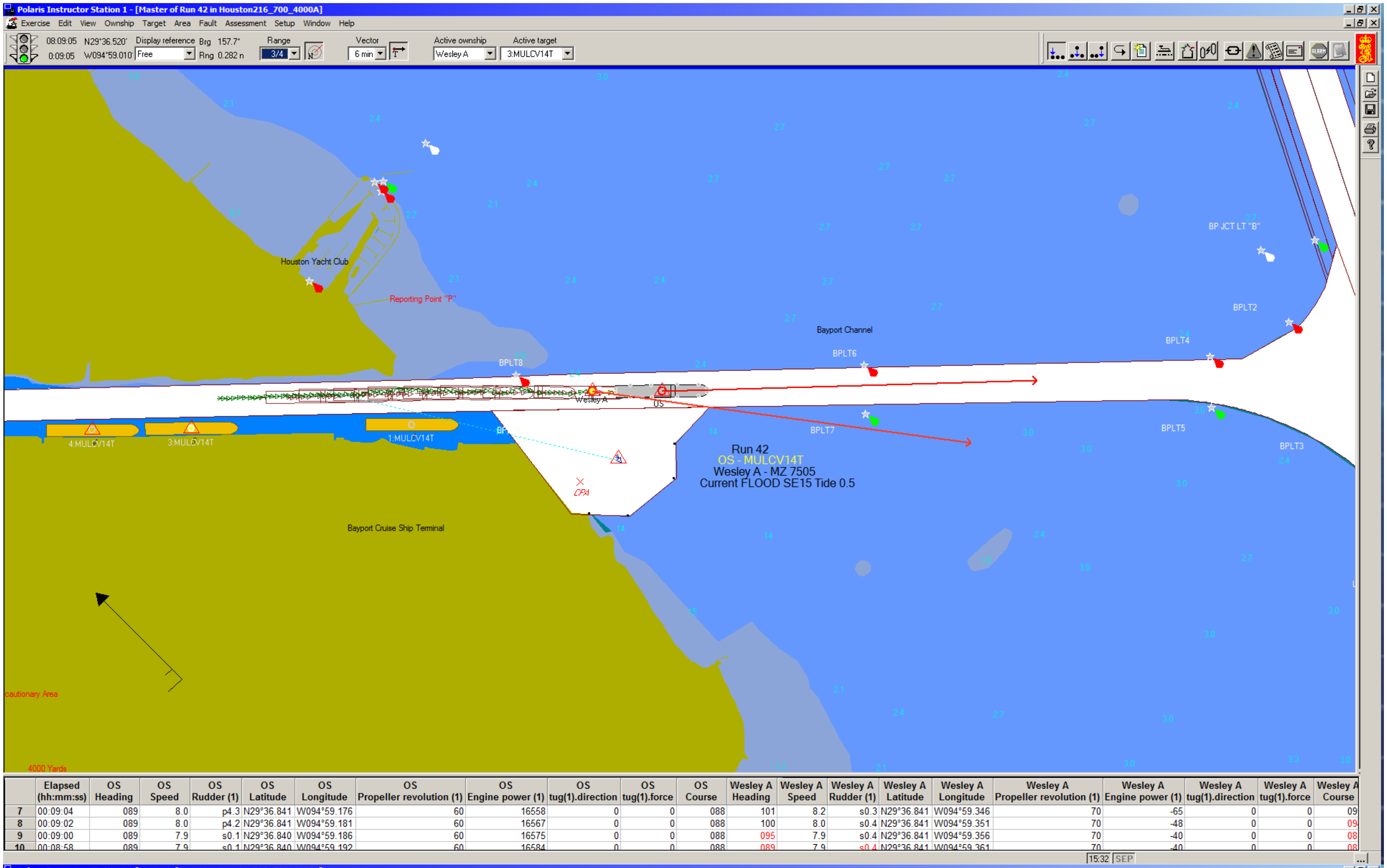
Current FLOOD SE15 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	Wesley A Heading	Wesley A Speed	Wesley A Rudder (1)	Wesley A Latitude	Wesley A Longitude	Wesley A Propeller revolution (1)	Wesley A Engine power (1)	Wesley A tug(1).direction	Wesley A tug(1).force	Wesley A Course
7	00:07:34	091	6.9	p0.4	N29°36.838	W094°59.391	60	17263	0	0	090	074	7.1	s36.5	N29°36.836	W094°59.561	70	1	0	0	08
8	00:07:32	091	6.9	p0.4	N29°36.838	W094°59.396	60	17282	0	0	090	079	6.9	s25.6	N29°36.836	W094°59.565	70	-11	0	0	08
9	00:07:30	091	6.8	s0.5	N29°36.838	W094°59.400	60	17302	0	0	090	084	6.8	s23.2	N29°36.836	W094°59.569	70	-13	0	0	09
10	00:07:28	091	6.8	s0.5	N29°36.838	W094°59.404	60	17322	0	0	090	089	6.8	s23.1	N29°36.836	W094°59.574	70	-13	0	0	09

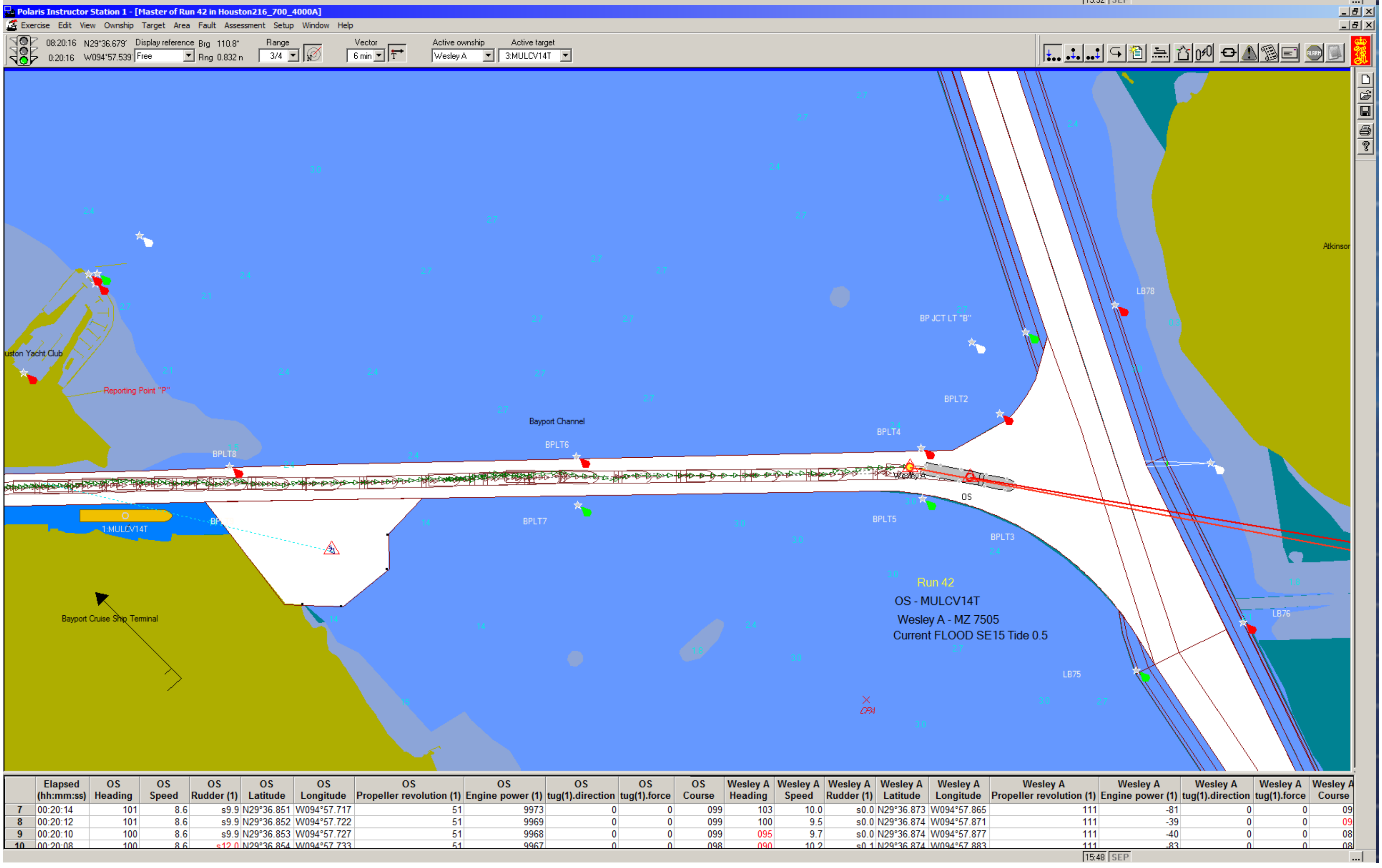
This is a current vector

15:30 SEP

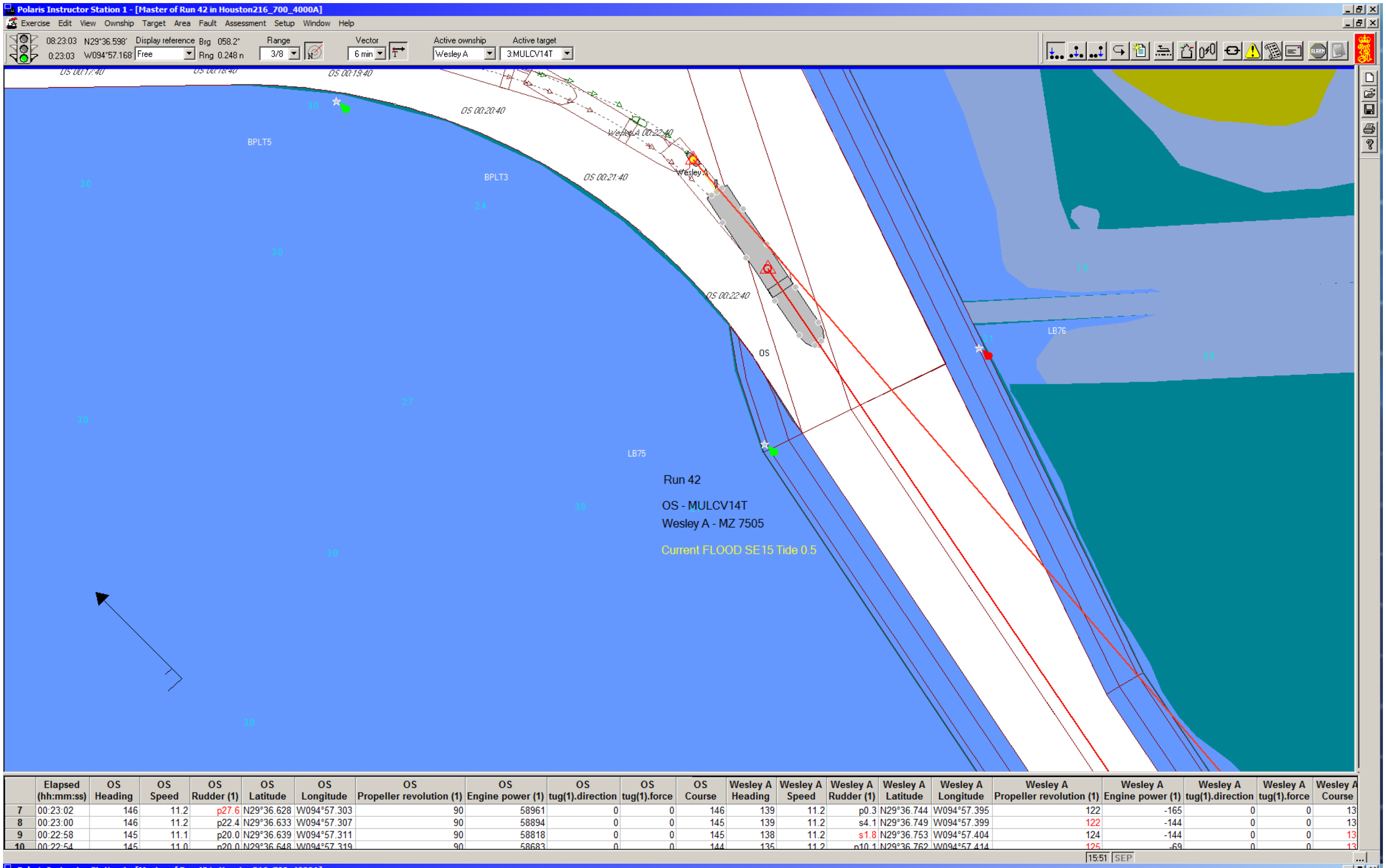
June 26, 2019



	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	Wesley A Heading	Wesley A Speed	Wesley A Rudder (1)	Wesley A Latitude	Wesley A Longitude	Wesley A Propeller revolution (1)	Wesley A Engine power (1)	Wesley A tug(1).direction	Wesley A tug(1).force	Wesley A Course
7	00:09:04	089	8.0	p4.3	N29°36.841	W094°59.176	60	16558	0	0	088	101	8.2	s0.3	N29°36.841	W094°59.346	70	-65	0	0	09
8	00:09:02	089	8.0	p4.2	N29°36.841	W094°59.181	60	16567	0	0	088	100	8.0	s0.4	N29°36.841	W094°59.351	70	-48	0	0	09
9	00:09:00	089	7.9	s0.1	N29°36.840	W094°59.186	60	16575	0	0	088	095	7.9	s0.4	N29°36.841	W094°59.356	70	-40	0	0	08
10	00:08:58	089	7.9	s0.1	N29°36.840	W094°59.192	60	16584	0	0	088	089	7.9	s0.4	N29°36.841	W094°59.361	70	-40	0	0	08



	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	Wesley A Heading	Wesley A Speed	Wesley A Rudder (1)	Wesley A Latitude	Wesley A Longitude	Wesley A Propeller revolution (1)	Wesley A Engine power (1)	Wesley A tug(1).direction	Wesley A tug(1).force	Wesley A Course
7	00:20:14	101	8.6	s9.9	N29°36.851	W094°57.717	51	9973	0	0	099	103	10.0	s0.0	N29°36.873	W094°57.865	111	-81	0	0	09
8	00:20:12	101	8.6	s9.9	N29°36.852	W094°57.722	51	9969	0	0	099	100	9.5	s0.0	N29°36.874	W094°57.871	111	-39	0	0	09
9	00:20:10	100	8.6	s9.9	N29°36.853	W094°57.727	51	9968	0	0	099	095	9.7	s0.0	N29°36.874	W094°57.877	111	-40	0	0	08
10	00:20:08	100	8.6	s12.0	N29°36.854	W094°57.733	51	9967	0	0	098	090	10.2	s0.1	N29°36.874	W094°57.883	111	-83	0	0	08



08:23:03 N29°36.598' Display reference Free Brg 058.2° Rng 0.248 n

0:23:03 W094°57.168'

Range 3/8

Vector 6 min

Active ownship Wesley A

Active target 3:MULCV14T

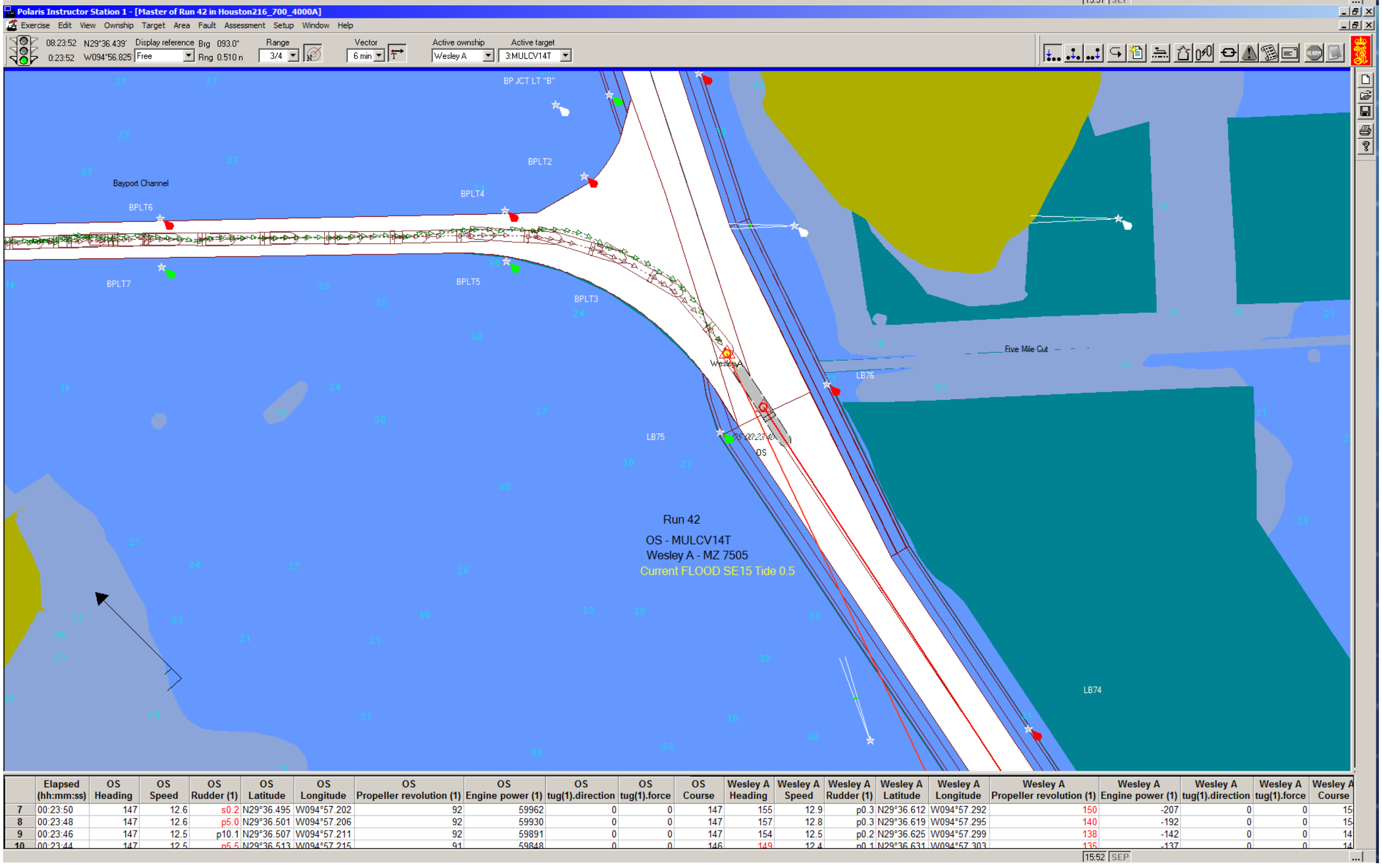
Run 42

OS - MULCV14T

Wesley A - MZ 7505

Current FLOOD SE15 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	Wesley A Heading	Wesley A Speed	Wesley A Rudder (1)	Wesley A Latitude	Wesley A Longitude	Wesley A Propeller revolution (1)	Wesley A Engine power (1)	Wesley A tug(1).direction	Wesley A tug(1).force	Wesley A Course
7	00:23:02	146	11.2	p27.6	N29°36.628	W094°57.303	90	58961	0	0	146	139	11.2	p0.3	N29°36.744	W094°57.395	122	-165	0	0	13
8	00:23:00	146	11.2	p22.4	N29°36.633	W094°57.307	90	58894	0	0	145	139	11.2	s4.1	N29°36.749	W094°57.399	122	-144	0	0	13
9	00:22:58	145	11.1	p20.0	N29°36.639	W094°57.311	90	58818	0	0	145	138	11.2	s1.8	N29°36.753	W094°57.404	124	-144	0	0	13
10	00:22:54	145	11.0	p20.0	N29°36.648	W094°57.319	90	58683	0	0	144	135	11.2	p10.1	N29°36.762	W094°57.414	125	-69	0	0	13



08:23:52 N29°36.439' Display reference Free Brg 093.0° Rng 0.510 n

0:23:52 W094°56.825'

Range 3/4

Vector 6 min

Active ownship Wesley A

Active target 3:MULCV14T

Run 42

OS - MULCV14T

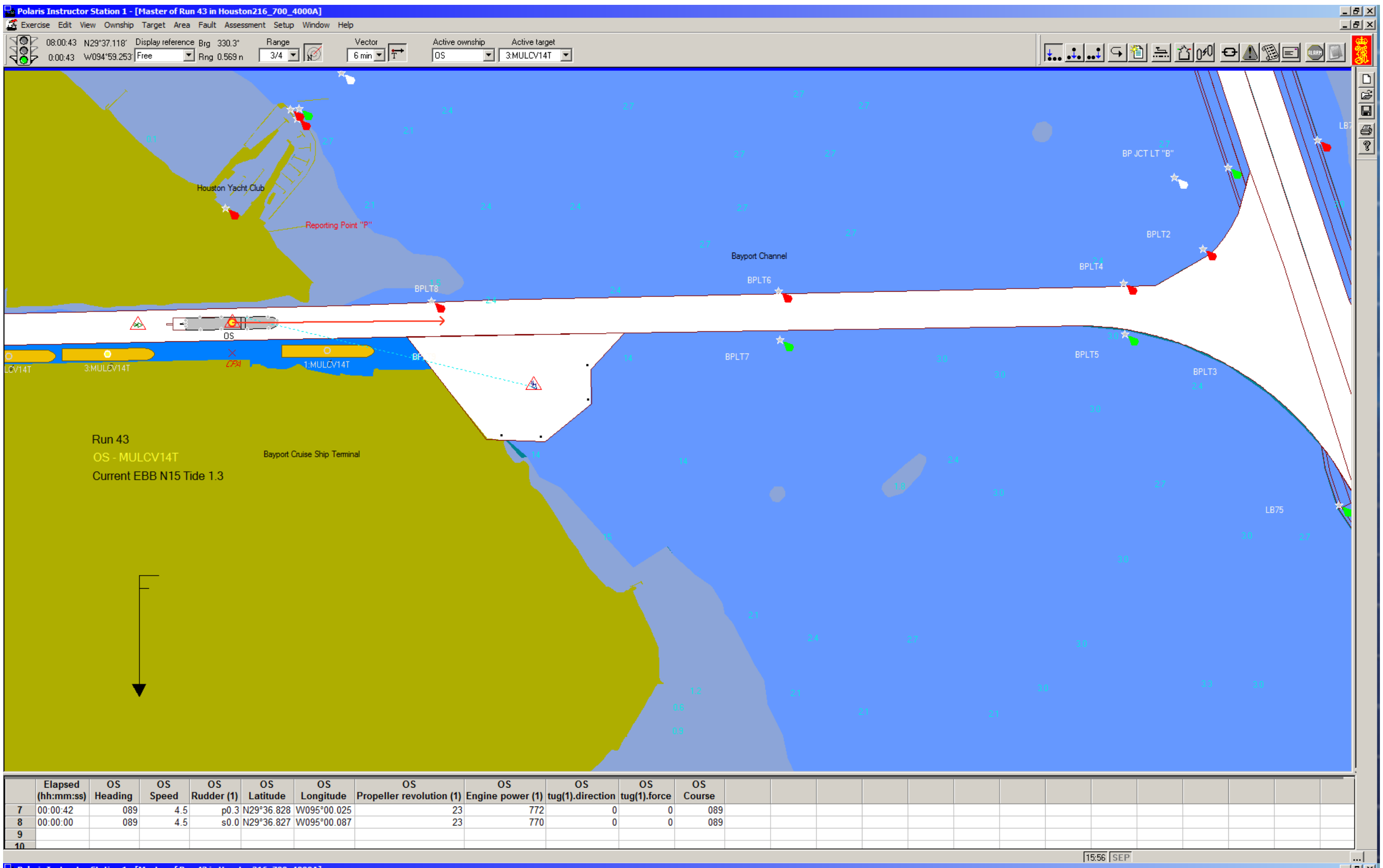
Wesley A - MZ 7505

Current FLOOD SE15 Tide 0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	Wesley A Heading	Wesley A Speed	Wesley A Rudder (1)	Wesley A Latitude	Wesley A Longitude	Wesley A Propeller revolution (1)	Wesley A Engine power (1)	Wesley A tug(1).direction	Wesley A tug(1).force	Wesley A Course
7	00:23:50	147	12.6	s0.2	N29°36.495	W094°57.202	92	59962	0	0	147	155	12.9	p0.3	N29°36.612	W094°57.292	150	-207	0	0	15
8	00:23:48	147	12.6	p5.0	N29°36.501	W094°57.206	92	59930	0	0	147	157	12.8	p0.3	N29°36.619	W094°57.295	140	-192	0	0	15
9	00:23:46	147	12.5	p10.1	N29°36.507	W094°57.211	92	59891	0	0	147	154	12.5	p0.2	N29°36.625	W094°57.299	138	-142	0	0	14
10	00:23:44	147	12.5	p5.5	N29°36.513	W094°57.215	91	59848	0	0	146	149	12.4	p0.1	N29°36.631	W094°57.303	135	-137	0	0	14

June 26, 2019

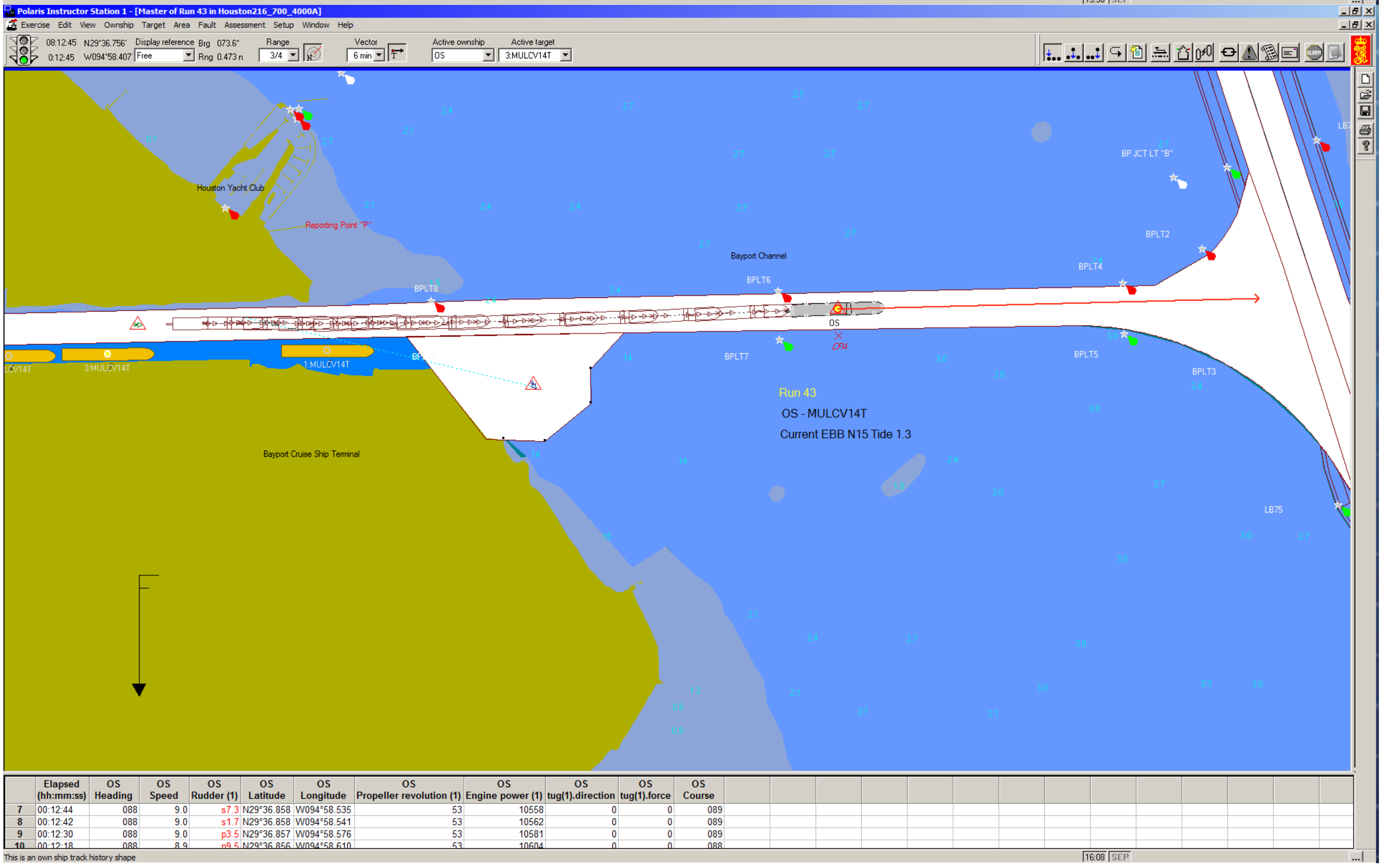
Run 43



08:00:43 N29°37.118' Display reference Free Brg 330.3° Rng 0.569 n
0:00:43 W094°59.253
Range 3/4
Vector 6 min
Active ownship OS
Active target 3:MULCV14T

Run 43
OS - MULCV14T
Current EBB N15 Tide 1.3

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course
7	00:00:42	089	4.5	p0.3	N29°36.828	W095°00.025	23	772	0	0	089
8	00:00:00	089	4.5	s0.0	N29°36.827	W095°00.087	23	770	0	0	089
9											
10											

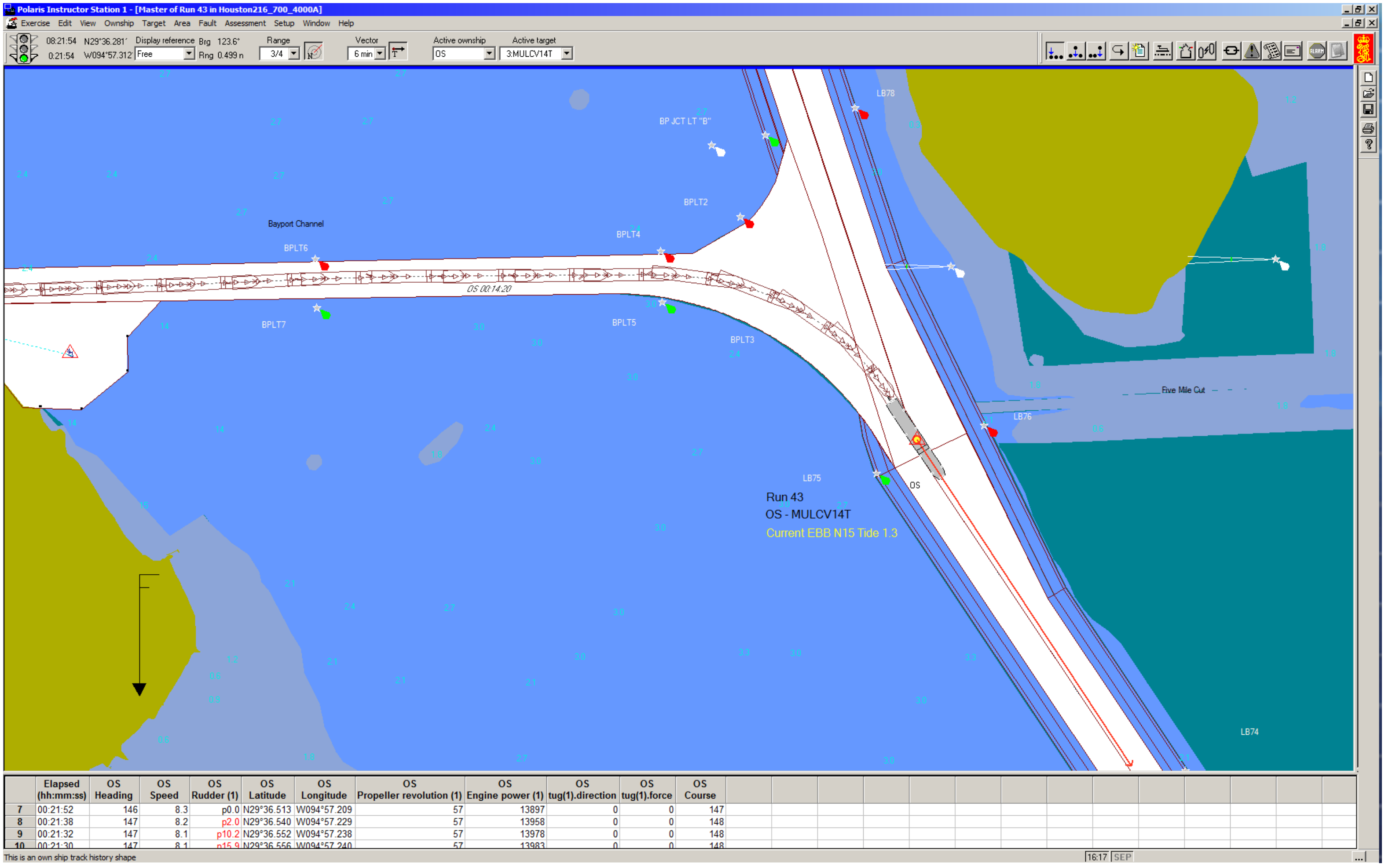


08:12:45 N29°36.756' Display reference Free Brg 073.6° Rng 0.473 n
0:12:45 W094°58.407'
Range 3/4
Vector 6 min
Active ownship OS
Active target 3:MULCV14T

Run 43
OS - MULCV14T
Current EBB N15 Tide 1.3

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course
7	00:12:44	088	9.0	s7.3	N29°36.858	W094°58.535	53	10558	0	0	089
8	00:12:42	088	9.0	s1.7	N29°36.858	W094°58.541	53	10562	0	0	089
9	00:12:30	088	9.0	p3.5	N29°36.857	W094°58.576	53	10581	0	0	089
10	00:12:18	088	8.9	p9.5	N29°36.856	W094°58.610	53	10604	0	0	088

This is an own ship track history shape



Polaris Instructor Station 1 - [Master of Run 43 in Houston216_700_4000A]

08:21:54 N29°36.281´
0:21:54 W094°57.312´

Display reference: Free

Brg 123.6°
Rng 0.499 n

Range: 3/4

Vector: 6 min

Active ownship: OS

Active target: 3:MULCV14T

Run 43
OS - MULCV14T
Current EBB N15 Tide 1.3

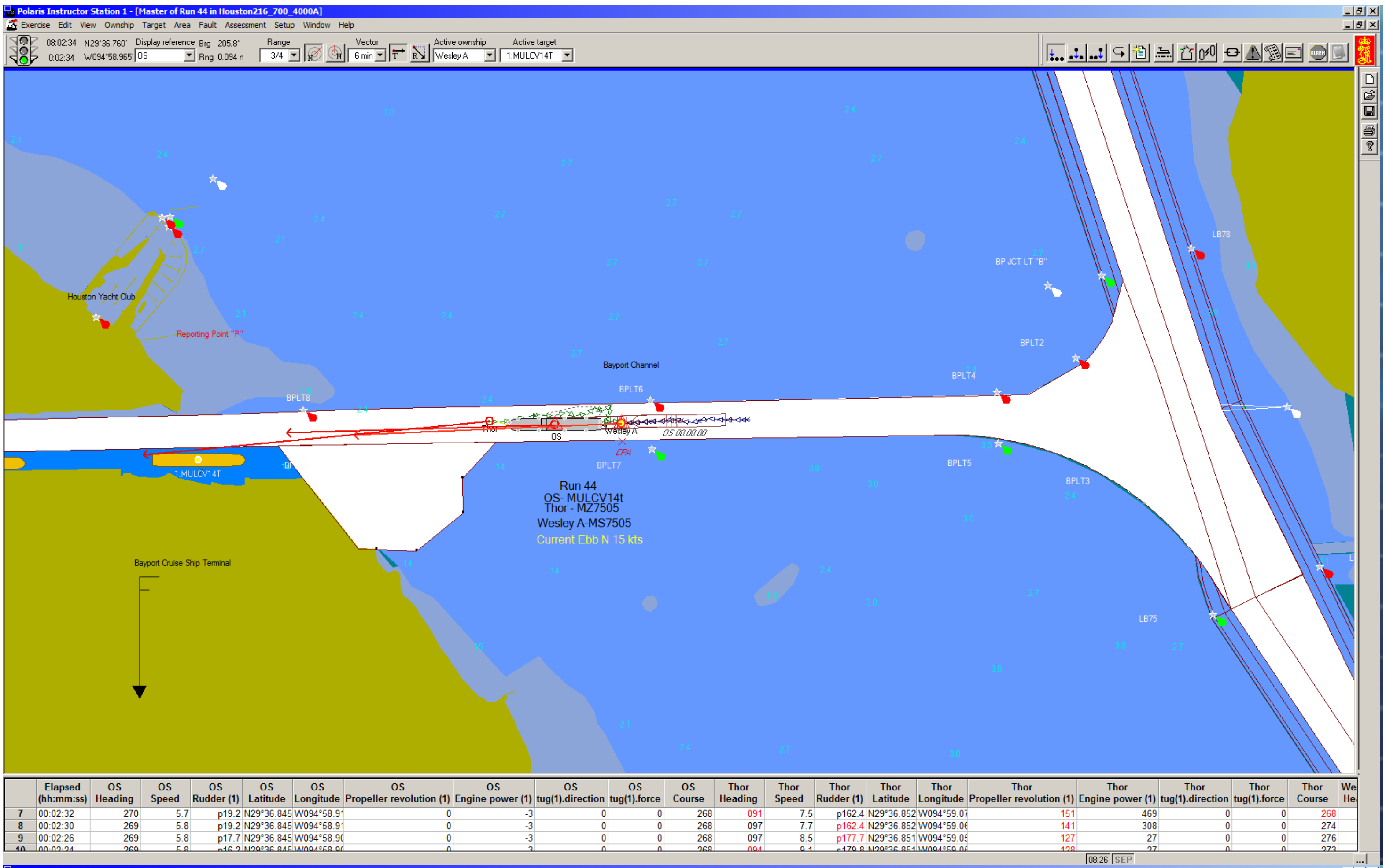
	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course
7	00:21:52	146	8.3	p0.0	N29°36.513	W094°57.209	57	13897	0	0	147
8	00:21:38	147	8.2	p2.0	N29°36.540	W094°57.229	57	13958	0	0	148
9	00:21:32	147	8.1	p10.2	N29°36.552	W094°57.238	57	13978	0	0	148
10	00:21:30	147	8.1	p15.9	N29°36.556	W094°57.240	57	13983	0	0	148

This is an own ship track history shape

16:17 SEP

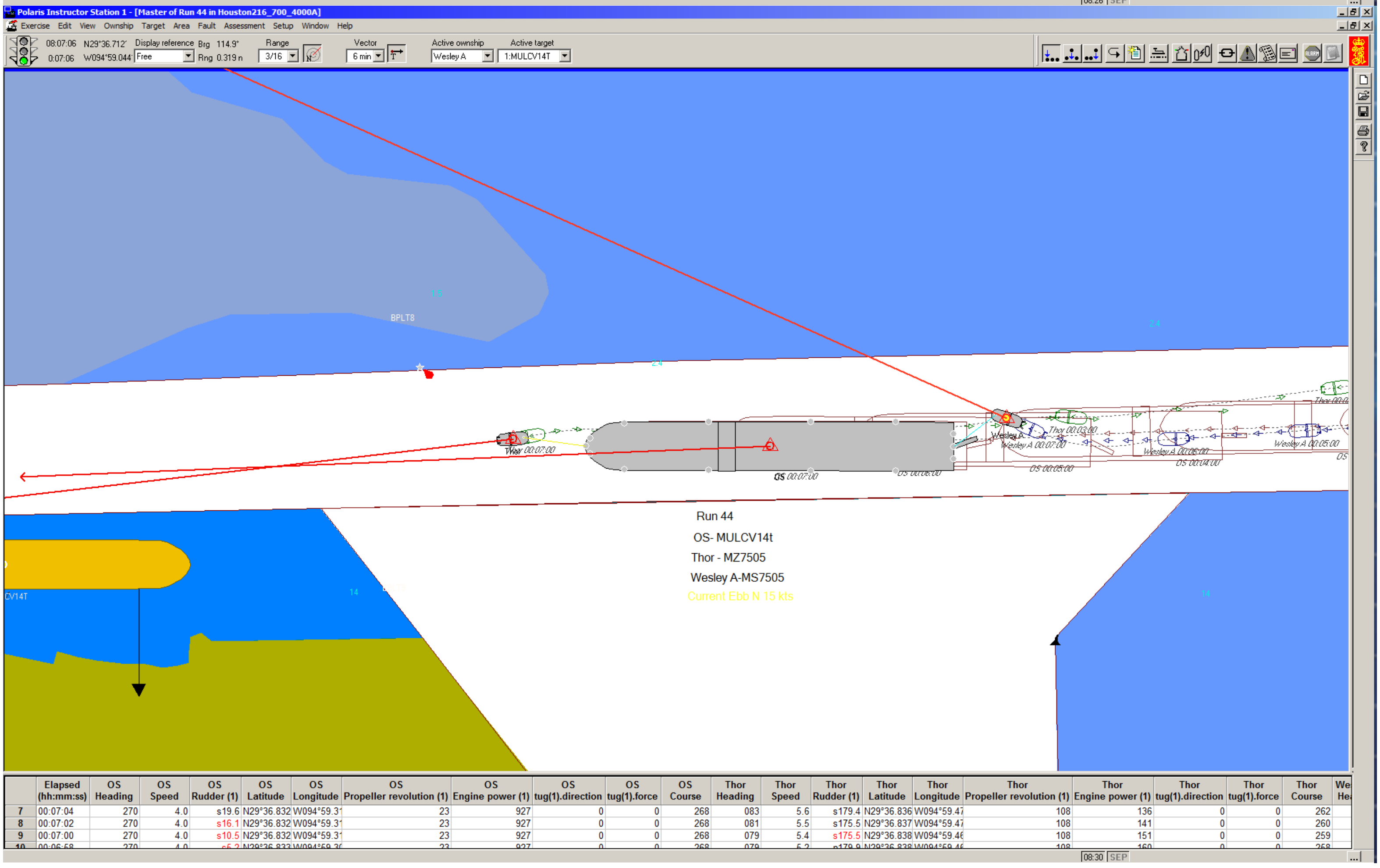
June 26, 2019

Run 44



08:02:34 N29°36.760′
0:02:34 W094°58.965′
Display reference: OS
Brg 205.8°
Rng 0.094 n
Range: 3/4
Vector: 6 min
Active ownship: Wesley A
Active target: 1:MULCV14T

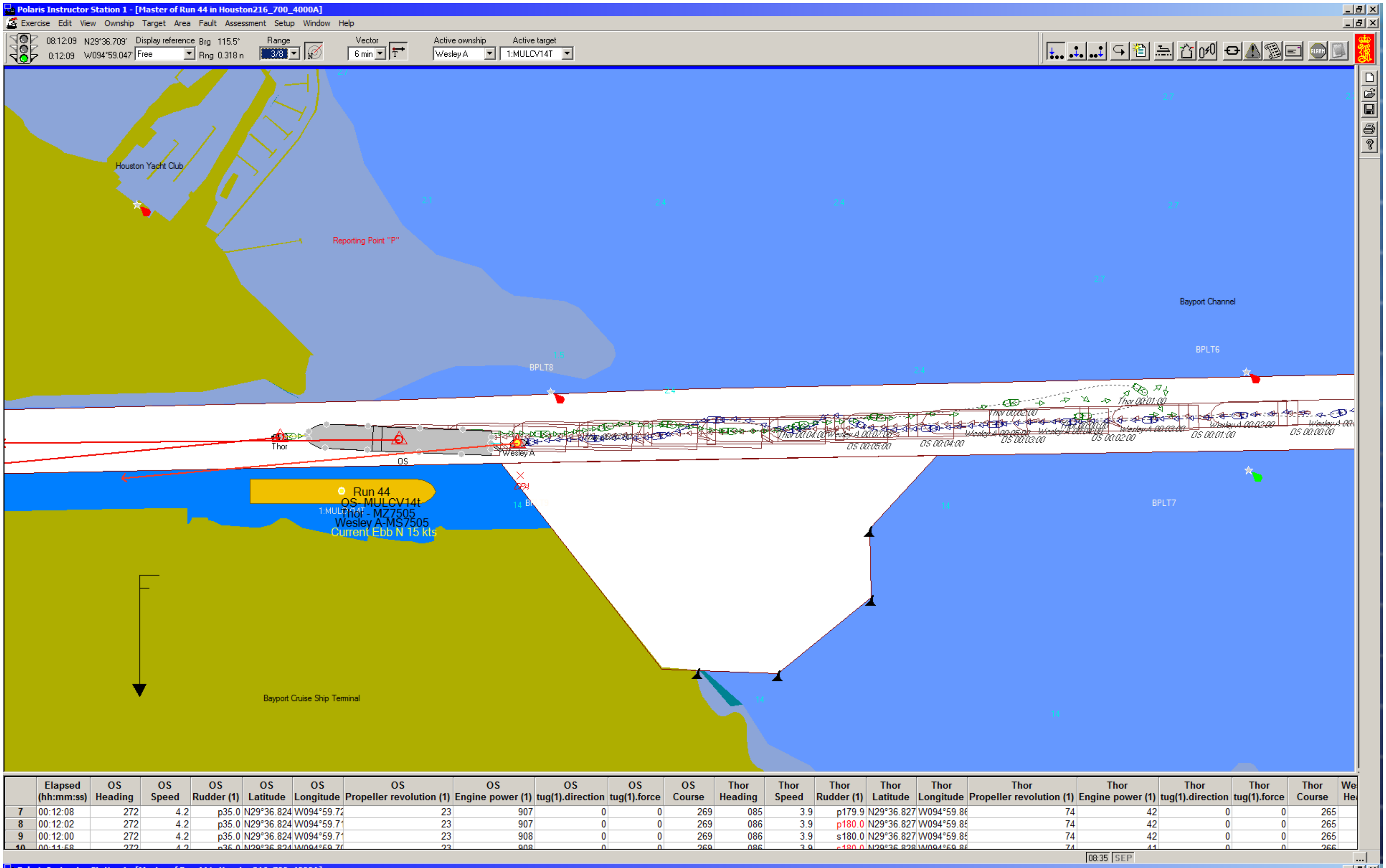
	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	Thor Heading	Thor Speed	Thor Rudder (1)	Thor Latitude	Thor Longitude	Thor Propeller revolution (1)	Thor Engine power (1)	Thor tug(1).direction	Thor tug(1).force	Thor Course	We He
7	00:02:32	270	5.7	p19.2	N29°36.845	W094°58.9	0	-3	0	0	268	091	7.5	p162.4	N29°36.852	W094°59.07	151	469	0	0	268	
8	00:02:30	269	5.8	p19.2	N29°36.845	W094°58.9	0	-3	0	0	268	097	7.7	p162.4	N29°36.852	W094°59.0	141	308	0	0	274	
9	00:02:26	269	5.8	p17.7	N29°36.845	W094°58.9	0	-3	0	0	268	097	8.5	p177.7	N29°36.851	W094°59.0	127	27	0	0	276	



08:07:06 N29°36.712′
0:07:06 W094°59.044′
Display reference: Free
Brg 114.9°
Rng 0.319 n
Range: 3/16
Vector: 6 min
Active ownship: Wesley A
Active target: 1:MULCV14T

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	Thor Heading	Thor Speed	Thor Rudder (1)	Thor Latitude	Thor Longitude	Thor Propeller revolution (1)	Thor Engine power (1)	Thor tug(1).direction	Thor tug(1).force	Thor Course	We He
7	00:07:04	270	4.0	s19.6	N29°36.832	W094°59.3	23	927	0	0	268	083	5.6	s179.4	N29°36.836	W094°59.47	108	136	0	0	262	
8	00:07:02	270	4.0	s16.1	N29°36.832	W094°59.3	23	927	0	0	268	081	5.5	s175.5	N29°36.837	W094°59.47	108	141	0	0	260	
9	00:07:00	270	4.0	s10.5	N29°36.832	W094°59.3	23	927	0	0	268	079	5.4	s175.5	N29°36.838	W094°59.4	108	151	0	0	259	

June 26, 2019

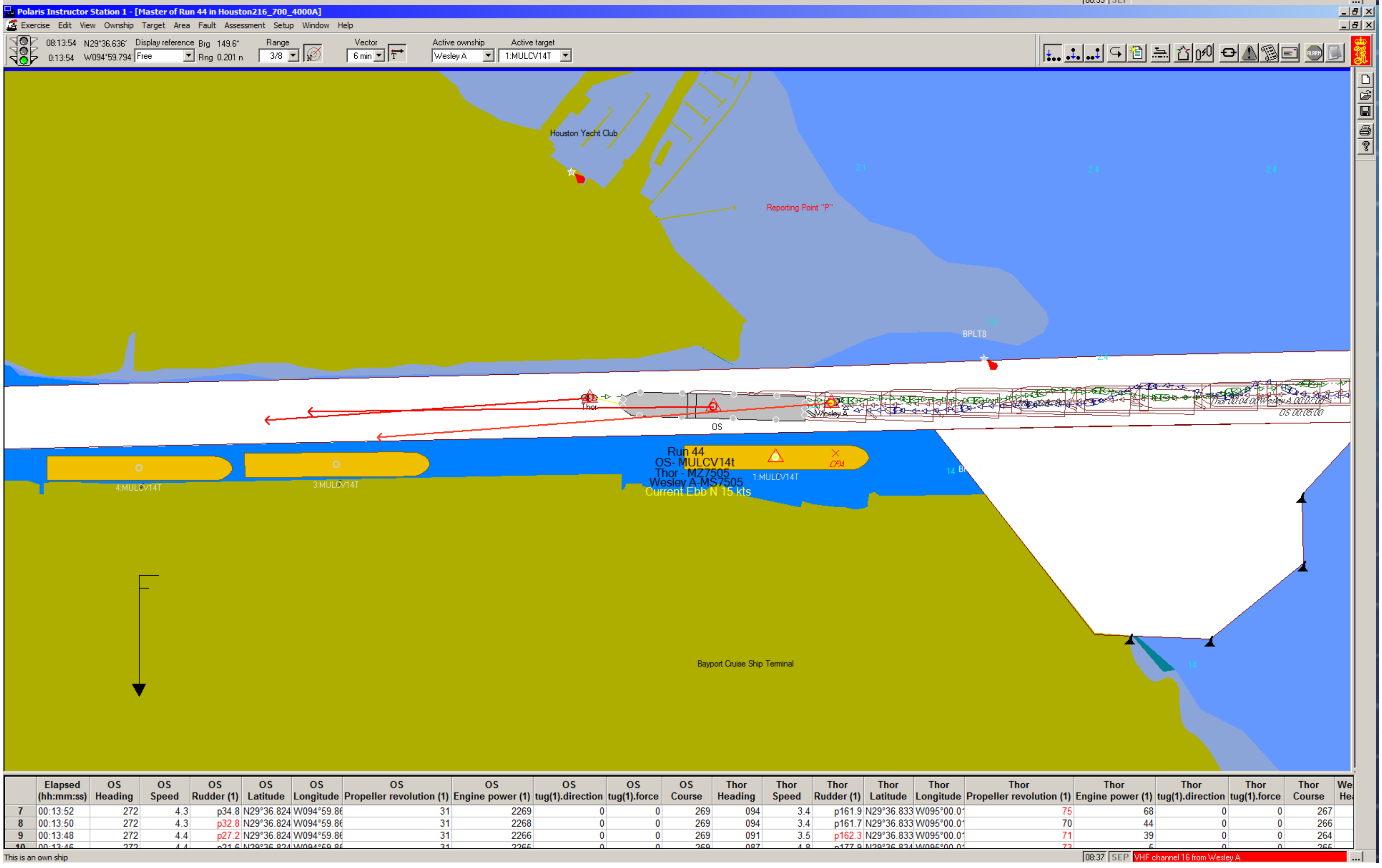


Polaris Instructor Station 1 - [Master of Run 44 in Houston216_700_4000A]

08:12:09 N29°36.709′ Display reference Brg 115.5°
0:12:09 W094°59.047′ Free Rng 0.318 n
Range 3/8
Vector 6 min
Active ownship Wesley A
Active target 1:MULCV14T

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	Thor Heading	Thor Speed	Thor Rudder (1)	Thor Latitude	Thor Longitude	Thor Propeller revolution (1)	Thor Engine power (1)	Thor tug(1).direction	Thor tug(1).force	Thor Course
7	00:12:08	272	4.2	p35.0	N29°36.824	W094°59.72	23	907	0	0	269	085	3.9	p179.9	N29°36.827	W094°59.86	74	42	0	0	265
8	00:12:02	272	4.2	p35.0	N29°36.824	W094°59.71	23	907	0	0	269	086	3.9	p180.0	N29°36.827	W094°59.85	74	42	0	0	265
9	00:12:00	272	4.2	p35.0	N29°36.824	W094°59.71	23	908	0	0	269	086	3.9	s180.0	N29°36.827	W094°59.85	74	42	0	0	265

08:35 SEP



Polaris Instructor Station 1 - [Master of Run 44 in Houston216_700_4000A]

08:13:54 N29°36.636′ Display reference Brg 149.6°
0:13:54 W094°59.794′ Free Rng 0.201 n
Range 3/8
Vector 6 min
Active ownship Wesley A
Active target 1:MULCV14T

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	Thor Heading	Thor Speed	Thor Rudder (1)	Thor Latitude	Thor Longitude	Thor Propeller revolution (1)	Thor Engine power (1)	Thor tug(1).direction	Thor tug(1).force	Thor Course
7	00:13:52	272	4.3	p34.8	N29°36.824	W094°59.86	31	2269	0	0	269	094	3.4	p161.9	N29°36.833	W095°00.01	75	68	0	0	267
8	00:13:50	272	4.3	p32.8	N29°36.824	W094°59.86	31	2268	0	0	269	094	3.4	p161.7	N29°36.833	W095°00.01	70	44	0	0	266
9	00:13:48	272	4.4	p27.2	N29°36.824	W094°59.86	31	2266	0	0	269	091	3.5	p162.3	N29°36.833	W095°00.01	71	39	0	0	264

This is an own ship

08:37 SEP VHF channel 16 from Wesley A

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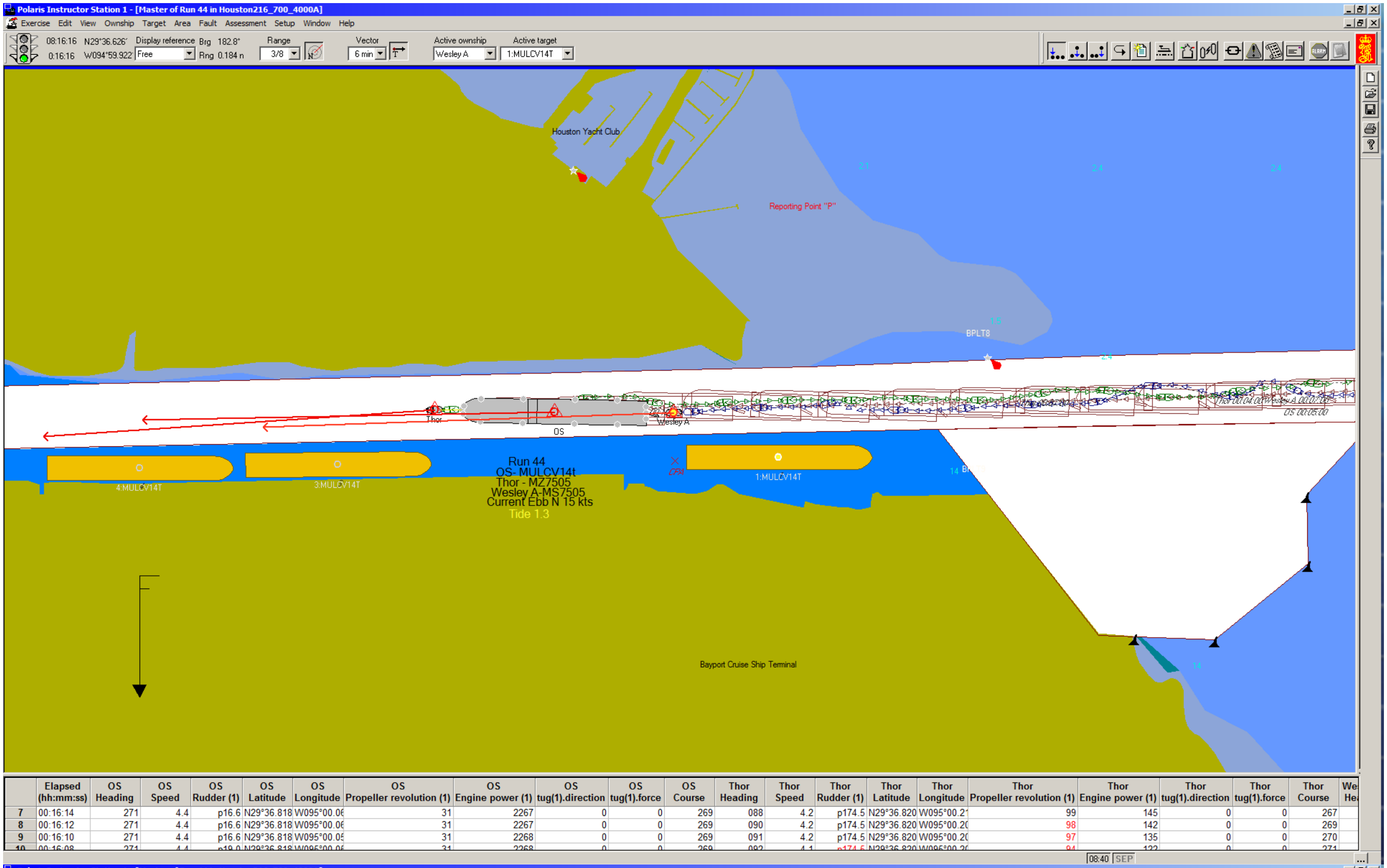
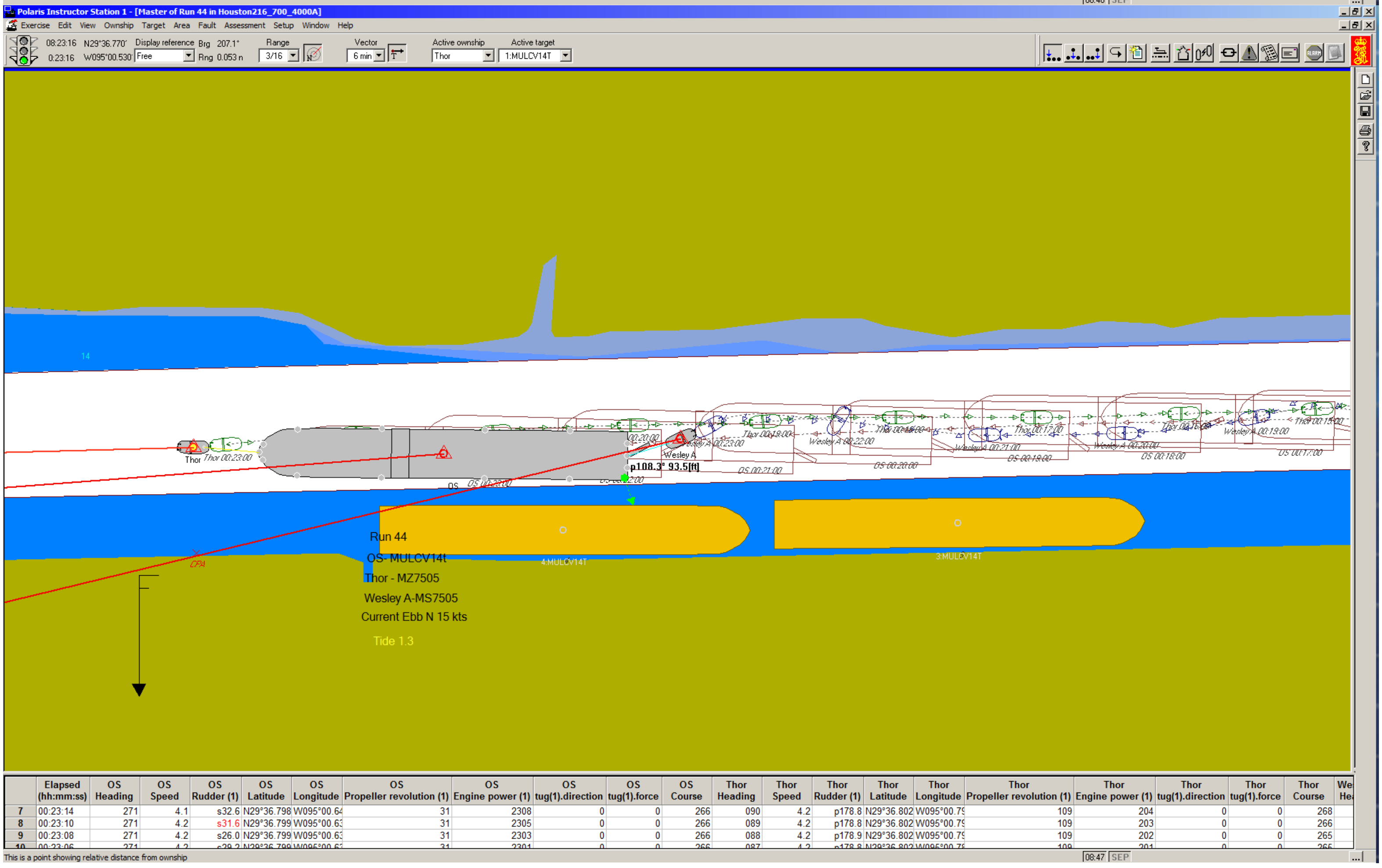


08:16:16 N29°36.626′ Display reference Free Brg 182.8° Rng 0.184 n Range 3/8 Vector 6 min Active ownship Wesley A Active target 1:MULCV14T

0:16:16 W094°59.922′

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	Thor Heading	Thor Speed	Thor Rudder (1)	Thor Latitude	Thor Longitude	Thor Propeller revolution (1)	Thor Engine power (1)	Thor tug(1).direction	Thor tug(1).force	Thor Course	We He
7	00:16:14	271	4.4	p16.6	N29°36.818	W095°00.06	31	2267	0	0	269	088	4.2	p174.5	N29°36.820	W095°00.21	99	145	0	0	267	
8	00:16:12	271	4.4	p16.6	N29°36.818	W095°00.06	31	2267	0	0	269	090	4.2	p174.5	N29°36.820	W095°00.20	98	142	0	0	269	
9	00:16:10	271	4.4	p16.6	N29°36.818	W095°00.05	31	2268	0	0	269	091	4.2	p174.5	N29°36.820	W095°00.20	97	135	0	0	270	
10	00:16:08	271	4.4	p19.0	N29°36.818	W095°00.0	31	2268	0	0	269	092	4.1	p174.5	N29°36.820	W095°00.2	94	122	0	0	271	

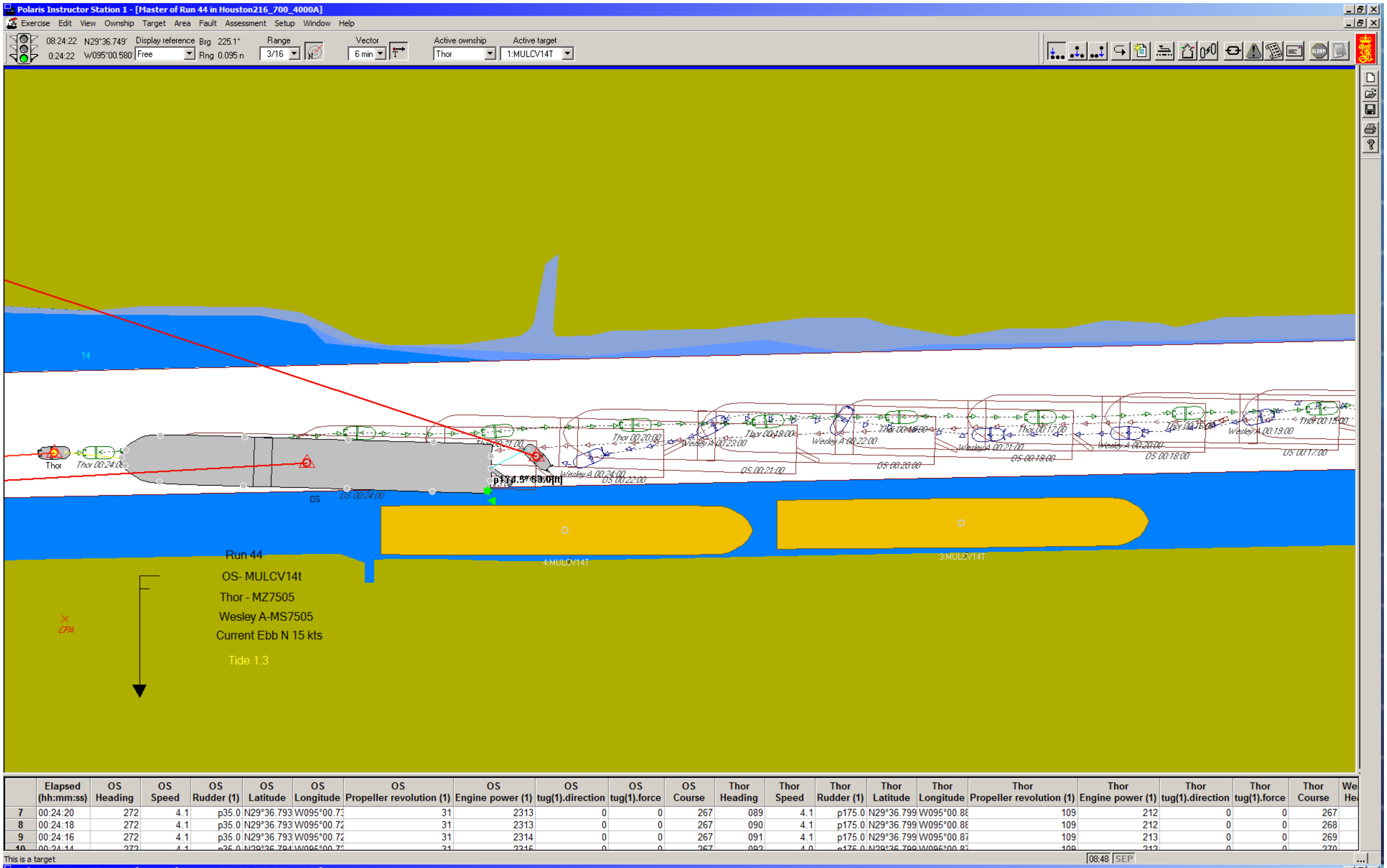


08:23:16 N29°36.770′ Display reference Free Brg 207.1° Rng 0.053 n Range 3/16 Vector 6 min Active ownship Thor Active target 1:MULCV14T

0:23:16 W095°00.530′

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	Thor Heading	Thor Speed	Thor Rudder (1)	Thor Latitude	Thor Longitude	Thor Propeller revolution (1)	Thor Engine power (1)	Thor tug(1).direction	Thor tug(1).force	Thor Course	We He
7	00:23:14	271	4.1	s32.6	N29°36.798	W095°00.64	31	2308	0	0	266	090	4.2	p178.8	N29°36.802	W095°00.79	109	204	0	0	268	
8	00:23:10	271	4.2	s31.6	N29°36.799	W095°00.63	31	2305	0	0	266	089	4.2	p178.8	N29°36.802	W095°00.79	109	203	0	0	266	
9	00:23:08	271	4.2	s26.0	N29°36.799	W095°00.63	31	2303	0	0	266	088	4.2	p178.9	N29°36.802	W095°00.79	109	202	0	0	265	
10	00:23:06	271	4.2	s29.2	N29°36.799	W095°00.6	31	2301	0	0	266	087	4.2	p178.8	N29°36.802	W095°00.7	109	201	0	0	265	

This is a point showing relative distance from ownship

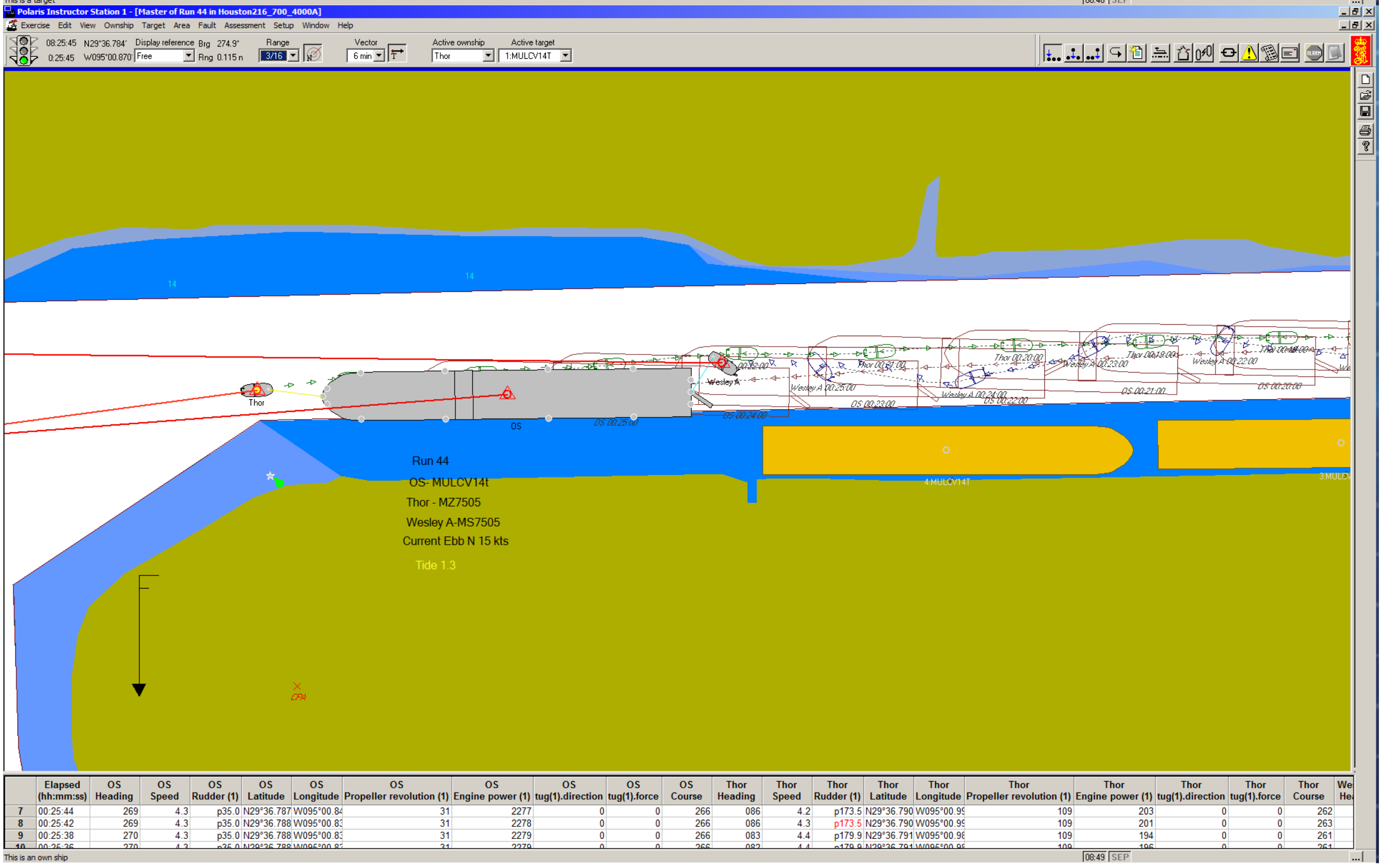


08:24:22 N29°36.749'
0:24:22 W095°00.580'
Display reference: Free
Brg 225.1°
Rng 0.095 n
Range: 3/16
Vector: 6 min
Active ownship: Thor
Active target: 1:MULCV14T

Run 44
OS- MULCV14t
Thor - MZ7505
Wesley A-MS7505
Current Ebb N 15 kts
Tide 1.3

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	Thor Heading	Thor Speed	Thor Rudder (1)	Thor Latitude	Thor Longitude	Thor Propeller revolution (1)	Thor Engine power (1)	Thor tug(1).direction	Thor tug(1).force	Thor Course
7	00:24:20	272	4.1	p35.0	N29°36.793	W095°00.73	31	2313	0	0	267	089	4.1	p175.0	N29°36.799	W095°00.88	109	212	0	0	267
8	00:24:18	272	4.1	p35.0	N29°36.793	W095°00.72	31	2313	0	0	267	090	4.1	p175.0	N29°36.799	W095°00.88	109	212	0	0	268
9	00:24:16	272	4.1	p35.0	N29°36.793	W095°00.72	31	2314	0	0	267	091	4.1	p175.0	N29°36.799	W095°00.87	109	213	0	0	269

This is a target



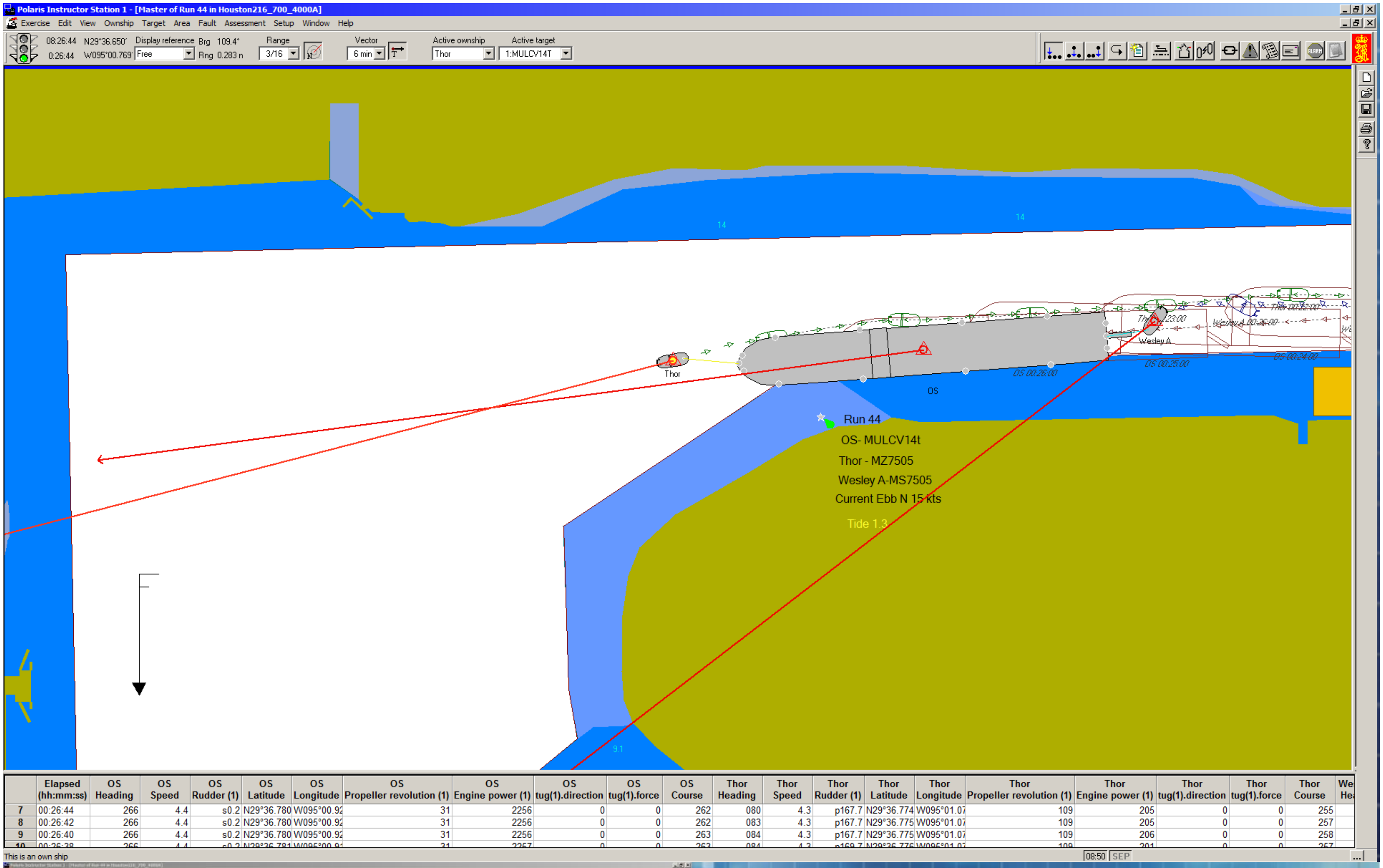
08:25:45 N29°36.784'
0:25:45 W095°00.870'
Display reference: Free
Brg 274.9°
Rng 0.115 n
Range: 3/16
Vector: 6 min
Active ownship: Thor
Active target: 1:MULCV14T

Run 44
OS- MULCV14t
Thor - MZ7505
Wesley A-MS7505
Current Ebb N 15 kts
Tide 1.3

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	Thor Heading	Thor Speed	Thor Rudder (1)	Thor Latitude	Thor Longitude	Thor Propeller revolution (1)	Thor Engine power (1)	Thor tug(1).direction	Thor tug(1).force	Thor Course
7	00:25:44	269	4.3	p35.0	N29°36.787	W095°00.84	31	2277	0	0	266	086	4.2	p173.5	N29°36.790	W095°00.99	109	203	0	0	262
8	00:25:42	269	4.3	p35.0	N29°36.788	W095°00.83	31	2278	0	0	266	086	4.3	p173.5	N29°36.790	W095°00.99	109	201	0	0	263
9	00:25:38	270	4.3	p35.0	N29°36.788	W095°00.83	31	2279	0	0	266	083	4.4	p179.9	N29°36.791	W095°00.98	109	194	0	0	261

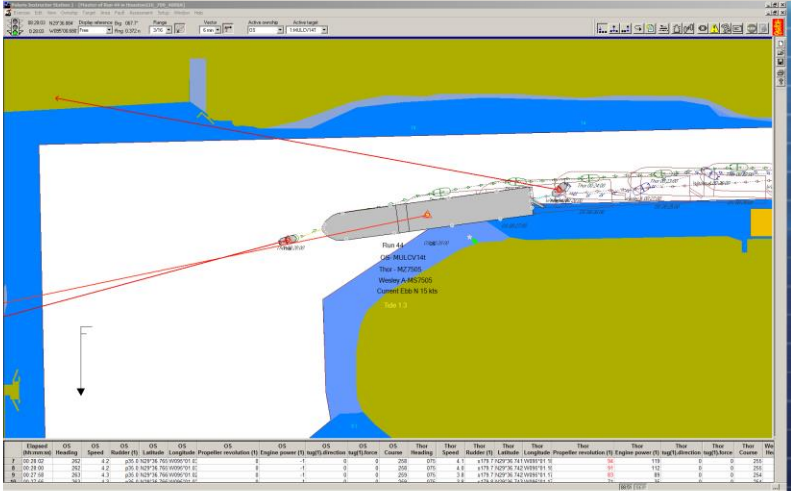
This is an own ship

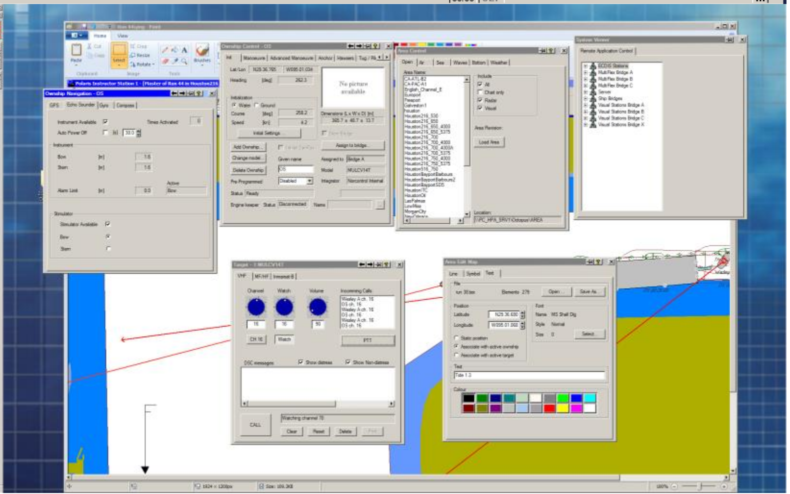
June 26, 2019

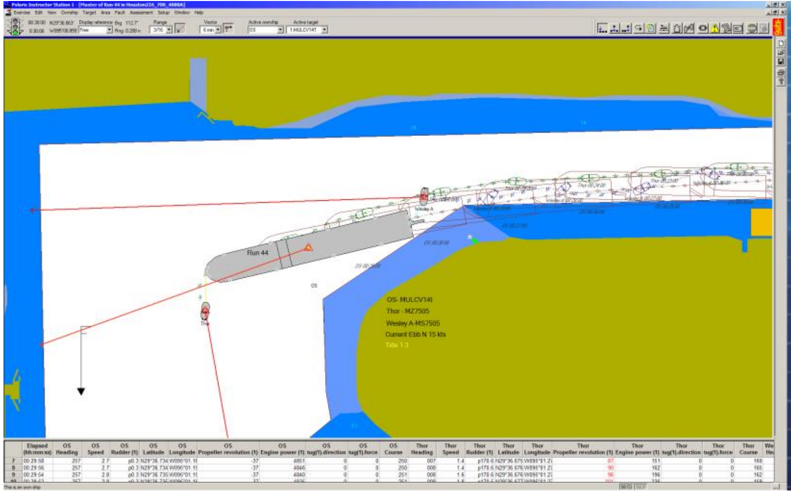


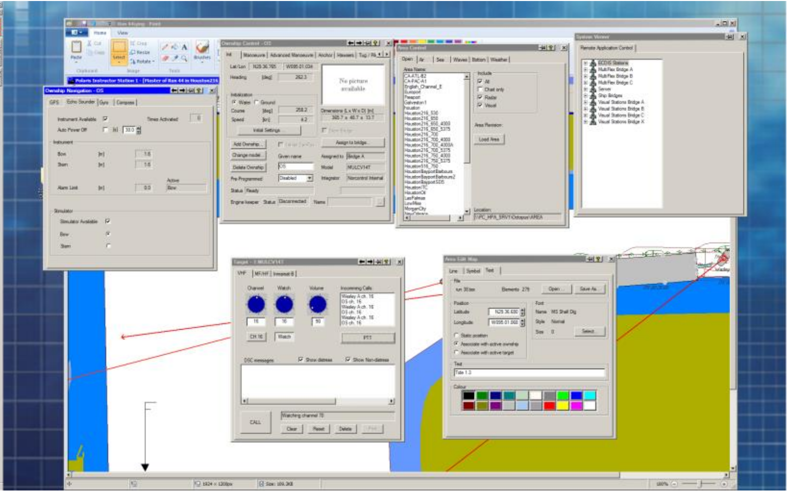
	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	Thor Heading	Thor Speed	Thor Rudder (1)	Thor Latitude	Thor Longitude	Thor Propeller revolution (1)	Thor Engine power (1)	Thor tug(1).direction	Thor tug(1).force	Thor Course
7	00:26:44	266	4.4	s0.2	N29°36.780	W095°00.92	31	2256	0	0	262	080	4.3	p167.7	N29°36.774	W095°01.07	109	205	0	0	255
8	00:26:42	266	4.4	s0.2	N29°36.780	W095°00.92	31	2256	0	0	262	083	4.3	p167.7	N29°36.775	W095°01.07	109	205	0	0	257
9	00:26:40	266	4.4	s0.2	N29°36.780	W095°00.92	31	2256	0	0	263	084	4.3	p167.7	N29°36.775	W095°01.07	109	206	0	0	258

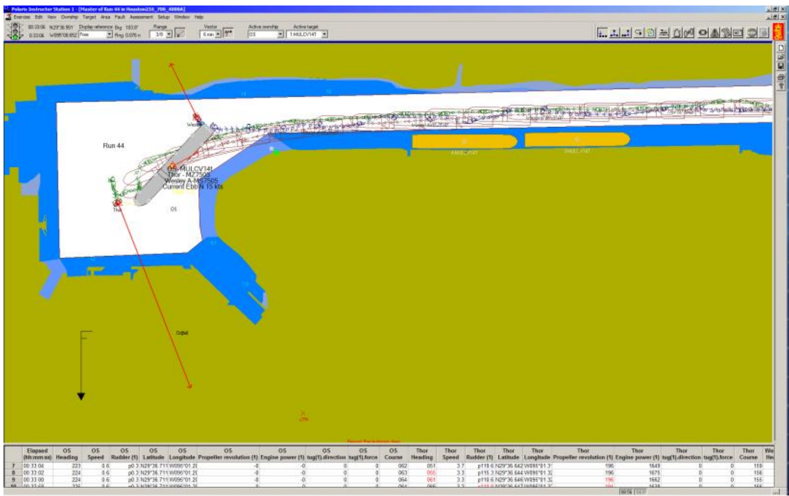
This is an own ship

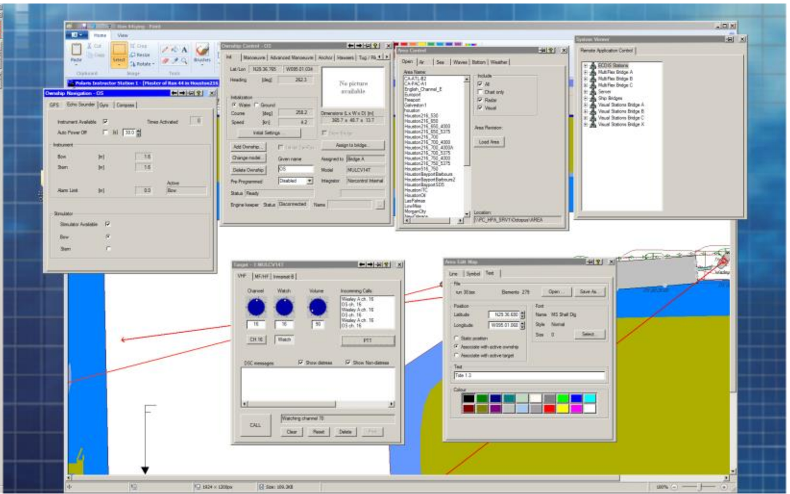


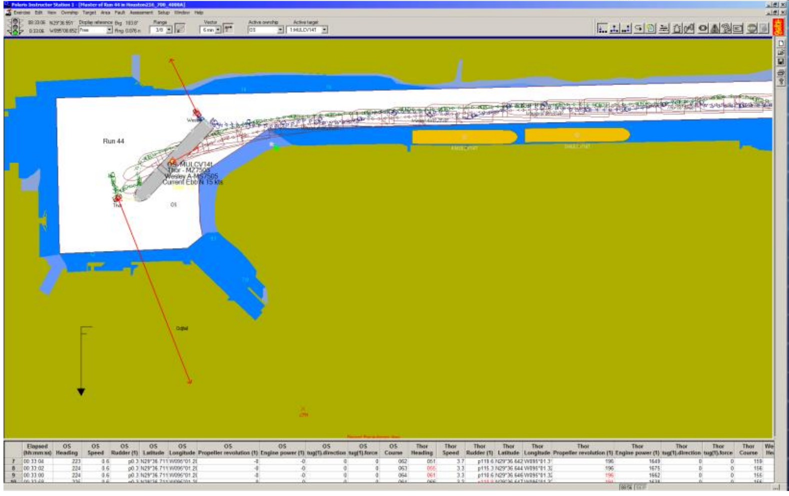


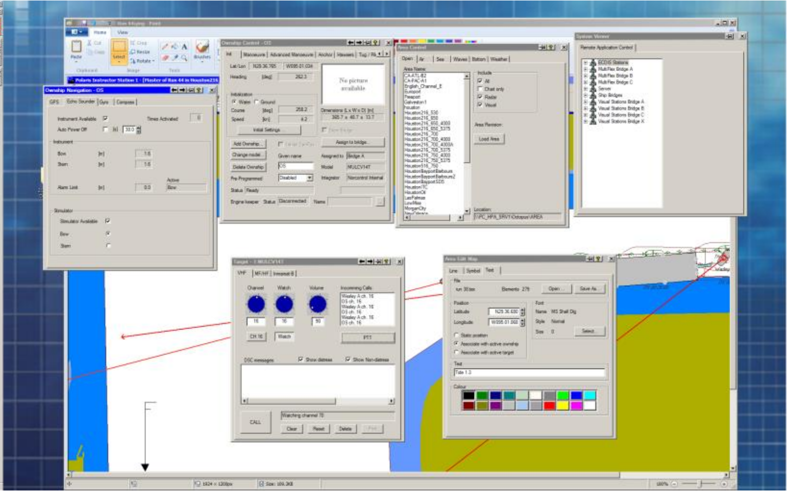





Run 44

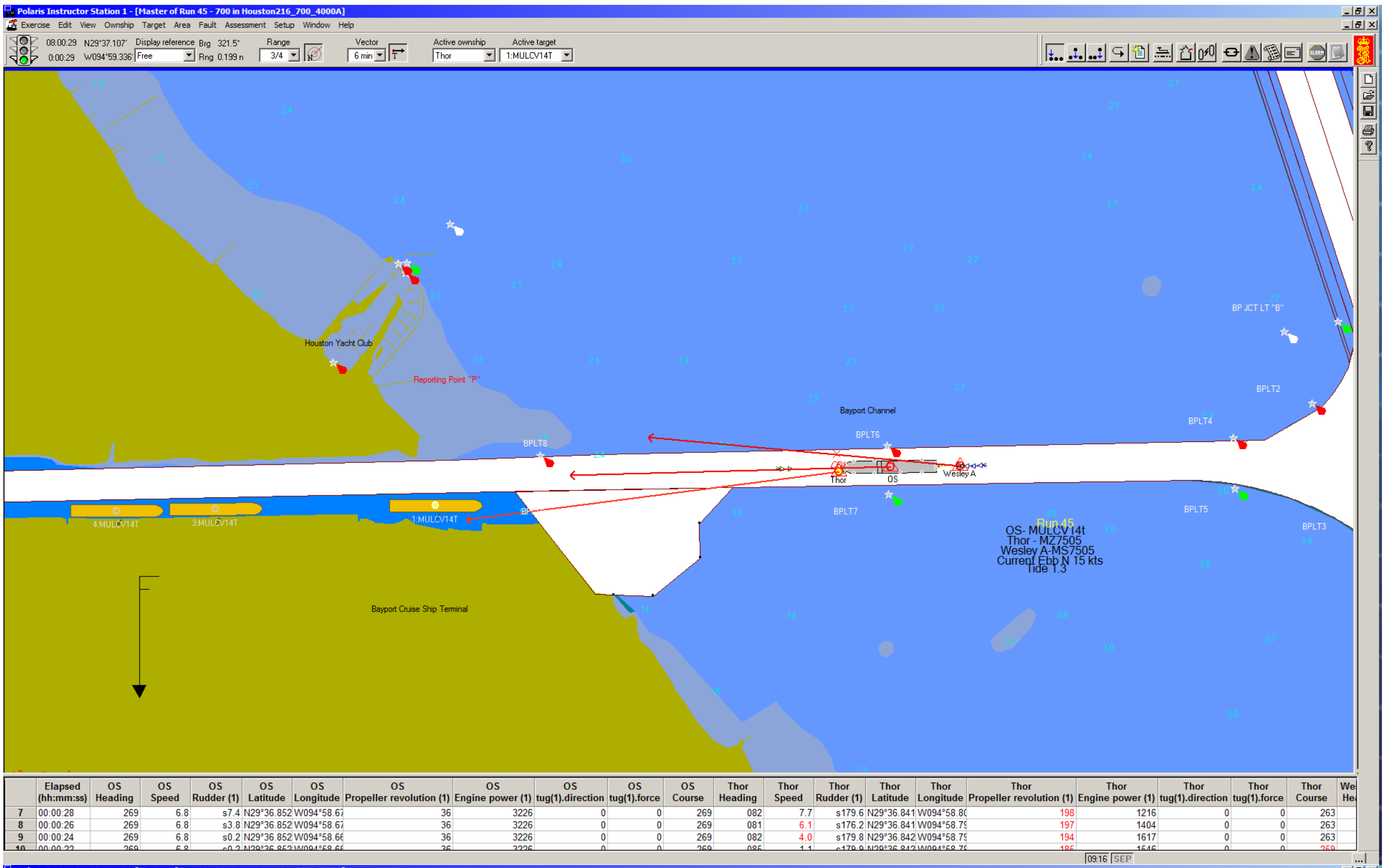



Run 44



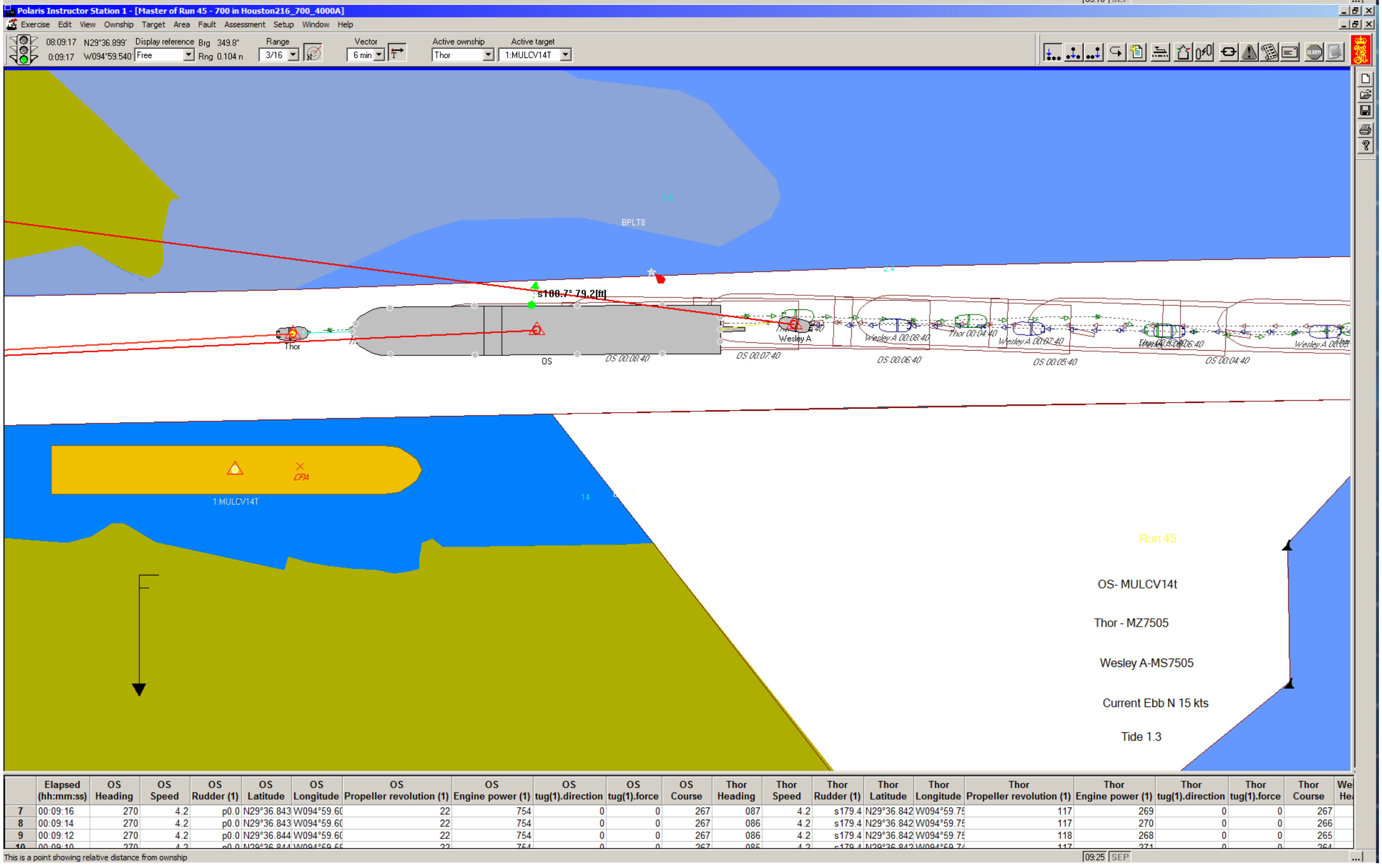
June 26, 2019

Run 45



08:00:29 N29°37.107′
0:00:29 W094°59.336′
Display reference: Free
Brg 321.5°
Rng 0.199 n
Range: 3/4
Vector: 6 min
Active ownship: Thor
Active target: 1:MULCV14T

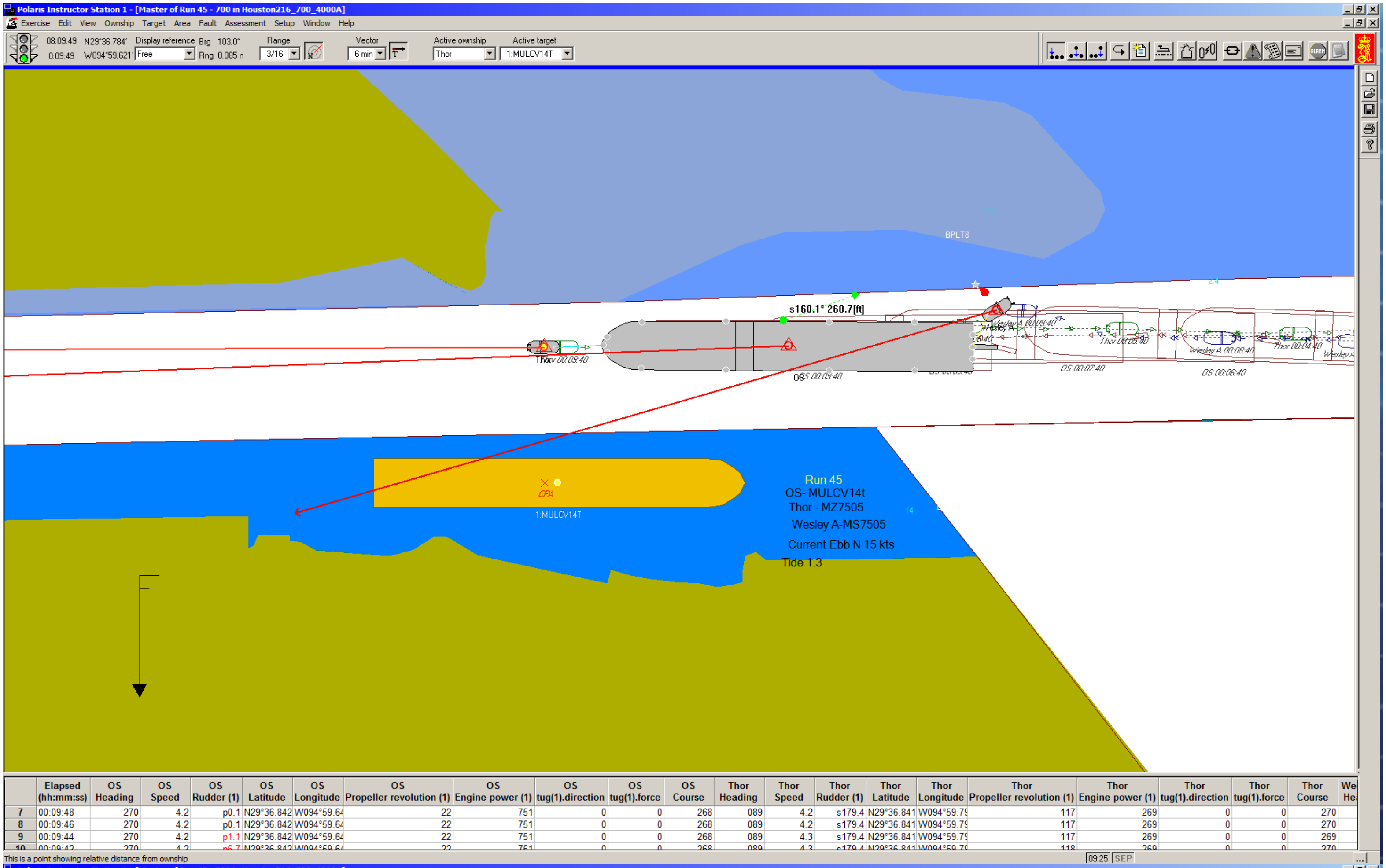
	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	Thor Heading	Thor Speed	Thor Rudder (1)	Thor Latitude	Thor Longitude	Thor Propeller revolution (1)	Thor Engine power (1)	Thor tug(1).direction	Thor tug(1).force	Thor Course
7	00:00:28	269	6.8	s7.4	N29°36.852	W094°58.67	36	3226	0	0	269	082	7.7	s179.6	N29°36.841	W094°58.80	198	1216	0	0	263
8	00:00:26	269	6.8	s3.8	N29°36.852	W094°58.67	36	3226	0	0	269	081	6.1	s176.2	N29°36.841	W094°58.79	197	1404	0	0	263
9	00:00:24	269	6.8	s0.2	N29°36.852	W094°58.66	36	3226	0	0	269	082	4.0	s179.8	N29°36.842	W094°58.79	194	1617	0	0	263



08:09:17 N29°36.899′
0:09:17 W094°59.540′
Display reference: Free
Brg 349.8°
Rng 0.104 n
Range: 3/16
Vector: 6 min
Active ownship: Thor
Active target: 1:MULCV14T

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	Thor Heading	Thor Speed	Thor Rudder (1)	Thor Latitude	Thor Longitude	Thor Propeller revolution (1)	Thor Engine power (1)	Thor tug(1).direction	Thor tug(1).force	Thor Course
7	00:09:16	270	4.2	p0.0	N29°36.843	W094°59.60	22	754	0	0	267	087	4.2	s179.4	N29°36.842	W094°59.75	117	269	0	0	267
8	00:09:14	270	4.2	p0.0	N29°36.843	W094°59.60	22	754	0	0	267	086	4.2	s179.4	N29°36.842	W094°59.75	117	270	0	0	266
9	00:09:12	270	4.2	p0.0	N29°36.844	W094°59.60	22	754	0	0	267	086	4.2	s179.4	N29°36.842	W094°59.75	118	268	0	0	265

This is a point showing relative distance from ownship



Polaris Instructor Station 1 - [Master of Run 45 - 700 in Houston216_700_4000A]

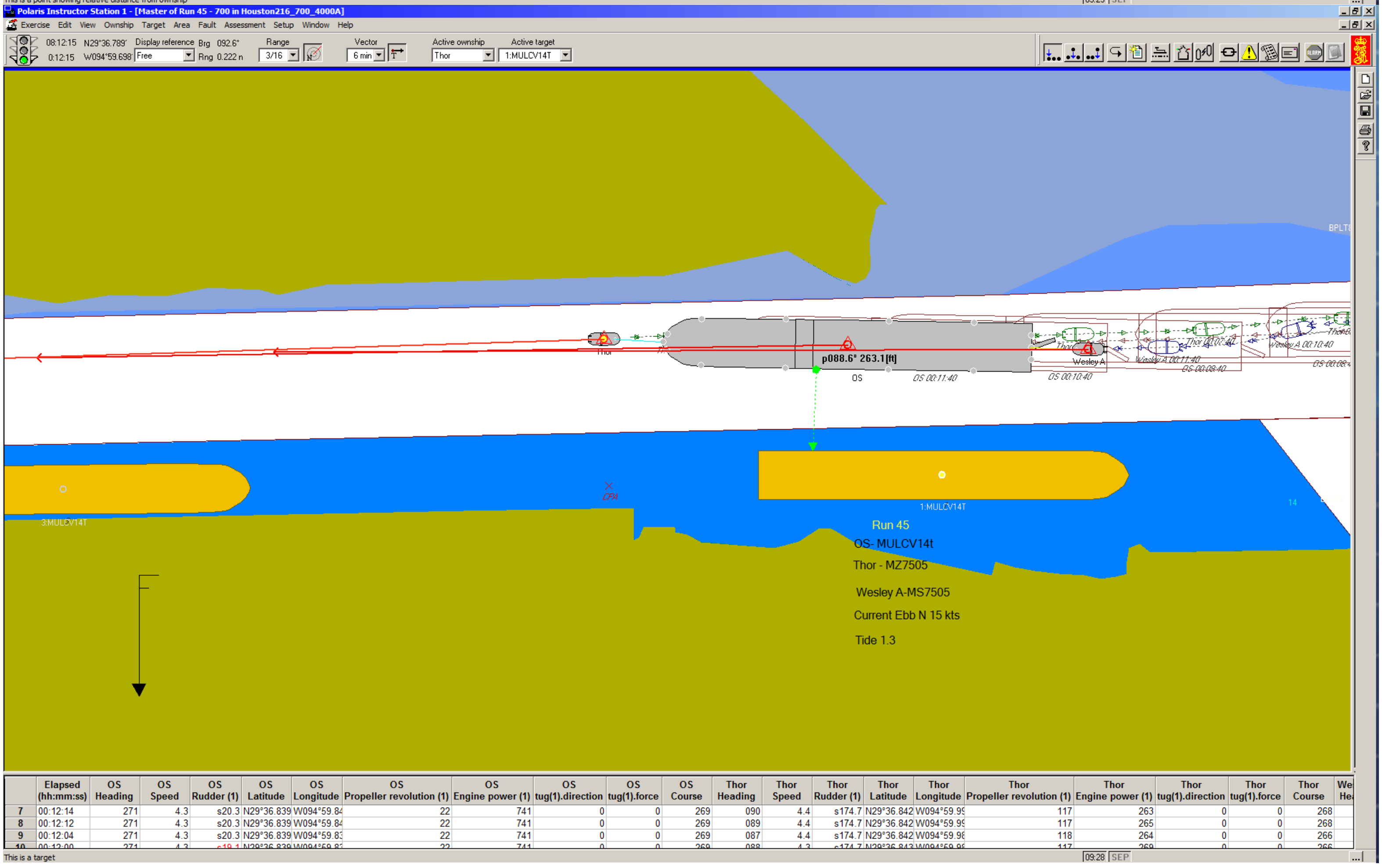
08:09:49 N29°36.784' 0:09:49 W094°59.621'
Display reference: Free
Brg 103.0°
Rng 0.085 n
Range: 3/16
Vector: 6 min
Active ownship: Thor
Active target: 1:MULCV14T

Run 45
OS- MULCV14t
Thor - MZ7505
Wesley A-MS7505
Current Ebb N 15 kts
Tide 1.3

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	Thor Heading	Thor Speed	Thor Rudder (1)	Thor Latitude	Thor Longitude	Thor Propeller revolution (1)	Thor Engine power (1)	Thor tug(1).direction	Thor tug(1).force	Thor Course
7	00:09:48	270	4.2	p0.1	N29°36.842	W094°59.64	22	751	0	0	268	089	4.2	s179.4	N29°36.841	W094°59.79	117	269	0	0	270
8	00:09:46	270	4.2	p0.1	N29°36.842	W094°59.64	22	751	0	0	268	089	4.2	s179.4	N29°36.841	W094°59.79	117	269	0	0	270
9	00:09:44	270	4.2	p1.1	N29°36.842	W094°59.64	22	751	0	0	268	089	4.3	s179.4	N29°36.841	W094°59.79	117	269	0	0	269

This is a point showing relative distance from ownship

09:25 SEP



Polaris Instructor Station 1 - [Master of Run 45 - 700 in Houston216_700_4000A]

08:12:15 N29°36.789' 0:12:15 W094°59.698'
Display reference: Free
Brg 092.6°
Rng 0.222 n
Range: 3/16
Vector: 6 min
Active ownship: Thor
Active target: 1:MULCV14T

Run 45
OS- MULCV14t
Thor - MZ7505
Wesley A-MS7505
Current Ebb N 15 kts
Tide 1.3

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	Thor Heading	Thor Speed	Thor Rudder (1)	Thor Latitude	Thor Longitude	Thor Propeller revolution (1)	Thor Engine power (1)	Thor tug(1).direction	Thor tug(1).force	Thor Course
7	00:12:14	271	4.3	s20.3	N29°36.839	W094°59.84	22	741	0	0	269	090	4.4	s174.7	N29°36.842	W094°59.99	117	263	0	0	268
8	00:12:12	271	4.3	s20.3	N29°36.839	W094°59.84	22	741	0	0	269	089	4.4	s174.7	N29°36.842	W094°59.99	117	265	0	0	268
9	00:12:04	271	4.3	s20.3	N29°36.839	W094°59.83	22	741	0	0	269	087	4.4	s174.7	N29°36.842	W094°59.98	118	264	0	0	266

This is a target

09:28 SEP

June 26, 2019

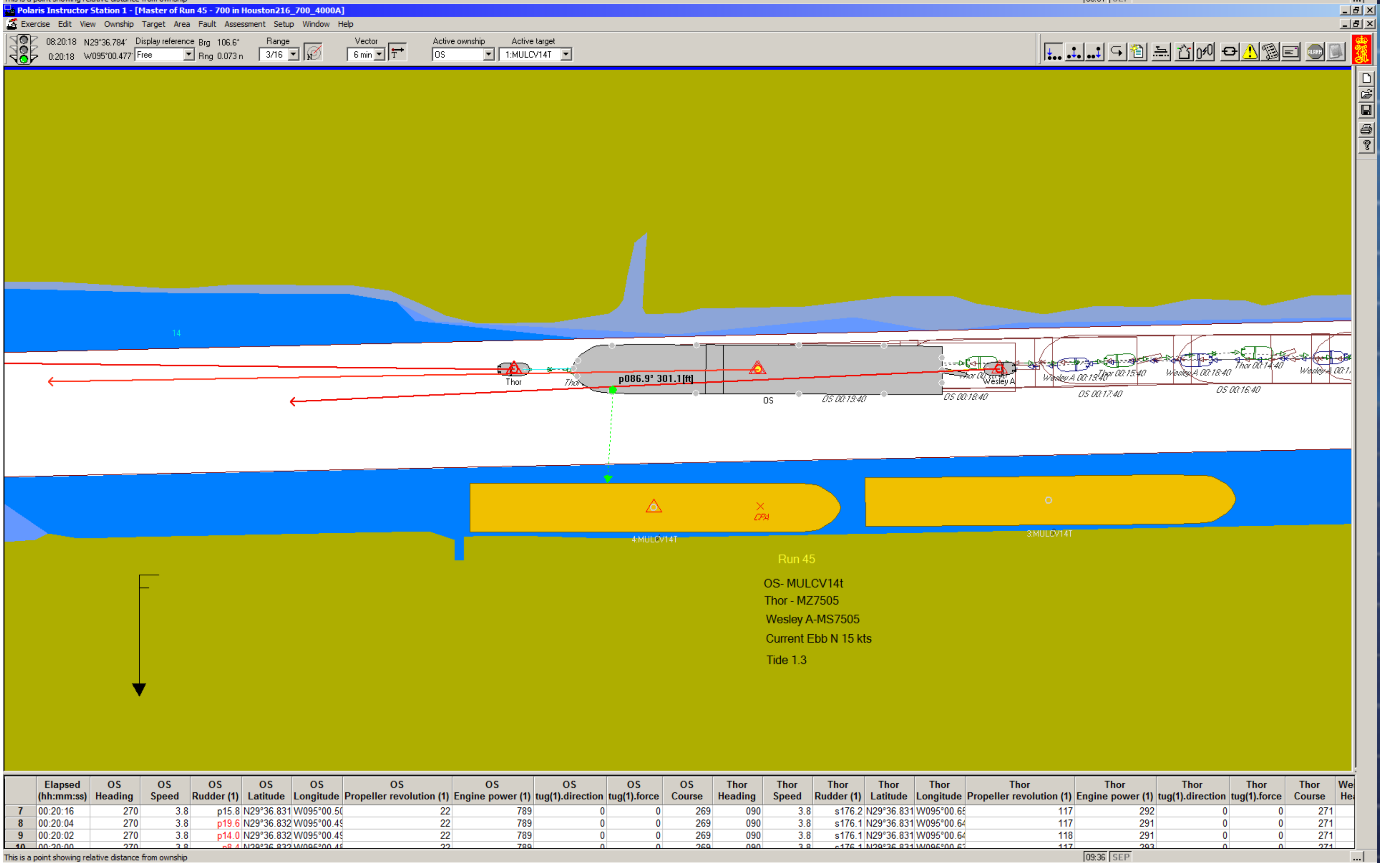
08:15:08 N29°36.786′ Display reference Free Brg 091.6° Rng 0.120 n Range 3/16 Vector 6 min Active ownship Thor Active target 1:MULCV14T

0:15:08 W095°00.054′

Run 45
OS- MULCV14t
Thor - MZ7505
Wesley A-MS7505
Current Ebb N 15 kts
Tide 1.3

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	Thor Heading	Thor Speed	Thor Rudder (1)	Thor Latitude	Thor Longitude	Thor Propeller revolution (1)	Thor Engine power (1)	Thor tug(1).direction	Thor tug(1).force	Thor Course
7	00:15:06	270	4.4	s0.5	N29°36.837	W095°00.08	22	734	0	0	270	087	4.5	s174.7	N29°36.839	W095°00.23	117	262	0	0	266
8	00:15:00	270	4.4	s0.5	N29°36.837	W095°00.08	22	734	0	0	270	088	4.4	s174.7	N29°36.840	W095°00.23	117	264	0	0	266
9	00:14:48	271	4.4	s0.5	N29°36.837	W095°00.06	22	734	0	0	270	091	4.4	s174.7	N29°36.840	W095°00.21	117	266	0	0	270

This is a point showing relative distance from ownship



08:20:18 N29°36.784′ Display reference Free Brg 106.6° Rng 0.073 n Range 3/16 Vector 6 min Active ownship OS Active target 1:MULCV14T

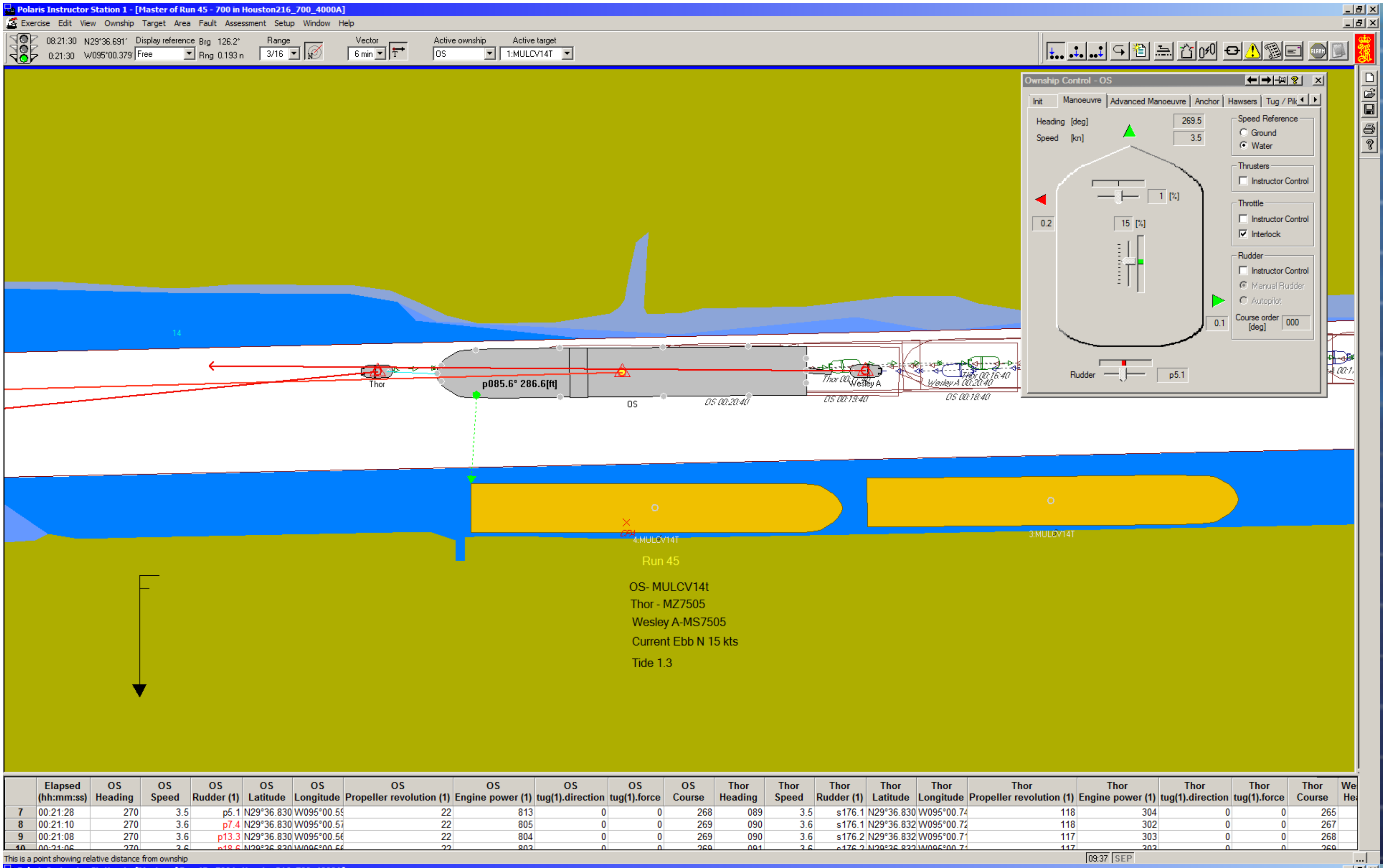
0:20:18 W095°00.477′

Run 45
OS- MULCV14t
Thor - MZ7505
Wesley A-MS7505
Current Ebb N 15 kts
Tide 1.3

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	Thor Heading	Thor Speed	Thor Rudder (1)	Thor Latitude	Thor Longitude	Thor Propeller revolution (1)	Thor Engine power (1)	Thor tug(1).direction	Thor tug(1).force	Thor Course
7	00:20:16	270	3.8	p15.8	N29°36.831	W095°00.50	22	789	0	0	269	090	3.8	s176.2	N29°36.831	W095°00.65	117	292	0	0	271
8	00:20:04	270	3.8	p19.6	N29°36.832	W095°00.49	22	789	0	0	269	090	3.8	s176.1	N29°36.831	W095°00.64	117	291	0	0	271
9	00:20:02	270	3.8	p14.0	N29°36.832	W095°00.49	22	789	0	0	269	090	3.8	s176.1	N29°36.831	W095°00.64	118	291	0	0	271

This is a point showing relative distance from ownship

June 26, 2019



Polaris Instructor Station 1 - [Master of Run 45 - 700 in Houston216_700_4000A]

08:21:30 N29°36.691' Display reference Free Brg 126.2° Rng 0.193 n
0:21:30 W095°00.379'
Range 3/16 Vector 6 min Active ownship OS Active target 1:MULCV14T

Ownship Control - OS
Heading [deg] 269.5
Speed [kn] 3.5
Speed Reference ○ Ground ● Water
Thrusters ☐ Instructor Control
Throttle ☐ Instructor Control ☑ Interlock
Rudder ☐ Instructor Control ● Manual Rudder ○ Autopilot
Course order [deg] 000
1 [%]
15 [%]
0.2
0.1
Rudder p5.1

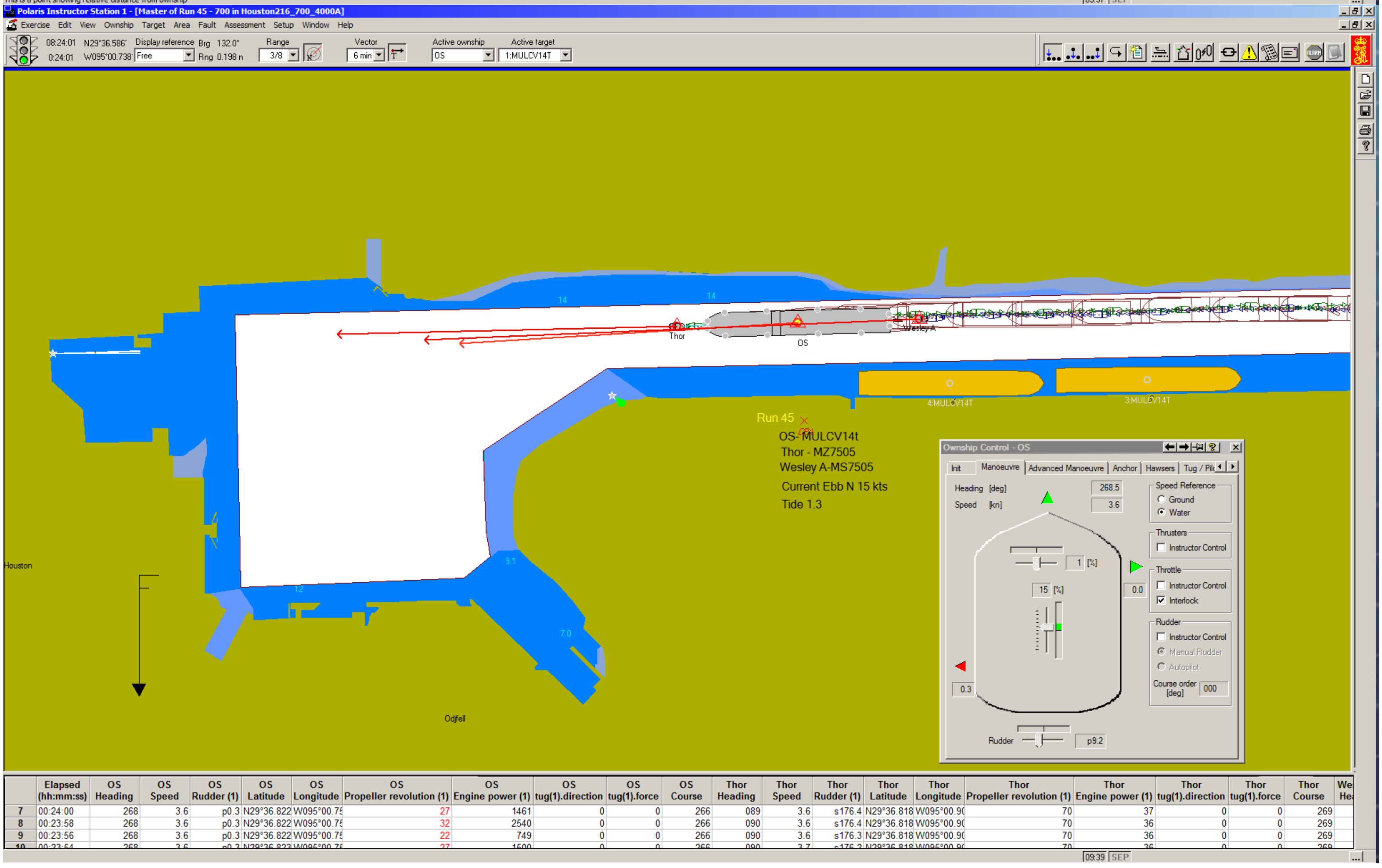
Run 45

OS- MULCV14t
Thor - MZ7505
Wesley A-MS7505
Current Ebb N 15 kts
Tide 1.3

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	Thor Heading	Thor Speed	Thor Rudder (1)	Thor Latitude	Thor Longitude	Thor Propeller revolution (1)	Thor Engine power (1)	Thor tug(1).direction	Thor tug(1).force	Thor Course
7	00:21:28	270	3.5	p5.1	N29°36.830	W095°00.59	22	813	0	0	268	089	3.5	s176.1	N29°36.830	W095°00.74	118	304	0	0	265
8	00:21:10	270	3.6	p7.4	N29°36.830	W095°00.57	22	805	0	0	269	090	3.6	s176.1	N29°36.832	W095°00.72	118	302	0	0	267
9	00:21:08	270	3.6	p13.3	N29°36.830	W095°00.56	22	804	0	0	269	090	3.6	s176.2	N29°36.832	W095°00.71	117	303	0	0	268

This is a point showing relative distance from ownship

09:37 SEP



Polaris Instructor Station 1 - [Master of Run 45 - 700 in Houston216_700_4000A]

08:24:01 N29°36.586' Display reference Free Brg 132.0° Rng 0.198 n
0:24:01 W095°00.738'
Range 3/8 Vector 6 min Active ownship OS Active target 1:MULCV14T

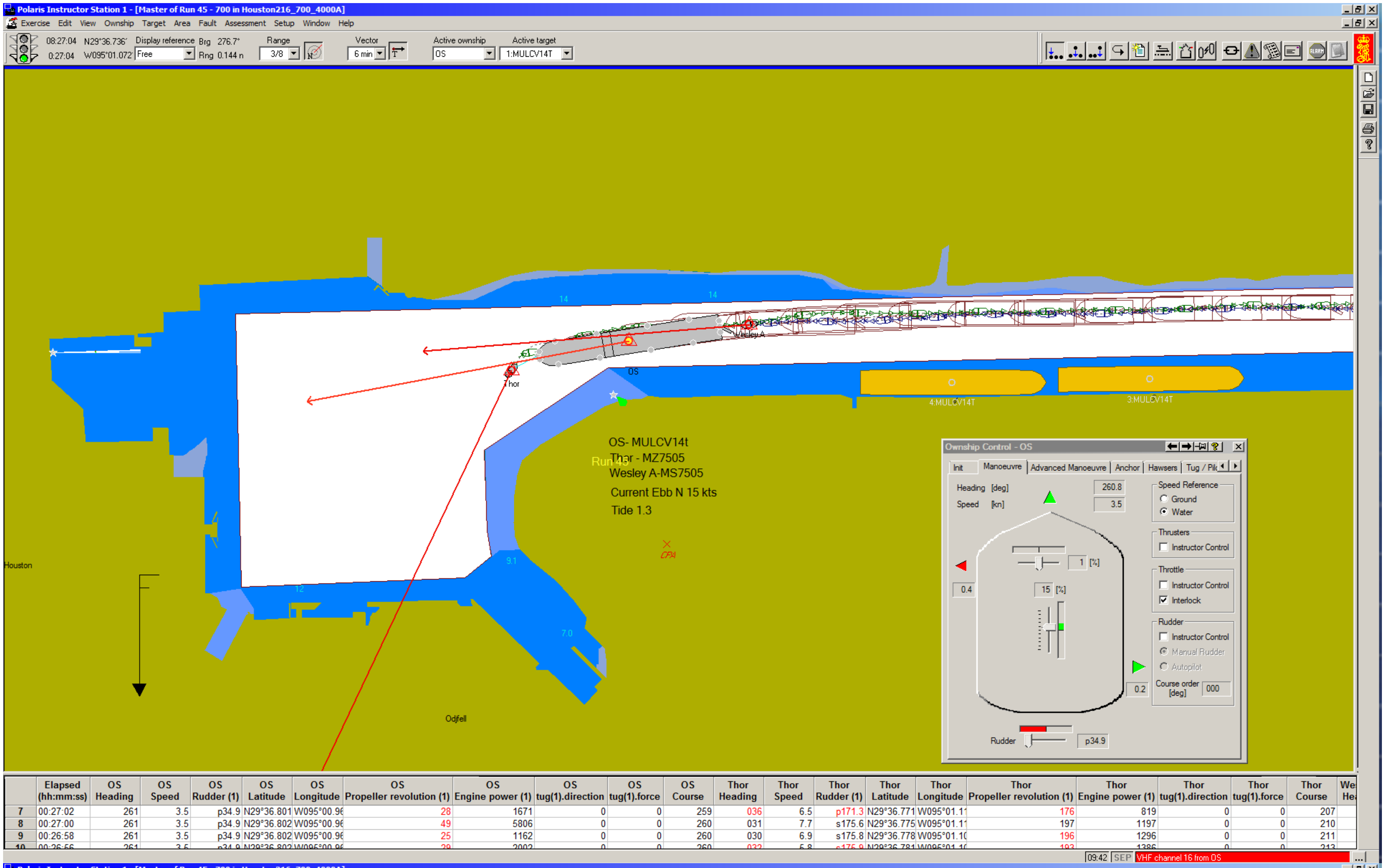
Run 45

OS- MULCV14t
Thor - MZ7505
Wesley A-MS7505
Current Ebb N 15 kts
Tide 1.3

Ownship Control - OS
Heading [deg] 268.5
Speed [kn] 3.6
Speed Reference ○ Ground ● Water
Thrusters ☐ Instructor Control
Throttle ☐ Instructor Control ☑ Interlock
Rudder ☐ Instructor Control ● Manual Rudder ○ Autopilot
Course order [deg] 000
1 [%]
15 [%]
0.0
0.3
Rudder p9.2

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	Thor Heading	Thor Speed	Thor Rudder (1)	Thor Latitude	Thor Longitude	Thor Propeller revolution (1)	Thor Engine power (1)	Thor tug(1).direction	Thor tug(1).force	Thor Course
7	00:24:00	268	3.6	p0.3	N29°36.822	W095°00.75	27	1461	0	0	266	089	3.6	s176.4	N29°36.818	W095°00.90	70	37	0	0	269
8	00:23:58	268	3.6	p0.3	N29°36.822	W095°00.75	32	2540	0	0	266	090	3.6	s176.4	N29°36.818	W095°00.90	70	36	0	0	269
9	00:23:56	268	3.6	p0.3	N29°36.822	W095°00.75	22	749	0	0	266	090	3.6	s176.3	N29°36.818	W095°00.90	70	36	0	0	269

09:39 SEP



Polaris Instructor Station 1 - [Master of Run 45 - 700 in Houston216_700_4000A]

08:27:04 N29°36.736' 0:27:04 W095°01.072' Display reference Free Brg 276.7° Rng 0.144 n Range 3/8 Vector 6 min Active ownship OS Active target 1:MULCV14T

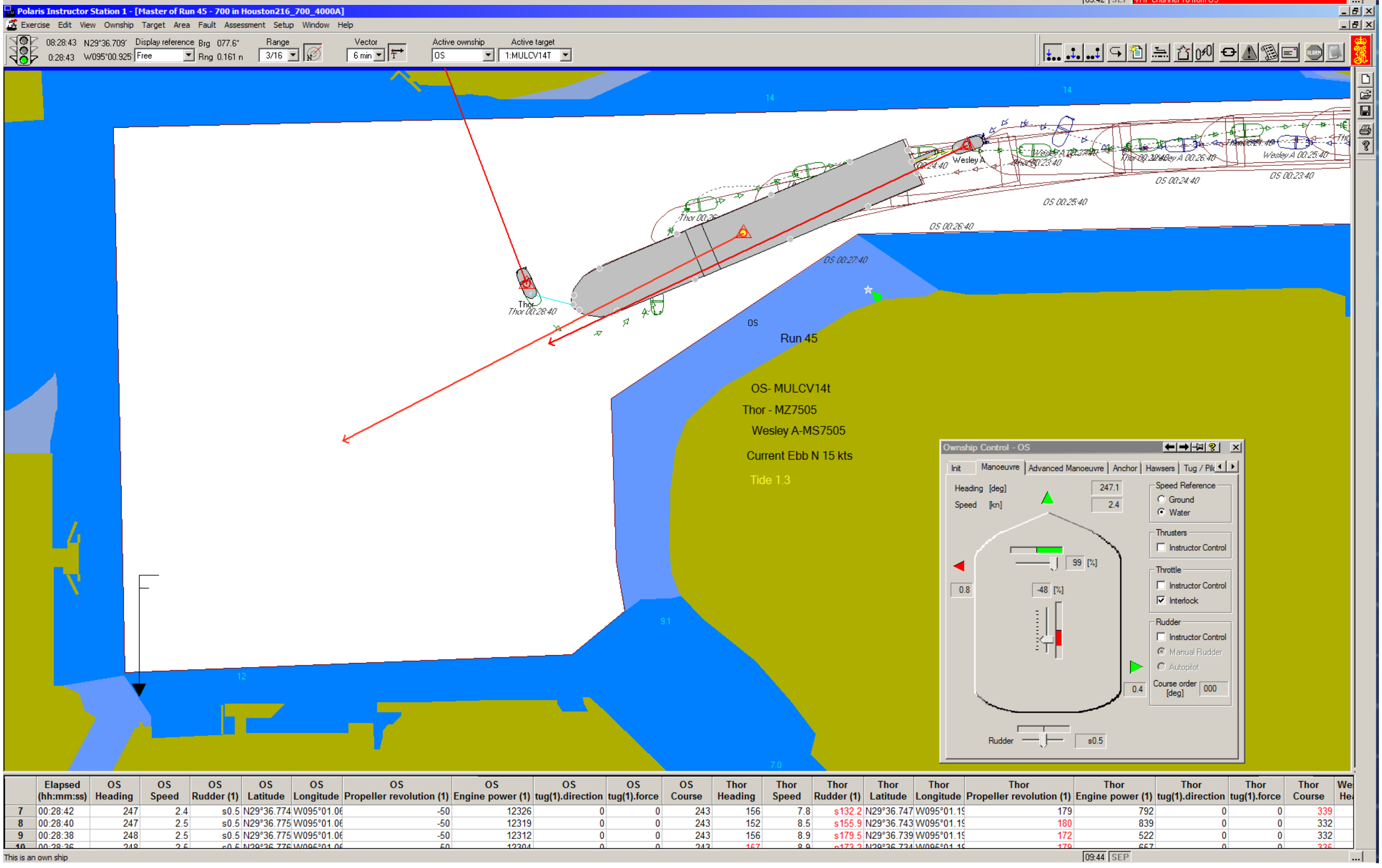
OS- MULCV14t
Thor - MZ7505
Wesley A-MS7505
Current Ebb N 15 kts
Tide 1.3

Ownship Control - OS

Heading [deg] 260.8
Speed [kn] 3.5
Speed Reference ○ Ground ● Water
Thrusters ☐ Instructor Control
Throttle ☐ Instructor Control ☑ Interlock
Rudder ☐ Instructor Control ● Manual Rudder ○ Autopilot
Course order [deg] 000
Rudder p34.9

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	Thor Heading	Thor Speed	Thor Rudder (1)	Thor Latitude	Thor Longitude	Thor Propeller revolution (1)	Thor Engine power (1)	Thor tug(1).direction	Thor tug(1).force	Thor Course
7	00:27:02	261	3.5	p34.9	N29°36.801	W095°00.96	28	1671	0	0	259	036	6.5	p171.3	N29°36.771	W095°01.11	176	819	0	0	207
8	00:27:00	261	3.5	p34.9	N29°36.802	W095°00.96	49	5806	0	0	260	031	7.7	s175.6	N29°36.775	W095°01.11	197	1197	0	0	210
9	00:26:58	261	3.5	p34.9	N29°36.802	W095°00.96	25	1162	0	0	260	030	6.9	s175.8	N29°36.778	W095°01.10	196	1296	0	0	211

09:42 SEP VHF channel 16 from OS



Polaris Instructor Station 1 - [Master of Run 45 - 700 in Houston216_700_4000A]

08:28:43 N29°36.709' 0:28:43 W095°00.925' Display reference Free Brg 077.6° Rng 0.161 n Range 3/16 Vector 6 min Active ownship OS Active target 1:MULCV14T

Run 45

OS- MULCV14t
Thor - MZ7505
Wesley A-MS7505
Current Ebb N 15 kts
Tide 1.3

Ownship Control - OS

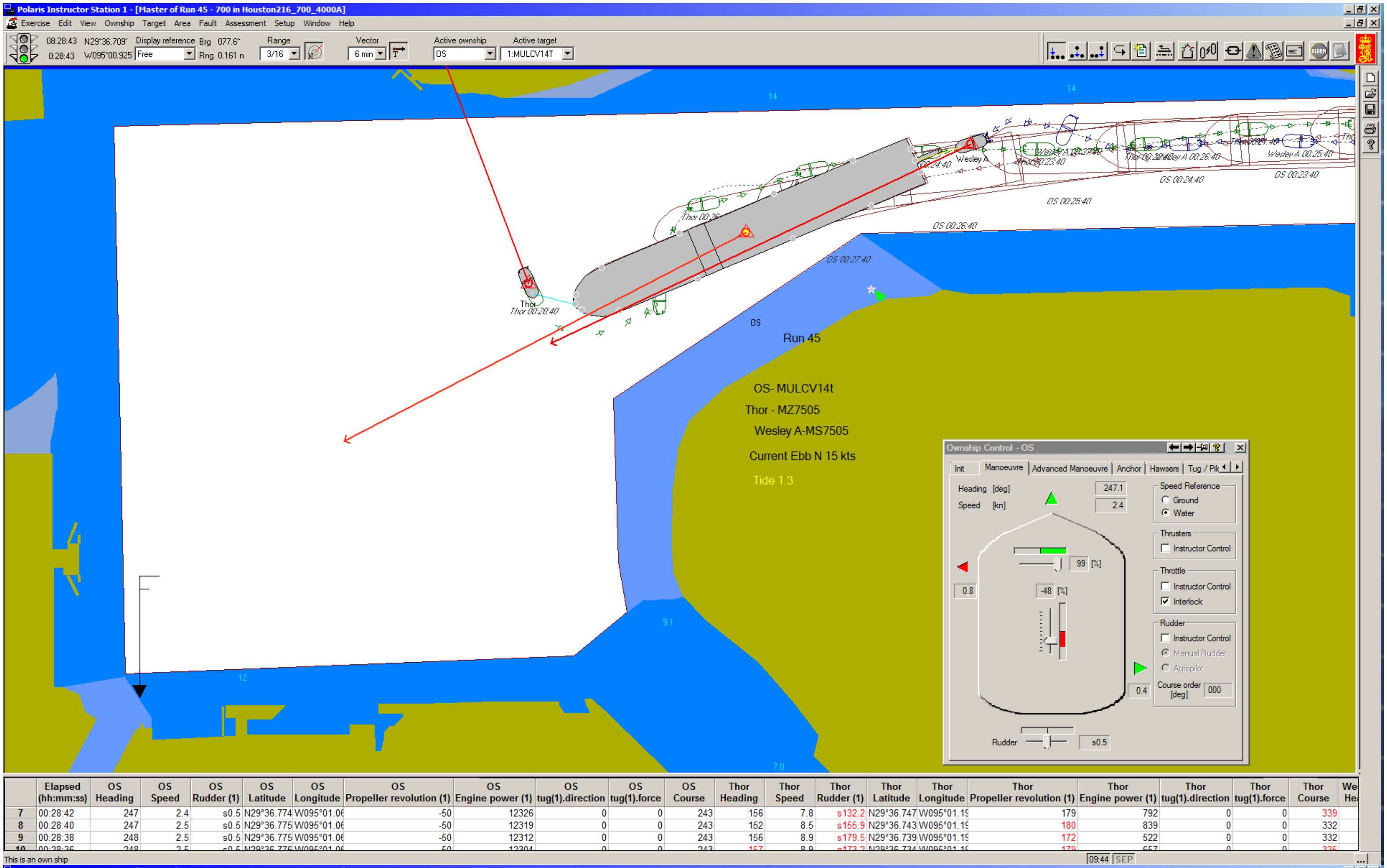
Heading [deg] 247.1
Speed [kn] 2.4
Speed Reference ○ Ground ● Water
Thrusters ☐ Instructor Control
Throttle ☐ Instructor Control ☑ Interlock
Rudder ☐ Instructor Control ● Manual Rudder ○ Autopilot
Course order [deg] 000
Rudder s0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	Thor Heading	Thor Speed	Thor Rudder (1)	Thor Latitude	Thor Longitude	Thor Propeller revolution (1)	Thor Engine power (1)	Thor tug(1).direction	Thor tug(1).force	Thor Course
7	00:28:42	247	2.4	s0.5	N29°36.774	W095°01.06	-50	12326	0	0	243	156	7.8	s132.2	N29°36.747	W095°01.19	179	792	0	0	339
8	00:28:40	247	2.5	s0.5	N29°36.775	W095°01.06	-50	12319	0	0	243	152	8.5	s155.9	N29°36.743	W095°01.19	180	839	0	0	332
9	00:28:38	248	2.5	s0.5	N29°36.775	W095°01.06	-50	12312	0	0	243	156	8.9	s179.5	N29°36.739	W095°01.19	172	522	0	0	332

This is an own ship

09:44 SEP

June 26, 2019



Polaris Instructor Station 1 - [Master of Run 45 - 700 in Houston216_700_4000A]

08:28:43 N29°36.709' Display reference Brg 077.6°
0:28:43 W095°00.925' Free Rng 0.161 n
Range 3/16
Vector 6 min
Active ownship OS
Active target 1:MULCV14T

Run 45

OS- MULCV14t

Thor - MZ7505

Wesley A-MS7505

Current Ebb N 15 kts

Tide 1.3

Ownship Control - OS

Heading [deg] 247.1
Speed [kn] 2.4

Speed Reference
○ Ground
● Water

Thrusters
☐ Instructor Control

Throttle
☐ Instructor Control
☑ Interlock

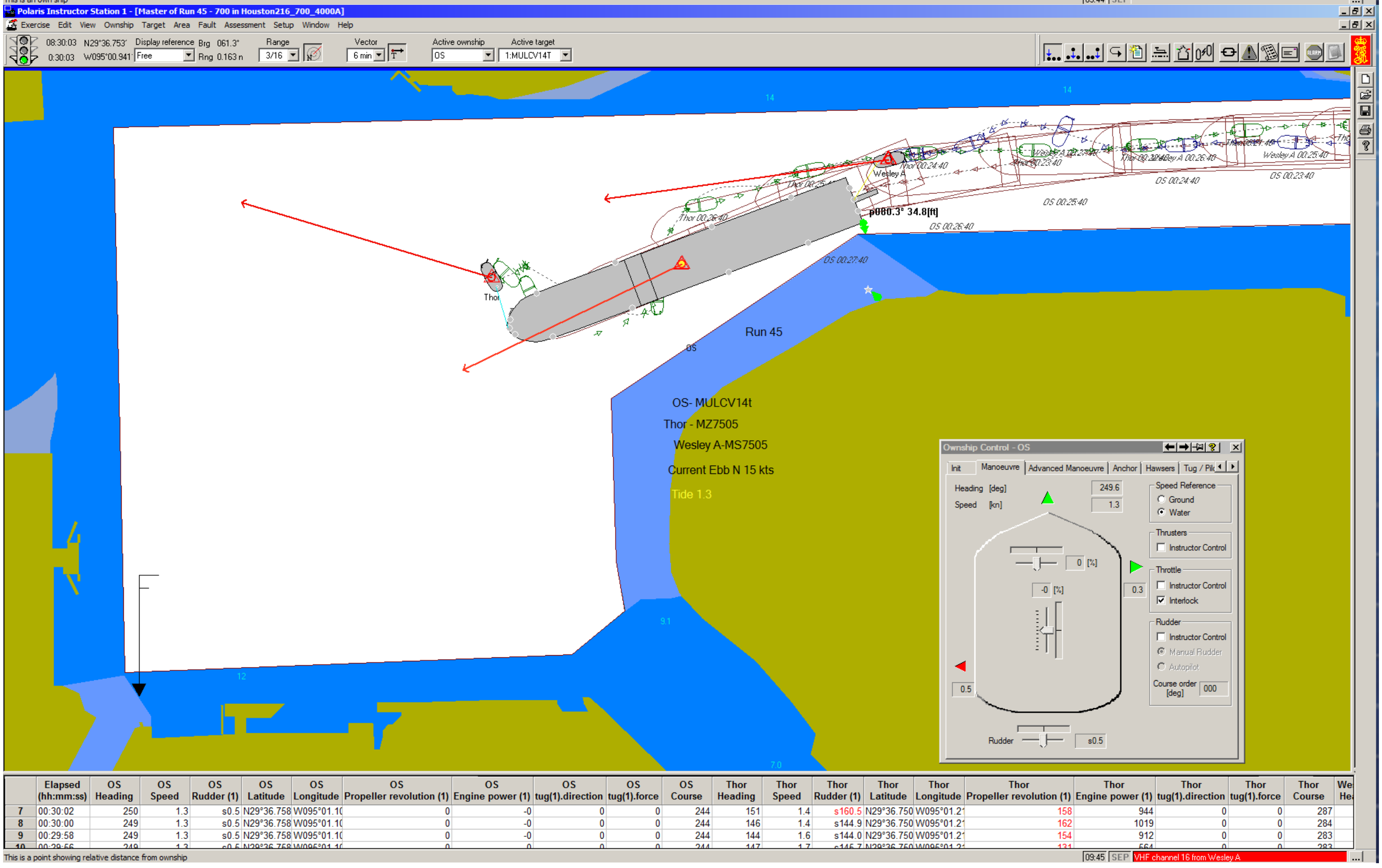
Rudder
☐ Instructor Control
● Manual Rudder
○ Autopilot
Course order [deg] 000

99 [%]
-48 [%]
0.8
0.4
Rudder s0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	Thor Heading	Thor Speed	Thor Rudder (1)	Thor Latitude	Thor Longitude	Thor Propeller revolution (1)	Thor Engine power (1)	Thor tug(1).direction	Thor tug(1).force	Thor Course
7	00:28:42	247	2.4	s0.5	N29°36.774	W095°01.0	-50	12326	0	0	243	156	7.8	s132.2	N29°36.747	W095°01.1	179	792	0	0	339
8	00:28:40	247	2.5	s0.5	N29°36.775	W095°01.0	-50	12319	0	0	243	152	8.5	s155.9	N29°36.743	W095°01.1	180	839	0	0	332
9	00:28:38	248	2.5	s0.5	N29°36.775	W095°01.0	-50	12312	0	0	243	156	8.9	s179.5	N29°36.739	W095°01.1	172	522	0	0	332

This is an own ship

09:44 SEP



Polaris Instructor Station 1 - [Master of Run 45 - 700 in Houston216_700_4000A]

08:30:03 N29°36.753' Display reference Brg 061.3°
0:30:03 W095°00.941' Free Rng 0.163 n
Range 3/16
Vector 6 min
Active ownship OS
Active target 1:MULCV14T

Run 45

OS- MULCV14t

Thor - MZ7505

Wesley A-MS7505

Current Ebb N 15 kts

Tide 1.3

Ownship Control - OS

Heading [deg] 249.6
Speed [kn] 1.3

Speed Reference
○ Ground
● Water

Thrusters
☐ Instructor Control

Throttle
☐ Instructor Control
☑ Interlock

Rudder
☐ Instructor Control
● Manual Rudder
○ Autopilot
Course order [deg] 000

0 [%]
-0 [%]
0.3
0.5
Rudder s0.5

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	Thor Heading	Thor Speed	Thor Rudder (1)	Thor Latitude	Thor Longitude	Thor Propeller revolution (1)	Thor Engine power (1)	Thor tug(1).direction	Thor tug(1).force	Thor Course
7	00:30:02	250	1.3	s0.5	N29°36.758	W095°01.1	0	-0	0	0	244	151	1.4	s160.5	N29°36.750	W095°01.2	158	944	0	0	287
8	00:30:00	249	1.3	s0.5	N29°36.758	W095°01.1	0	-0	0	0	244	146	1.4	s144.9	N29°36.750	W095°01.2	162	1019	0	0	284
9	00:29:58	249	1.3	s0.5	N29°36.758	W095°01.1	0	-0	0	0	244	144	1.6	s144.0	N29°36.750	W095°01.2	154	912	0	0	283

This is a point showing relative distance from ownship

09:45 SEP VHF channel 16 from Wesley A

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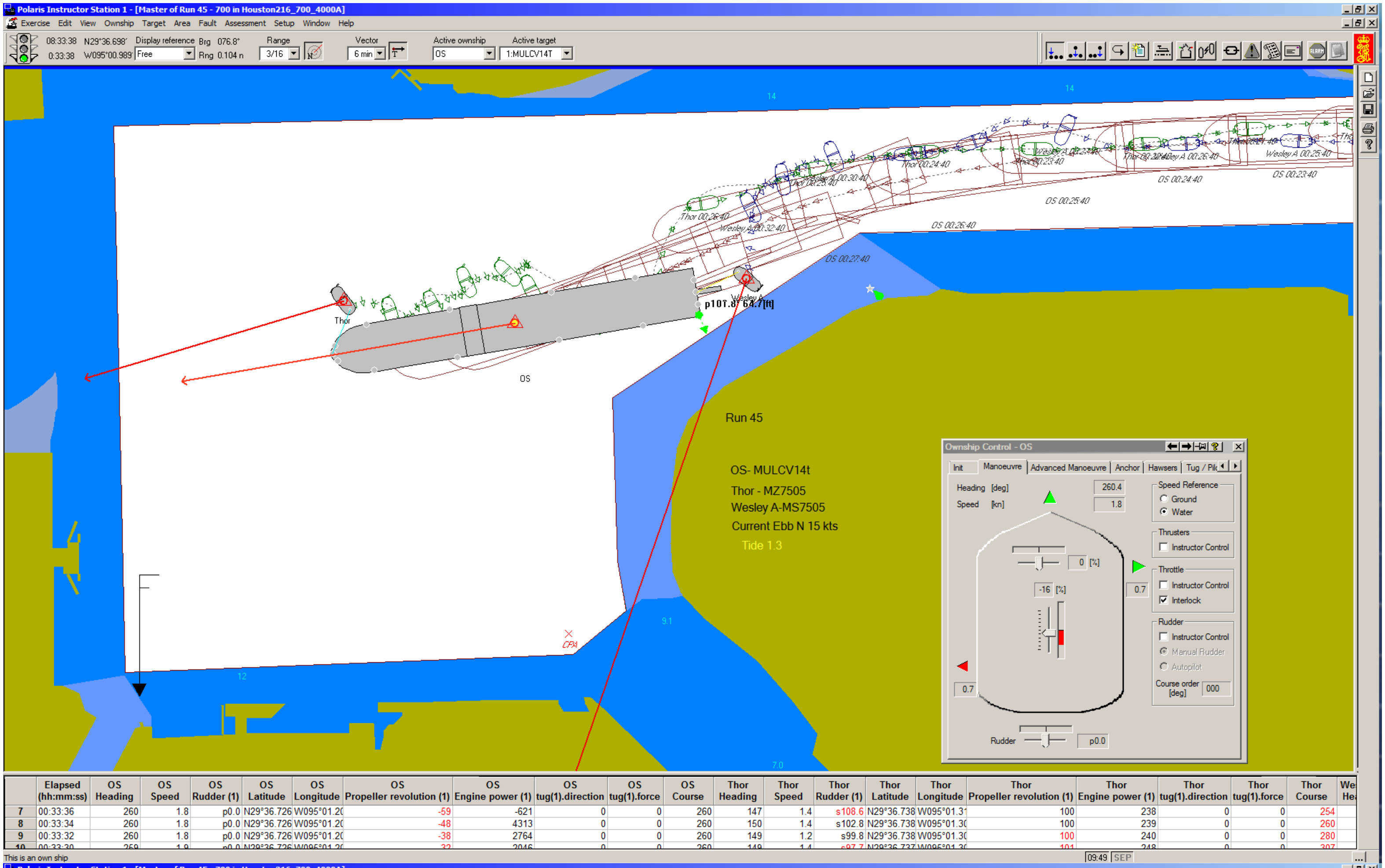


Polaris Instructor Station 1 - [Master of Run 45 - 700 in Houston216_700_4000A]

08:33:38 N29°36.698'
0:33:38 W095°00.989'
Display reference: Free
Brg 076.8°
Rng 0.104 n
Range: 3/16
Vector: 6 min
Active ownship: OS
Active target: 1:MULCV14T

Run 45

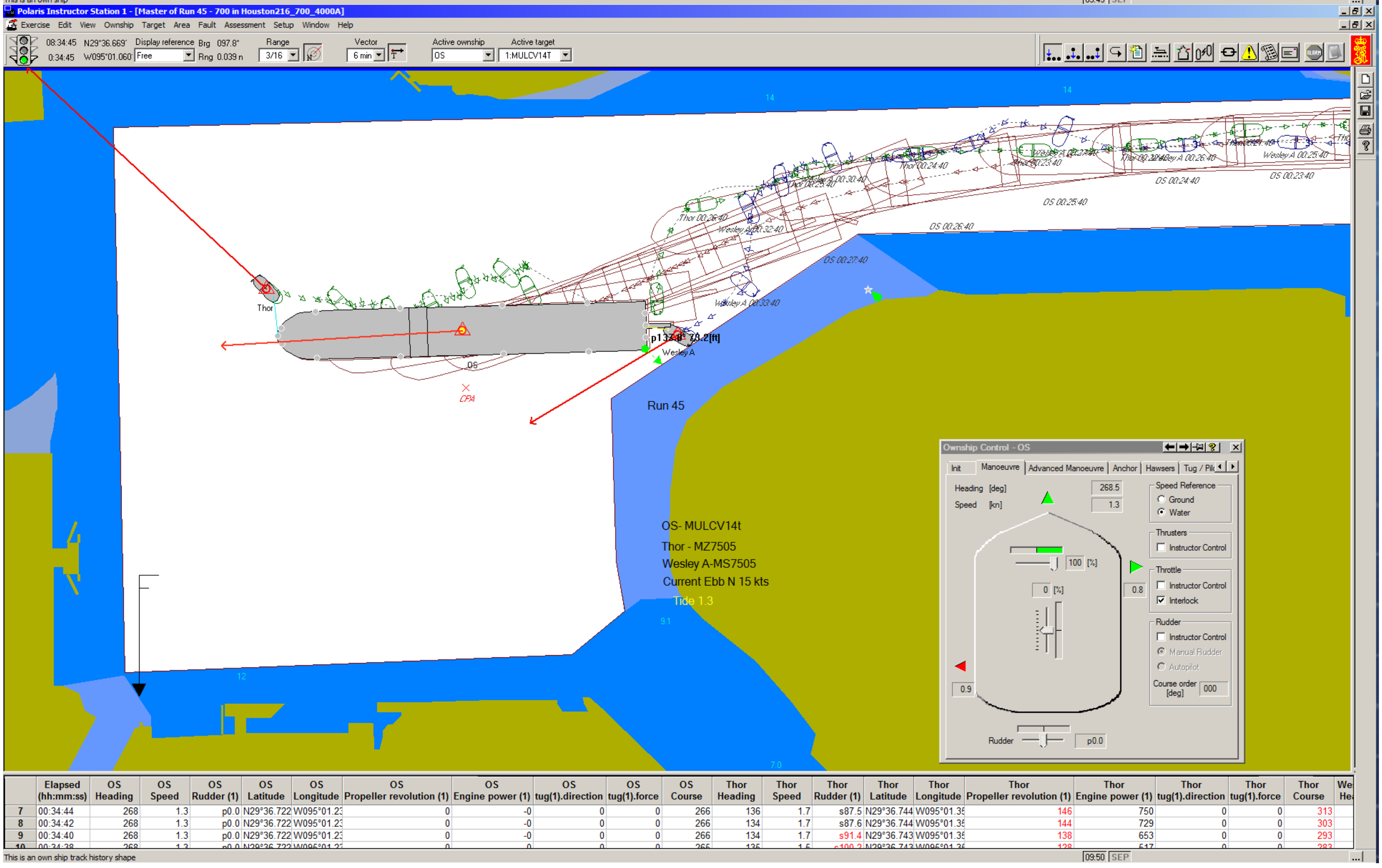
OS- MULCV14t
Thor - MZ7505
Wesley A-MS7505
Current Ebb N 15 kts
Tide 1.3

Ownship Control - OS
Init | Manoeuvre | Advanced Manoeuvre | Anchor | Hawsers | Tug / Pil
Heading [deg] 260.4
Speed [kn] 1.8
Speed Reference: ○ Ground ● Water
Thrusters: ☐ Instructor Control
Throttle: ☐ Instructor Control ☑ Interlock
Rudder: ☐ Instructor Control ● Manual Rudder ○ Autopilot
Course order [deg] 000
0 [%]
-16 [%]
0.7
0.7
Rudder p0.0

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	Thor Heading	Thor Speed	Thor Rudder (1)	Thor Latitude	Thor Longitude	Thor Propeller revolution (1)	Thor Engine power (1)	Thor tug(1).direction	Thor tug(1).force	Thor Course
7	00:33:36	260	1.8	p0.0	N29°36.726	W095°01.20	-59	-621	0	0	260	147	1.4	s108.6	N29°36.738	W095°01.31	100	238	0	0	254
8	00:33:34	260	1.8	p0.0	N29°36.726	W095°01.20	-48	4313	0	0	260	150	1.4	s102.8	N29°36.738	W095°01.30	100	239	0	0	260
9	00:33:32	260	1.8	p0.0	N29°36.726	W095°01.20	-38	2764	0	0	260	149	1.2	s99.8	N29°36.738	W095°01.30	100	240	0	0	280

This is an own ship

09:49 SEP



Polaris Instructor Station 1 - [Master of Run 45 - 700 in Houston216_700_4000A]

08:34:45 N29°36.669'
0:34:45 W095°01.060'
Display reference: Free
Brg 097.8°
Rng 0.039 n
Range: 3/16
Vector: 6 min
Active ownship: OS
Active target: 1:MULCV14T

Run 45

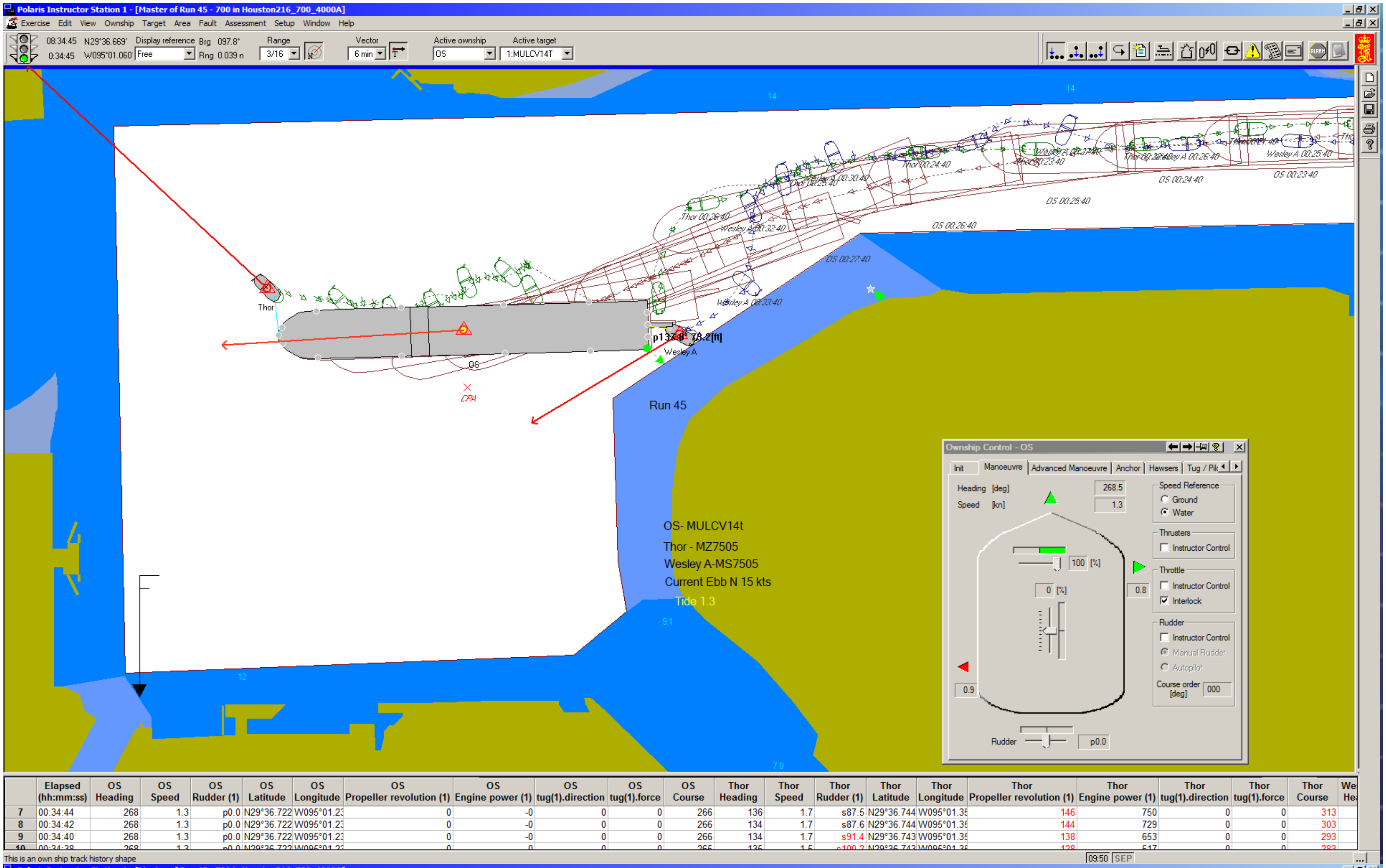
OS- MULCV14t
Thor - MZ7505
Wesley A-MS7505
Current Ebb N 15 kts
Tide 1.3

Ownship Control - OS
Init | Manoeuvre | Advanced Manoeuvre | Anchor | Hawsers | Tug / Pil
Heading [deg] 268.5
Speed [kn] 1.3
Speed Reference: ○ Ground ● Water
Thrusters: ☐ Instructor Control
Throttle: ☐ Instructor Control ☑ Interlock
Rudder: ☐ Instructor Control ● Manual Rudder ○ Autopilot
Course order [deg] 000
100 [%]
0 [%]
0.8
0.9
Rudder p0.0

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	Thor Heading	Thor Speed	Thor Rudder (1)	Thor Latitude	Thor Longitude	Thor Propeller revolution (1)	Thor Engine power (1)	Thor tug(1).direction	Thor tug(1).force	Thor Course
7	00:34:44	268	1.3	p0.0	N29°36.722	W095°01.23	0	-0	0	0	266	136	1.7	s87.5	N29°36.744	W095°01.35	146	750	0	0	313
8	00:34:42	268	1.3	p0.0	N29°36.722	W095°01.23	0	-0	0	0	266	134	1.7	s87.6	N29°36.744	W095°01.35	144	729	0	0	303
9	00:34:40	268	1.3	p0.0	N29°36.722	W095°01.23	0	-0	0	0	266	134	1.7	s91.4	N29°36.743	W095°01.35	138	653	0	0	293

This is an own ship track history shape

09:50 SEP



Polaris Instructor Station 1 - [Master of Run 45 - 700 in Houston216_700_4000A]

Exercise Edit View Ownship Target Area Fault Assessment Setup Window Help

08:34:45 N29°36.669' Display reference Free Brg 097.8° Range 3/16 Vector 6 min Active ownship OS Active target 1:MULCV14T
0:34:45 W095°01.060' Rng 0.039 n

Ownship Control - OS

Init | Manoeuvre | Advanced Manoeuvre | Anchor | Hawsers | Tug / Pil

Heading [deg] 268.5
Speed [kn] 1.3

100 [%]
0 [%]
0.8
0.9
Rudder p0.0

Speed Reference
○ Ground
● Water

Thrusters
☐ Instructor Control

Throttle
☐ Instructor Control
☑ Interlock

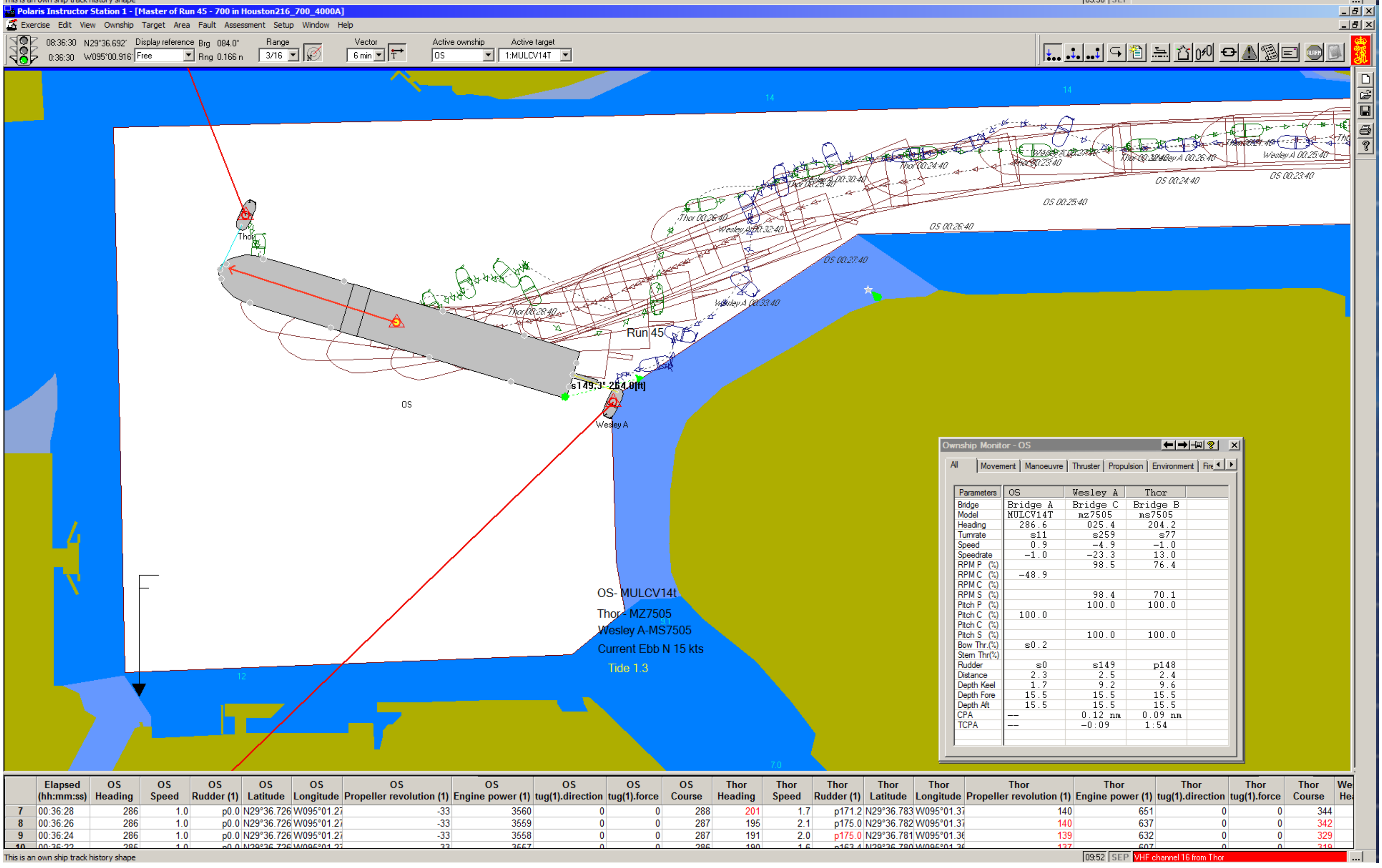
Rudder
☐ Instructor Control
● Manual Rudder
○ Autopilot
Course order [deg] 000

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course
7	00:34:44	268	1.3	p0.0	N29°36.722	W095°01.23	0	-0	0	0	266
8	00:34:42	268	1.3	p0.0	N29°36.722	W095°01.23	0	-0	0	0	266
9	00:34:40	268	1.3	p0.0	N29°36.722	W095°01.23	0	-0	0	0	266

	Thor Heading	Thor Speed	Thor Rudder (1)	Thor Latitude	Thor Longitude	Thor Propeller revolution (1)	Thor Engine power (1)	Thor tug(1).direction	Thor tug(1).force	Thor Course
7	136	1.7	s87.5	N29°36.744	W095°01.35	146	750	0	0	313
8	134	1.7	s87.6	N29°36.744	W095°01.35	144	729	0	0	303
9	134	1.7	s91.4	N29°36.743	W095°01.35	138	653	0	0	293

This is an own ship track history shape

09:50 SEP



Polaris Instructor Station 1 - [Master of Run 45 - 700 in Houston216_700_4000A]

Exercise Edit View Ownship Target Area Fault Assessment Setup Window Help

08:36:30 N29°36.692' Display reference Free Brg 084.0° Range 3/16 Vector 6 min Active ownship OS Active target 1:MULCV14T
0:36:30 W095°00.916' Rng 0.166 n

Ownship Monitor - OS

All | Movement | Manoeuvre | Thruster | Propulsion | Environment | Fire

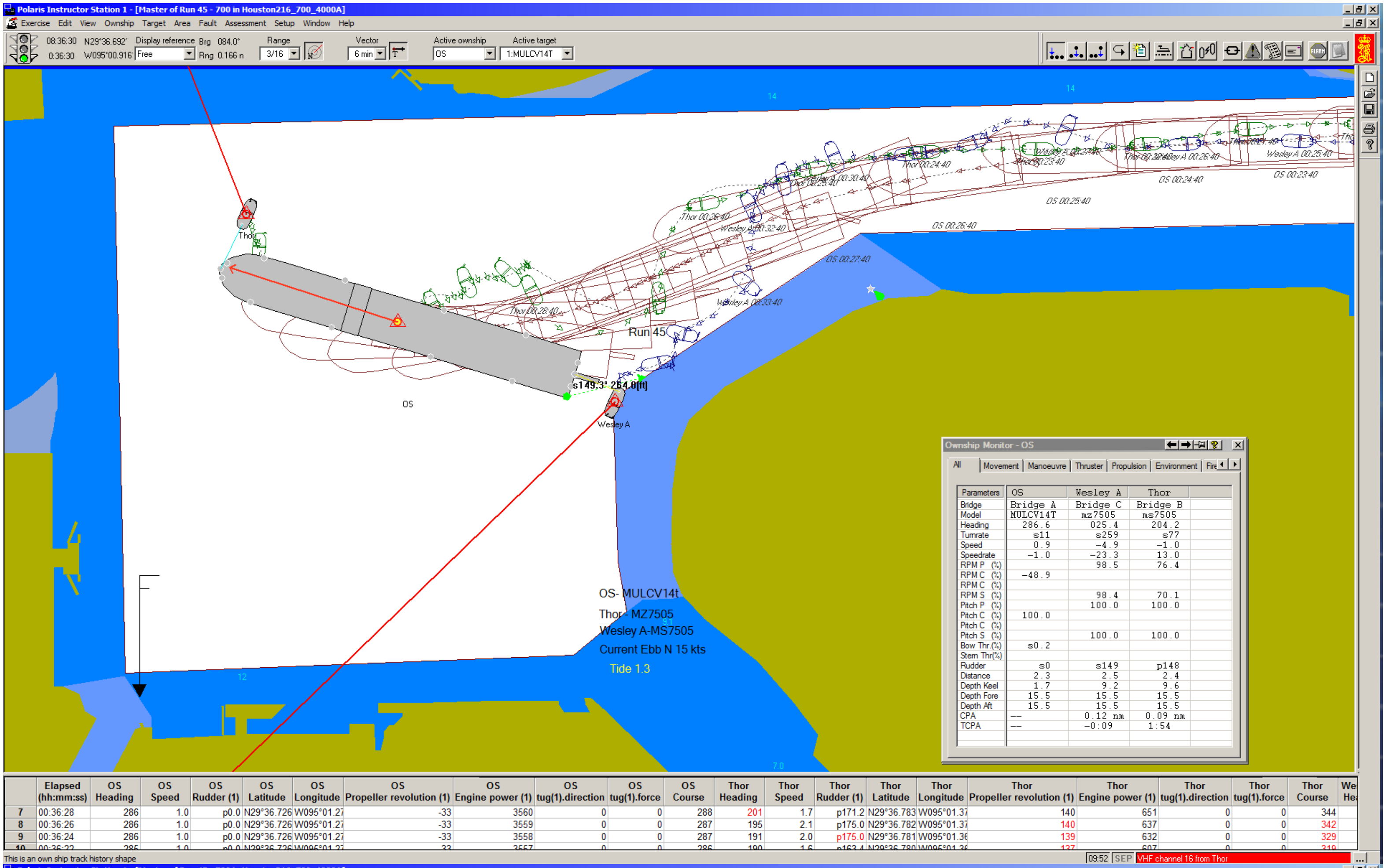
Parameters	OS	Wesley A	Thor
Bridge	Bridge A	Bridge C	Bridge B
Model	MULCV14T	mz7505	ms7505
Heading	286.6	025.4	204.2
Turnrate	s11	s259	s77
Speed	0.9	-4.9	-1.0
Speedrate	-1.0	-23.3	13.0
RPM P (%)		98.5	76.4
RPM C (%)	-48.9		
RPM C (%)			
RPM S (%)		98.4	70.1
Pitch P (%)		100.0	100.0
Pitch C (%)	100.0		
Pitch C (%)			
Pitch S (%)		100.0	100.0
Bow Thr.(%)	s0.2		
Stern Thr(%)			
Rudder	s0	s149	p148
Distance	2.3	2.5	2.4
Depth Keel	1.7	9.2	9.6
Depth Fore	15.5	15.5	15.5
Depth Aft	15.5	15.5	15.5
CPA	--	0.12 nm	0.09 nm
TCPA	--	-0:09	1:54

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course
7	00:36:28	286	1.0	p0.0	N29°36.726	W095°01.27	-33	3560	0	0	288
8	00:36:26	286	1.0	p0.0	N29°36.726	W095°01.27	-33	3559	0	0	287
9	00:36:24	286	1.0	p0.0	N29°36.726	W095°01.27	-33	3558	0	0	287

	Thor Heading	Thor Speed	Thor Rudder (1)	Thor Latitude	Thor Longitude	Thor Propeller revolution (1)	Thor Engine power (1)	Thor tug(1).direction	Thor tug(1).force	Thor Course
7	201	1.7	p171.2	N29°36.783	W095°01.37	140	651	0	0	344
8	195	2.1	p175.0	N29°36.782	W095°01.37	140	637	0	0	342
9	191	2.0	p175.0	N29°36.781	W095°01.36	139	632	0	0	329

This is an own ship track history shape

09:52 SEP VHF channel 16 from Thor



Polaris Instructor Station 1 - [Master of Run 45 - 700 in Houston216_700_4000A]

08:36:30 N29°36.692′ · 0:36:30 W095°00.916′ · Display reference: Free · Brg 084.0° · Rng 0.166 n · Range: 3/16 · Vector: 6 min · Active ownship: OS · Active target: 1:MULCV14T

OS- MULCV14t
Thor - MZ7505
Wesley A-MS7505
Current Ebb N 15 kts
Tide 1.3

Ownship Monitor - OS

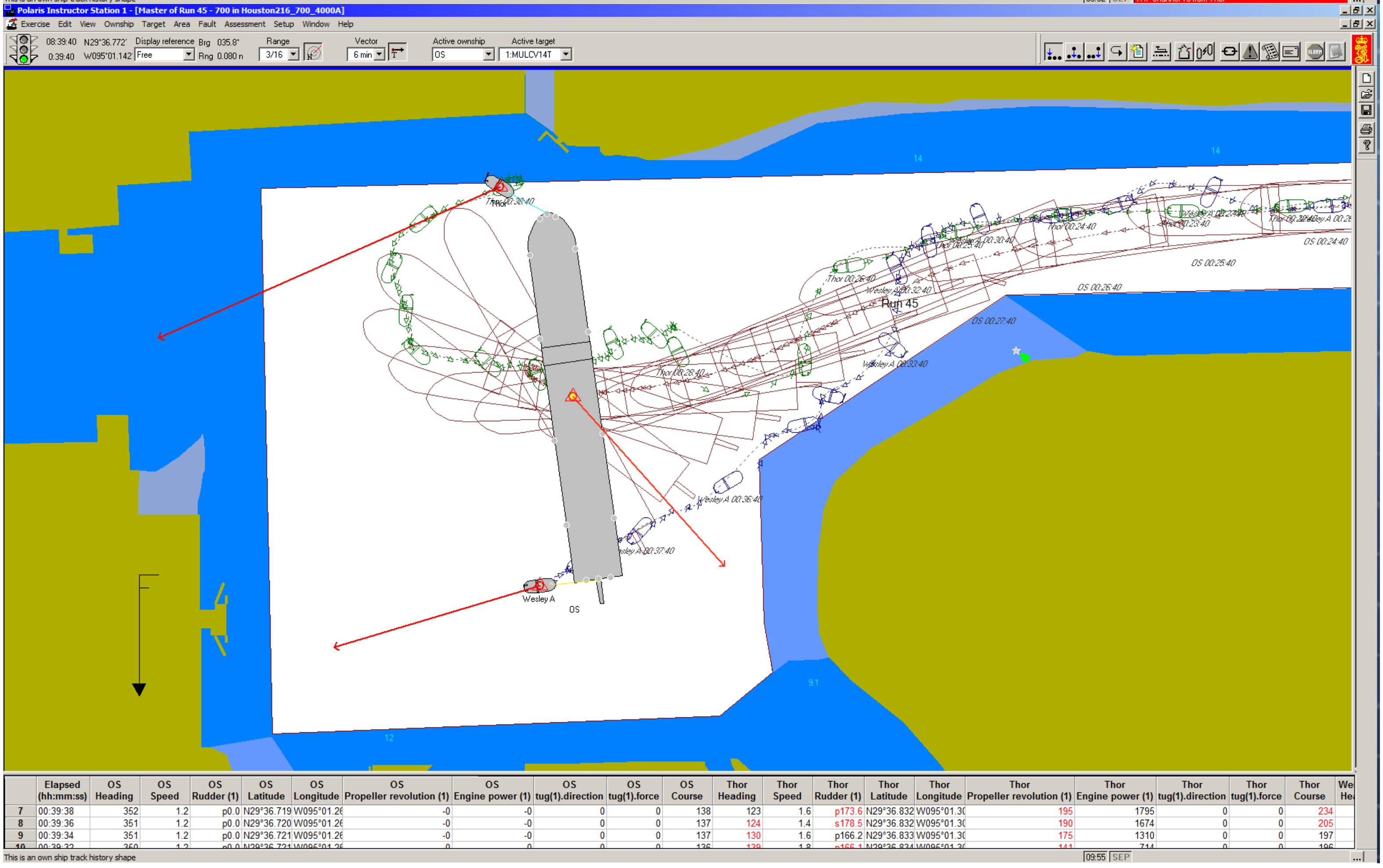
All · Movement · Manoeuvre · Thruster · Propulsion · Environment · Fire

Parameters	OS	Wesley A	Thor
Bridge	Bridge A	Bridge C	Bridge B
Model	MULCV14T	mz7505	ms7505
Heading	286.6	025.4	204.2
Turnrate	s11	s259	s77
Speed	0.9	-4.9	-1.0
Speedrate	-1.0	-23.3	13.0
RPM P (%)		98.5	76.4
RPM C (%)	-48.9		
RPM C (%)			
RPM S (%)		98.4	70.1
Pitch P (%)		100.0	100.0
Pitch C (%)	100.0		
Pitch C (%)			
Pitch S (%)		100.0	100.0
Bow Thr.(%)	s0.2		
Stern Thr(%)			
Rudder	s0	s149	p148
Distance	2.3	2.5	2.4
Depth Keel	1.7	9.2	9.6
Depth Fore	15.5	15.5	15.5
Depth Aft	15.5	15.5	15.5
CPA	--	0.12 nm	0.09 nm
TCPA	--	-0:09	1:54

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	Thor Heading	Thor Speed	Thor Rudder (1)	Thor Latitude	Thor Longitude	Thor Propeller revolution (1)	Thor Engine power (1)	Thor tug(1).direction	Thor tug(1).force	Thor Course
7	00:36:28	286	1.0	p0.0	N29°36.726	W095°01.27	-33	3560	0	0	288	201	1.7	p171.2	N29°36.783	W095°01.37	140	651	0	0	344
8	00:36:26	286	1.0	p0.0	N29°36.726	W095°01.27	-33	3559	0	0	287	195	2.1	p175.0	N29°36.782	W095°01.37	140	637	0	0	342
9	00:36:24	286	1.0	p0.0	N29°36.726	W095°01.27	-33	3558	0	0	287	191	2.0	p175.0	N29°36.781	W095°01.36	139	632	0	0	329

This is an own ship track history shape

09:52 SEP VHF channel 16 from Thor



Polaris Instructor Station 1 - [Master of Run 45 - 700 in Houston216_700_4000A]

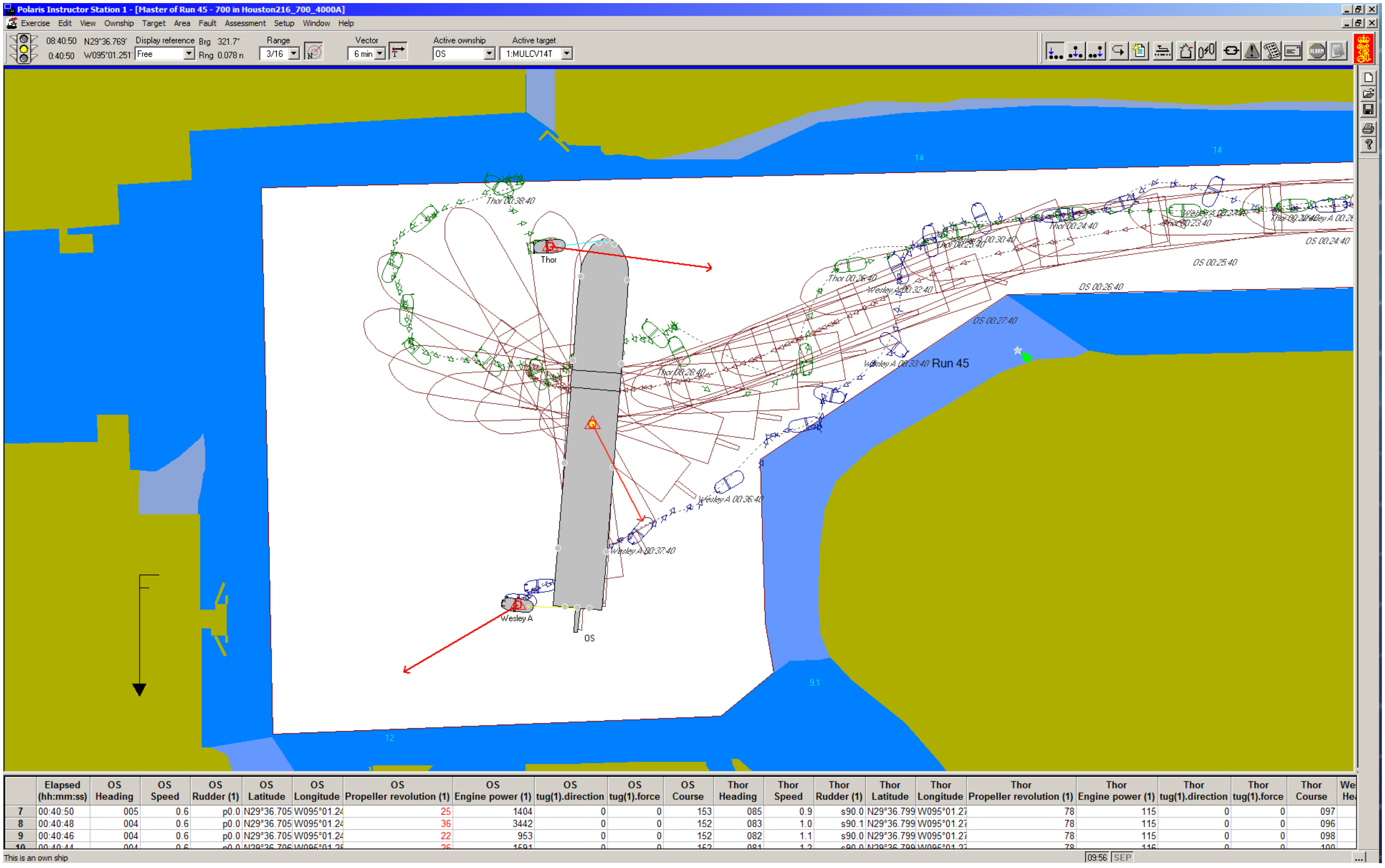
08:39:40 N29°36.772′ · 0:39:40 W095°01.142′ · Display reference: Free · Brg 035.8° · Rng 0.080 n · Range: 3/16 · Vector: 6 min · Active ownship: OS · Active target: 1:MULCV14T

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	Thor Heading	Thor Speed	Thor Rudder (1)	Thor Latitude	Thor Longitude	Thor Propeller revolution (1)	Thor Engine power (1)	Thor tug(1).direction	Thor tug(1).force	Thor Course
7	00:39:38	352	1.2	p0.0	N29°36.719	W095°01.26	-0	-0	0	0	138	123	1.6	p173.6	N29°36.832	W095°01.30	195	1795	0	0	234
8	00:39:36	351	1.2	p0.0	N29°36.720	W095°01.26	-0	-0	0	0	137	124	1.4	s178.5	N29°36.832	W095°01.30	190	1674	0	0	205
9	00:39:34	351	1.2	p0.0	N29°36.721	W095°01.26	-0	-0	0	0	137	130	1.6	p166.2	N29°36.833	W095°01.30	175	1310	0	0	197

This is an own ship track history shape

09:55 SEP

June 26, 2019



Polaris Instructor Station 1 - [Master of Run 45 - 700 in Houston216_700_4000A]

08:40:50 N29°36.769′ Display reference Brg 321.7°
0:40:50 W095°01.251′ Free Rng 0.078 n

Range 3/16

Vector 6 min

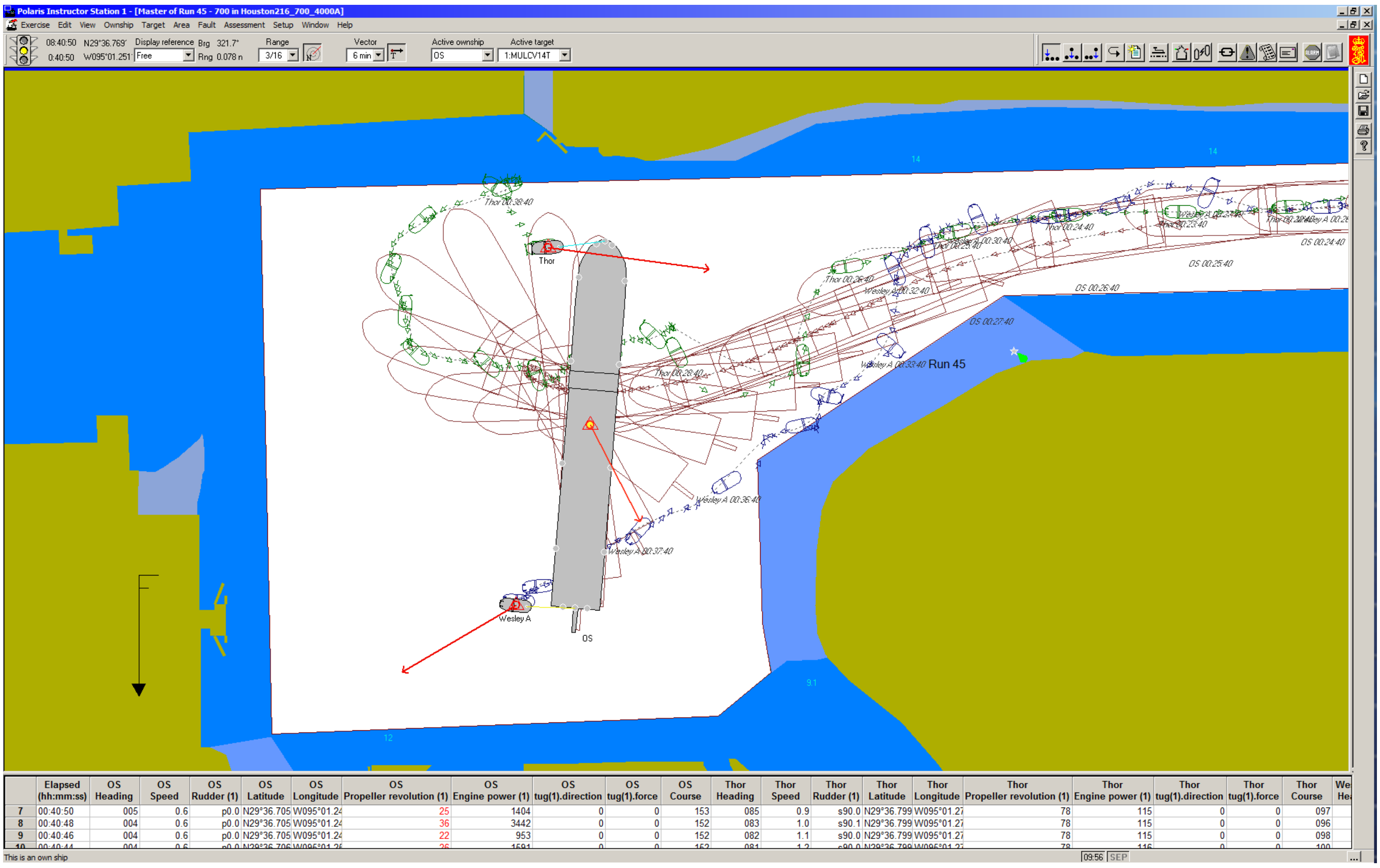
Active ownship OS

Active target 1:MULCV14T

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	Thor Heading	Thor Speed	Thor Rudder (1)	Thor Latitude	Thor Longitude	Thor Propeller revolution (1)	Thor Engine power (1)	Thor tug(1).direction	Thor tug(1).force	Thor Course	We He
7	00:40:50	005	0.6	p0.0	N29°36.705	W095°01.24	25	1404	0	0	153	085	0.9	s90.0	N29°36.799	W095°01.27	78	115	0	0	097	
8	00:40:48	004	0.6	p0.0	N29°36.705	W095°01.24	36	3442	0	0	152	083	1.0	s90.1	N29°36.799	W095°01.27	78	115	0	0	096	
9	00:40:46	004	0.6	p0.0	N29°36.705	W095°01.24	22	953	0	0	152	082	1.1	s90.0	N29°36.799	W095°01.27	78	115	0	0	098	
10	00:40:44	004	0.6	p0.0	N29°36.706	W095°01.2	26	1591	0	0	152	081	1.2	s90.0	N29°36.799	W095°01.27	78	116	0	0	100	

This is an own ship

09:56 SEP


Polaris Instructor Station 1 - [Master of Run 45 - 700 in Houston216_700_4000A]

08:40:50 N29°36.769′ Display reference Brg 321.7°
0:40:50 W095°01.251′ Free Rng 0.078 n

Range 3/16

Vector 6 min

Active ownship OS

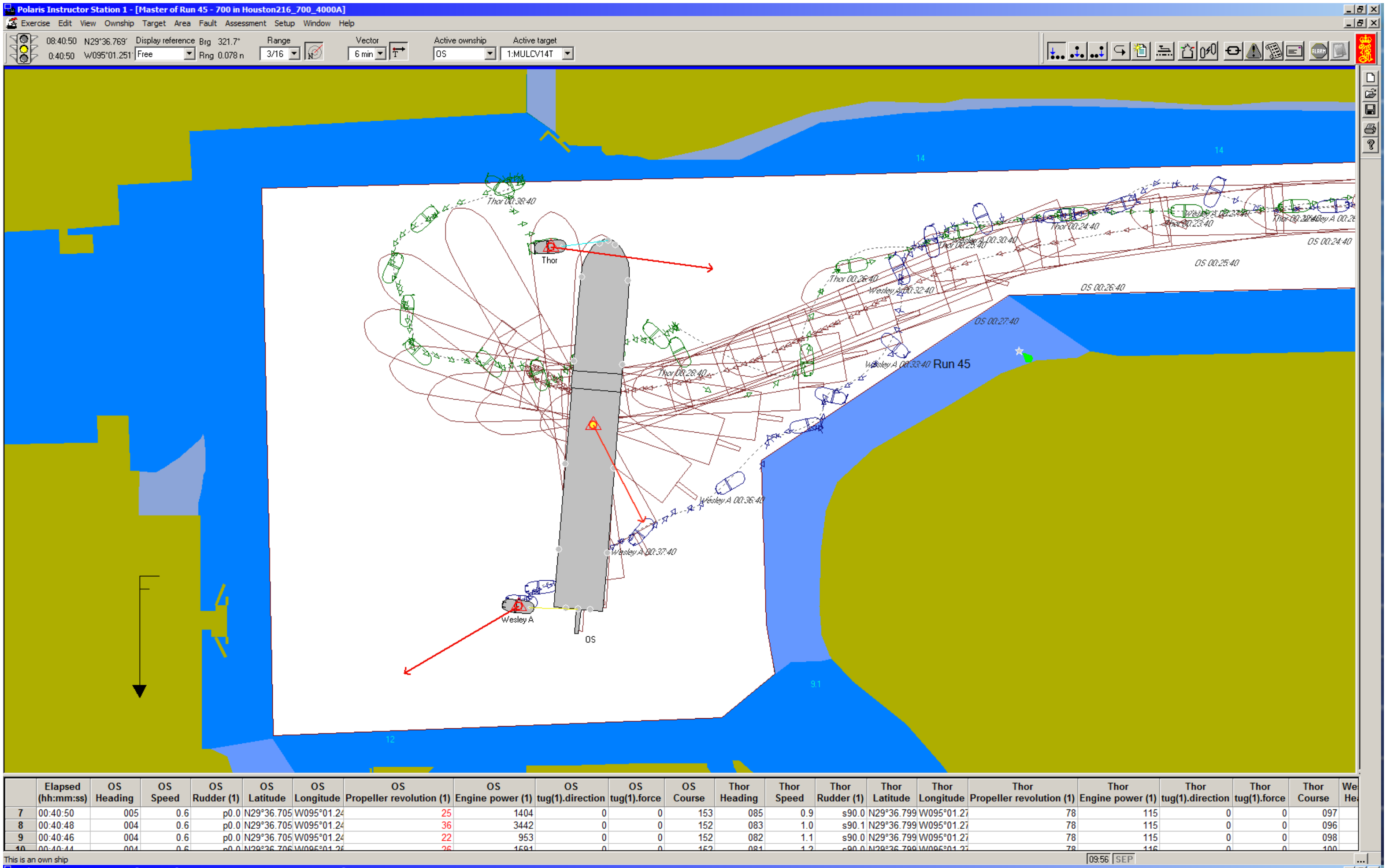
Active target 1:MULCV14T

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	Thor Heading	Thor Speed	Thor Rudder (1)	Thor Latitude	Thor Longitude	Thor Propeller revolution (1)	Thor Engine power (1)	Thor tug(1).direction	Thor tug(1).force	Thor Course	We He
7	00:40:50	005	0.6	p0.0	N29°36.705	W095°01.24	25	1404	0	0	153	085	0.9	s90.0	N29°36.799	W095°01.27	78	115	0	0	097	
8	00:40:48	004	0.6	p0.0	N29°36.705	W095°01.24	36	3442	0	0	152	083	1.0	s90.1	N29°36.799	W095°01.27	78	115	0	0	096	
9	00:40:46	004	0.6	p0.0	N29°36.705	W095°01.24	22	953	0	0	152	082	1.1	s90.0	N29°36.799	W095°01.27	78	115	0	0	098	
10	00:40:44	004	0.6	p0.0	N29°36.706	W095°01.2	26	1591	0	0	152	081	1.2	s90.0	N29°36.799	W095°01.27	78	116	0	0	100	

This is an own ship

09:56 SEP

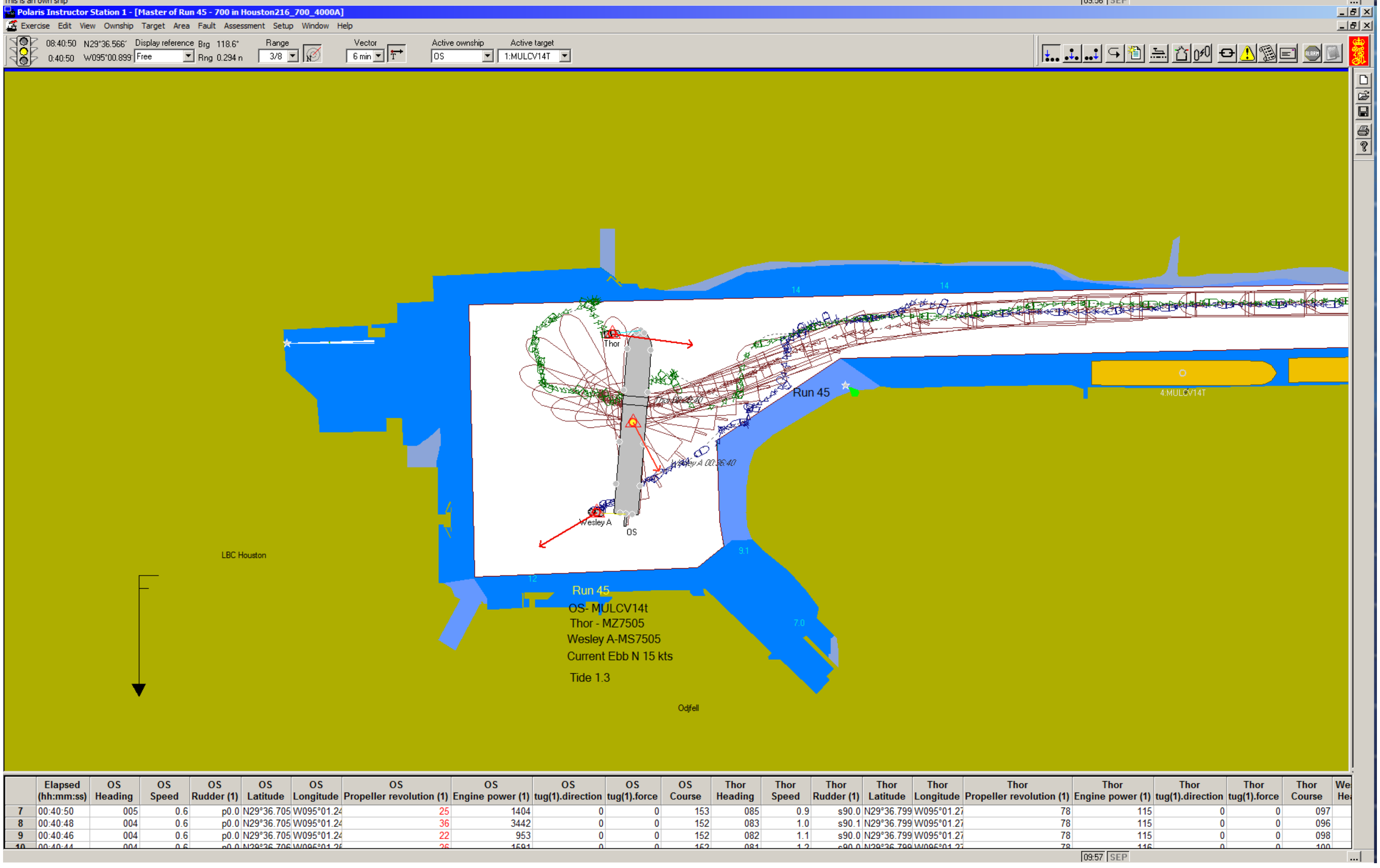
June 26, 2019



08:40:50 N29°36.769' Display reference Free Brg 321.7° Rng 0.078 n Range 3/16 Vector 6 min Active ownship OS Active target 1:MULCV14T
0:40:50 W095°01.251'

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	Thor Heading	Thor Speed	Thor Rudder (1)	Thor Latitude	Thor Longitude	Thor Propeller revolution (1)	Thor Engine power (1)	Thor tug(1).direction	Thor tug(1).force	Thor Course
7	00:40:50	005	0.6	p0.0	N29°36.705	W095°01.24	25	1404	0	0	153	085	0.9	s90.0	N29°36.799	W095°01.27	78	115	0	0	097
8	00:40:48	004	0.6	p0.0	N29°36.705	W095°01.24	36	3442	0	0	152	083	1.0	s90.1	N29°36.799	W095°01.27	78	115	0	0	096
9	00:40:46	004	0.6	p0.0	N29°36.705	W095°01.24	22	953	0	0	152	082	1.1	s90.0	N29°36.799	W095°01.27	78	115	0	0	098

This is an own ship



08:40:50 N29°36.566' Display reference Free Brg 118.6° Rng 0.294 n Range 3/8 Vector 6 min Active ownship OS Active target 1:MULCV14T
0:40:50 W095°00.899'

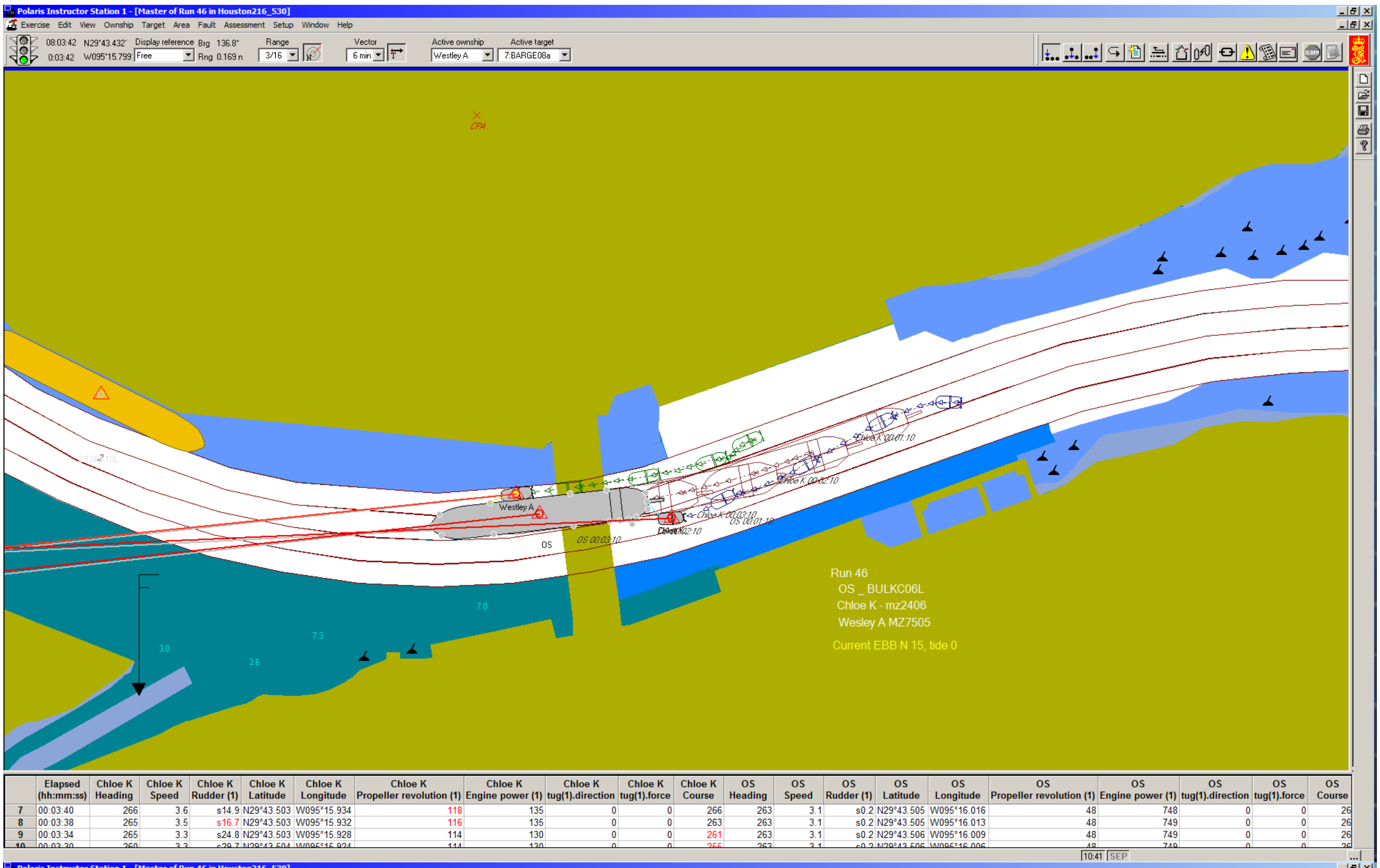
Run 45
OS- MULCV14t
Thor - MZ7505
Wesley A-MS7505
Current Ebb N 15 kts

Tide 1.3

	Elapsed (hh:mm:ss)	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course	Thor Heading	Thor Speed	Thor Rudder (1)	Thor Latitude	Thor Longitude	Thor Propeller revolution (1)	Thor Engine power (1)	Thor tug(1).direction	Thor tug(1).force	Thor Course
7	00:40:50	005	0.6	p0.0	N29°36.705	W095°01.24	25	1404	0	0	153	085	0.9	s90.0	N29°36.799	W095°01.27	78	115	0	0	097
8	00:40:48	004	0.6	p0.0	N29°36.705	W095°01.24	36	3442	0	0	152	083	1.0	s90.1	N29°36.799	W095°01.27	78	115	0	0	096
9	00:40:46	004	0.6	p0.0	N29°36.705	W095°01.24	22	953	0	0	152	082	1.1	s90.0	N29°36.799	W095°01.27	78	115	0	0	098

Appendix O: Brady Island Turning Basin Simulations

Run 46



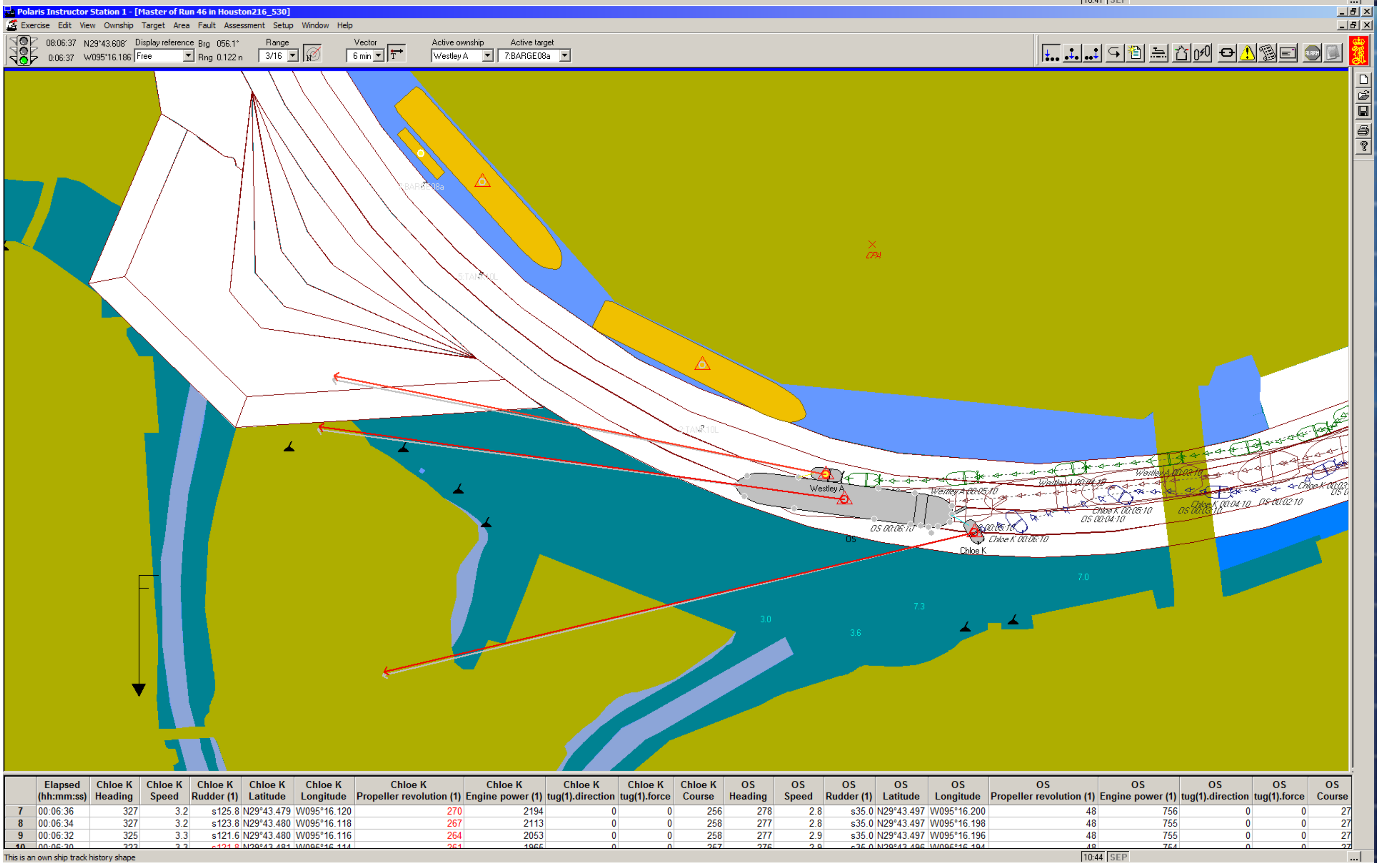
Polaris Instructor Station 1 - [Master of Run 46 in Houston216_530]

08:03:42 N29°43.432' Display reference Free Brg 136.8° Rng 0.169 n

0:03:42 W095°15.799

Range 3/16 Vector 6 min Active ownship Westley A Active target 7:BARGE08a

	Elapsed (hh:mm:ss)	Chloe K Heading	Chloe K Speed	Chloe K Rudder (1)	Chloe K Latitude	Chloe K Longitude	Chloe K Propeller revolution (1)	Chloe K Engine power (1)	Chloe K tug(1).direction	Chloe K tug(1).force	Chloe K Course	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course
7	00:03:40	266	3.6	s14.9	N29°43.503	W095°15.934	118	135	0	0	266	263	3.1	s0.2	N29°43.505	W095°16.016	48	748	0	0	26
8	00:03:38	265	3.5	s16.7	N29°43.503	W095°15.932	116	135	0	0	263	263	3.1	s0.2	N29°43.505	W095°16.013	48	749	0	0	26
9	00:03:34	265	3.3	s24.8	N29°43.503	W095°15.928	114	130	0	0	261	263	3.1	s0.2	N29°43.506	W095°16.009	48	749	0	0	26
10	00:03:30	260	3.3	s29.7	N29°43.504	W095°15.924	114	130	0	0	255	263	3.1	s0.2	N29°43.506	W095°16.006	48	749	0	0	26



Polaris Instructor Station 1 - [Master of Run 46 in Houston216_530]

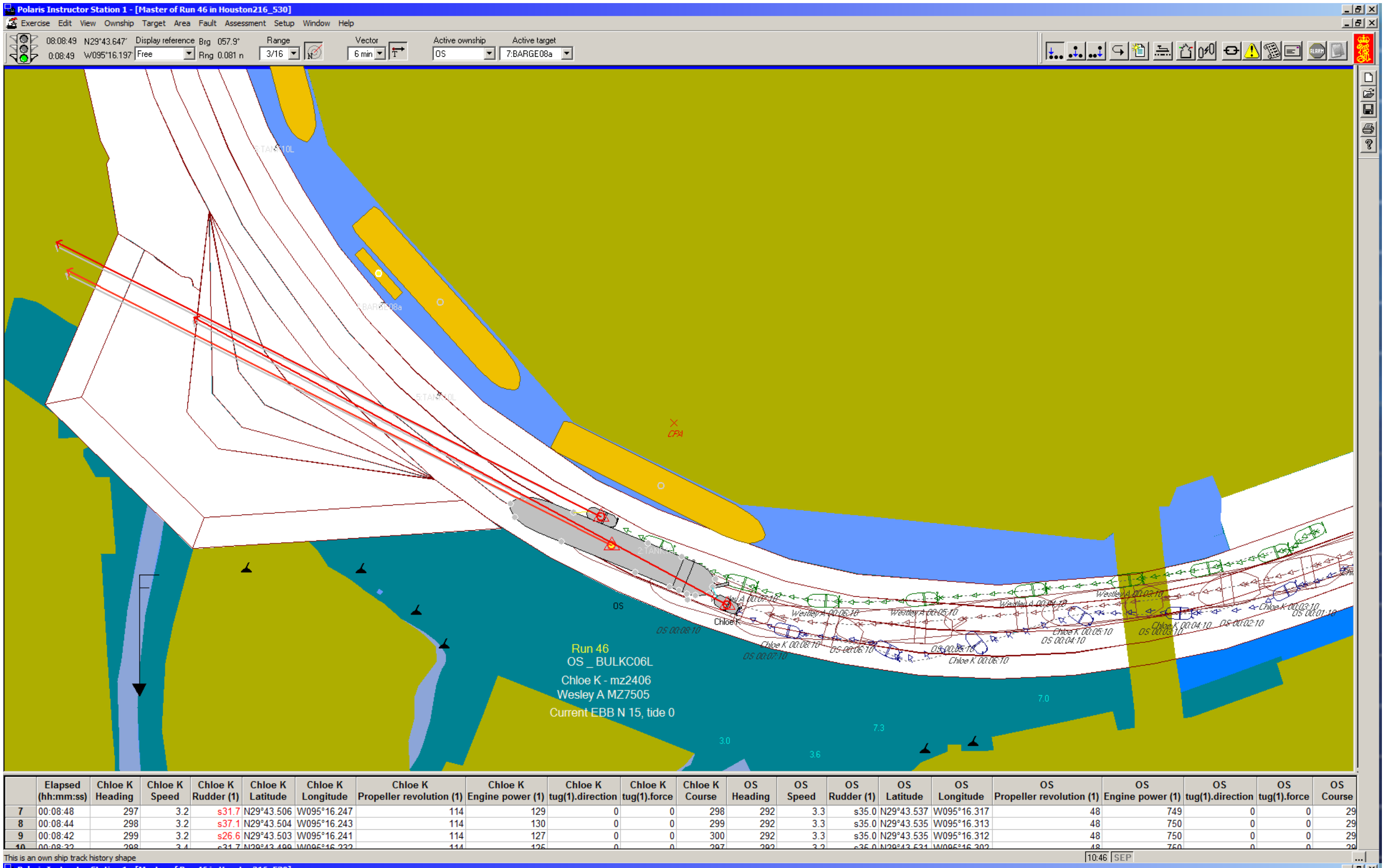
08:06:37 N29°43.608' Display reference Free Brg 056.1° Rng 0.122 n

0:06:37 W095°16.186'

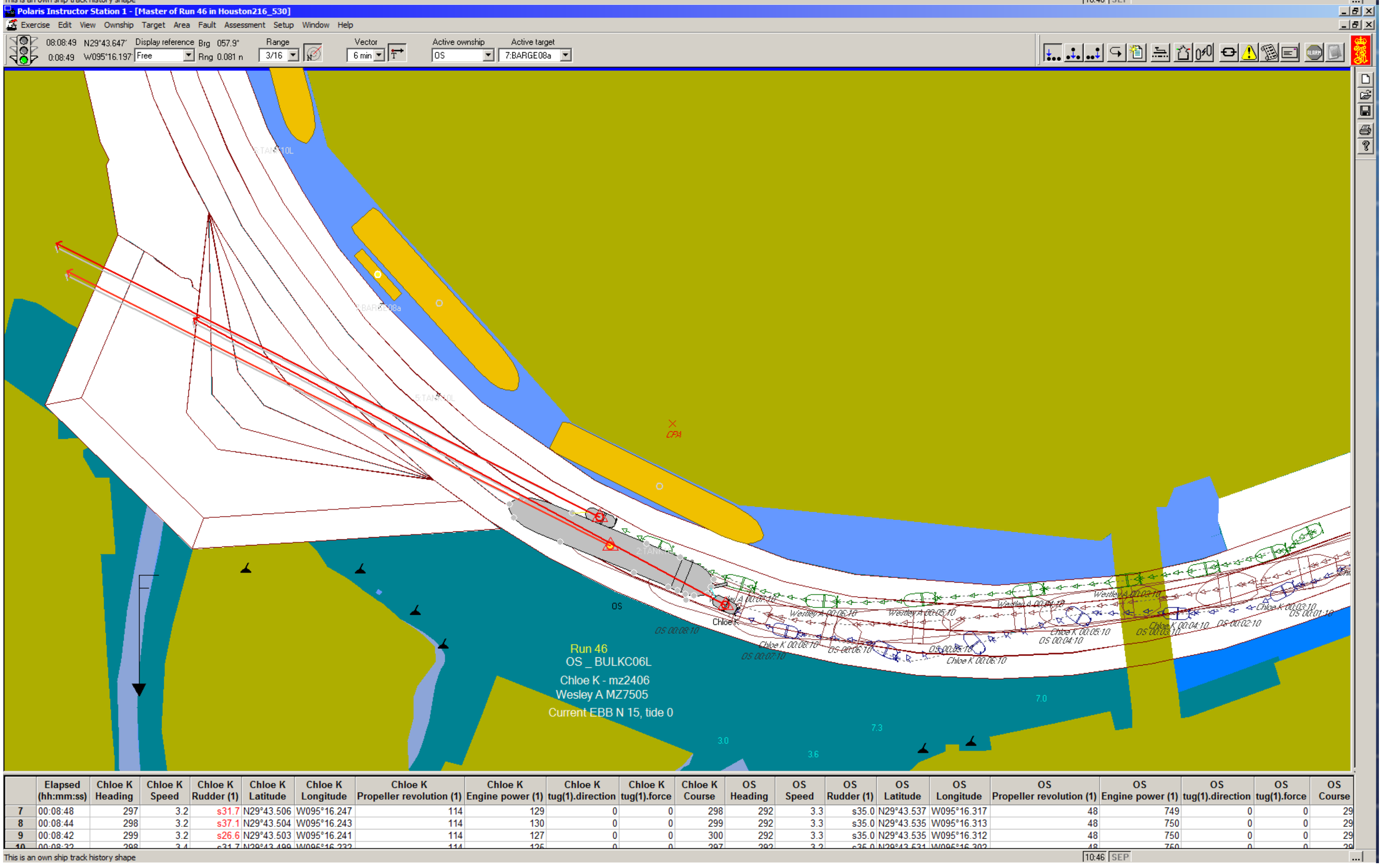
Range 3/16 Vector 6 min Active ownship Westley A Active target 7:BARGE08a

	Elapsed (hh:mm:ss)	Chloe K Heading	Chloe K Speed	Chloe K Rudder (1)	Chloe K Latitude	Chloe K Longitude	Chloe K Propeller revolution (1)	Chloe K Engine power (1)	Chloe K tug(1).direction	Chloe K tug(1).force	Chloe K Course	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course
7	00:06:36	327	3.2	s125.8	N29°43.479	W095°16.120	270	2194	0	0	256	278	2.8	s35.0	N29°43.497	W095°16.200	48	756	0	0	27
8	00:06:34	327	3.2	s123.8	N29°43.480	W095°16.118	267	2113	0	0	258	277	2.8	s35.0	N29°43.497	W095°16.198	48	755	0	0	27
9	00:06:32	325	3.3	s121.6	N29°43.480	W095°16.116	264	2053	0	0	258	277	2.9	s35.0	N29°43.497	W095°16.196	48	755	0	0	27
10	00:06:30	323	3.3	s121.8	N29°43.481	W095°16.114	261	1965	0	0	257	276	2.9	s35.0	N29°43.496	W095°16.194	48	754	0	0	27

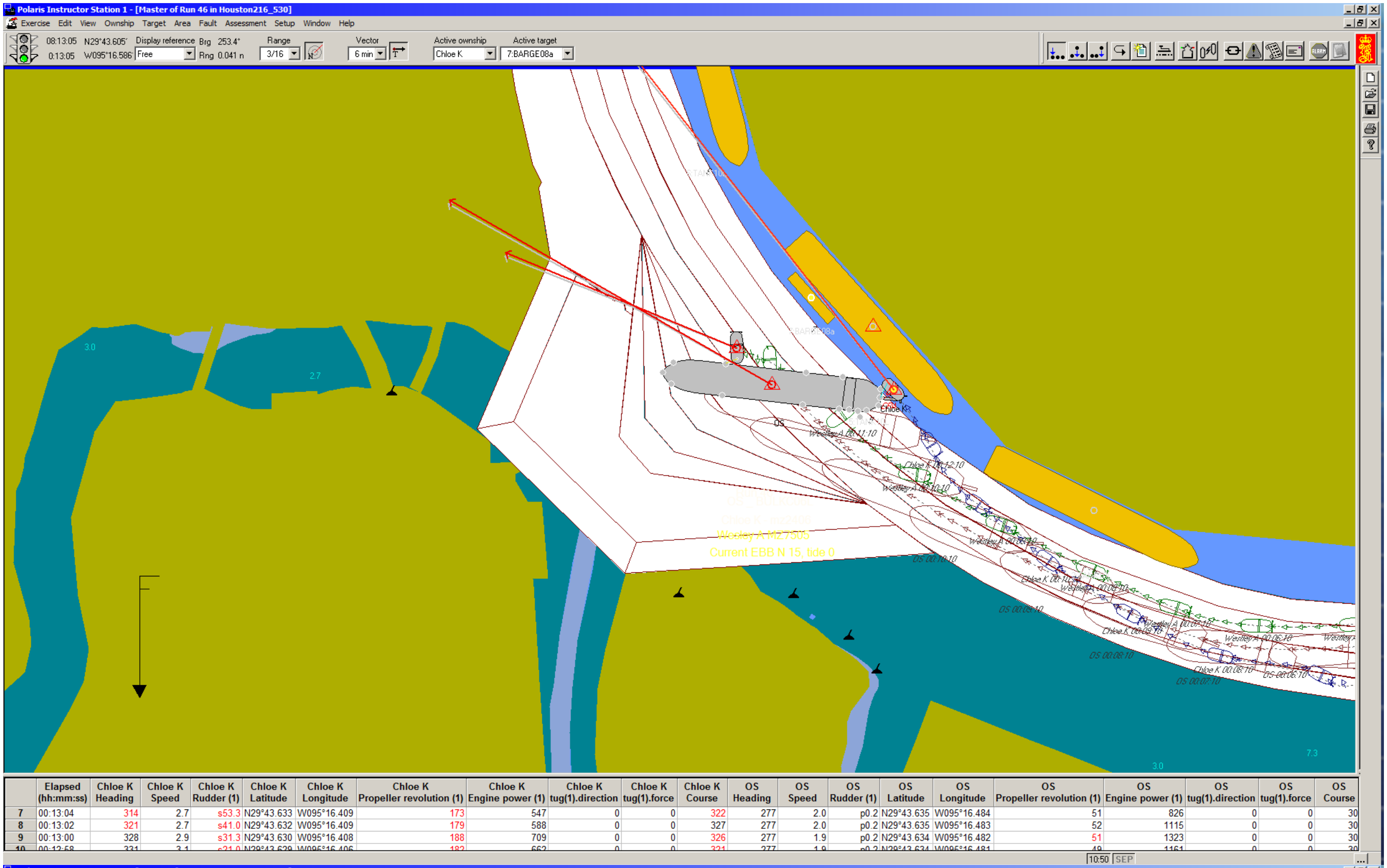
This is an own ship track history shape



	Elapsed (hh:mm:ss)	Chloe K Heading	Chloe K Speed	Chloe K Rudder (1)	Chloe K Latitude	Chloe K Longitude	Chloe K Propeller revolution (1)	Chloe K Engine power (1)	Chloe K tug(1).direction	Chloe K tug(1).force	Chloe K Course	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course
7	00:08:48	297	3.2	s31.7	N29°43.506	W095°16.247	114	129	0	0	298	292	3.3	s35.0	N29°43.537	W095°16.317	48	749	0	0	29
8	00:08:44	298	3.2	s37.1	N29°43.504	W095°16.243	114	130	0	0	299	292	3.3	s35.0	N29°43.535	W095°16.313	48	750	0	0	29
9	00:08:42	299	3.2	s26.6	N29°43.503	W095°16.241	114	127	0	0	300	292	3.3	s35.0	N29°43.535	W095°16.312	48	750	0	0	29
10	00:08:32	298	3.4	s31.7	N29°43.499	W095°16.232	114	125	0	0	297	292	3.2	s35.0	N29°43.531	W095°16.302	48	750	0	0	29


Polaris Instructor Station 1 - [Master of Run 46 in Houston216_530]

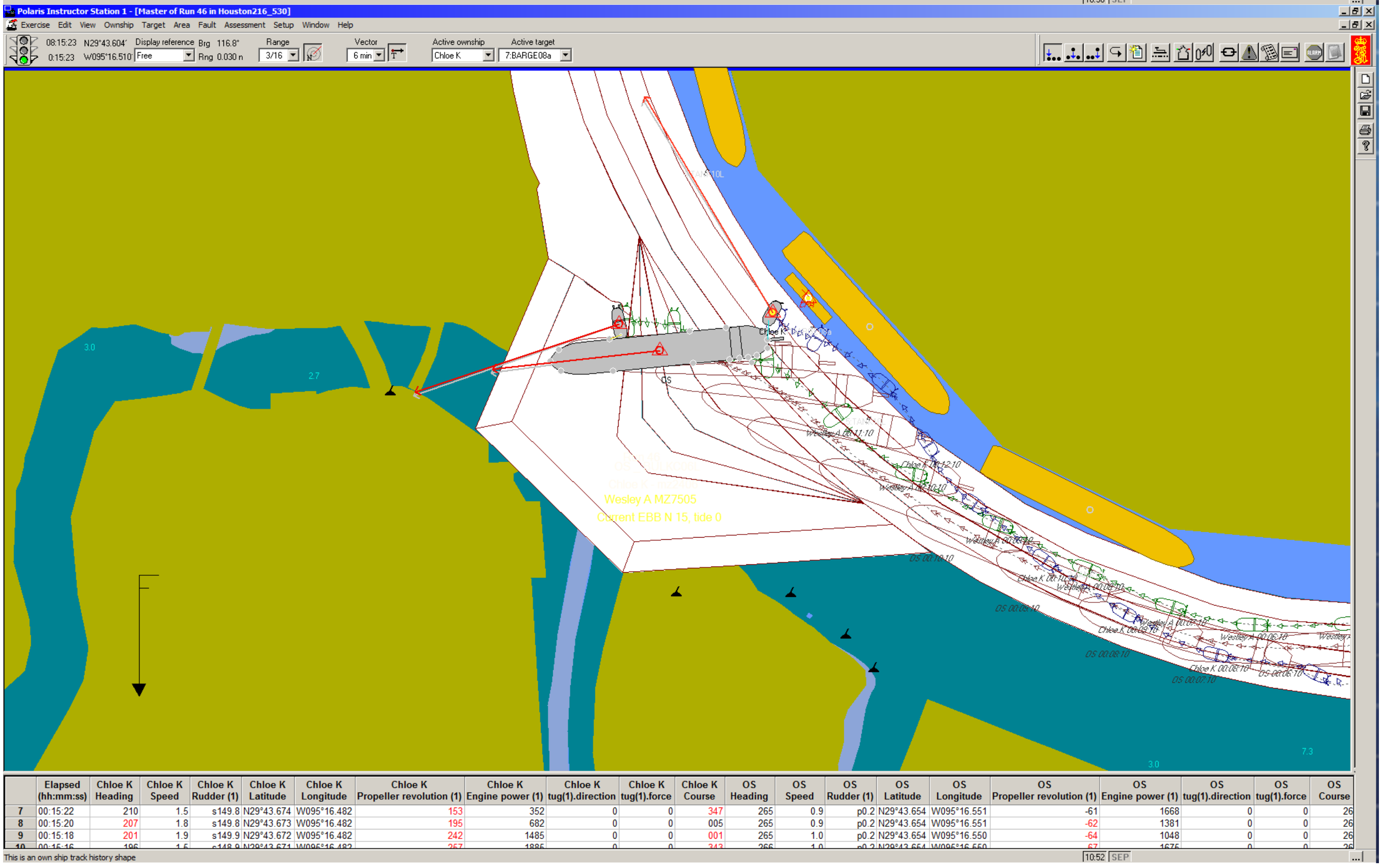
	Elapsed (hh:mm:ss)	Chloe K Heading	Chloe K Speed	Chloe K Rudder (1)	Chloe K Latitude	Chloe K Longitude	Chloe K Propeller revolution (1)	Chloe K Engine power (1)	Chloe K tug(1).direction	Chloe K tug(1).force	Chloe K Course	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course
7	00:08:48	297	3.2	s31.7	N29°43.506	W095°16.247	114	129	0	0	298	292	3.3	s35.0	N29°43.537	W095°16.317	48	749	0	0	29
8	00:08:44	298	3.2	s37.1	N29°43.504	W095°16.243	114	130	0	0	299	292	3.3	s35.0	N29°43.535	W095°16.313	48	750	0	0	29
9	00:08:42	299	3.2	s26.6	N29°43.503	W095°16.241	114	127	0	0	300	292	3.3	s35.0	N29°43.535	W095°16.312	48	750	0	0	29
10	00:08:32	298	3.4	s31.7	N29°43.499	W095°16.232	114	125	0	0	297	292	3.2	s35.0	N29°43.531	W095°16.302	48	750	0	0	29



08:13:05 N29°43.605′ Display reference Brg 253.4°
0:13:05 W095°16.586′ Free Rng 0.041 n
Range 3/16
Vector 6 min
Active ownship Chloe K
Active target 7:BARGE08a

	Elapsed (hh:mm:ss)	Chloe K Heading	Chloe K Speed	Chloe K Rudder (1)	Chloe K Latitude	Chloe K Longitude	Chloe K Propeller revolution (1)	Chloe K Engine power (1)	Chloe K tug(1).direction	Chloe K tug(1).force	Chloe K Course	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course
7	00:13:04	314	2.7	s53.3	N29°43.633	W095°16.409	173	547	0	0	322	277	2.0	p0.2	N29°43.635	W095°16.484	51	826	0	0	30
8	00:13:02	321	2.7	s41.0	N29°43.632	W095°16.409	179	588	0	0	327	277	2.0	p0.2	N29°43.635	W095°16.483	52	1115	0	0	30
9	00:13:00	328	2.9	s31.3	N29°43.630	W095°16.408	188	709	0	0	326	277	1.9	p0.2	N29°43.634	W095°16.482	51	1323	0	0	30

10:50 SEP



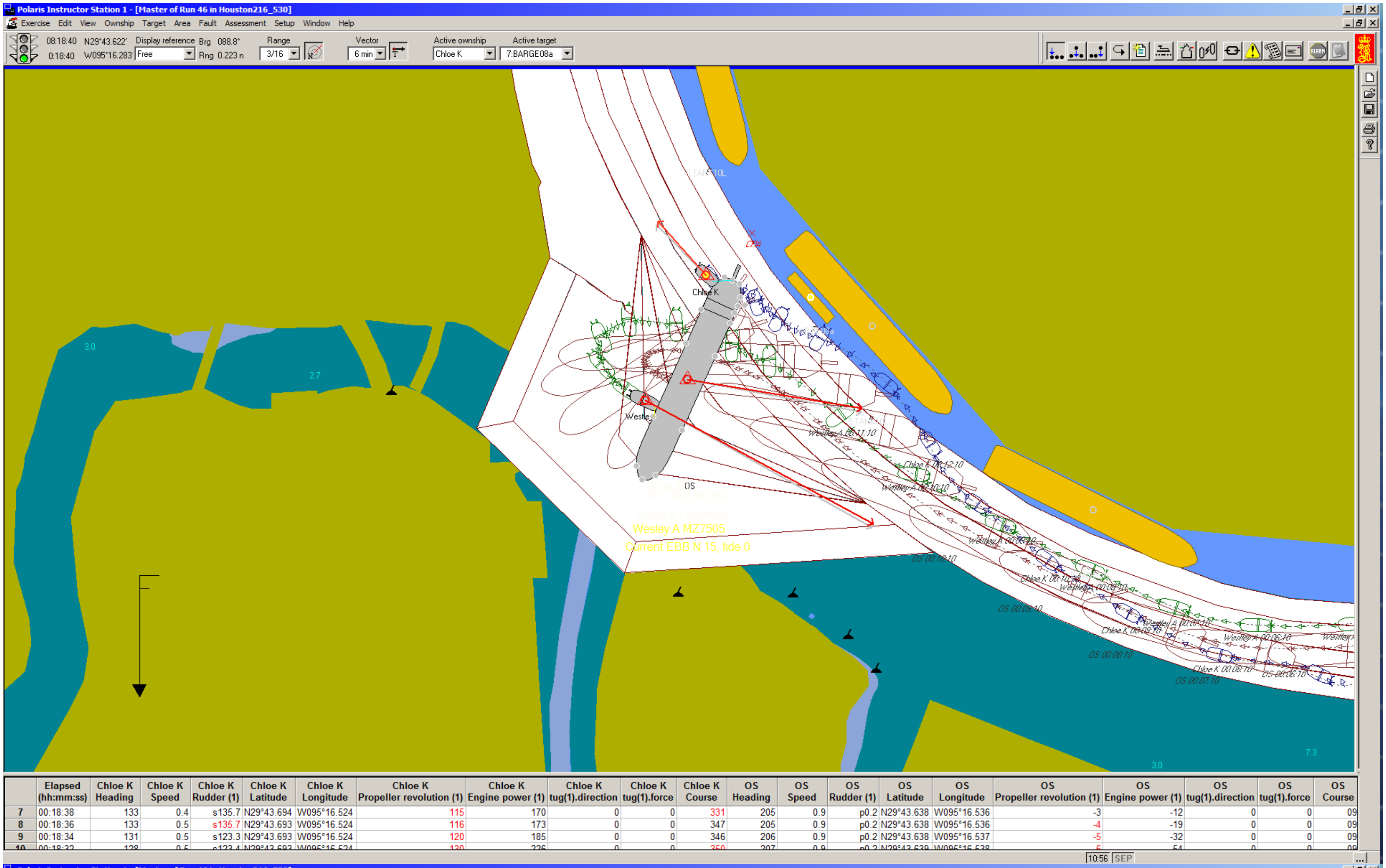
08:15:23 N29°43.604′ Display reference Brg 116.8°
0:15:23 W095°16.510′ Free Rng 0.030 n
Range 3/16
Vector 6 min
Active ownship Chloe K
Active target 7:BARGE08a

	Elapsed (hh:mm:ss)	Chloe K Heading	Chloe K Speed	Chloe K Rudder (1)	Chloe K Latitude	Chloe K Longitude	Chloe K Propeller revolution (1)	Chloe K Engine power (1)	Chloe K tug(1).direction	Chloe K tug(1).force	Chloe K Course	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course
7	00:15:22	210	1.5	s149.8	N29°43.674	W095°16.482	153	352	0	0	347	265	0.9	p0.2	N29°43.654	W095°16.551	-61	1668	0	0	26
8	00:15:20	207	1.8	s149.8	N29°43.673	W095°16.482	195	682	0	0	005	265	0.9	p0.2	N29°43.654	W095°16.551	-62	1381	0	0	26
9	00:15:18	201	1.9	s149.9	N29°43.672	W095°16.482	242	1485	0	0	001	265	1.0	p0.2	N29°43.654	W095°16.550	-64	1048	0	0	26

This is an own ship track history shape

10:52 SEP

June 26, 2019



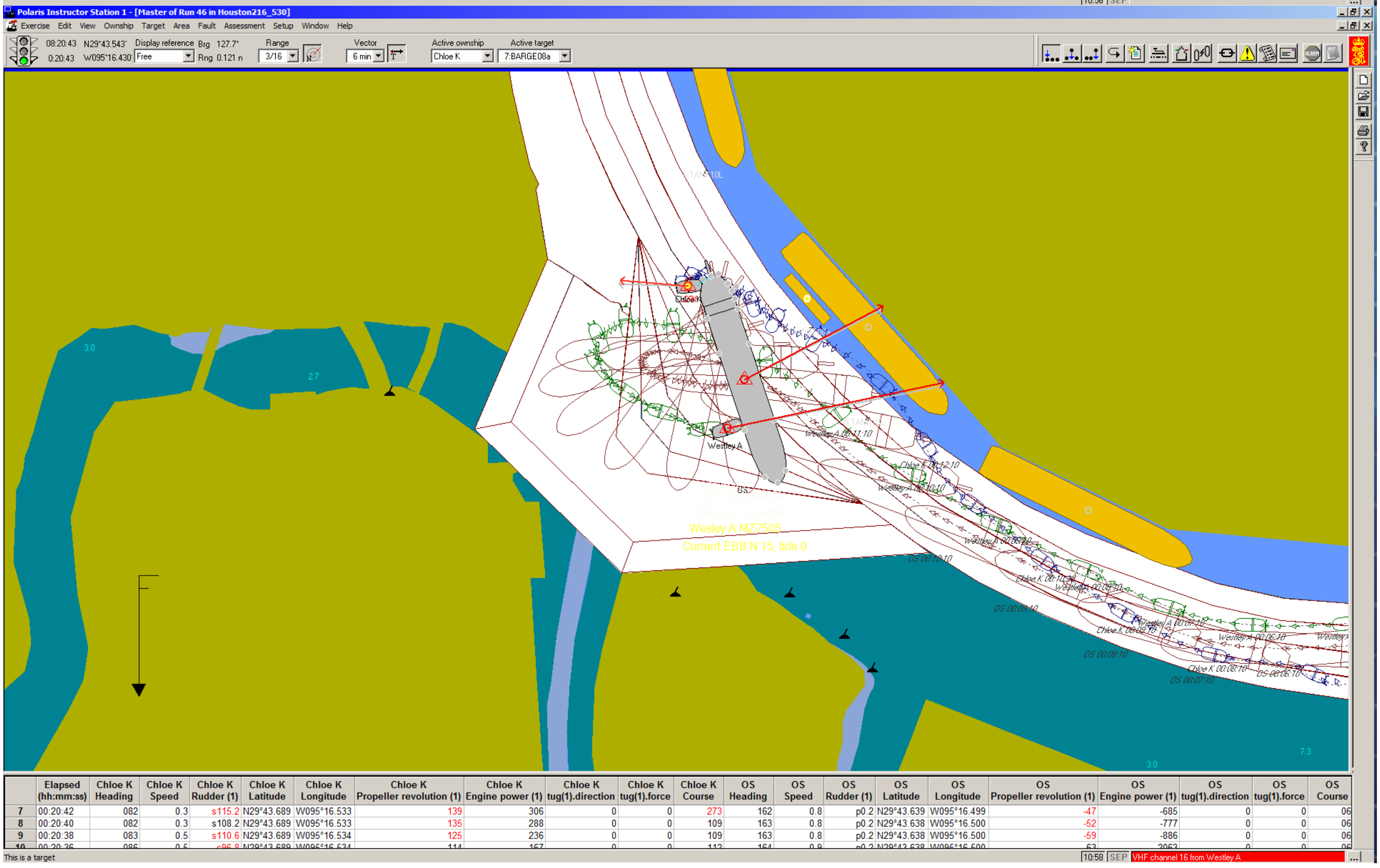
Polaris Instructor Station 1 - [Master of Run 46 in Houston216_530]

08:18:40 N29°43.622′ Display reference Brg 088.8° Range Vector Active ownship Active target
0:18:40 W095°16.283′ Free Rng 0.223 n 3/16 6 min Chloe K 7:BARGE08a

Wesley A MZ7505
Current EBB N 15, tide 0

	Elapsed (hh:mm:ss)	Chloe K Heading	Chloe K Speed	Chloe K Rudder (1)	Chloe K Latitude	Chloe K Longitude	Chloe K Propeller revolution (1)	Chloe K Engine power (1)	Chloe K tug(1).direction	Chloe K tug(1).force	Chloe K Course	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course
7	00:18:38	133	0.4	s135.7	N29°43.694	W095°16.524	115	170	0	0	331	205	0.9	p0.2	N29°43.638	W095°16.536	-3	-12	0	0	09
8	00:18:36	133	0.5	s135.7	N29°43.693	W095°16.524	116	173	0	0	347	205	0.9	p0.2	N29°43.638	W095°16.536	-4	-19	0	0	09
9	00:18:34	131	0.5	s123.3	N29°43.693	W095°16.524	120	185	0	0	346	206	0.9	p0.2	N29°43.638	W095°16.537	-5	-32	0	0	09

10:56 SEP



Polaris Instructor Station 1 - [Master of Run 46 in Houston216_530]

08:20:43 N29°43.543′ Display reference Brg 127.7° Range Vector Active ownship Active target
0:20:43 W095°16.430′ Free Rng 0.121 n 3/16 6 min Chloe K 7:BARGE08a

Wesley A MZ7505
Current EBB N 15, tide 0

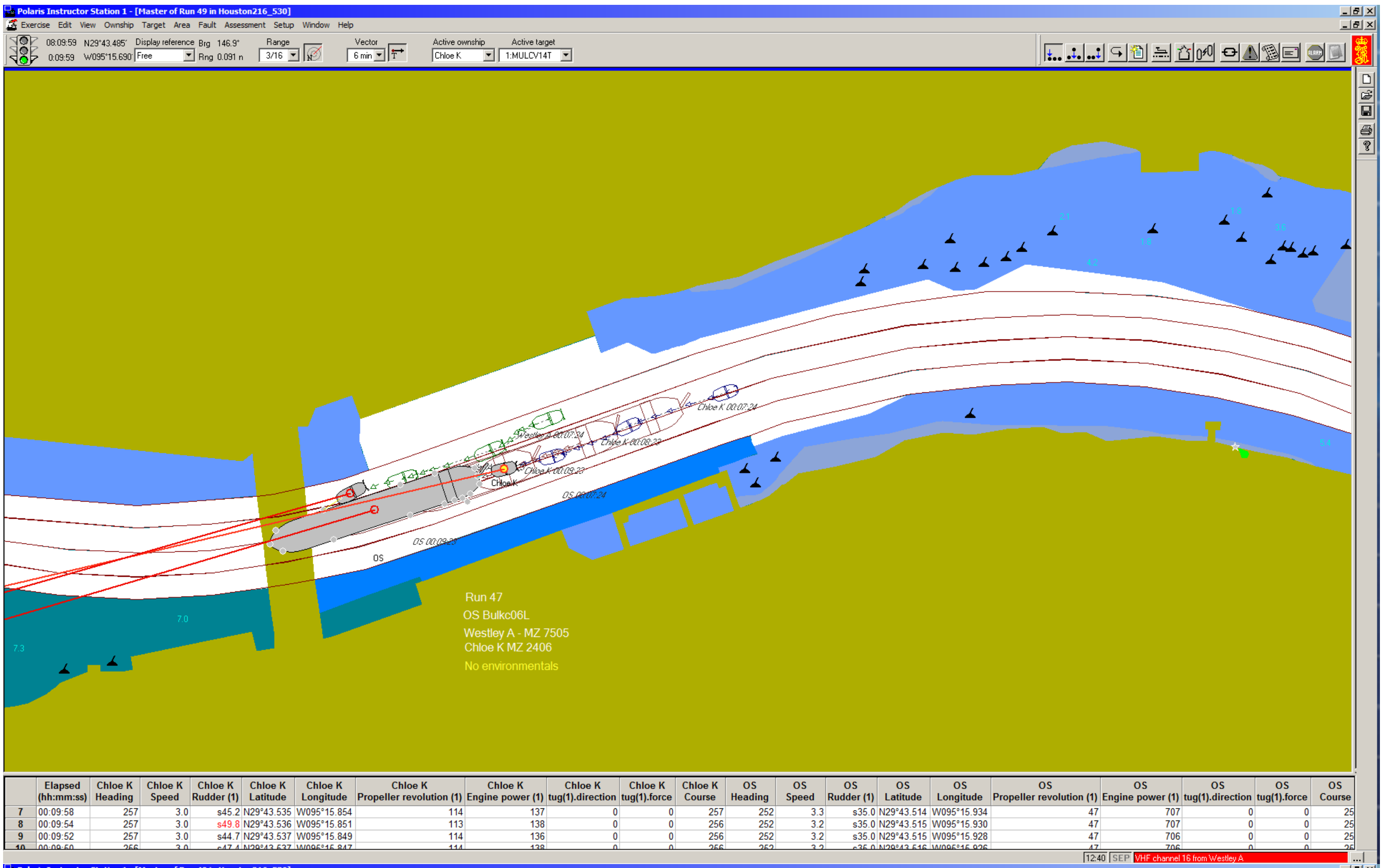
	Elapsed (hh:mm:ss)	Chloe K Heading	Chloe K Speed	Chloe K Rudder (1)	Chloe K Latitude	Chloe K Longitude	Chloe K Propeller revolution (1)	Chloe K Engine power (1)	Chloe K tug(1).direction	Chloe K tug(1).force	Chloe K Course	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course
7	00:20:42	082	0.3	s115.2	N29°43.689	W095°16.533	139	306	0	0	273	162	0.8	p0.2	N29°43.639	W095°16.499	-47	-685	0	0	06
8	00:20:40	082	0.3	s108.2	N29°43.689	W095°16.533	135	288	0	0	109	163	0.8	p0.2	N29°43.638	W095°16.500	-52	-777	0	0	06
9	00:20:38	083	0.5	s110.6	N29°43.689	W095°16.534	125	236	0	0	109	163	0.8	p0.2	N29°43.638	W095°16.500	-59	-886	0	0	06

This is a target

10:58 SEP VHF channel 16 from Westley A

- Page 455

Run47

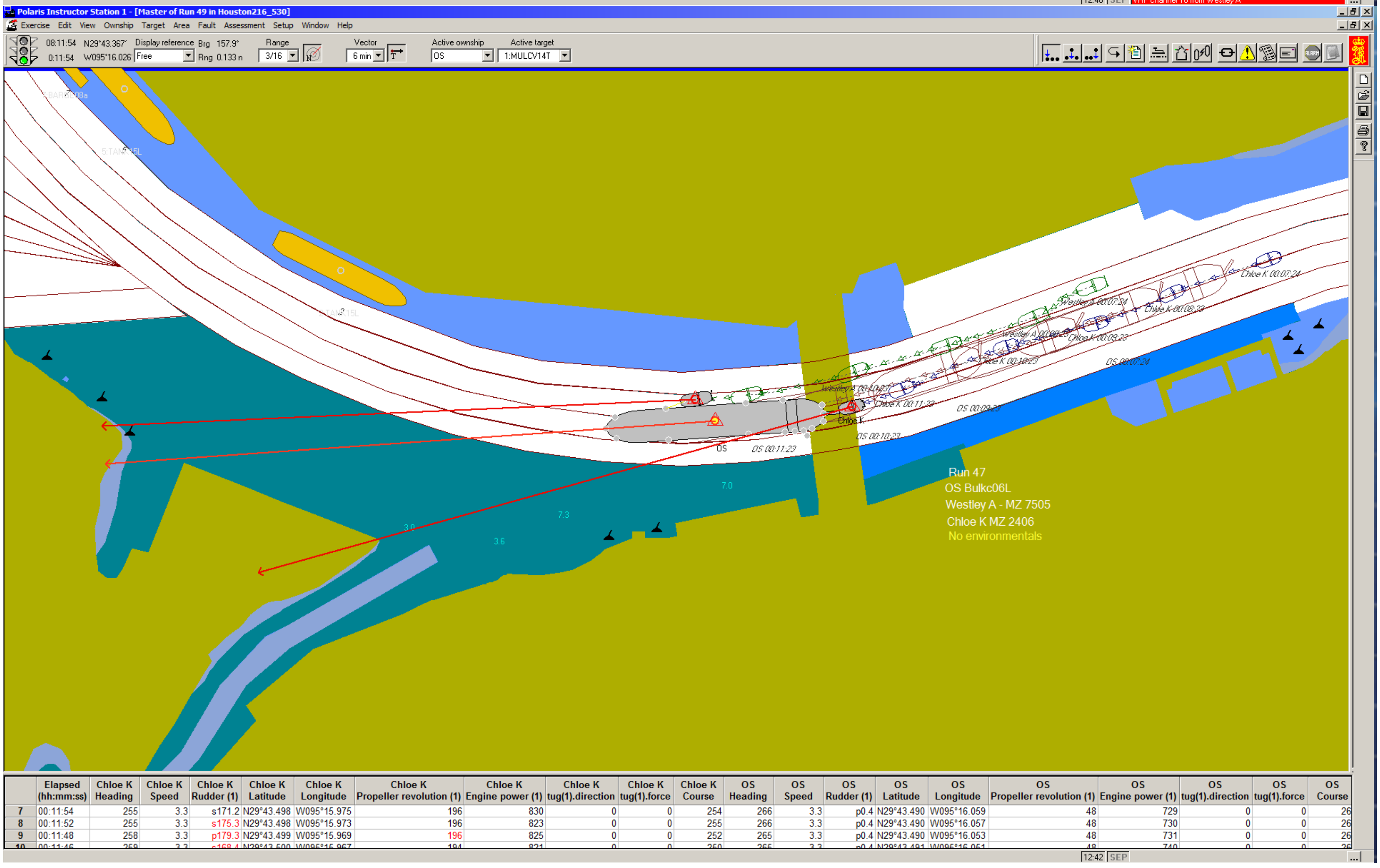


Polaris Instructor Station 1 - [Master of Run 49 in Houston216_530]

Run 47
OS Bulkc06L
Westley A - MZ 7505
Chloe K MZ 2406
No environmentals

	Elapsed (hh:mm:ss)	Chloe K Heading	Chloe K Speed	Chloe K Rudder (1)	Chloe K Latitude	Chloe K Longitude	Chloe K Propeller revolution (1)	Chloe K Engine power (1)	Chloe K tug(1).direction	Chloe K tug(1).force	Chloe K Course	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course
7	00:09:58	257	3.0	s45.2	N29°43.535	W095°15.854	114	137	0	0	257	252	3.3	s35.0	N29°43.514	W095°15.934	47	707	0	0	25
8	00:09:54	257	3.0	s49.8	N29°43.536	W095°15.851	113	138	0	0	256	252	3.2	s35.0	N29°43.515	W095°15.930	47	707	0	0	25
9	00:09:52	257	3.0	s44.7	N29°43.537	W095°15.849	114	136	0	0	256	252	3.2	s35.0	N29°43.515	W095°15.928	47	706	0	0	25

12:40 SEP VHF channel 16 from Westley A

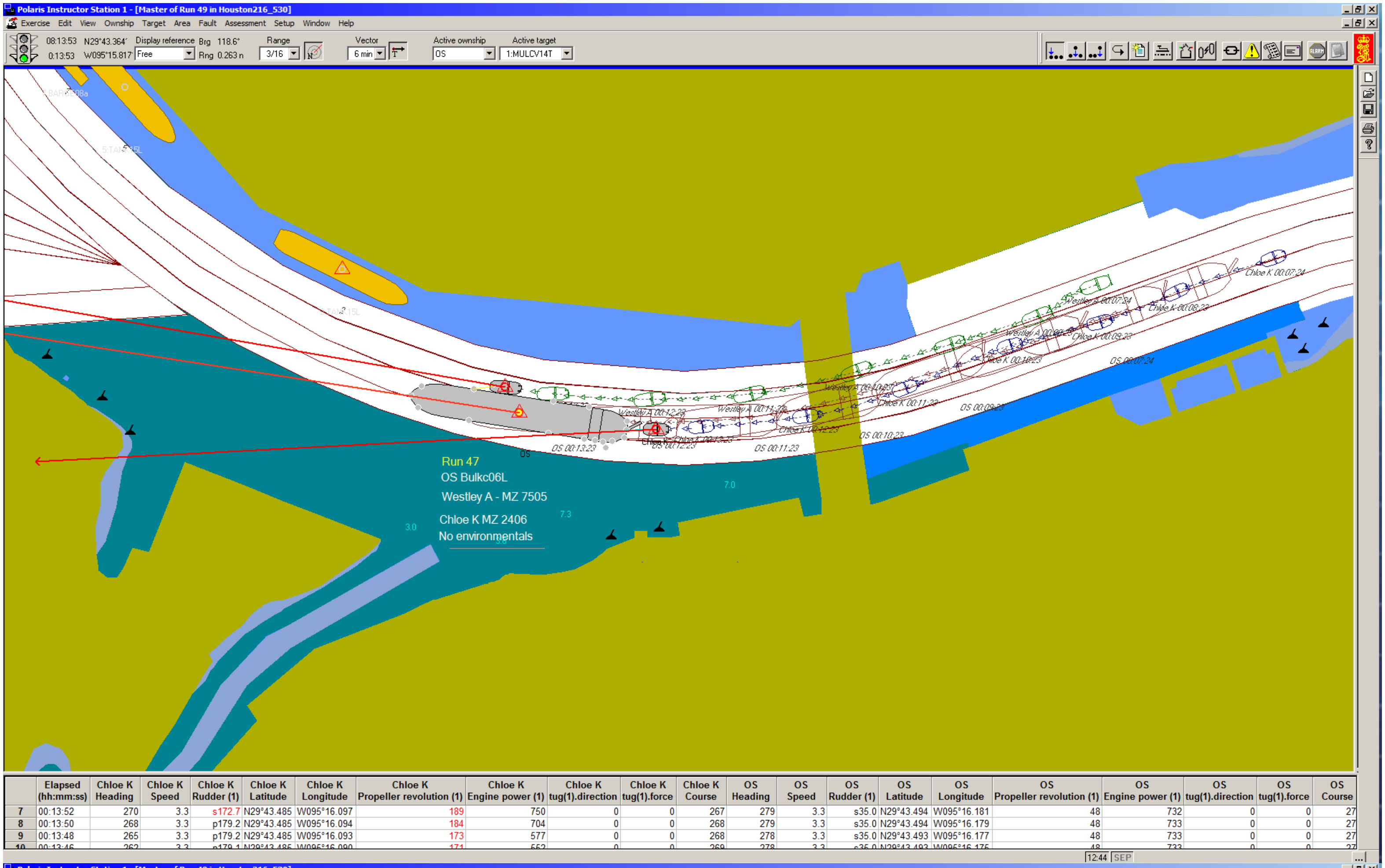


Polaris Instructor Station 1 - [Master of Run 49 in Houston216_530]

Run 47
OS Bulkc06L
Westley A - MZ 7505
Chloe K MZ 2406
No environmentals

	Elapsed (hh:mm:ss)	Chloe K Heading	Chloe K Speed	Chloe K Rudder (1)	Chloe K Latitude	Chloe K Longitude	Chloe K Propeller revolution (1)	Chloe K Engine power (1)	Chloe K tug(1).direction	Chloe K tug(1).force	Chloe K Course	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course
7	00:11:54	255	3.3	s171.2	N29°43.498	W095°15.975	196	830	0	0	254	266	3.3	p0.4	N29°43.490	W095°16.059	48	729	0	0	26
8	00:11:52	255	3.3	s175.3	N29°43.498	W095°15.973	196	823	0	0	255	266	3.3	p0.4	N29°43.490	W095°16.057	48	730	0	0	26
9	00:11:48	258	3.3	p179.3	N29°43.499	W095°15.969	196	825	0	0	252	265	3.3	p0.4	N29°43.490	W095°16.053	48	731	0	0	26

12:42 SEP

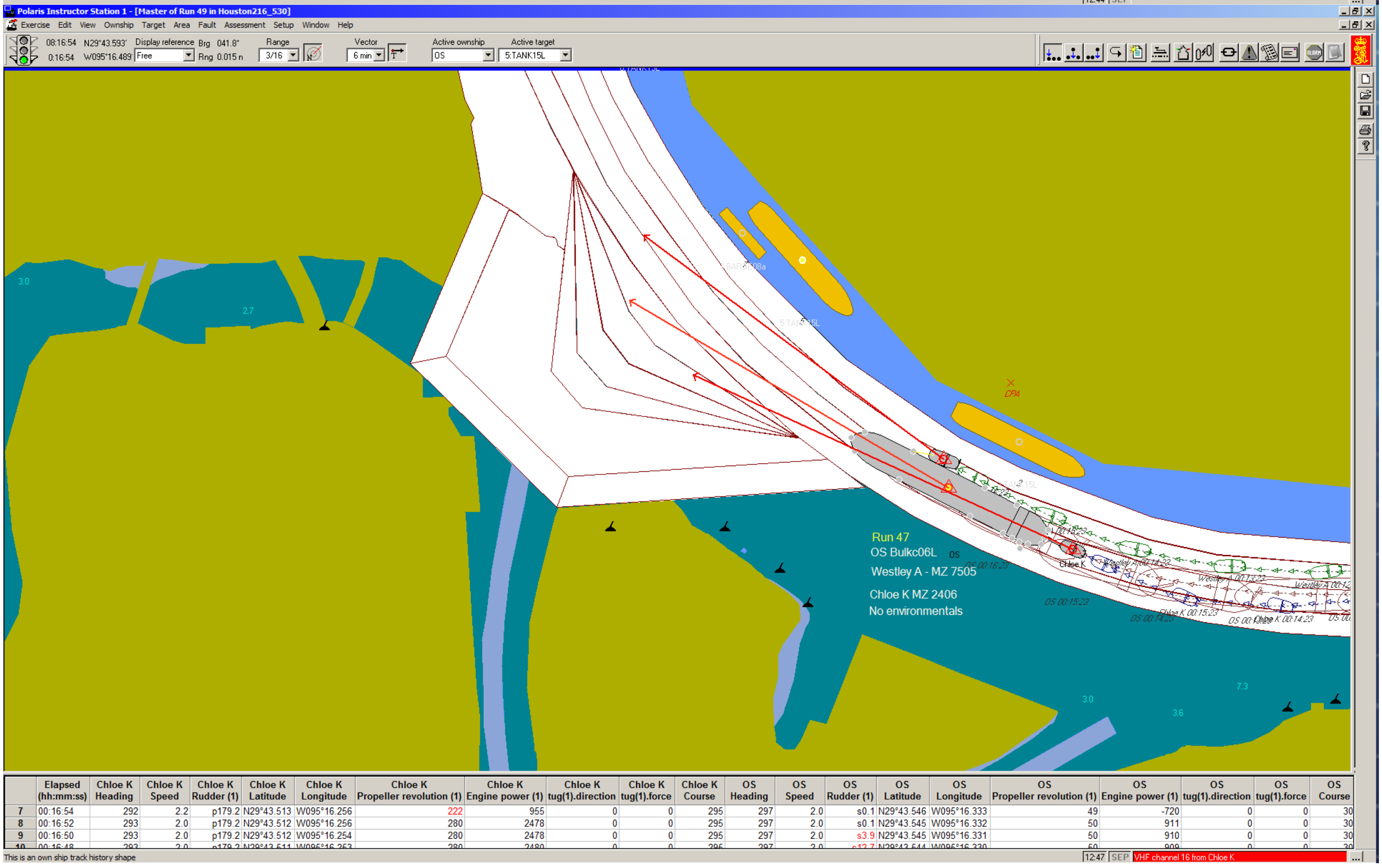


Polaris Instructor Station 1 - [Master of Run 49 in Houston216_530]

08:13:53 N29°43.364' Display reference: Free Brg 118.6°
0:13:53 W095°15.817' Rng 0.263 n
Range: 3/16
Vector: 6 min
Active ownship: OS
Active target: 1:MULCV14T

	Elapsed (hh:mm:ss)	Chloe K Heading	Chloe K Speed	Chloe K Rudder (1)	Chloe K Latitude	Chloe K Longitude	Chloe K Propeller revolution (1)	Chloe K Engine power (1)	Chloe K tug(1).direction	Chloe K tug(1).force	Chloe K Course	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course
7	00:13:52	270	3.3	s172.7	N29°43.485	W095°16.097	189	750	0	0	267	279	3.3	s35.0	N29°43.494	W095°16.181	48	732	0	0	27
8	00:13:50	268	3.3	p179.2	N29°43.485	W095°16.094	184	704	0	0	268	279	3.3	s35.0	N29°43.494	W095°16.179	48	733	0	0	27
9	00:13:48	265	3.3	p179.2	N29°43.485	W095°16.093	173	577	0	0	268	278	3.3	s35.0	N29°43.493	W095°16.177	48	733	0	0	27

12:44 SEP



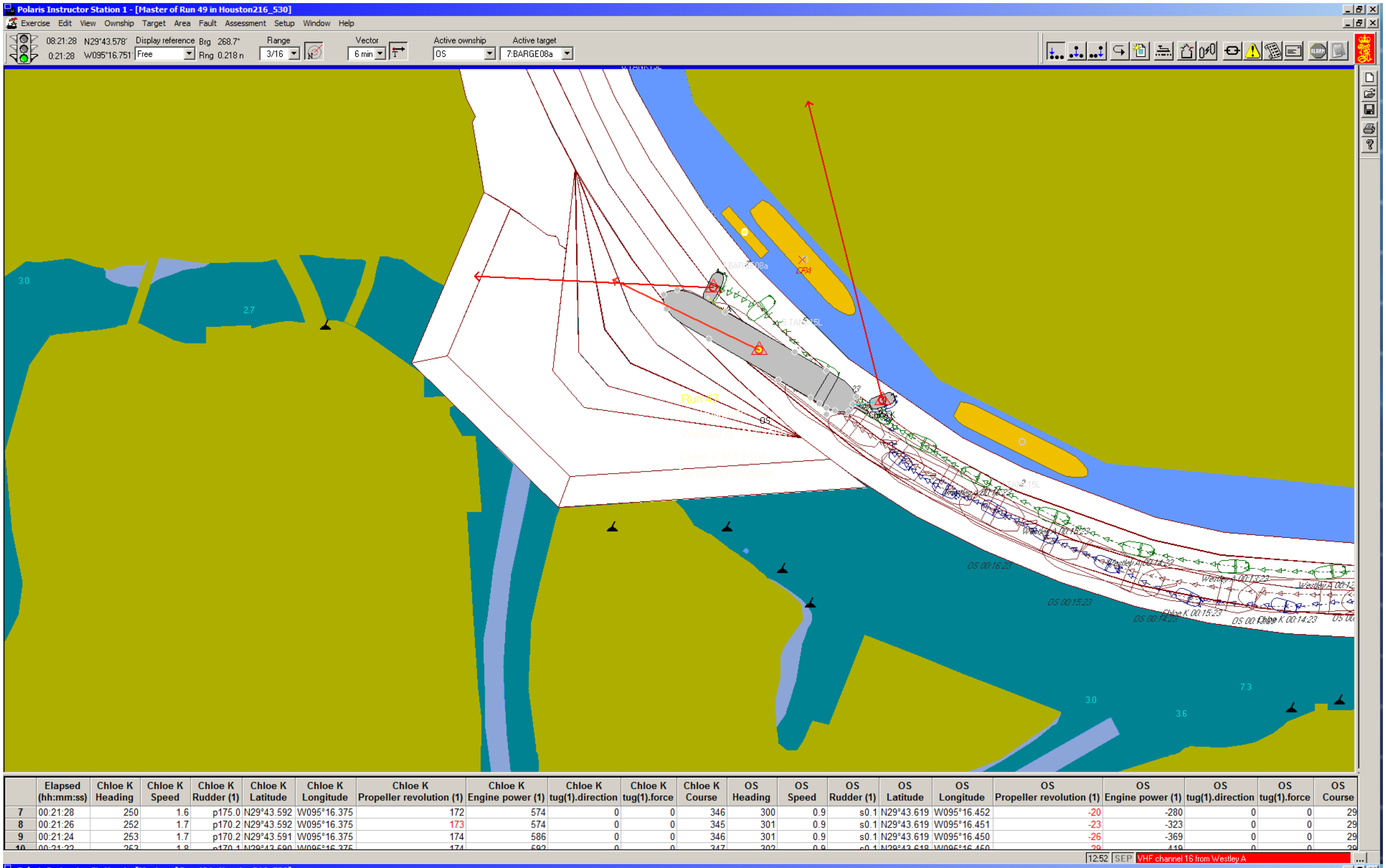
Polaris Instructor Station 1 - [Master of Run 49 in Houston216_530]

08:16:54 N29°43.593' Display reference: Free Brg 041.8°
0:16:54 W095°16.489' Rng 0.015 n
Range: 3/16
Vector: 6 min
Active ownship: OS
Active target: 5:TANK15L

	Elapsed (hh:mm:ss)	Chloe K Heading	Chloe K Speed	Chloe K Rudder (1)	Chloe K Latitude	Chloe K Longitude	Chloe K Propeller revolution (1)	Chloe K Engine power (1)	Chloe K tug(1).direction	Chloe K tug(1).force	Chloe K Course	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course
7	00:16:54	292	2.2	p179.2	N29°43.513	W095°16.256	222	955	0	0	295	297	2.0	s0.1	N29°43.546	W095°16.333	49	-720	0	0	30
8	00:16:52	293	2.0	p179.2	N29°43.512	W095°16.256	280	2478	0	0	295	297	2.0	s0.1	N29°43.545	W095°16.332	50	911	0	0	30
9	00:16:50	293	2.0	p179.2	N29°43.512	W095°16.254	280	2478	0	0	295	297	2.0	s3.9	N29°43.545	W095°16.331	50	910	0	0	30

This is an own ship track history shape

12:47 SEP VHF channel 16 from Chloe K

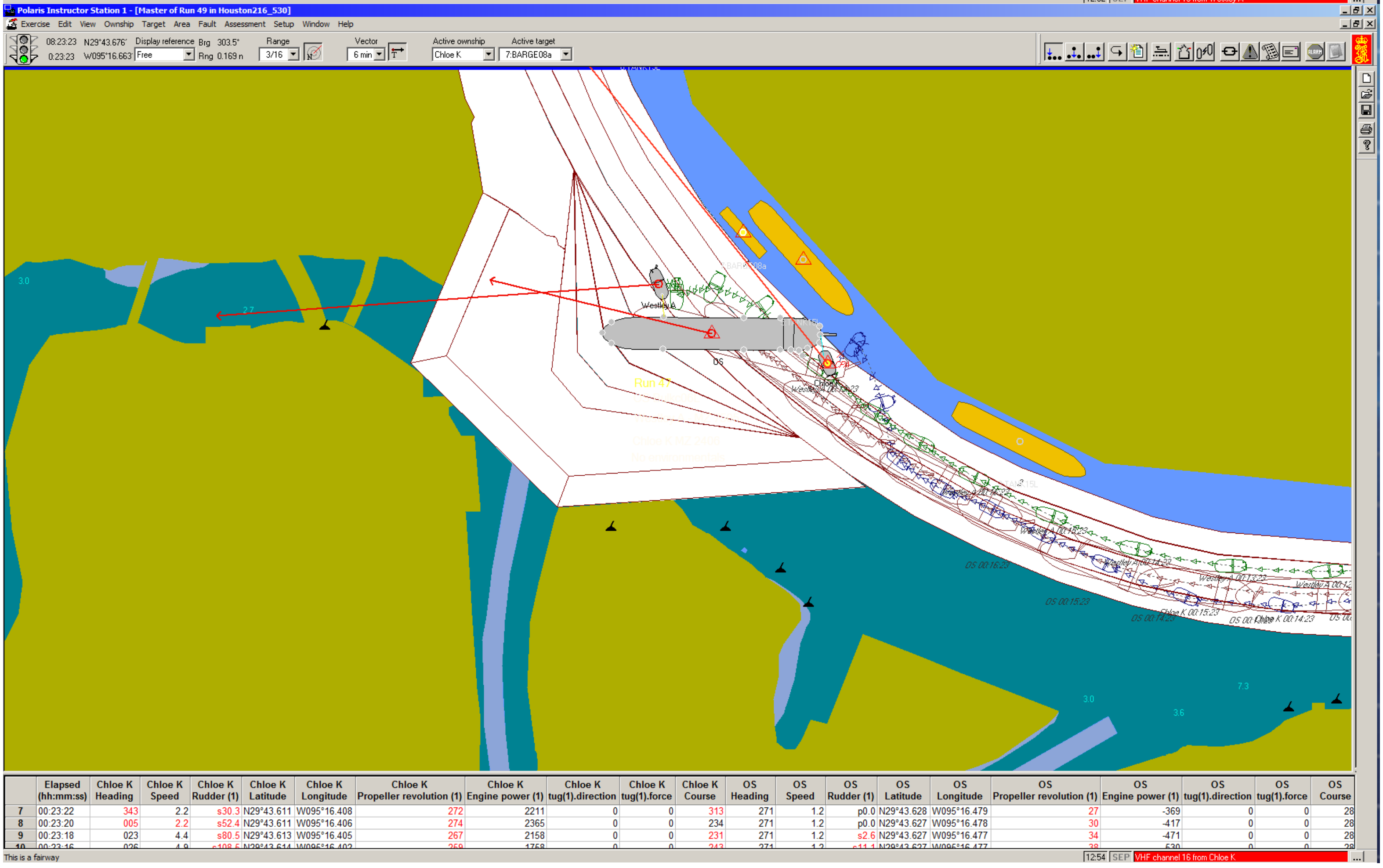


Polaris Instructor Station 1 - [Master of Run 49 in Houston216_530]

08:21:28 N29°43.578' Display reference: Free Brg 268.7° Range 3/16 Vector 6 min Active ownship: OS Active target: 7:BARGE08a
0:21:28 W095°16.751' Rng 0.218 n

	Elapsed (hh:mm:ss)	Chloe K Heading	Chloe K Speed	Chloe K Rudder (1)	Chloe K Latitude	Chloe K Longitude	Chloe K Propeller revolution (1)	Chloe K Engine power (1)	Chloe K tug(1).direction	Chloe K tug(1).force	Chloe K Course	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course
7	00:21:28	250	1.6	p175.0	N29°43.592	W095°16.375	172	574	0	0	346	300	0.9	s0.1	N29°43.619	W095°16.452	-20	-280	0	0	29
8	00:21:26	252	1.7	p170.2	N29°43.592	W095°16.375	173	574	0	0	345	301	0.9	s0.1	N29°43.619	W095°16.451	-23	-323	0	0	29
9	00:21:24	253	1.7	p170.2	N29°43.591	W095°16.375	174	586	0	0	346	301	0.9	s0.1	N29°43.619	W095°16.450	-26	-369	0	0	29

12:52 SEP VHF channel 16 from Westley A



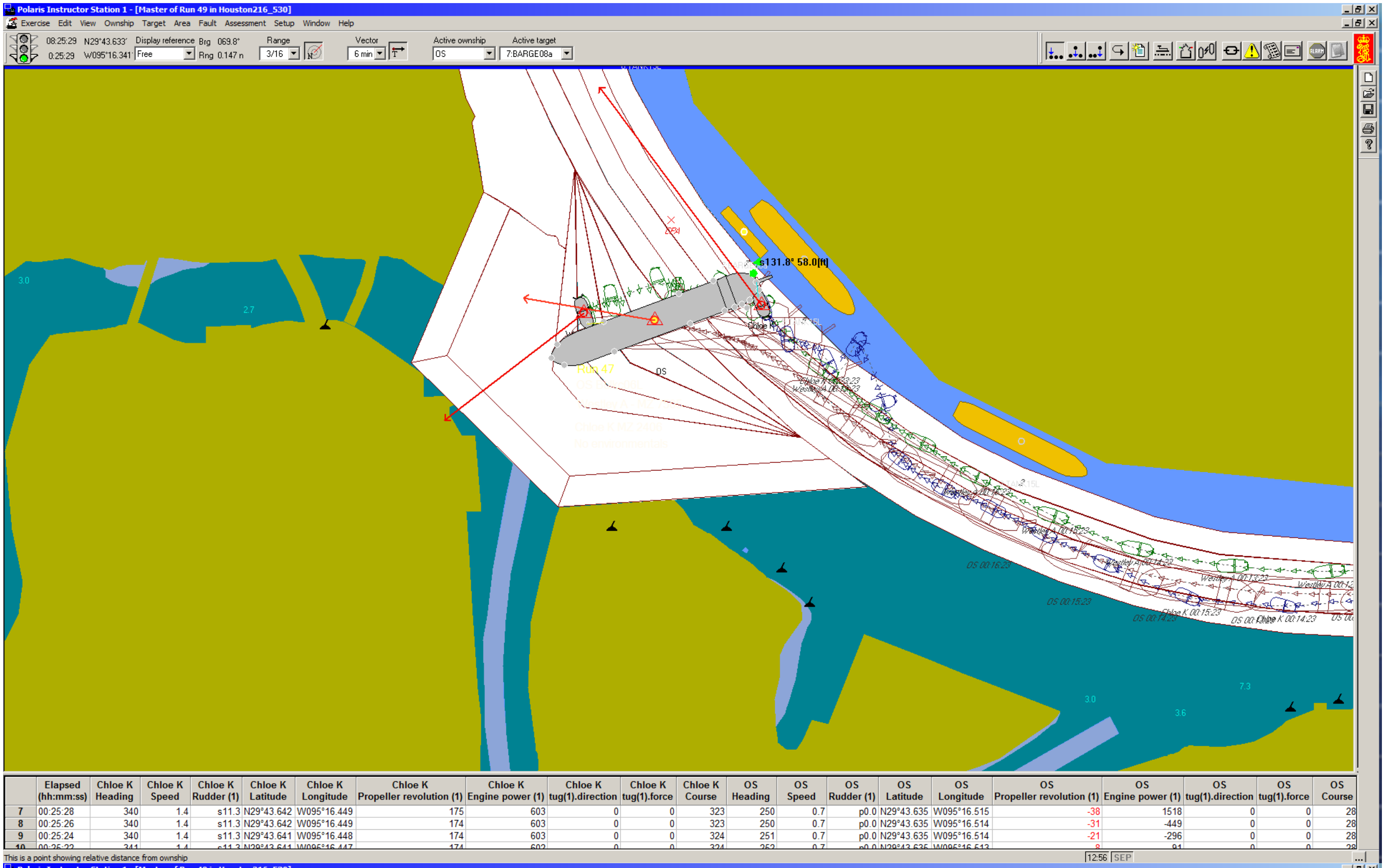
Polaris Instructor Station 1 - [Master of Run 49 in Houston216_530]

08:23:23 N29°43.676' Display reference: Free Brg 303.5° Range 3/16 Vector 6 min Active ownship: Chloe K Active target: 7:BARGE08a
0:23:23 W095°16.663' Rng 0.169 n

	Elapsed (hh:mm:ss)	Chloe K Heading	Chloe K Speed	Chloe K Rudder (1)	Chloe K Latitude	Chloe K Longitude	Chloe K Propeller revolution (1)	Chloe K Engine power (1)	Chloe K tug(1).direction	Chloe K tug(1).force	Chloe K Course	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course
7	00:23:22	343	2.2	s30.3	N29°43.611	W095°16.408	272	2211	0	0	313	271	1.2	p0.0	N29°43.628	W095°16.479	27	-369	0	0	28
8	00:23:20	005	2.2	s52.4	N29°43.611	W095°16.406	274	2365	0	0	234	271	1.2	p0.0	N29°43.627	W095°16.478	30	-417	0	0	28
9	00:23:18	023	4.4	s80.5	N29°43.613	W095°16.405	267	2158	0	0	231	271	1.2	s2.6	N29°43.627	W095°16.477	34	-471	0	0	28

This is a fairway

12:54 SEP VHF channel 16 from Chloe K



Polaris Instructor Station 1 - [Master of Run 49 in Houston216_530]

08:25:29 N29°43.633′ 0:25:29 W095°16.341′

Display reference: Free

Brg 069.8°

Rng 0.147 n

Range: 3/16

Vector: 6 min

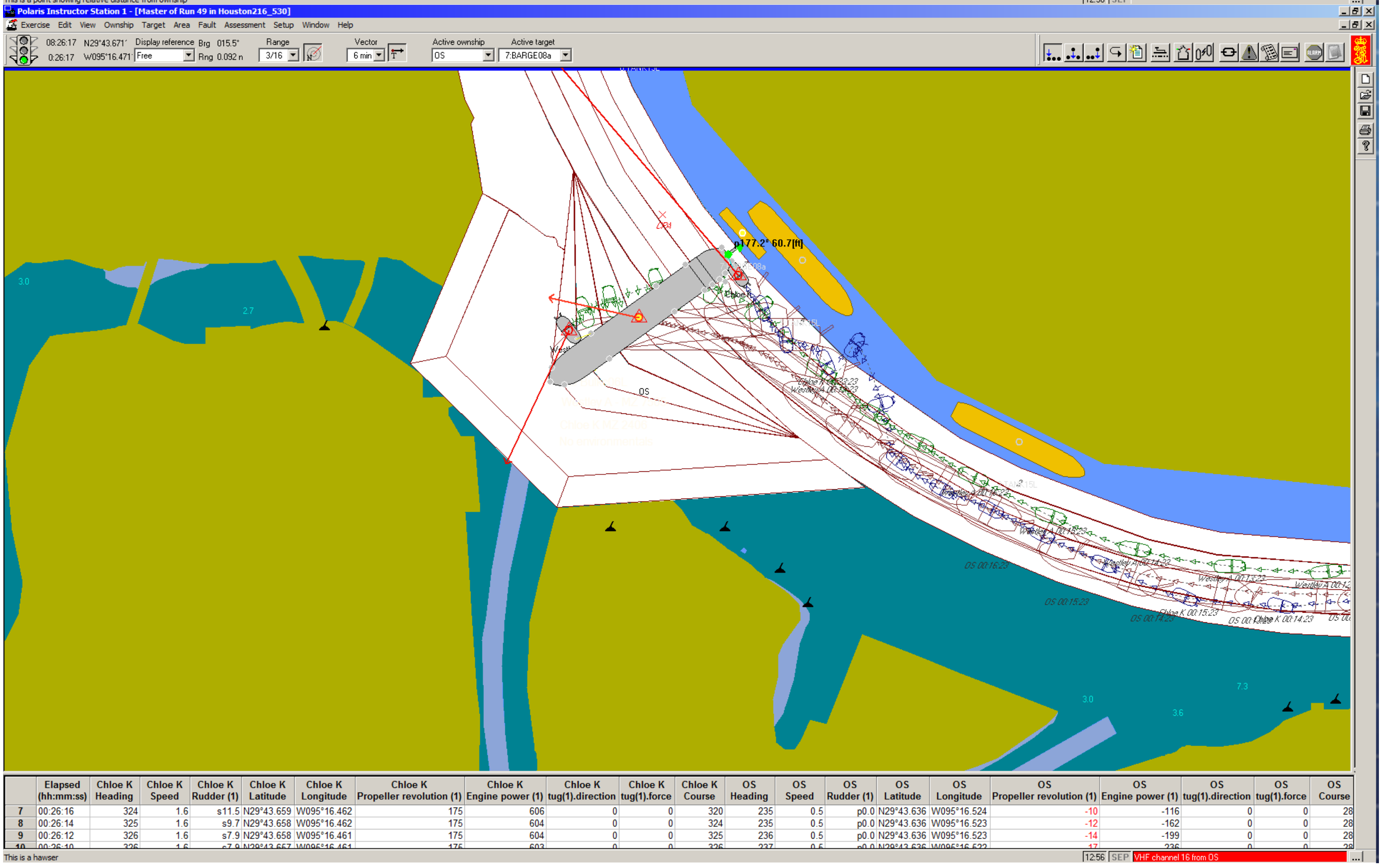
Active ownship: OS

Active target: 7:BARGE08a

	Elapsed (hh:mm:ss)	Chloe K Heading	Chloe K Speed	Chloe K Rudder (1)	Chloe K Latitude	Chloe K Longitude	Chloe K Propeller revolution (1)	Chloe K Engine power (1)	Chloe K tug(1).direction	Chloe K tug(1).force	Chloe K Course	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course
7	00:25:28	340	1.4	s11.3	N29°43.642	W095°16.449	175	603	0	0	323	250	0.7	p0.0	N29°43.635	W095°16.515	-38	1518	0	0	28
8	00:25:26	340	1.4	s11.3	N29°43.642	W095°16.449	174	603	0	0	323	250	0.7	p0.0	N29°43.635	W095°16.514	-31	-449	0	0	28
9	00:25:24	340	1.4	s11.3	N29°43.641	W095°16.448	174	603	0	0	324	251	0.7	p0.0	N29°43.635	W095°16.514	-21	-296	0	0	28

This is a point showing relative distance from ownship

12:56 SEP



Polaris Instructor Station 1 - [Master of Run 49 in Houston216_530]

08:26:17 N29°43.671′ 0:26:17 W095°16.471′

Display reference: Free

Brg 015.5°

Rng 0.092 n

Range: 3/16

Vector: 6 min

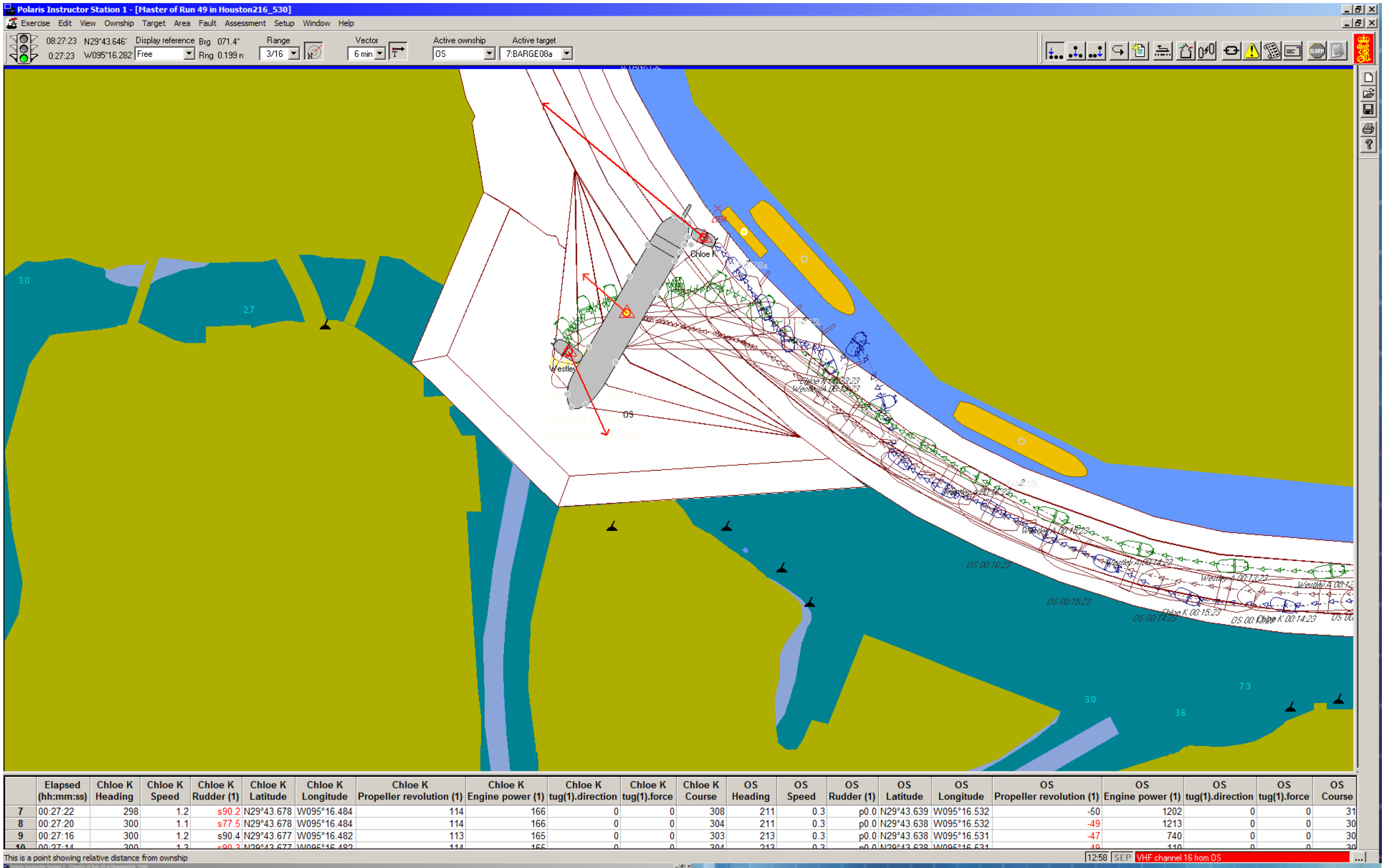
Active ownship: OS

Active target: 7:BARGE08a

	Elapsed (hh:mm:ss)	Chloe K Heading	Chloe K Speed	Chloe K Rudder (1)	Chloe K Latitude	Chloe K Longitude	Chloe K Propeller revolution (1)	Chloe K Engine power (1)	Chloe K tug(1).direction	Chloe K tug(1).force	Chloe K Course	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course
7	00:26:16	324	1.6	s11.5	N29°43.659	W095°16.462	175	606	0	0	320	235	0.5	p0.0	N29°43.636	W095°16.524	-10	-116	0	0	28
8	00:26:14	325	1.6	s9.7	N29°43.658	W095°16.462	175	604	0	0	324	235	0.5	p0.0	N29°43.636	W095°16.523	-12	-162	0	0	28
9	00:26:12	326	1.6	s7.9	N29°43.658	W095°16.461	175	604	0	0	325	236	0.5	p0.0	N29°43.636	W095°16.523	-14	-199	0	0	28

This is a hawser

12:56 SEP VHF channel 16 from OS



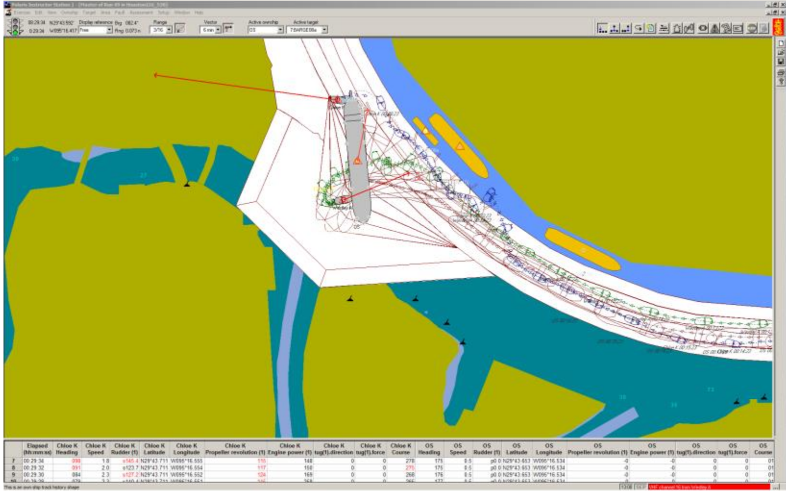
Polaris Instructor Station 1 - [Master of Run 49 in Houston216_530]

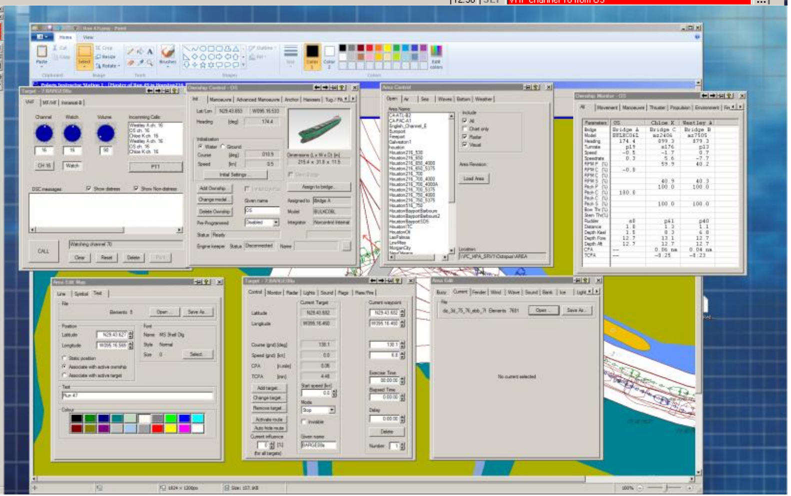
08:27:23 N29°43.646' Display reference Brg 071.4°
0:27:23 W095°16.282' Free Rng 0.199 n
Range 3/16
Vector 6 min
Active ownship OS
Active target 7:BARGE08a

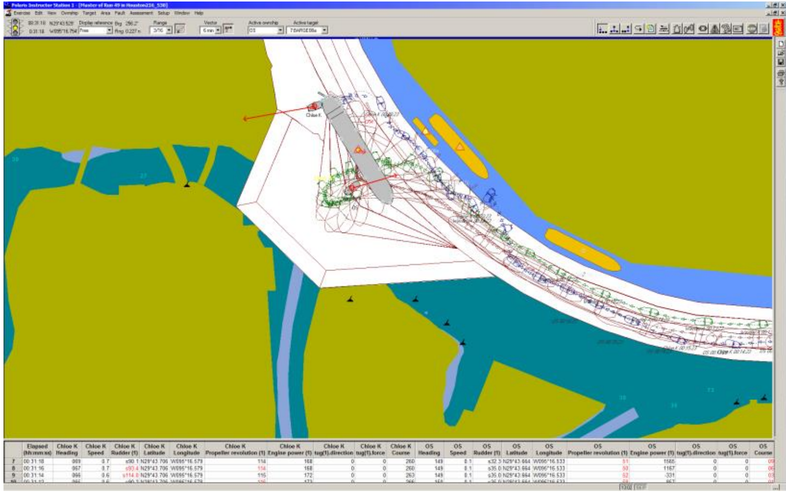
	Elapsed (hh:mm:ss)	Chloe K Heading	Chloe K Speed	Chloe K Rudder (1)	Chloe K Latitude	Chloe K Longitude	Chloe K Propeller revolution (1)	Chloe K Engine power (1)	Chloe K tug(1).direction	Chloe K tug(1).force	Chloe K Course	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Course
7	00:27:22	298	1.2	s90.2	N29°43.678	W095°16.484	114	166	0	0	308	211	0.3	p0.0	N29°43.639	W095°16.532	-50	1202	0	0	31
8	00:27:20	300	1.1	s77.5	N29°43.678	W095°16.484	114	166	0	0	304	211	0.3	p0.0	N29°43.638	W095°16.532	-49	1213	0	0	30
9	00:27:16	300	1.2	s90.4	N29°43.677	W095°16.482	113	165	0	0	303	213	0.3	p0.0	N29°43.638	W095°16.531	-47	740	0	0	30

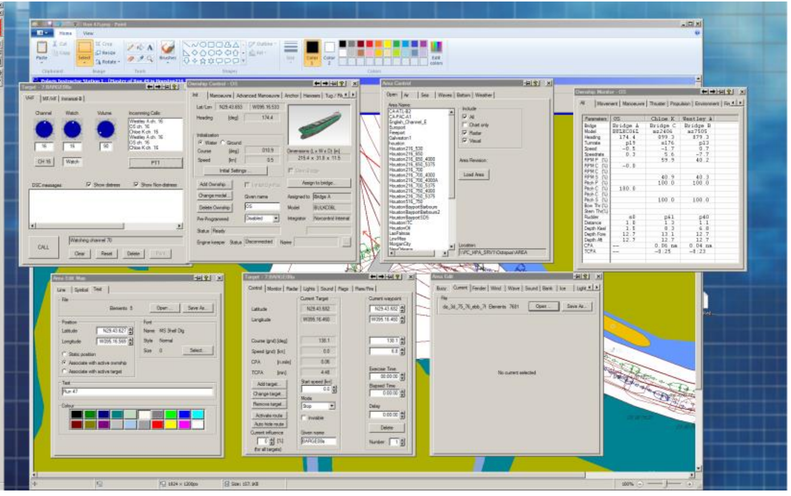
This is a point showing relative distance from ownship

12:58 SEP VHF channel 16 from OS



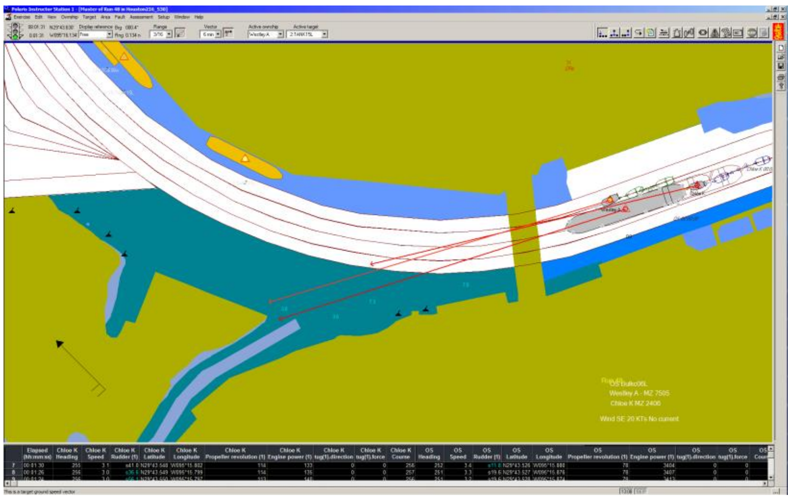


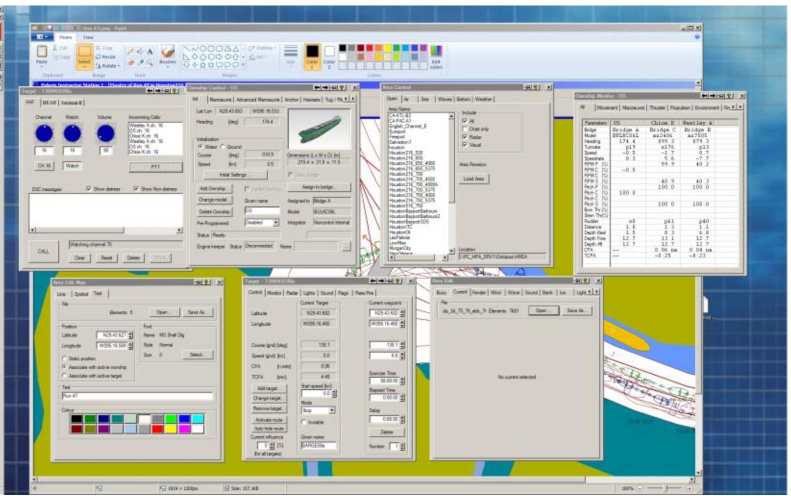


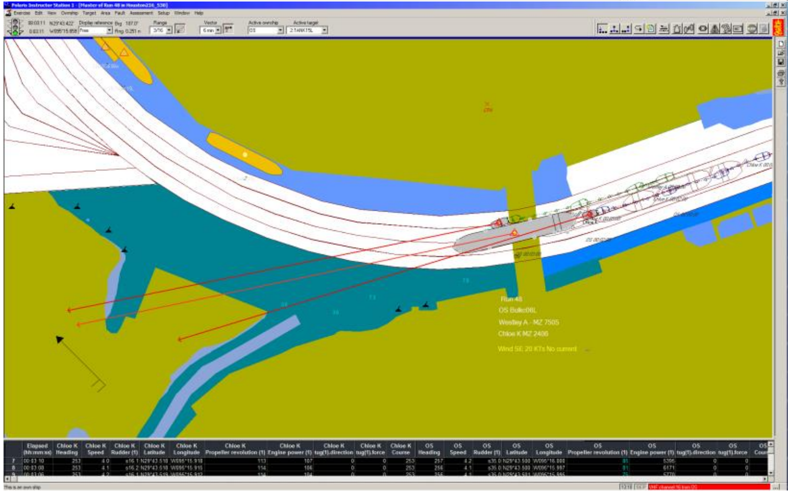


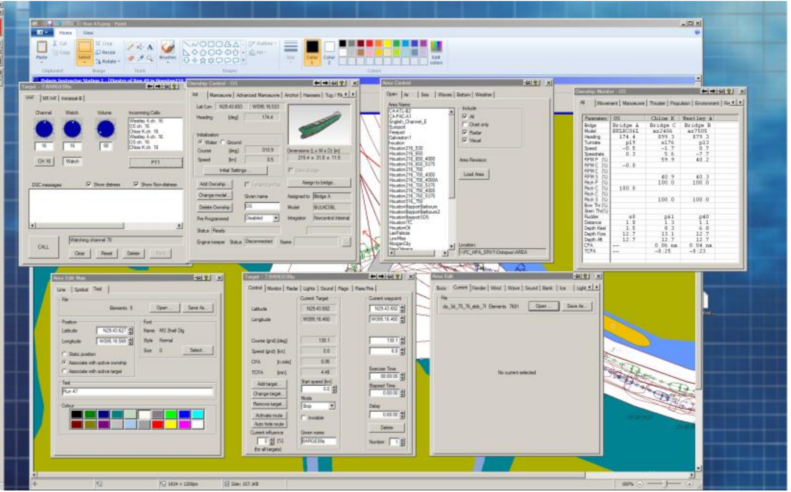
June 26, 2019

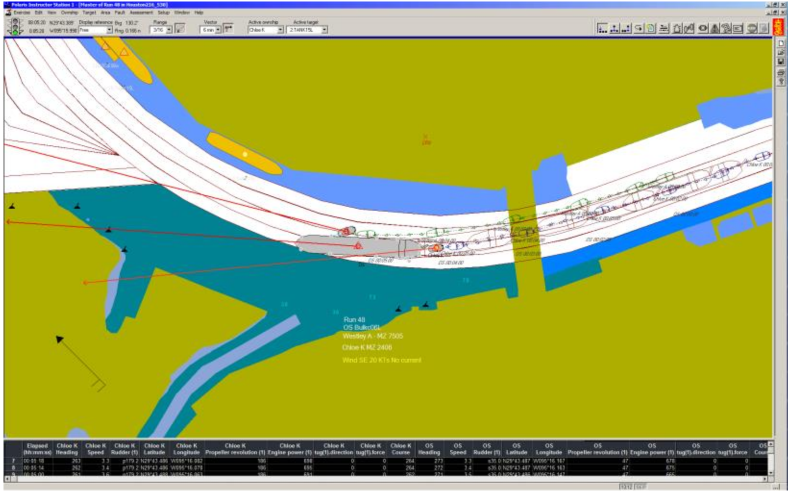
Run 48

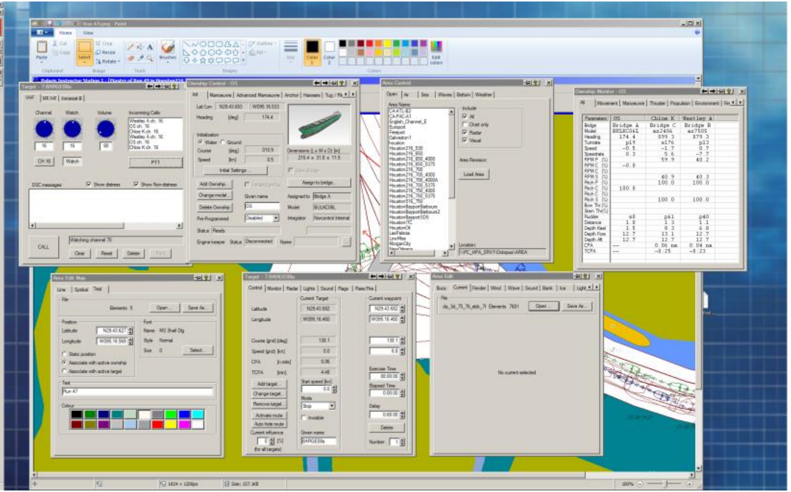


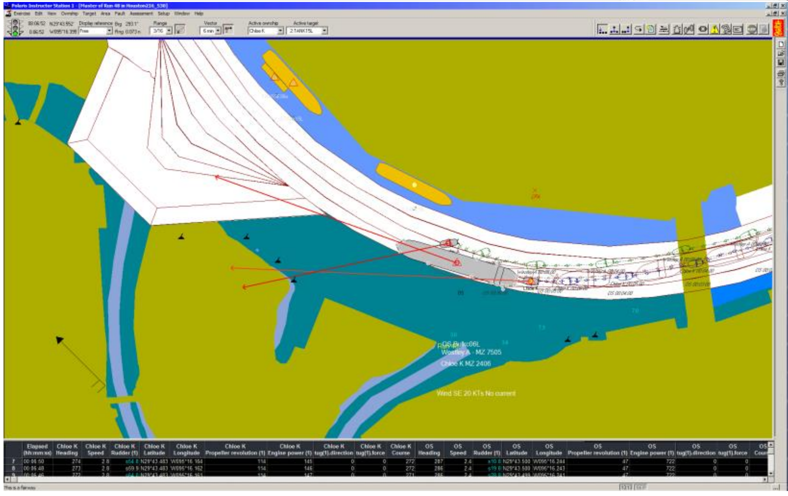


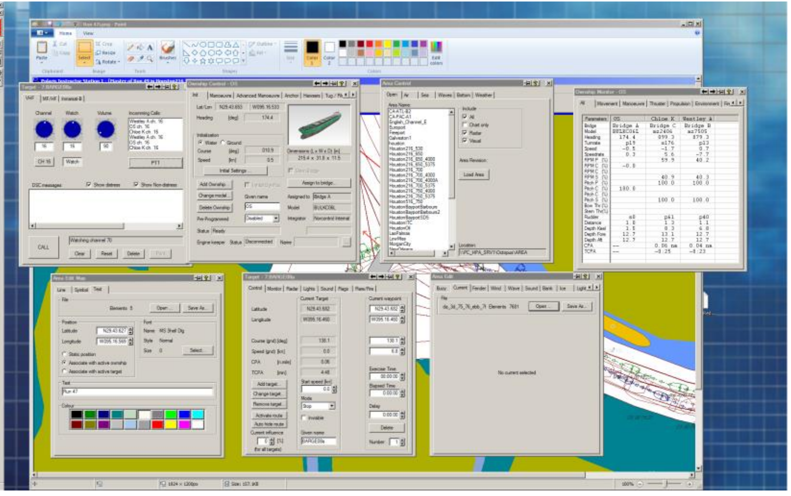


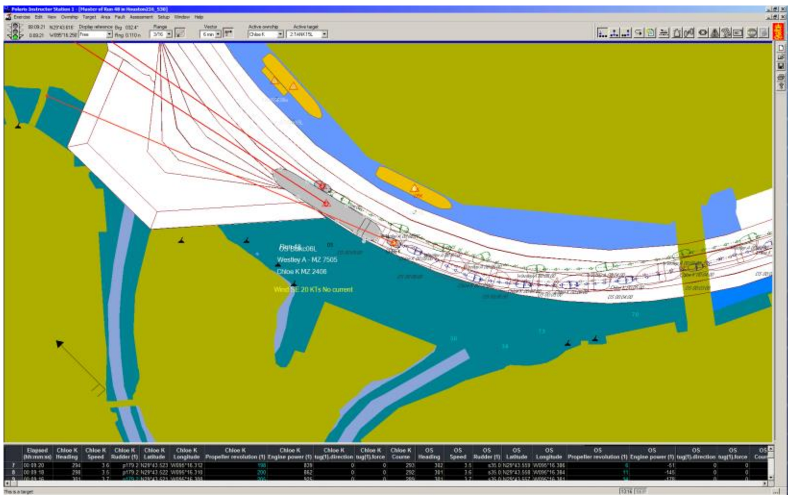


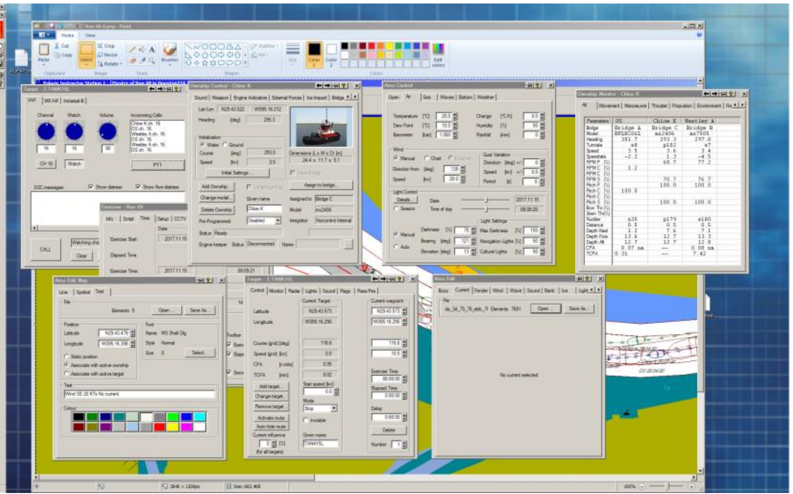


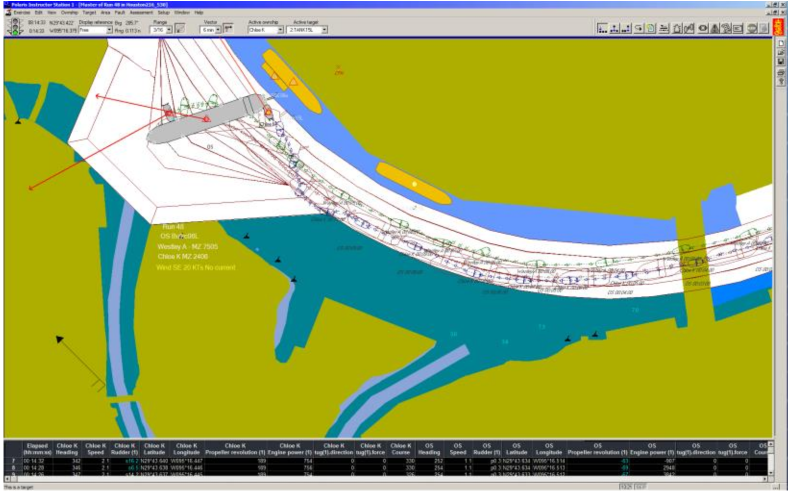


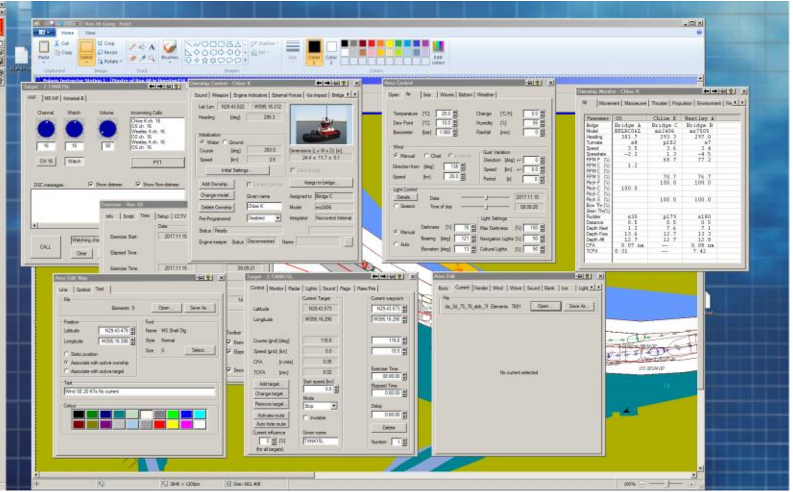


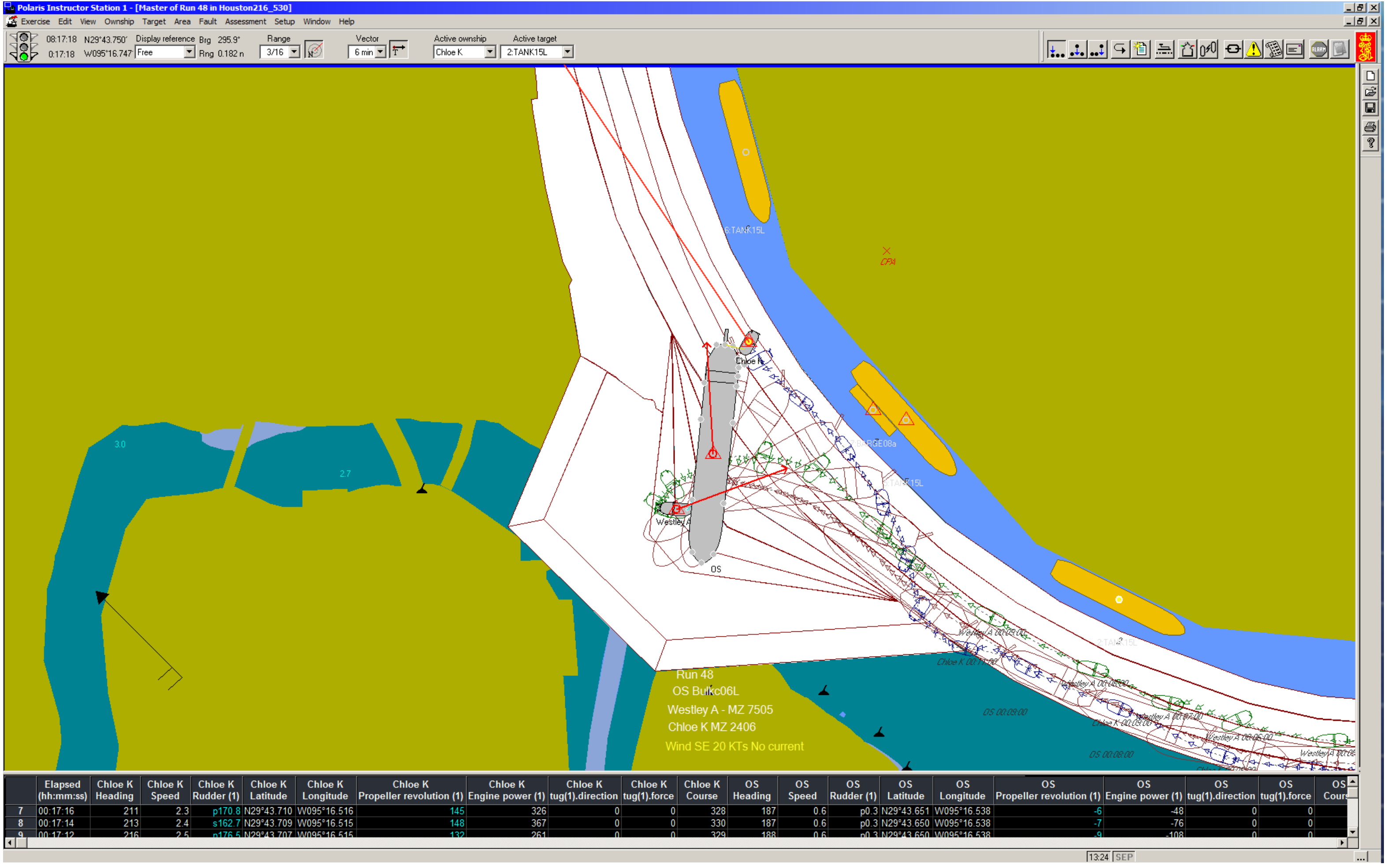












Polaris Instructor Station 1 - [Master of Run 48 in Houston216_530]

08:17:18 N29°43.750′ Display reference Brg 295.9°
0:17:18 W095°16.747′ Free Rng 0.182 n

Range 3/16

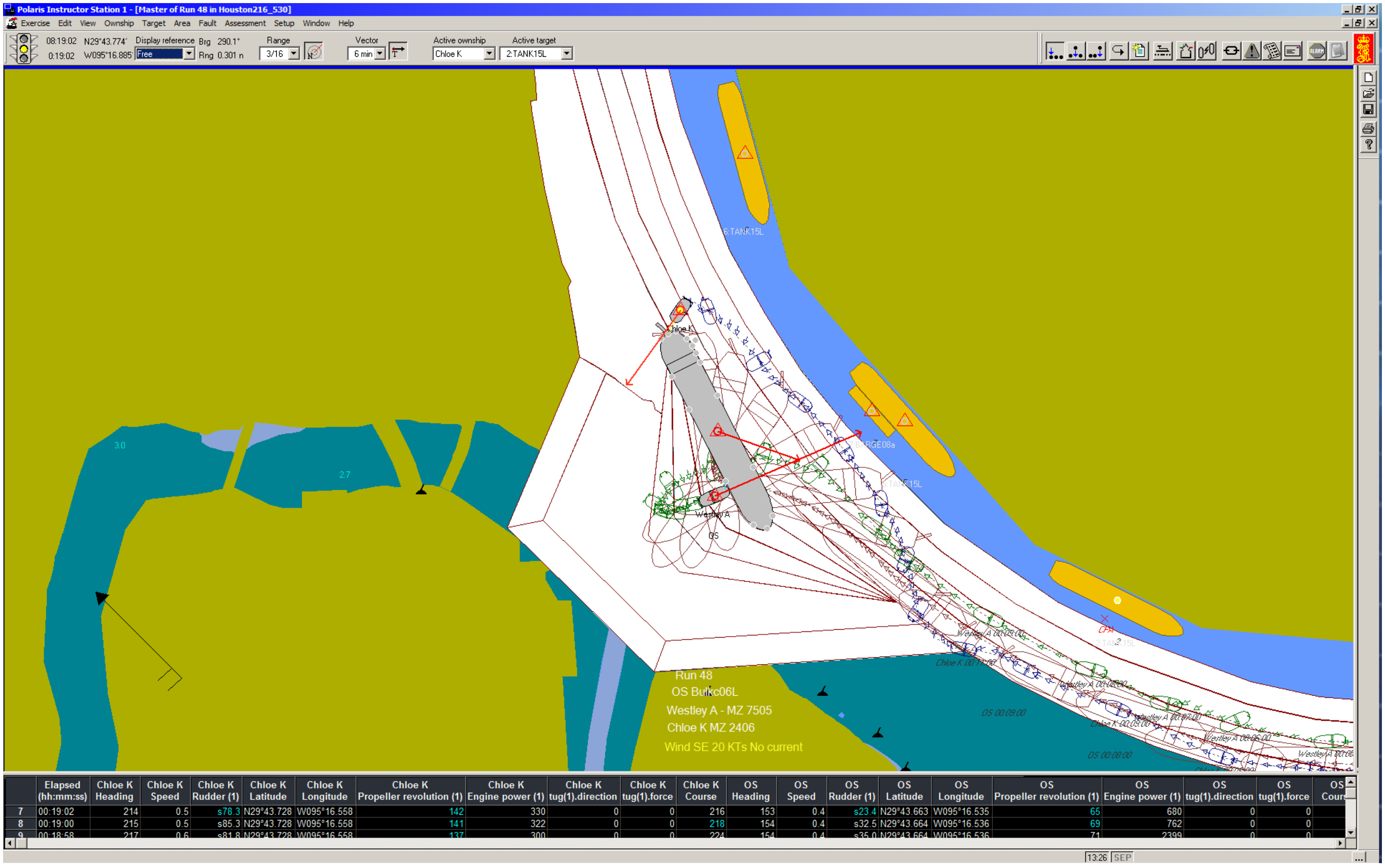
Vector 6 min

Active ownship Chloe K

Active target 2:TANK15L

	Elapsed (hh:mm:ss)	Chloe K Heading	Chloe K Speed	Chloe K Rudder (1)	Chloe K Latitude	Chloe K Longitude	Chloe K Propeller revolution (1)	Chloe K Engine power (1)	Chloe K tug(1).direction	Chloe K tug(1).force	Chloe K Course	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Cour
7	00:17:16	211	2.3	p170.8	N29°43.710	W095°16.516	145	326	0	0	328	187	0.6	p0.3	N29°43.651	W095°16.538	-6	-48	0	0	
8	00:17:14	213	2.4	s162.7	N29°43.709	W095°16.515	148	367	0	0	330	187	0.6	p0.3	N29°43.650	W095°16.538	-7	-76	0	0	
9	00:17:12	216	2.5	p176.5	N29°43.707	W095°16.515	132	261	0	0	329	188	0.6	p0.3	N29°43.650	W095°16.538	-9	-108	0	0	

13:24 SEP



08:19:02 N29°43.774′ Display reference: Free Brg 290.1°
0:19:02 W095°16.885′ Rng 0.301 n
Range: 3/16
Vector: 6 min
Active ownship: Chloe K
Active target: 2:TANK15L

Run 48
OS Bulkc06L
Westley A - MZ 7505
Chloe K MZ 2406
Wind SE 20 KTs No current

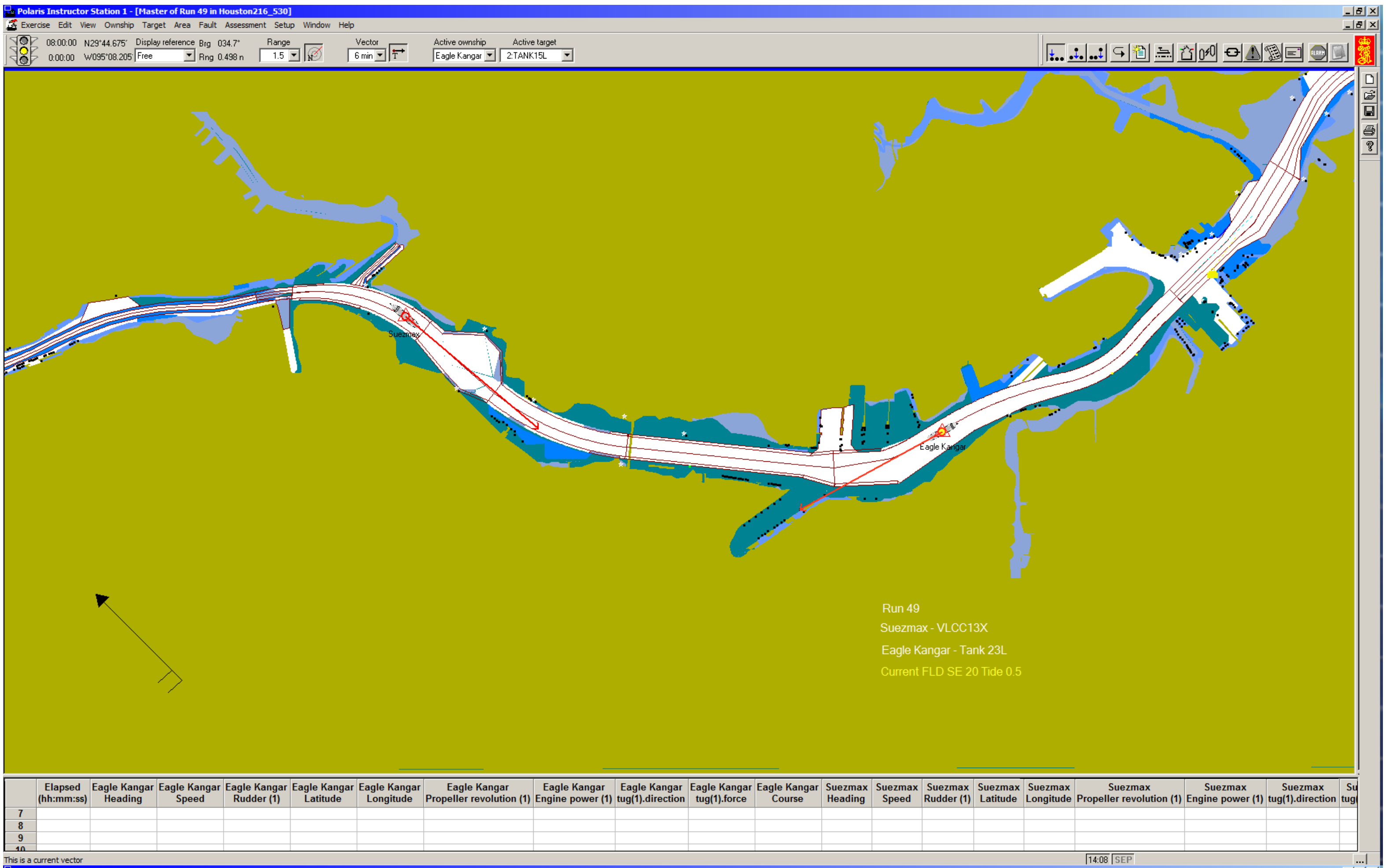
	Elapsed (hh:mm:ss)	Chloe K Heading	Chloe K Speed	Chloe K Rudder (1)	Chloe K Latitude	Chloe K Longitude	Chloe K Propeller revolution (1)	Chloe K Engine power (1)	Chloe K tug(1).direction	Chloe K tug(1).force	Chloe K Course	OS Heading	OS Speed	OS Rudder (1)	OS Latitude	OS Longitude	OS Propeller revolution (1)	OS Engine power (1)	OS tug(1).direction	OS tug(1).force	OS Cours
7	00:19:02	214	0.5	s78.3	N29°43.728	W095°16.558	142	330	0	0	216	153	0.4	s23.4	N29°43.663	W095°16.535	65	680	0	0	
8	00:19:00	215	0.5	s85.3	N29°43.728	W095°16.558	141	322	0	0	218	154	0.4	s32.5	N29°43.664	W095°16.536	69	762	0	0	
9	00:18:58	217	0.6	s81.8	N29°43.728	W095°16.558	137	300	0	0	224	154	0.4	s35.0	N29°43.664	W095°16.536	71	2399	0	0	

13:26 SEP

Appendix P: Boggy Bayou to Greens Bayou Simulations

June 26, 2019

Run 49

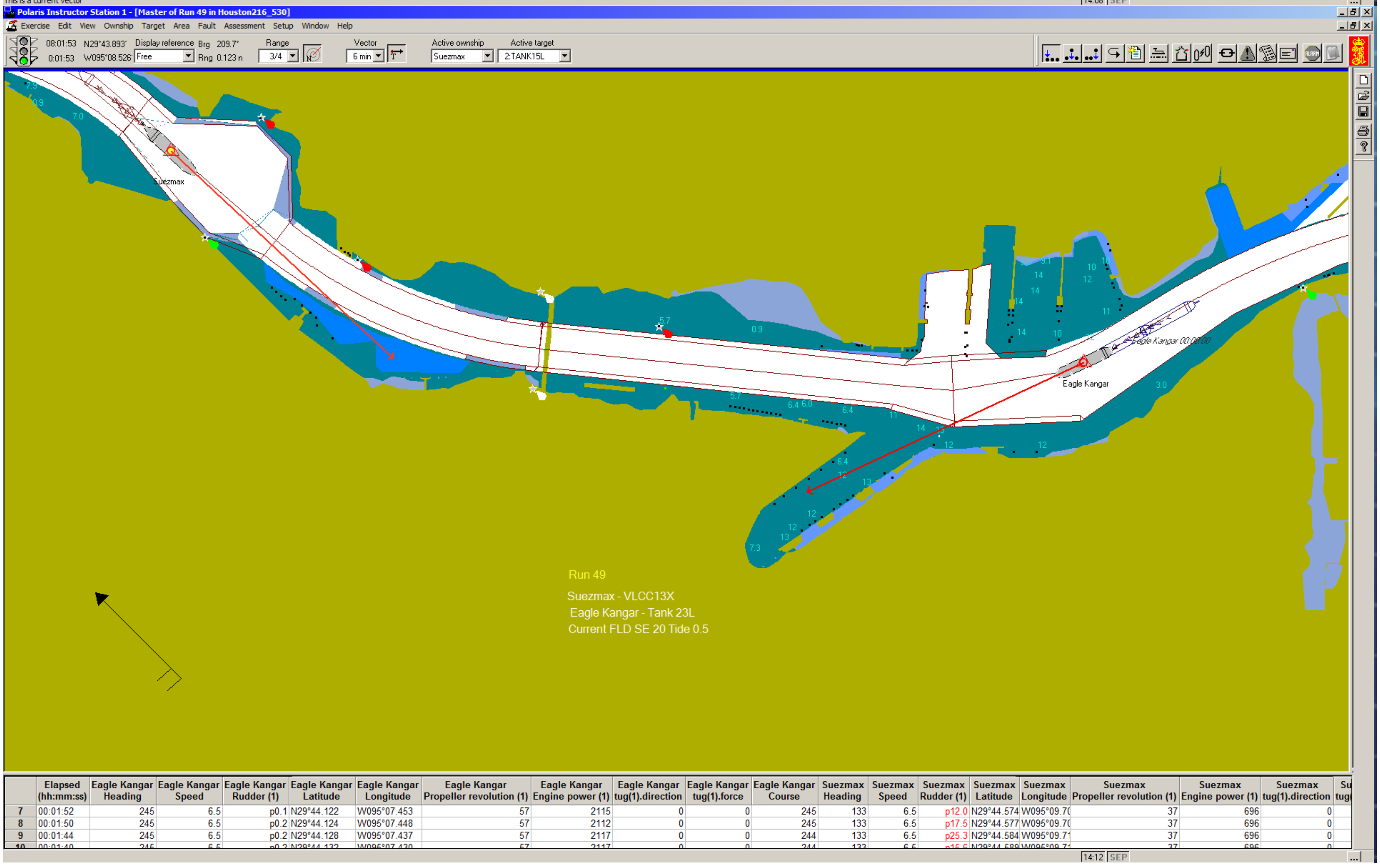

Polaris Instructor Station 1 - [Master of Run 49 in Houston216_530]

08:00:00 N29°44.675′ Display reference Free Brg 034.7° Rng 0.498 n Range 1.5 Vector 6 min Active ownship Eagle Kangar Active target 2:TANK15L

Run 49
Suezmax - VLCC13X
Eagle Kangar - Tank 23L
Current FLD SE 20 Tide 0.5

	Elapsed (hh:mm:ss)	Eagle Kangar Heading	Eagle Kangar Speed	Eagle Kangar Rudder (1)	Eagle Kangar Latitude	Eagle Kangar Longitude	Eagle Kangar Propeller revolution (1)	Eagle Kangar Engine power (1)	Eagle Kangar tug(1).direction	Eagle Kangar tug(1).force	Eagle Kangar Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax tug(1).direction	Su tug
7																				
8																				
9																				

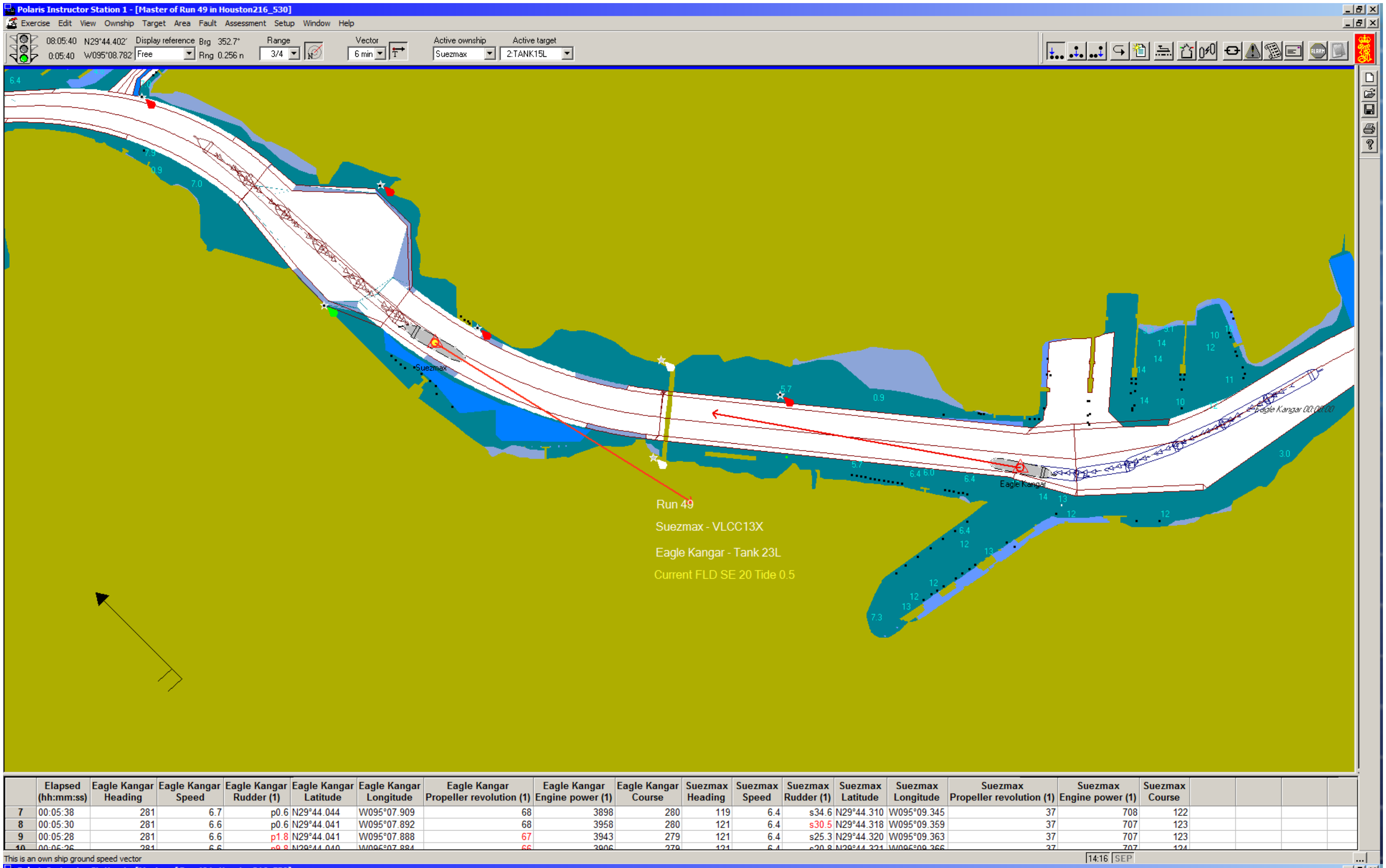
This is a current vector


Polaris Instructor Station 1 - [Master of Run 49 in Houston216_530]

08:01:53 N29°43.893′ Display reference Free Brg 209.7° Rng 0.123 n Range 3/4 Vector 6 min Active ownship Suezmax Active target 2:TANK15L

Run 49
Suezmax - VLCC13X
Eagle Kangar - Tank 23L
Current FLD SE 20 Tide 0.5

	Elapsed (hh:mm:ss)	Eagle Kangar Heading	Eagle Kangar Speed	Eagle Kangar Rudder (1)	Eagle Kangar Latitude	Eagle Kangar Longitude	Eagle Kangar Propeller revolution (1)	Eagle Kangar Engine power (1)	Eagle Kangar tug(1).direction	Eagle Kangar tug(1).force	Eagle Kangar Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax tug(1).direction	Su tug
7	00:01:52	245	6.5	p0.1	N29°44.122	W095°07.453	57	2115	0	0	245	133	6.5	p12.0	N29°44.574	W095°09.70	37	696	0	
8	00:01:50	245	6.5	p0.2	N29°44.124	W095°07.448	57	2112	0	0	245	133	6.5	p17.5	N29°44.577	W095°09.70	37	696	0	
9	00:01:44	245	6.5	p0.2	N29°44.128	W095°07.437	57	2117	0	0	244	133	6.5	p25.3	N29°44.584	W095°09.71	37	696	0	



Display reference: Free

Range: 3/4

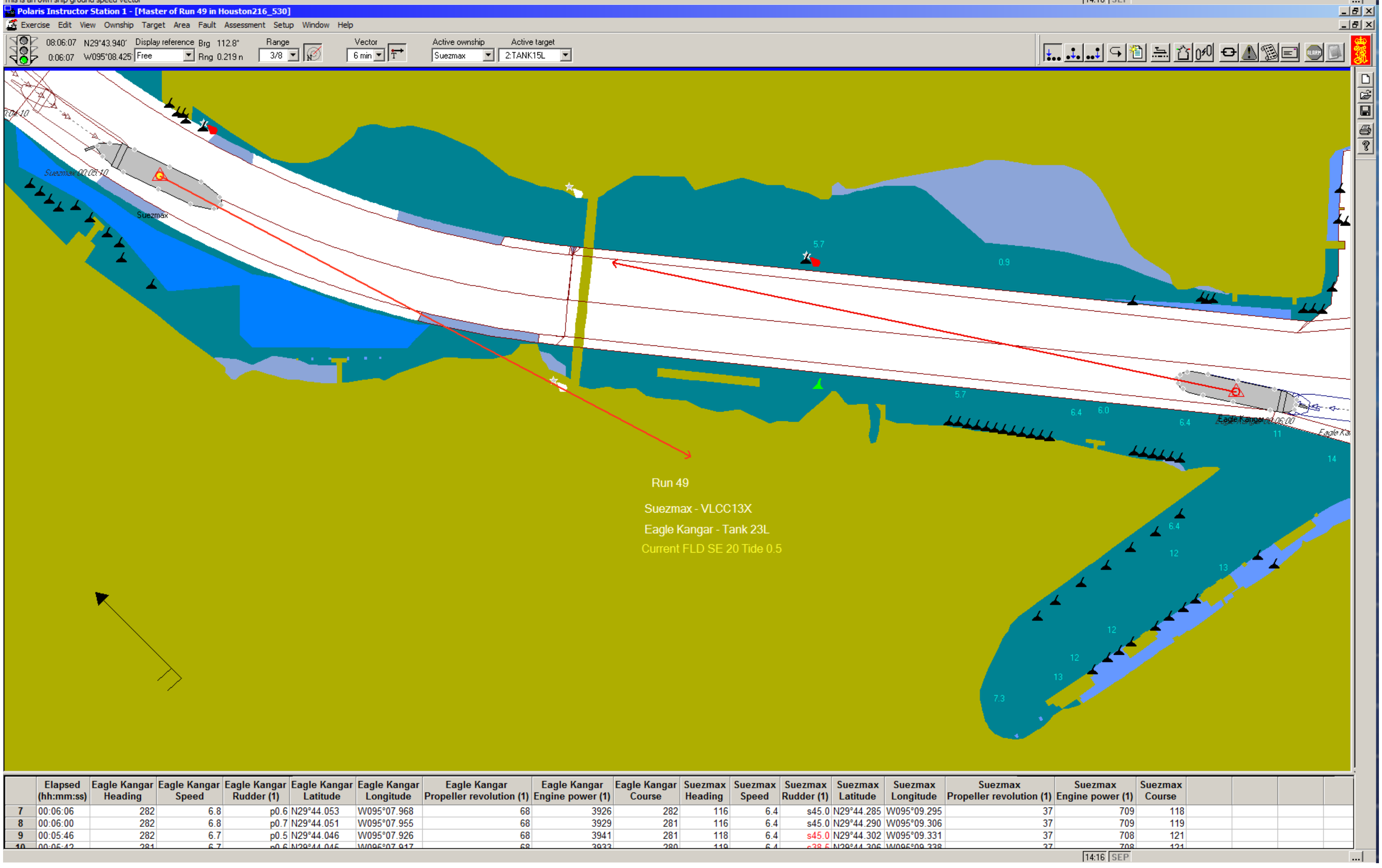
Vector: 6 min

Active ownship: Suezmax

Active target: 2:TANK15L

	Elapsed (hh:mm:ss)	Eagle Kangar Heading	Eagle Kangar Speed	Eagle Kangar Rudder (1)	Eagle Kangar Latitude	Eagle Kangar Longitude	Eagle Kangar Propeller revolution (1)	Eagle Kangar Engine power (1)	Eagle Kangar Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7	00:05:38	281	6.7	p0.6	N29°44.044	W095°07.909	68	3898	280	119	6.4	s34.6	N29°44.310	W095°09.345	37	708	122
8	00:05:30	281	6.6	p0.6	N29°44.041	W095°07.892	68	3958	280	121	6.4	s30.5	N29°44.318	W095°09.359	37	707	123
9	00:05:28	281	6.6	p1.8	N29°44.041	W095°07.888	67	3943	279	121	6.4	s25.3	N29°44.320	W095°09.363	37	707	123

This is an own ship ground speed vector



Display reference: Free

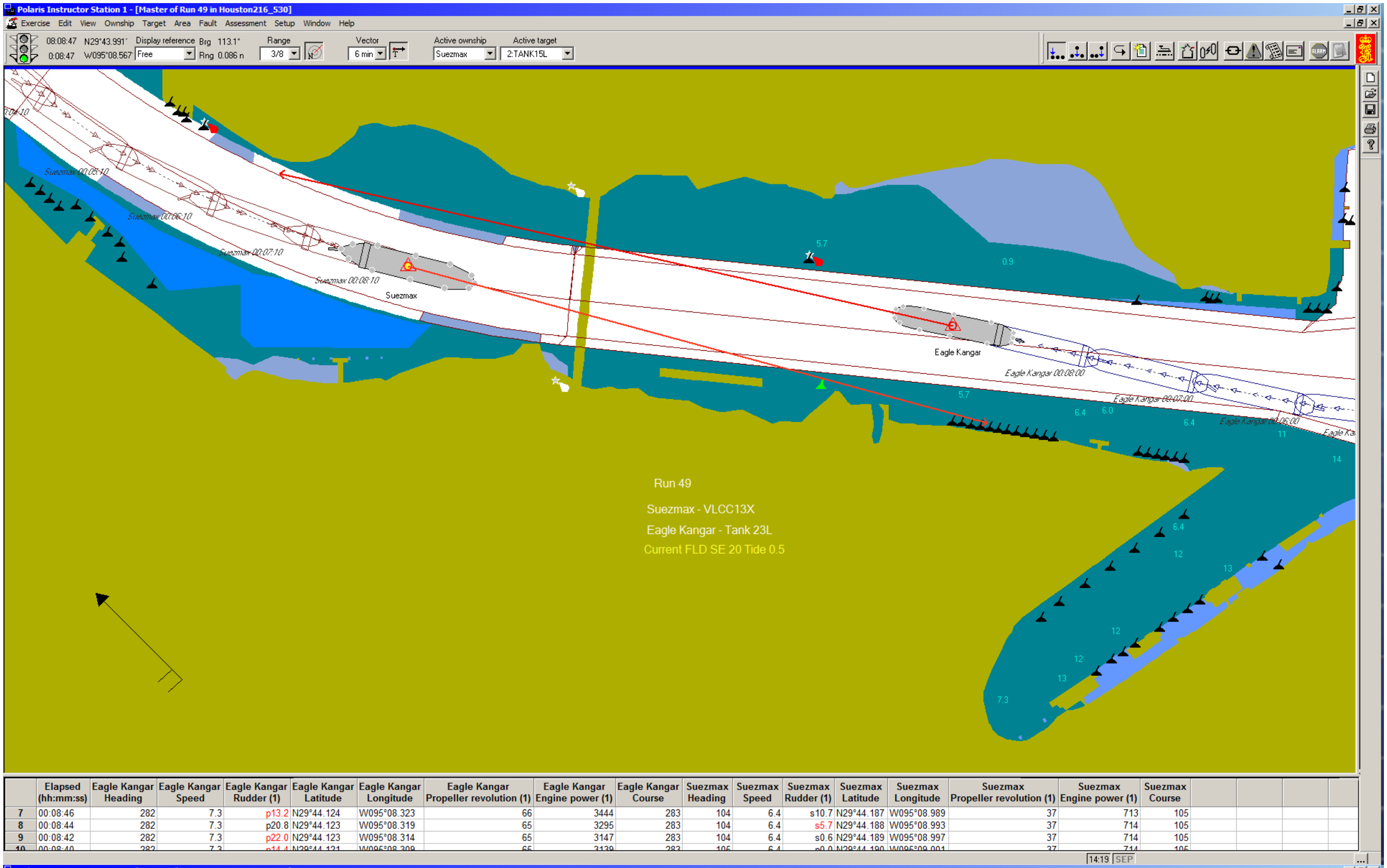
Range: 3/8

Vector: 6 min

Active ownship: Suezmax

Active target: 2:TANK15L

	Elapsed (hh:mm:ss)	Eagle Kangar Heading	Eagle Kangar Speed	Eagle Kangar Rudder (1)	Eagle Kangar Latitude	Eagle Kangar Longitude	Eagle Kangar Propeller revolution (1)	Eagle Kangar Engine power (1)	Eagle Kangar Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7	00:06:06	282	6.8	p0.6	N29°44.053	W095°07.968	68	3926	282	116	6.4	s45.0	N29°44.285	W095°09.295	37	709	118
8	00:06:00	282	6.8	p0.7	N29°44.051	W095°07.955	68	3929	281	116	6.4	s45.0	N29°44.290	W095°09.306	37	709	119
9	00:05:46	282	6.7	p0.5	N29°44.046	W095°07.926	68	3941	281	118	6.4	s45.0	N29°44.302	W095°09.331	37	708	121



Polaris Instructor Station 1 - [Master of Run 49 in Houston216_530]

08:08:47 N29°43.991′ 0:08:47 W095°08.567′

Display reference: Free

Brg 113.1°

Rng 0.086 n

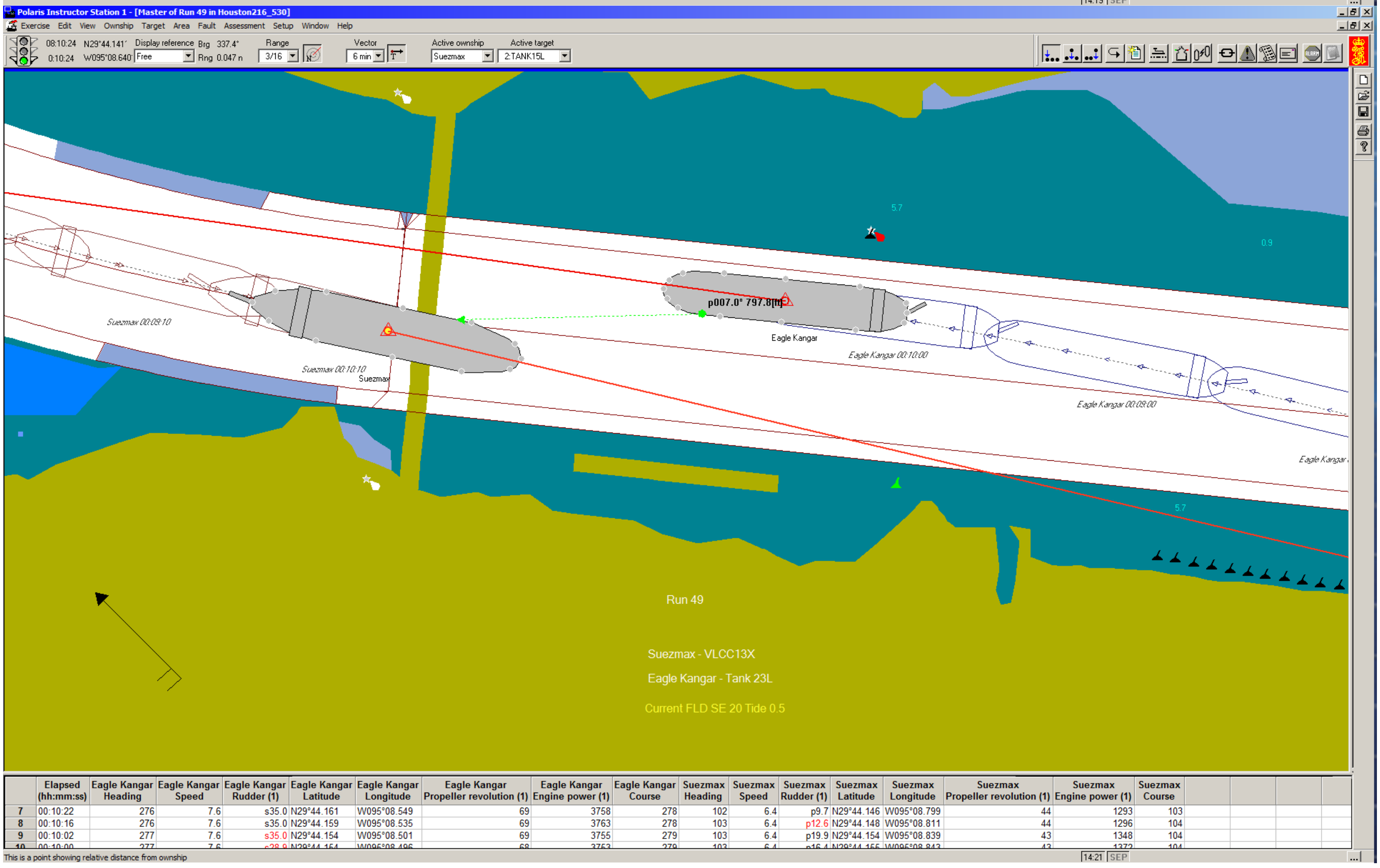
Range: 3/8

Vector: 6 min

Active ownship: Suezmax

Active target: 2:TANK15L

	Elapsed (hh:mm:ss)	Eagle Kangar Heading	Eagle Kangar Speed	Eagle Kangar Rudder (1)	Eagle Kangar Latitude	Eagle Kangar Longitude	Eagle Kangar Propeller revolution (1)	Eagle Kangar Engine power (1)	Eagle Kangar Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7	00:08:46	282	7.3	p13.2	N29°44.124	W095°08.323	66	3444	283	104	6.4	s10.7	N29°44.187	W095°08.989	37	713	105
8	00:08:44	282	7.3	p20.8	N29°44.123	W095°08.319	65	3295	283	104	6.4	s5.7	N29°44.188	W095°08.993	37	714	105
9	00:08:42	282	7.3	p22.0	N29°44.123	W095°08.314	65	3147	283	104	6.4	s0.6	N29°44.189	W095°08.997	37	714	105



Polaris Instructor Station 1 - [Master of Run 49 in Houston216_530]

08:10:24 N29°44.141′ 0:10:24 W095°08.640′

Display reference: Free

Brg 337.4°

Rng 0.047 n

Range: 3/16

Vector: 6 min

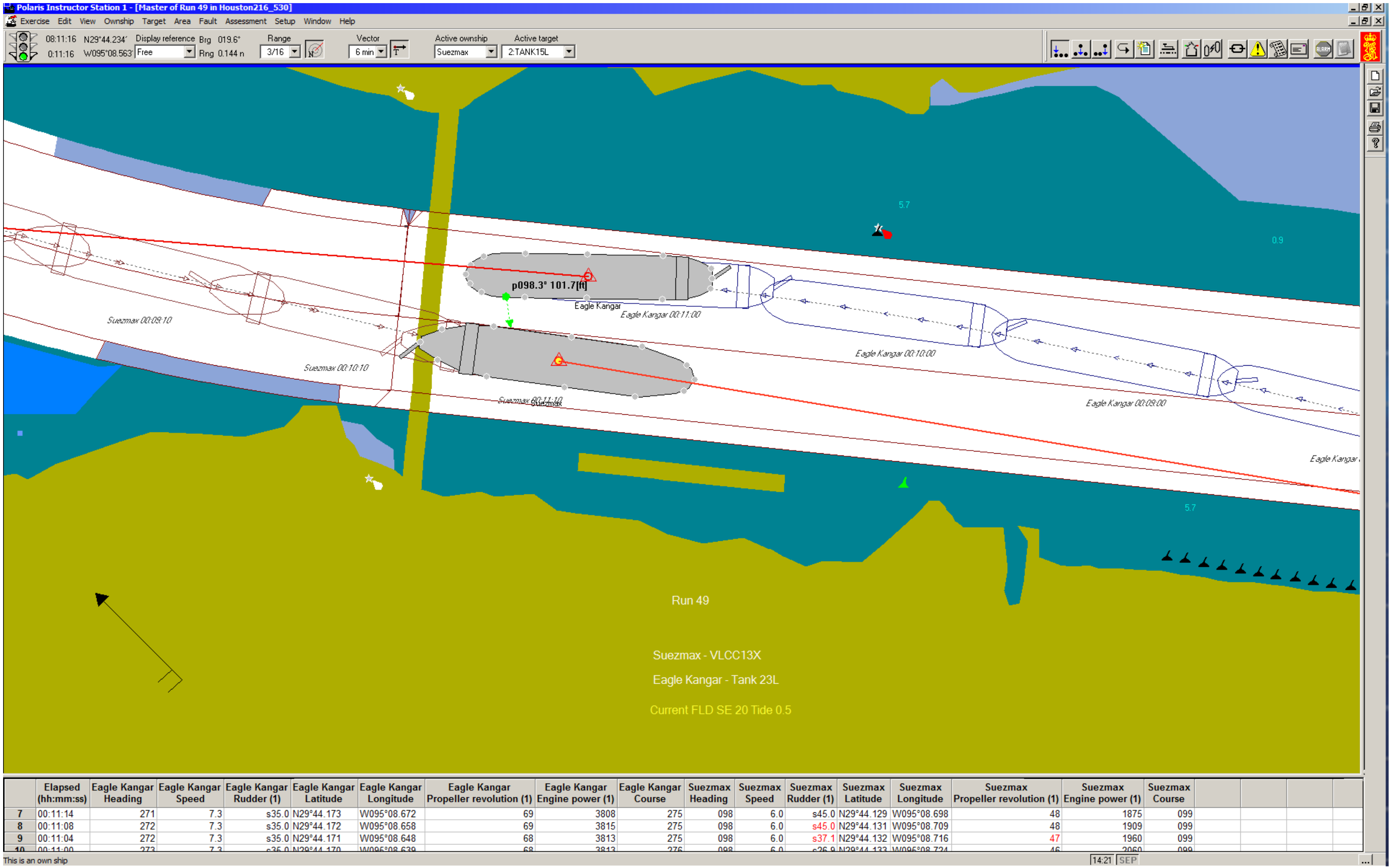
Active ownship: Suezmax

Active target: 2:TANK15L

	Elapsed (hh:mm:ss)	Eagle Kangar Heading	Eagle Kangar Speed	Eagle Kangar Rudder (1)	Eagle Kangar Latitude	Eagle Kangar Longitude	Eagle Kangar Propeller revolution (1)	Eagle Kangar Engine power (1)	Eagle Kangar Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7	00:10:22	276	7.6	s35.0	N29°44.161	W095°08.549	69	3758	278	102	6.4	p9.7	N29°44.146	W095°08.799	44	1293	103
8	00:10:16	276	7.6	s35.0	N29°44.159	W095°08.535	69	3763	278	103	6.4	p12.6	N29°44.148	W095°08.811	44	1296	104
9	00:10:02	277	7.6	s35.0	N29°44.154	W095°08.501	69	3755	279	103	6.4	p19.9	N29°44.154	W095°08.839	43	1348	104

This is a point showing relative distance from ownship

June 26, 2019

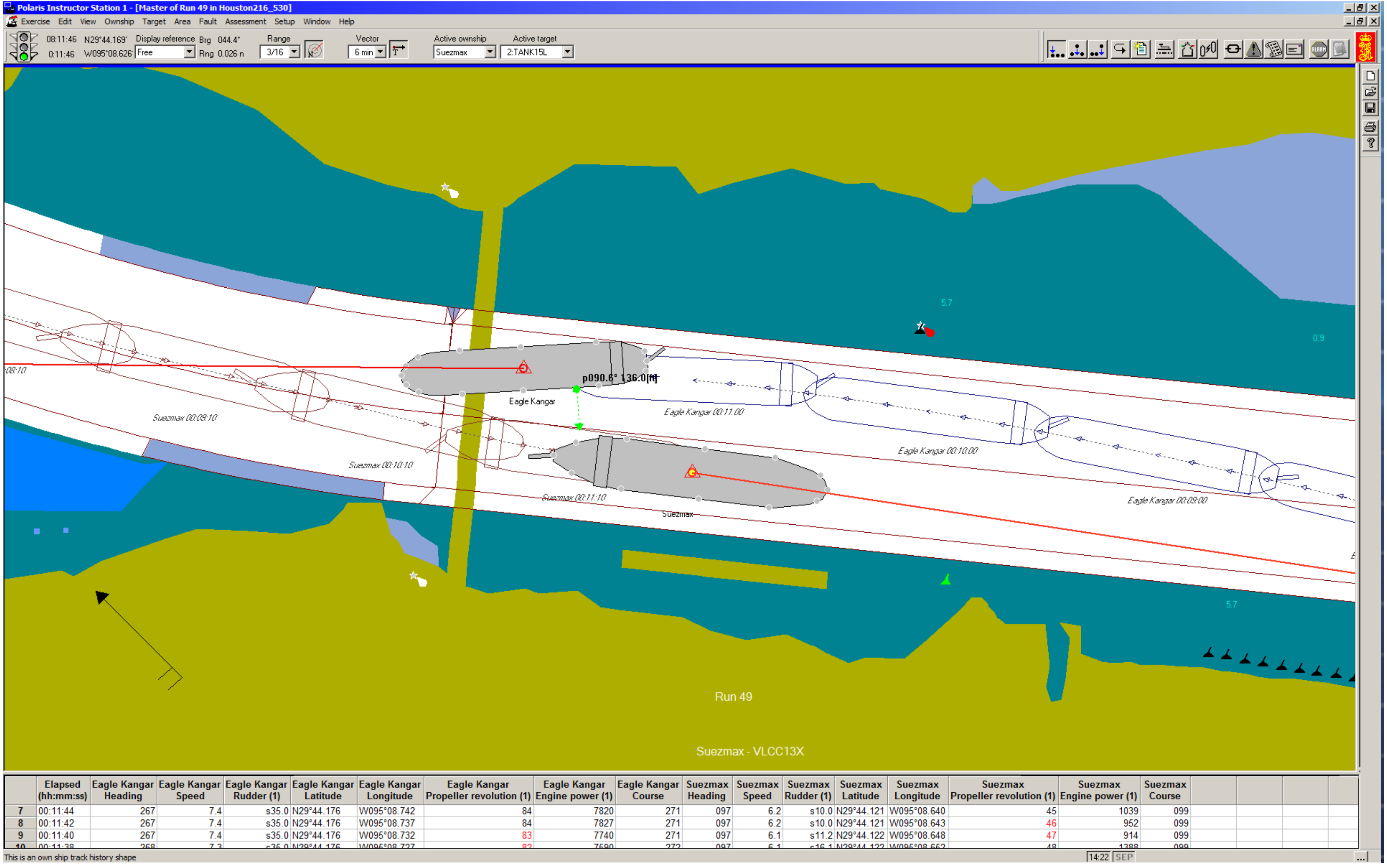


08:11:16 N29°44.234' Display reference: Free Brg 019.6° Rng 0.144 n
0:11:16 W095°08.563'
Range: 3/16
Vector: 6 min
Active ownship: Suezmax
Active target: 2:TANK15L

	Elapsed (hh:mm:ss)	Eagle Kangar Heading	Eagle Kangar Speed	Eagle Kangar Rudder (1)	Eagle Kangar Latitude	Eagle Kangar Longitude	Eagle Kangar Propeller revolution (1)	Eagle Kangar Engine power (1)	Eagle Kangar Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7	00:11:14	271	7.3	s35.0	N29°44.173	W095°08.672	69	3808	275	098	6.0	s45.0	N29°44.129	W095°08.698	48	1875	099
8	00:11:08	272	7.3	s35.0	N29°44.172	W095°08.658	69	3815	275	098	6.0	s45.0	N29°44.131	W095°08.709	48	1909	099
9	00:11:04	272	7.3	s35.0	N29°44.171	W095°08.648	68	3813	275	098	6.0	s37.1	N29°44.132	W095°08.716	47	1960	099

This is an own ship

14:21 SEP



08:11:46 N29°44.169' Display reference: Free Brg 044.4° Rng 0.026 n
0:11:46 W095°08.626'
Range: 3/16
Vector: 6 min
Active ownship: Suezmax
Active target: 2:TANK15L

	Elapsed (hh:mm:ss)	Eagle Kangar Heading	Eagle Kangar Speed	Eagle Kangar Rudder (1)	Eagle Kangar Latitude	Eagle Kangar Longitude	Eagle Kangar Propeller revolution (1)	Eagle Kangar Engine power (1)	Eagle Kangar Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7	00:11:44	267	7.4	s35.0	N29°44.176	W095°08.742	84	7820	271	097	6.2	s10.0	N29°44.121	W095°08.640	45	1039	099
8	00:11:42	267	7.4	s35.0	N29°44.176	W095°08.737	84	7827	271	097	6.2	s10.0	N29°44.121	W095°08.643	46	952	099
9	00:11:40	267	7.4	s35.0	N29°44.176	W095°08.732	83	7740	271	097	6.1	s11.2	N29°44.122	W095°08.648	47	914	099

This is an own ship track history shape

14:22 SEP

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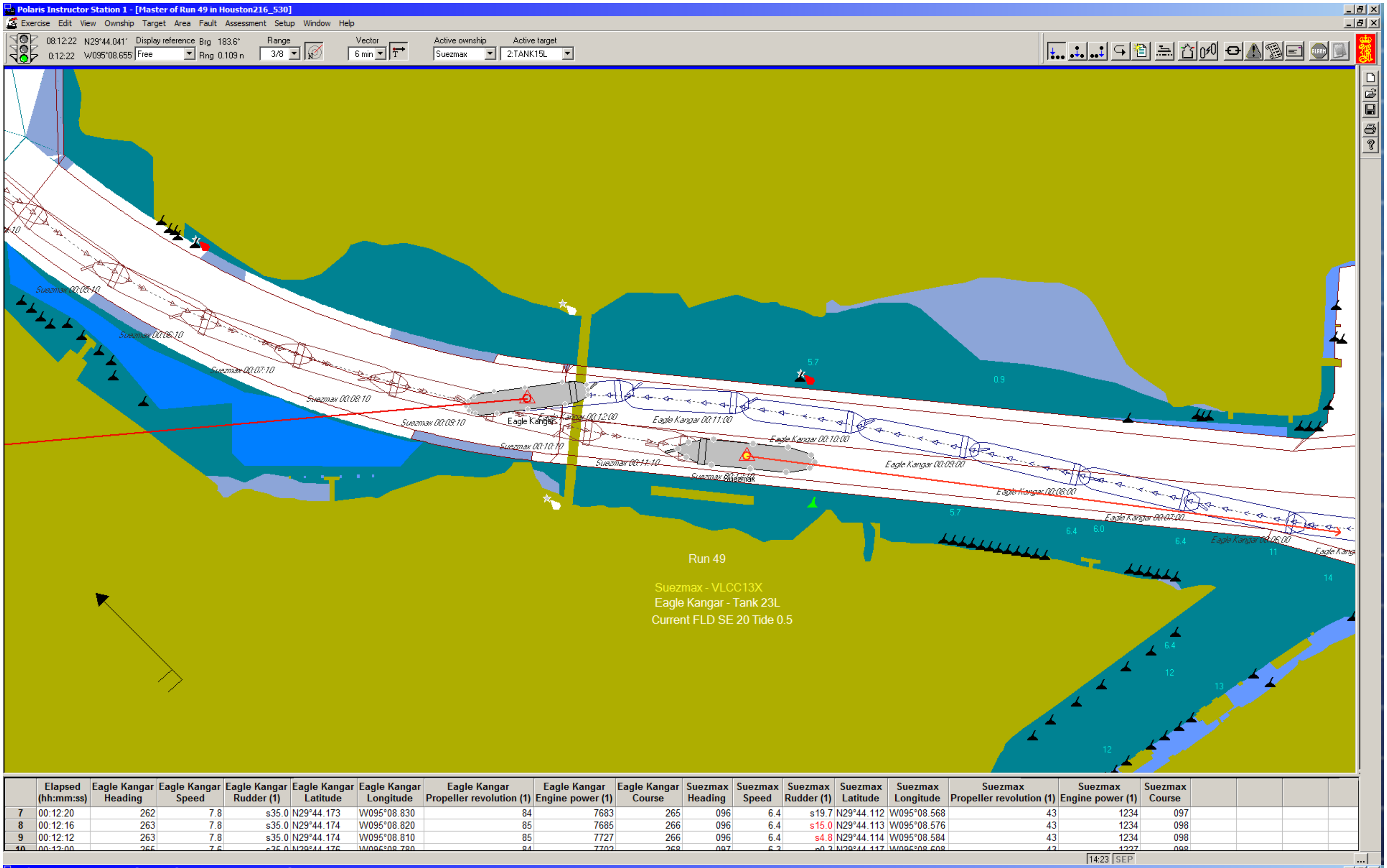


Polaris Instructor Station 1 - [Master of Run 49 in Houston216_530]

08:12:22 N29°44.041′ Display reference Free Brg 183.6° Rng 0.109 n

0:12:22 W095°08.655′

Range 3/8

Vector 6 min

Active ownship Suezmax

Active target 2:TANK15L

Run 49

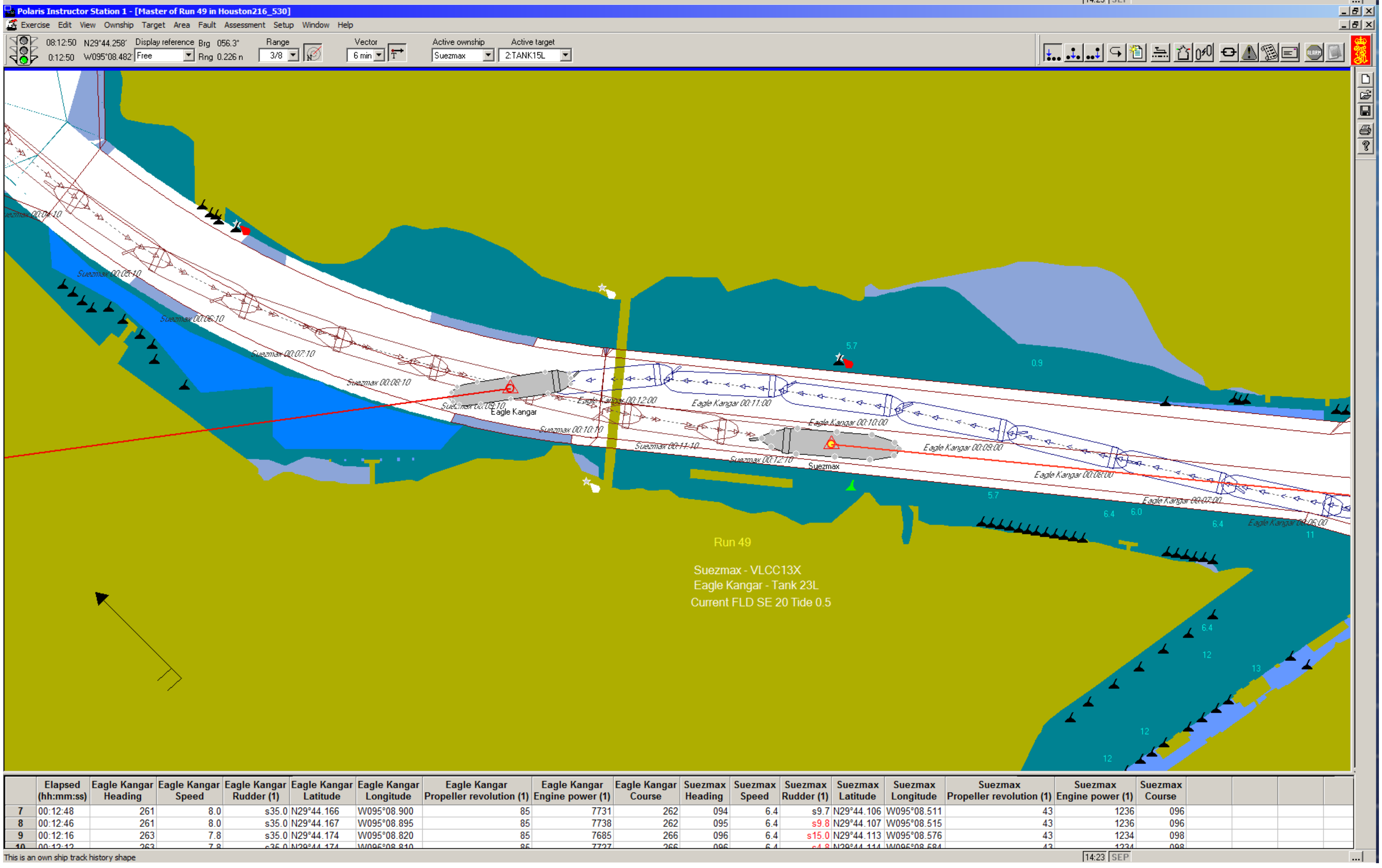
Suezmax - VLCC13X

Eagle Kangar - Tank 23L

Current FLD SE 20 Tide 0.5

	Elapsed (hh:mm:ss)	Eagle Kangar Heading	Eagle Kangar Speed	Eagle Kangar Rudder (1)	Eagle Kangar Latitude	Eagle Kangar Longitude	Eagle Kangar Propeller revolution (1)	Eagle Kangar Engine power (1)	Eagle Kangar Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course				
7	00:12:20	262	7.8	s35.0	N29°44.173	W095°08.830	84	7683	265	096	6.4	s19.7	N29°44.112	W095°08.568	43	1234	097				
8	00:12:16	263	7.8	s35.0	N29°44.174	W095°08.820	85	7685	266	096	6.4	s15.0	N29°44.113	W095°08.576	43	1234	098				
9	00:12:12	263	7.8	s35.0	N29°44.174	W095°08.810	85	7727	266	096	6.4	s4.8	N29°44.114	W095°08.584	43	1234	098				

14:23 SEP



Polaris Instructor Station 1 - [Master of Run 49 in Houston216_530]

08:12:50 N29°44.258′ Display reference Free Brg 056.3° Rng 0.226 n

0:12:50 W095°08.482′

Range 3/8

Vector 6 min

Active ownship Suezmax

Active target 2:TANK15L

Run 49

Suezmax - VLCC13X

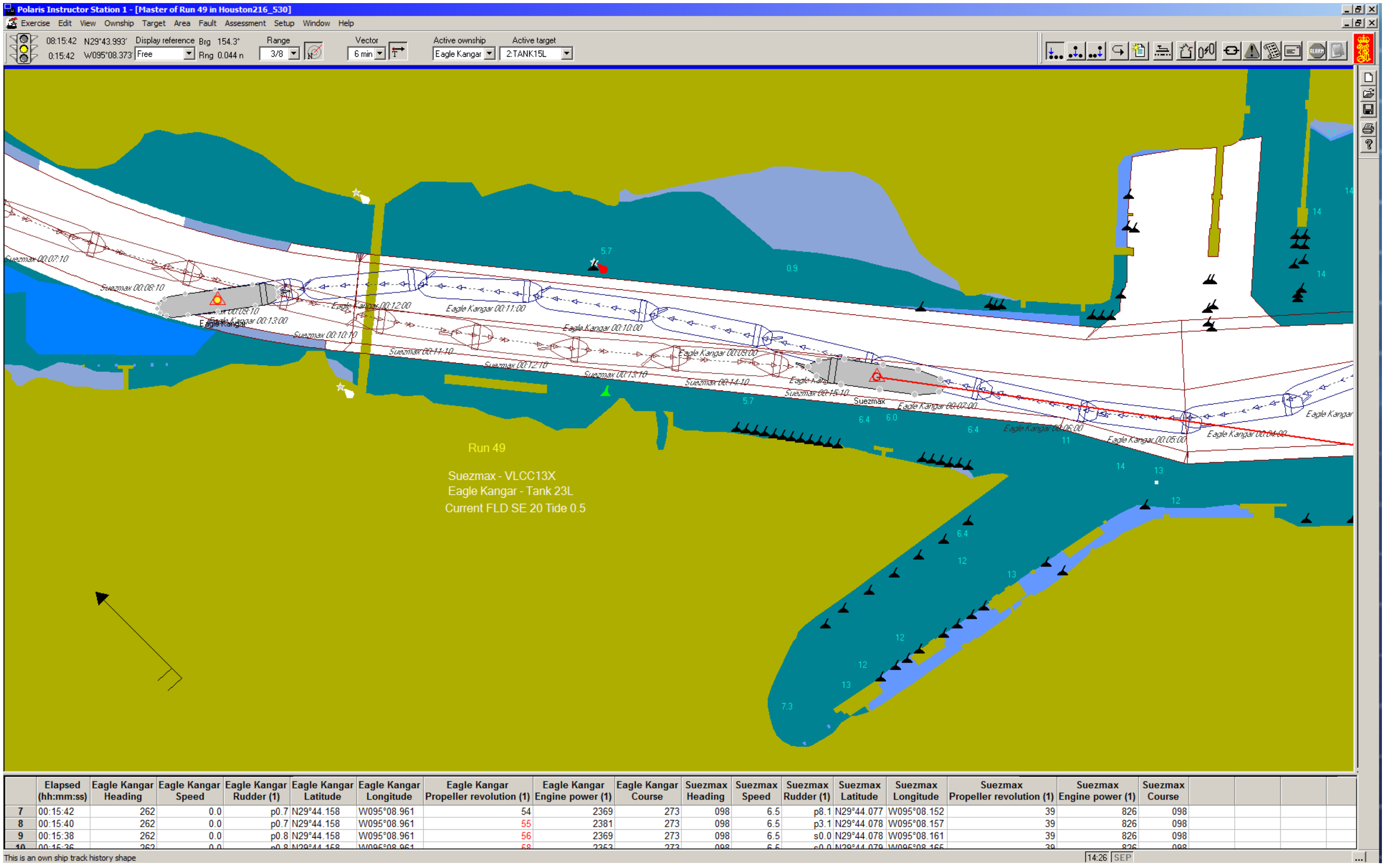
Eagle Kangar - Tank 23L

Current FLD SE 20 Tide 0.5

	Elapsed (hh:mm:ss)	Eagle Kangar Heading	Eagle Kangar Speed	Eagle Kangar Rudder (1)	Eagle Kangar Latitude	Eagle Kangar Longitude	Eagle Kangar Propeller revolution (1)	Eagle Kangar Engine power (1)	Eagle Kangar Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course				
7	00:12:48	261	8.0	s35.0	N29°44.166	W095°08.900	85	7731	262	094	6.4	s9.7	N29°44.106	W095°08.511	43	1236	096				
8	00:12:46	261	8.0	s35.0	N29°44.167	W095°08.895	85	7738	262	095	6.4	s9.8	N29°44.107	W095°08.515	43	1236	096				
9	00:12:16	263	7.8	s35.0	N29°44.174	W095°08.820	85	7685	266	096	6.4	s15.0	N29°44.113	W095°08.576	43	1234	098				

This is an own ship track history shape

14:23 SEP



Polaris Instructor Station 1 - [Master of Run 49 in Houston216_530]

08:15:42 N29°43.993' Display reference: Free Brg 154.3°
0:15:42 W095°08.373' Rng 0.044 n

Range: 3/8

Vector: 6 min

Active ownship: Eagle Kangar

Active target: 2:TANK15L

Run 49

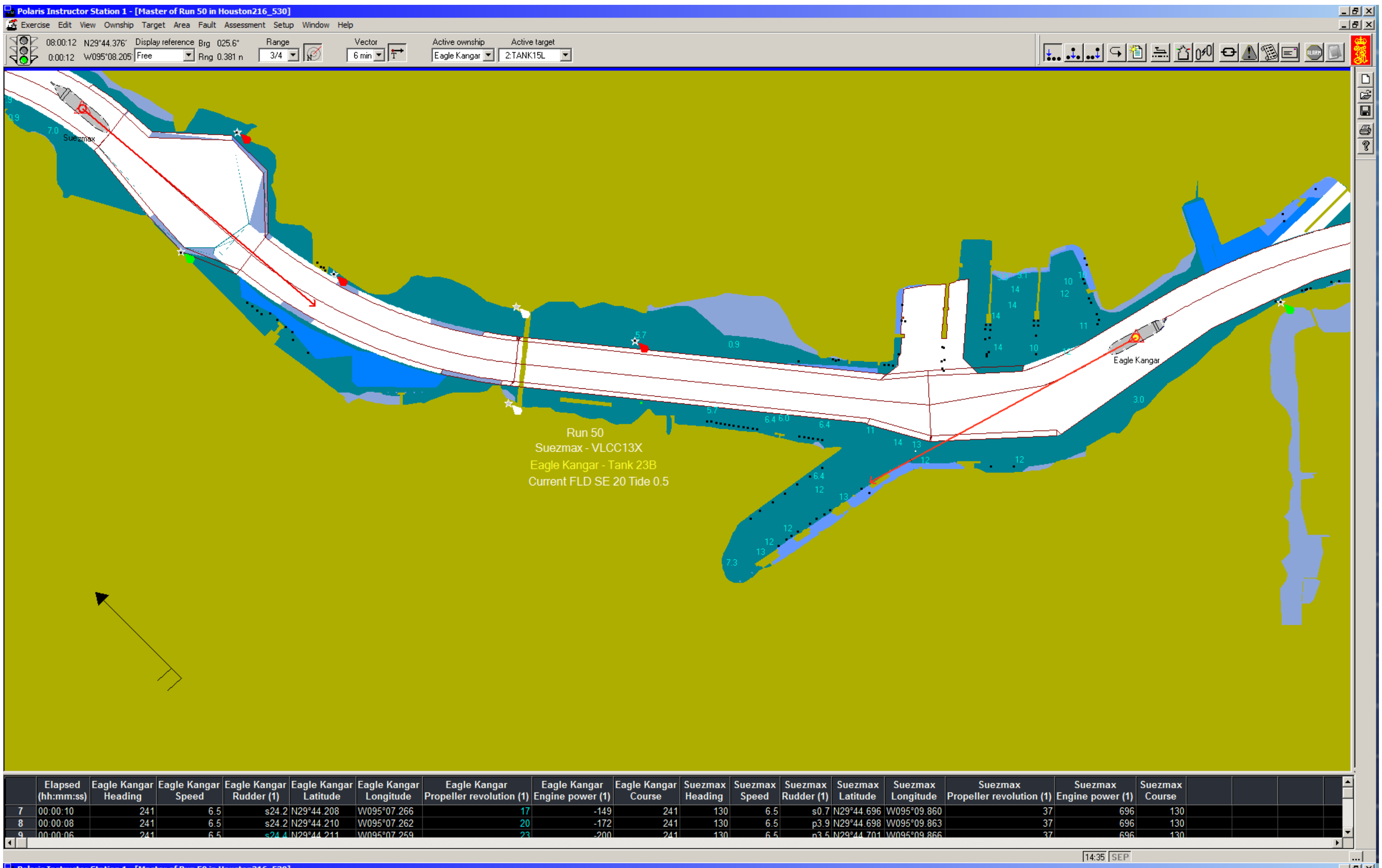
Suezmax - VLCC13X
Eagle Kangar - Tank 23L
Current FLD SE 20 Tide 0.5

	Elapsed (hh:mm:ss)	Eagle Kangar Heading	Eagle Kangar Speed	Eagle Kangar Rudder (1)	Eagle Kangar Latitude	Eagle Kangar Longitude	Eagle Kangar Propeller revolution (1)	Eagle Kangar Engine power (1)	Eagle Kangar Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7	00:15:42	262	0.0	p0.7	N29°44.158	W095°08.961	54	2369	273	098	6.5	p8.1	N29°44.077	W095°08.152	39	826	098
8	00:15:40	262	0.0	p0.7	N29°44.158	W095°08.961	55	2381	273	098	6.5	p3.1	N29°44.078	W095°08.157	39	826	098
9	00:15:38	262	0.0	p0.8	N29°44.158	W095°08.961	56	2369	273	098	6.5	s0.0	N29°44.078	W095°08.161	39	826	098
10	00:15:36	262	0.0	p0.8	N29°44.158	W095°08.961	58	2353	273	098	6.5	s0.0	N29°44.079	W095°08.165	39	826	098

This is an own ship track history shape

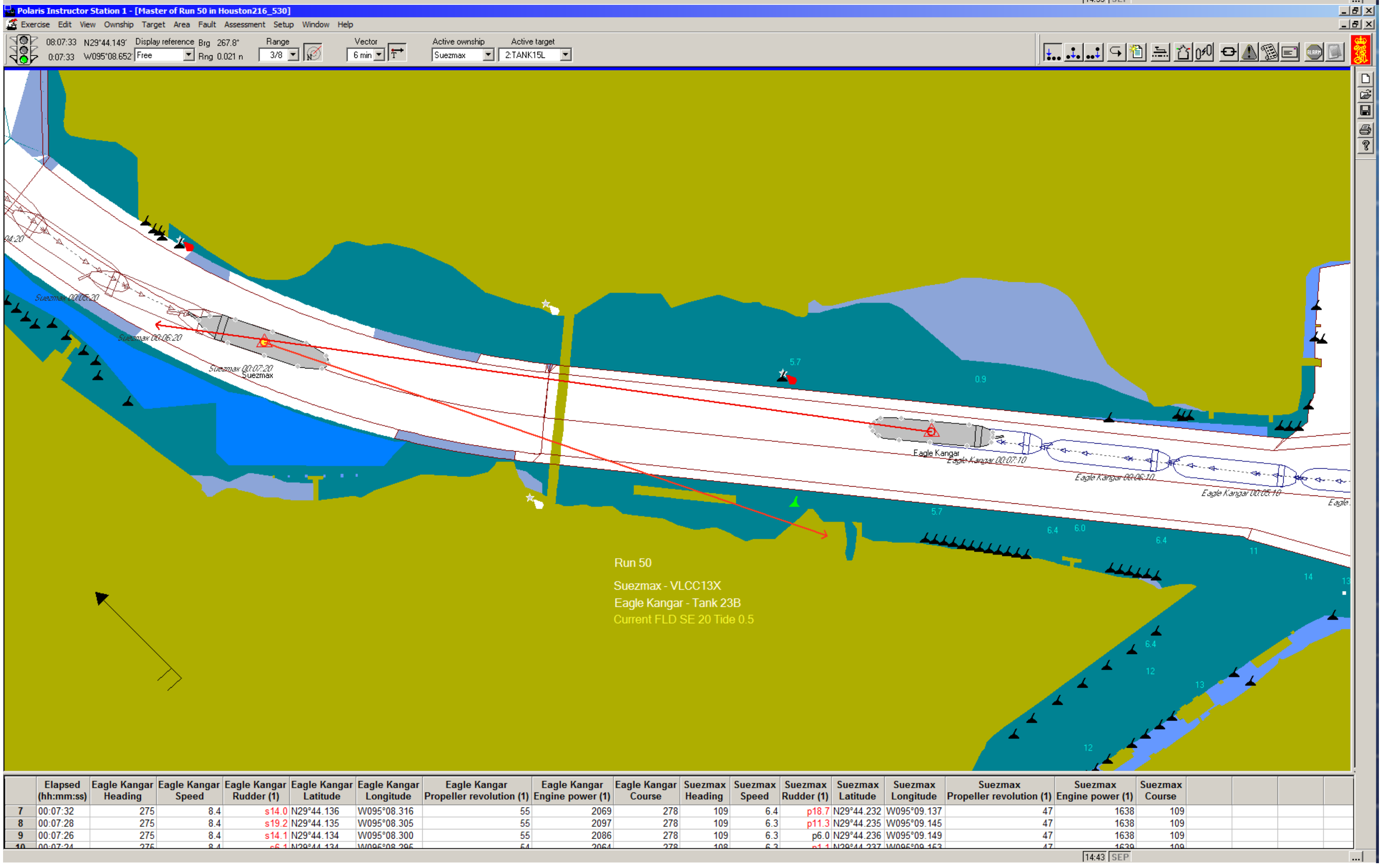
June 26, 2019

Run 50



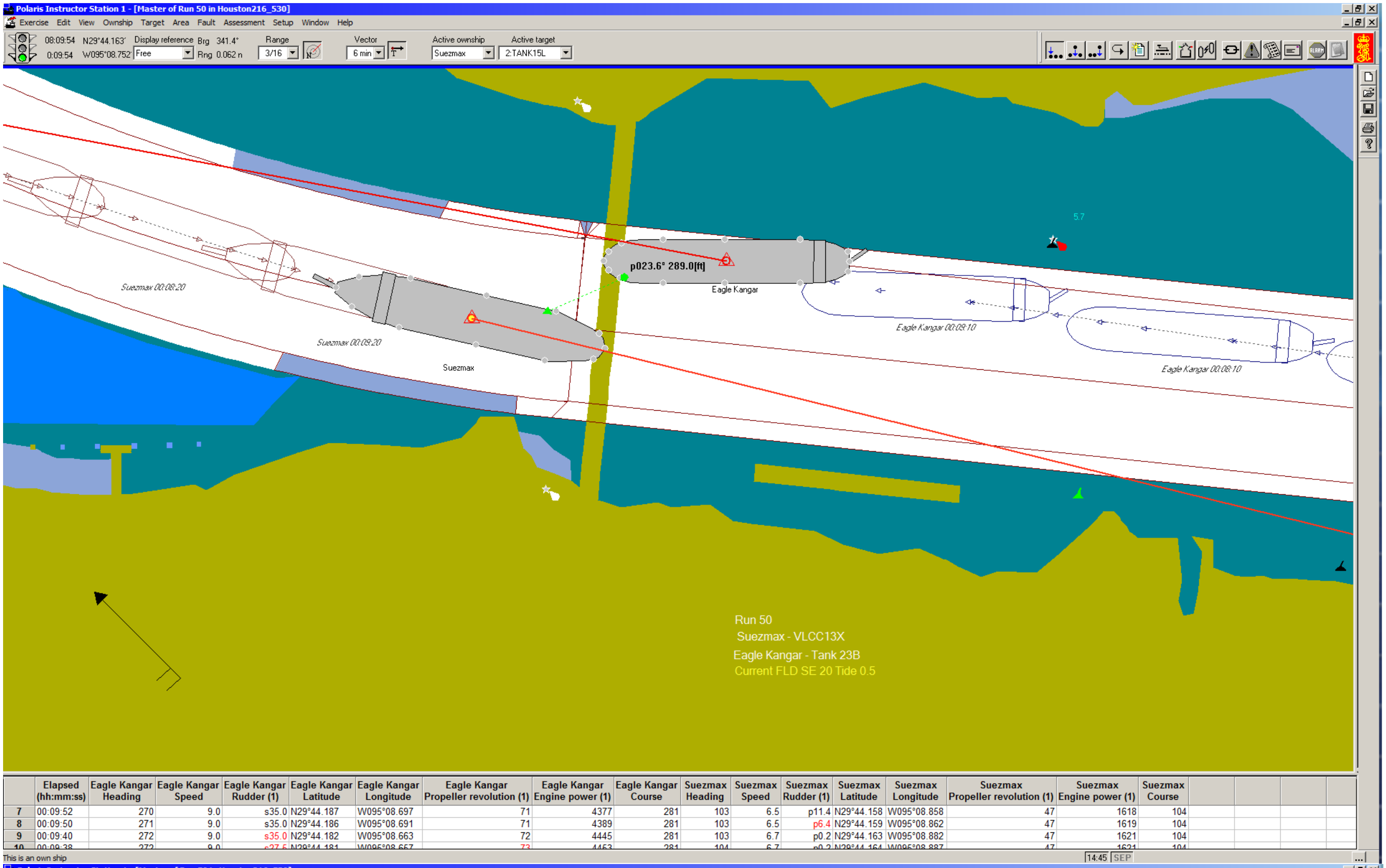
08:00:12 N29°44.376' Display reference Brg 025.6°
0:00:12 W095°08.205' Free Rng 0.381 n
Range 3/4
Vector 6 min
Active ownship Eagle Kangar
Active target 2:TANK15L

	Elapsed (hh:mm:ss)	Eagle Kangar Heading	Eagle Kangar Speed	Eagle Kangar Rudder (1)	Eagle Kangar Latitude	Eagle Kangar Longitude	Eagle Kangar Propeller revolution (1)	Eagle Kangar Engine power (1)	Eagle Kangar Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7	00:00:10	241	6.5	s24.2	N29°44.208	W095°07.266	17	-149	241	130	6.5	s0.7	N29°44.696	W095°09.860	37	696	130
8	00:00:08	241	6.5	s24.2	N29°44.210	W095°07.262	20	-172	241	130	6.5	p3.9	N29°44.698	W095°09.863	37	696	130
9	00:00:06	241	6.5	s24.4	N29°44.211	W095°07.259	23	-200	241	130	6.5	p3.5	N29°44.701	W095°09.866	37	696	130



08:07:33 N29°44.149' Display reference Brg 267.8°
0:07:33 W095°08.652' Free Rng 0.021 n
Range 3/8
Vector 6 min
Active ownship Suezmax
Active target 2:TANK15L

	Elapsed (hh:mm:ss)	Eagle Kangar Heading	Eagle Kangar Speed	Eagle Kangar Rudder (1)	Eagle Kangar Latitude	Eagle Kangar Longitude	Eagle Kangar Propeller revolution (1)	Eagle Kangar Engine power (1)	Eagle Kangar Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7	00:07:32	275	8.4	s14.0	N29°44.136	W095°08.316	55	2069	278	109	6.4	p18.7	N29°44.232	W095°09.137	47	1638	109
8	00:07:28	275	8.4	s19.2	N29°44.135	W095°08.305	55	2097	278	109	6.3	p11.3	N29°44.235	W095°09.145	47	1638	109
9	00:07:26	275	8.4	s14.1	N29°44.134	W095°08.300	55	2086	278	109	6.3	p6.0	N29°44.236	W095°09.149	47	1638	109
10	00:07:24	275	8.4	s6.1	N29°44.134	W095°08.295	54	2064	278	108	6.3	p1.1	N29°44.237	W095°09.153	47	1639	109

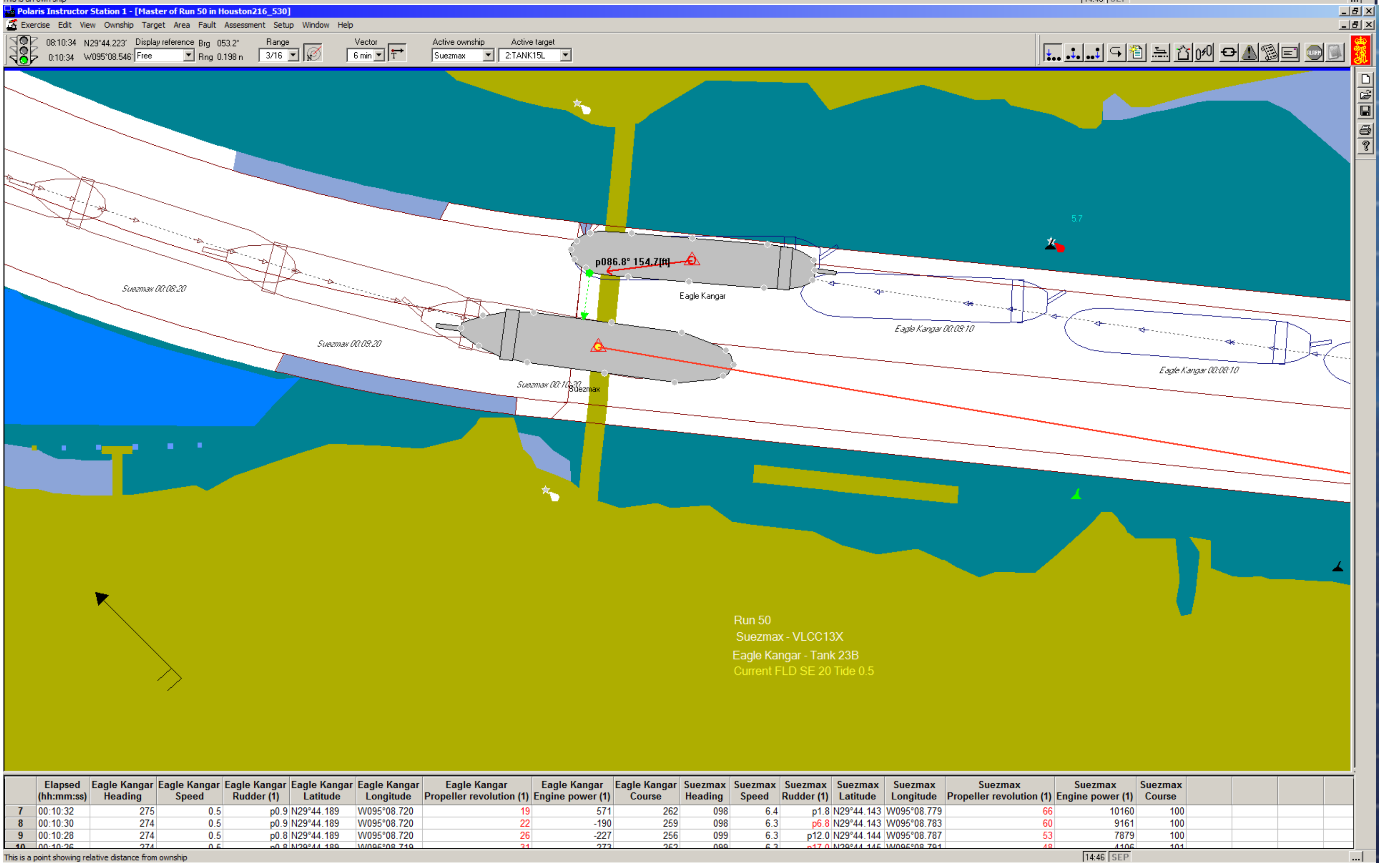


08:09:54 N29°44.163' Display reference: Free Brg 341.4°
0:09:54 W095°08.752' Rng 0.062 n
Range: 3/16
Vector: 6 min
Active ownship: Suezmax
Active target: 2:TANK15L

Run 50
Suezmax - VLCC13X
Eagle Kangar - Tank 23B
Current FLD SE 20 Tide 0.5

	Elapsed (hh:mm:ss)	Eagle Kangar Heading	Eagle Kangar Speed	Eagle Kangar Rudder (1)	Eagle Kangar Latitude	Eagle Kangar Longitude	Eagle Kangar Propeller revolution (1)	Eagle Kangar Engine power (1)	Eagle Kangar Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7	00:09:52	270	9.0	s35.0	N29°44.187	W095°08.697	71	4377	281	103	6.5	p11.4	N29°44.158	W095°08.858	47	1618	104
8	00:09:50	271	9.0	s35.0	N29°44.186	W095°08.691	71	4389	281	103	6.5	p6.4	N29°44.159	W095°08.862	47	1619	104
9	00:09:40	272	9.0	s35.0	N29°44.182	W095°08.663	72	4445	281	103	6.7	p0.2	N29°44.163	W095°08.882	47	1621	104

This is an own ship

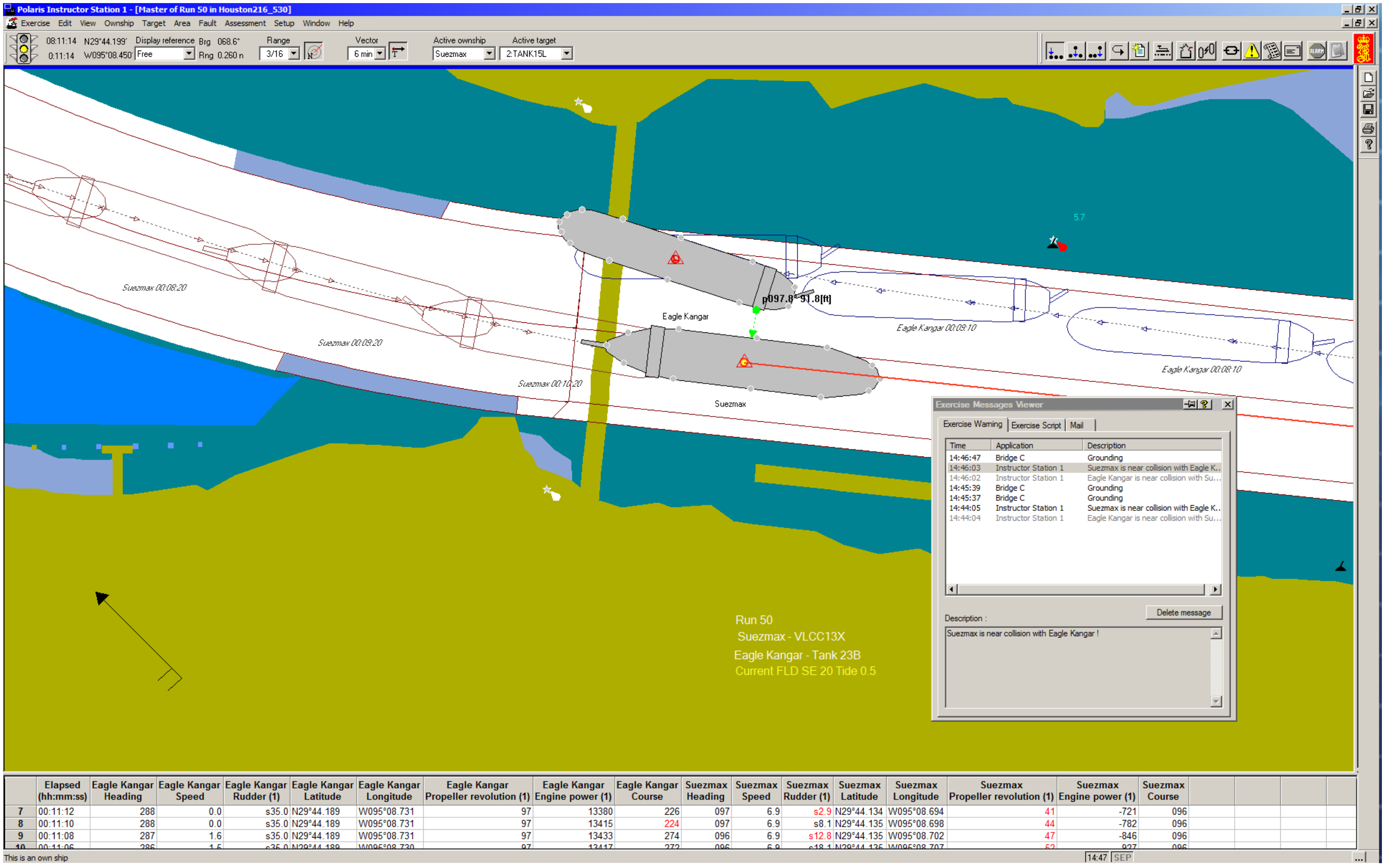


08:10:34 N29°44.223' Display reference: Free Brg 053.2°
0:10:34 W095°08.546' Rng 0.198 n
Range: 3/16
Vector: 6 min
Active ownship: Suezmax
Active target: 2:TANK15L

Run 50
Suezmax - VLCC13X
Eagle Kangar - Tank 23B
Current FLD SE 20 Tide 0.5

	Elapsed (hh:mm:ss)	Eagle Kangar Heading	Eagle Kangar Speed	Eagle Kangar Rudder (1)	Eagle Kangar Latitude	Eagle Kangar Longitude	Eagle Kangar Propeller revolution (1)	Eagle Kangar Engine power (1)	Eagle Kangar Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7	00:10:32	275	0.5	p0.9	N29°44.189	W095°08.720	19	571	262	098	6.4	p1.8	N29°44.143	W095°08.779	66	10160	100
8	00:10:30	274	0.5	p0.9	N29°44.189	W095°08.720	22	-190	259	098	6.3	p6.8	N29°44.143	W095°08.783	60	9161	100
9	00:10:28	274	0.5	p0.8	N29°44.189	W095°08.720	26	-227	256	099	6.3	p12.0	N29°44.144	W095°08.787	53	7879	100

This is a point showing relative distance from ownship



08:11:14 N29°44.199' Display reference Free Brg 068.6° Range 3/16 Vector 6 min Active ownship Suezmax Active target 2:TANK15L

0:11:14 W095°08.450' Rng 0.260 n

Run 50
Suezmax - VLCC13X
Eagle Kangar - Tank 23B
Current FLD SE 20 Tide 0.5

Time	Application	Description
14:46:47	Bridge C	Grounding
14:46:03	Instructor Station 1	Suezmax is near collision with Eagle K..
14:46:02	Instructor Station 1	Eagle Kangar is near collision with Su...
14:45:39	Bridge C	Grounding
14:45:37	Bridge C	Grounding
14:44:05	Instructor Station 1	Suezmax is near collision with Eagle K..
14:44:04	Instructor Station 1	Eagle Kangar is near collision with Su...

Description :

Suezmax is near collision with Eagle Kangar !

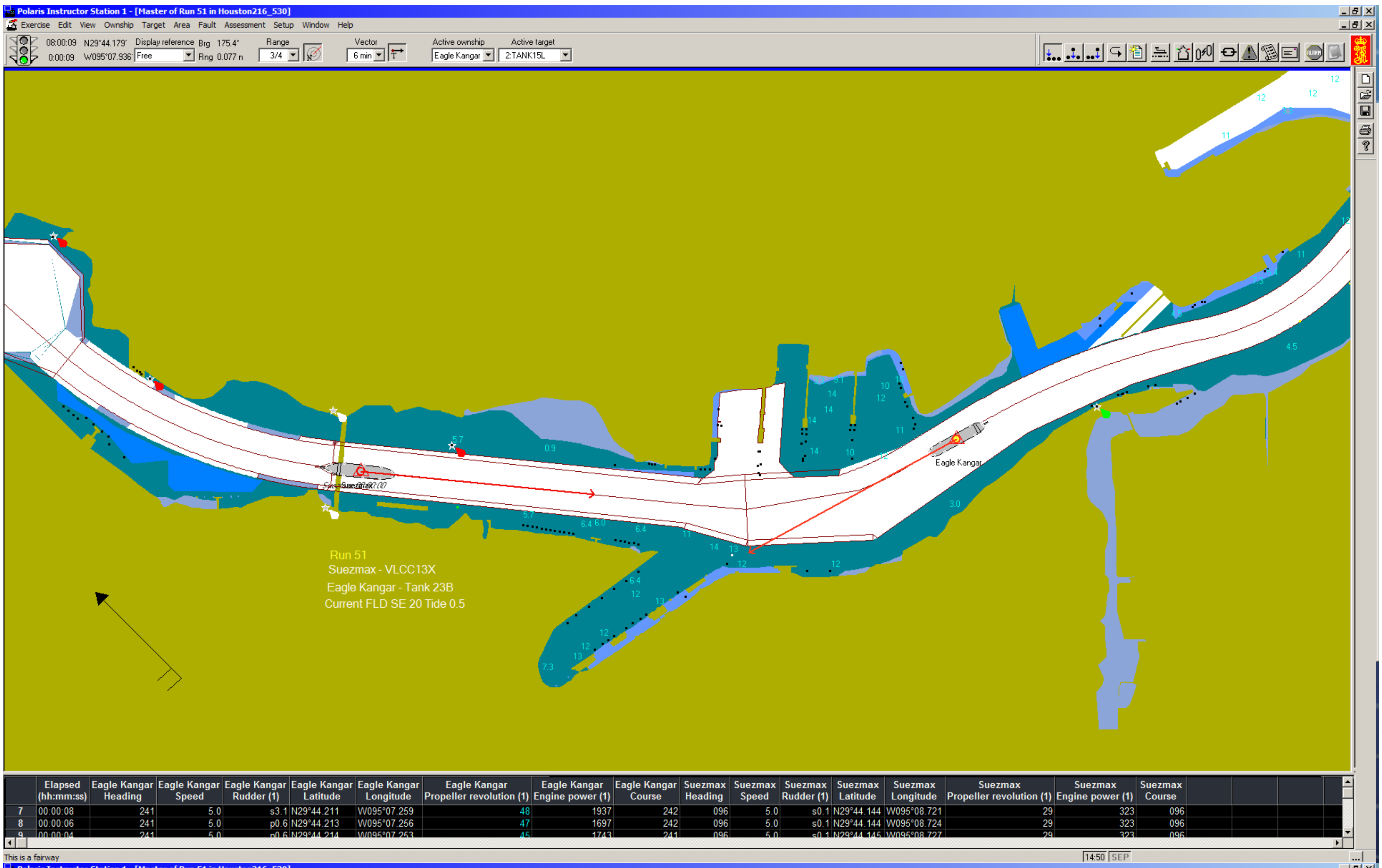
	Elapsed (hh:mm:ss)	Eagle Kangar Heading	Eagle Kangar Speed	Eagle Kangar Rudder (1)	Eagle Kangar Latitude	Eagle Kangar Longitude	Eagle Kangar Propeller revolution (1)	Eagle Kangar Engine power (1)	Eagle Kangar Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7	00:11:12	288	0.0	s35.0	N29°44.189	W095°08.731	97	13380	226	097	6.9	s2.9	N29°44.134	W095°08.694	41	-721	096
8	00:11:10	288	0.0	s35.0	N29°44.189	W095°08.731	97	13415	224	097	6.9	s8.1	N29°44.135	W095°08.698	44	-782	096
9	00:11:08	287	1.6	s35.0	N29°44.189	W095°08.731	97	13433	274	096	6.9	s12.8	N29°44.135	W095°08.702	47	-846	096

This is an own ship

14:47 SEP

June 26, 2019

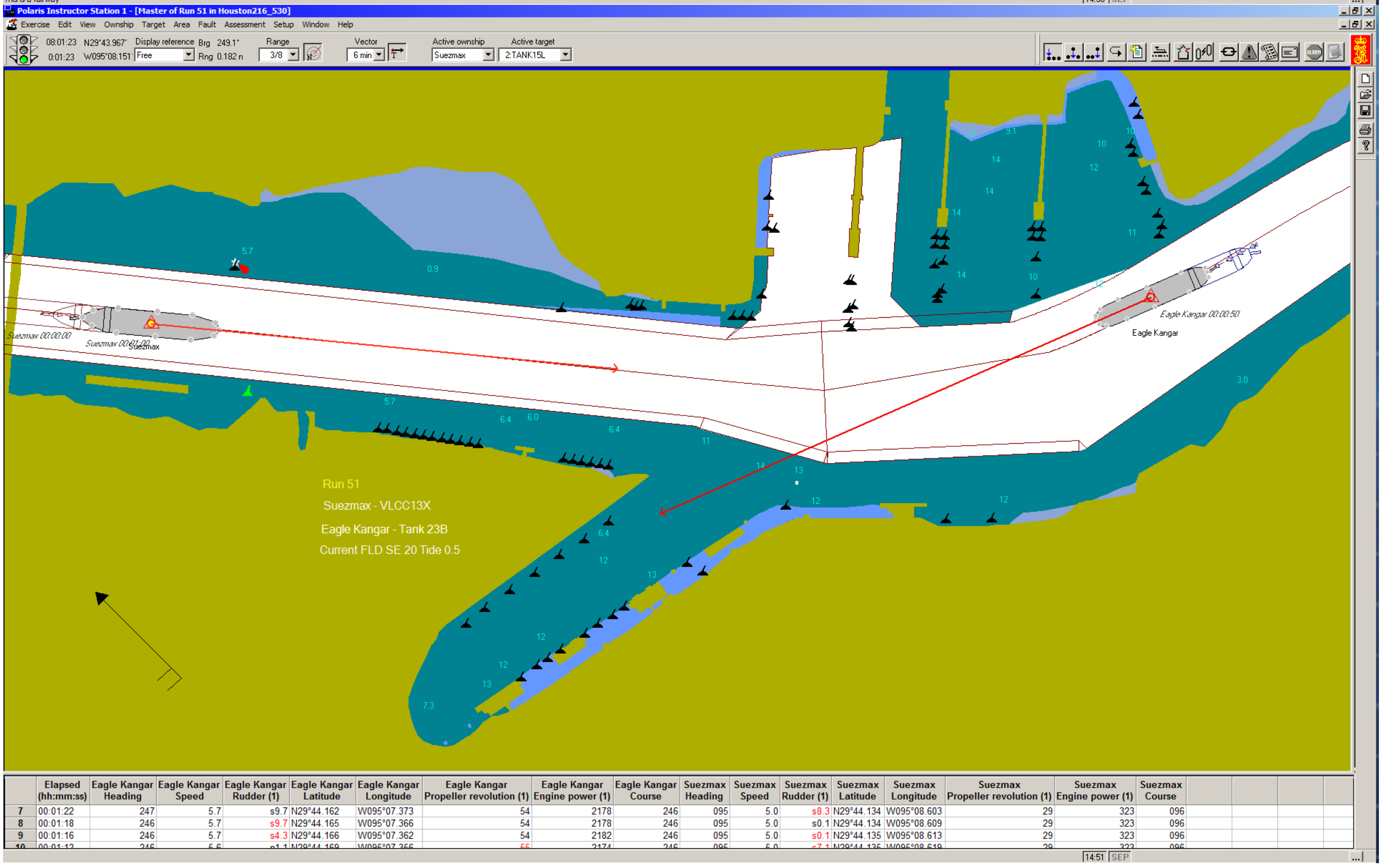
Run 51



08:00:09 N29°44.179′ Display reference Brg 175.4° Range 3/4 Vector 6 min Active ownship Eagle Kangar Active target 2:TANK15L
0:00:09 W095°07.936 Free Rng 0.077 n

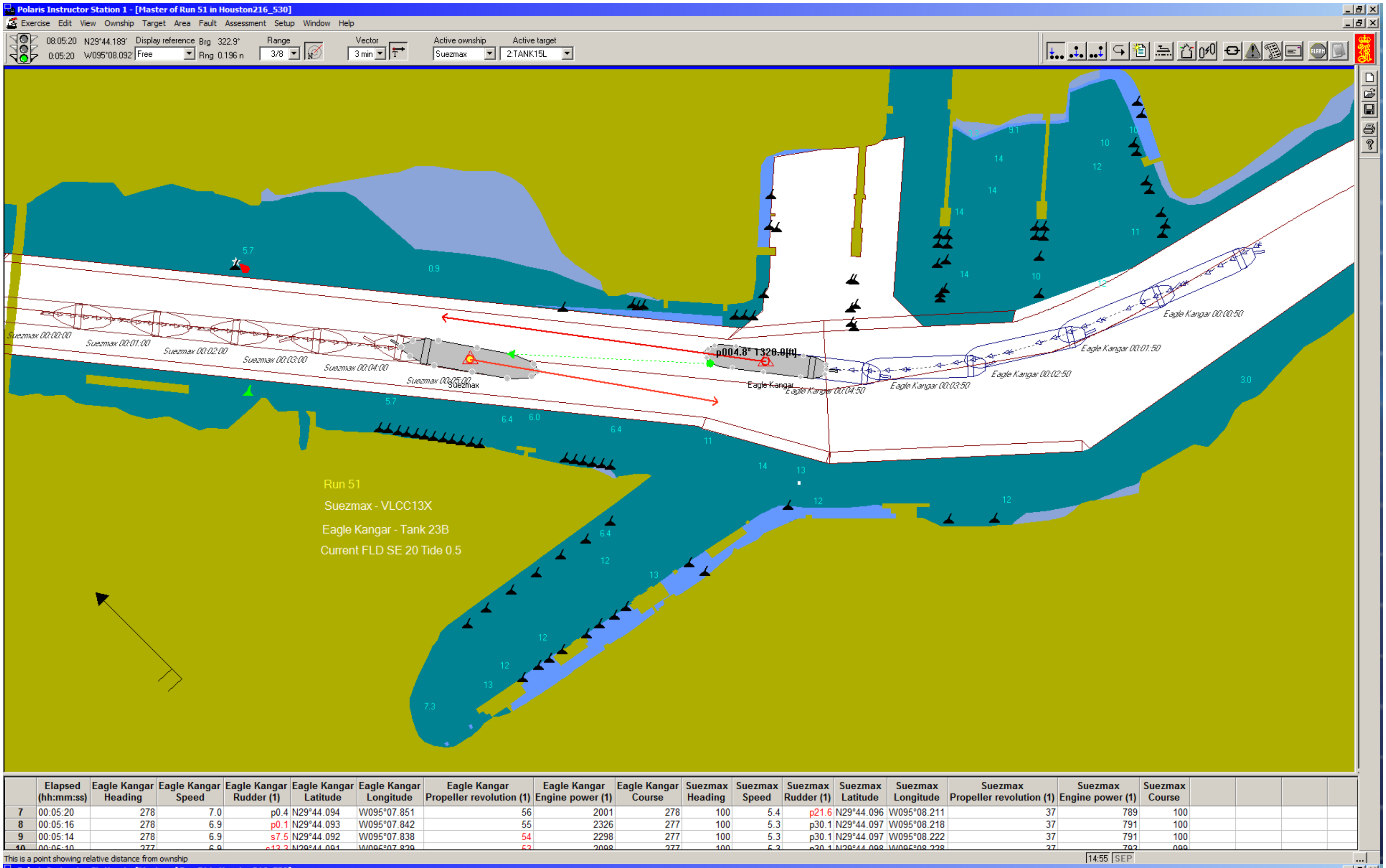
	Elapsed (hh:mm:ss)	Eagle Kangar Heading	Eagle Kangar Speed	Eagle Kangar Rudder (1)	Eagle Kangar Latitude	Eagle Kangar Longitude	Eagle Kangar Propeller revolution (1)	Eagle Kangar Engine power (1)	Eagle Kangar Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7	00:00:08	241	5.0	s3.1	N29°44.211	W095°07.259	48	1937	242	096	5.0	s0.1	N29°44.144	W095°08.721	29	323	096
8	00:00:06	241	5.0	p0.6	N29°44.213	W095°07.256	47	1697	242	096	5.0	s0.1	N29°44.144	W095°08.724	29	323	096
9	00:00:04	241	5.0	p0.6	N29°44.214	W095°07.253	45	1743	241	096	5.0	s0.1	N29°44.145	W095°08.727	29	323	096

This is a fairway



08:01:23 N29°43.967′ Display reference Brg 249.1° Range 3/8 Vector 6 min Active ownship Suezmax Active target 2:TANK15L
0:01:23 W095°08.151′ Free Rng 0.182 n

	Elapsed (hh:mm:ss)	Eagle Kangar Heading	Eagle Kangar Speed	Eagle Kangar Rudder (1)	Eagle Kangar Latitude	Eagle Kangar Longitude	Eagle Kangar Propeller revolution (1)	Eagle Kangar Engine power (1)	Eagle Kangar Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7	00:01:22	247	5.7	s9.7	N29°44.162	W095°07.373	54	2178	246	095	5.0	s8.3	N29°44.134	W095°08.603	29	323	096
8	00:01:18	246	5.7	s9.7	N29°44.165	W095°07.366	54	2178	246	095	5.0	s0.1	N29°44.134	W095°08.609	29	323	096
9	00:01:16	246	5.7	s4.3	N29°44.166	W095°07.362	54	2182	246	095	5.0	s0.1	N29°44.135	W095°08.613	29	323	096
10	00:01:12	246	5.6	p1.1	N29°44.169	W095°07.356	55	2174	246	095	5.0	s7.1	N29°44.135	W095°08.619	29	323	096

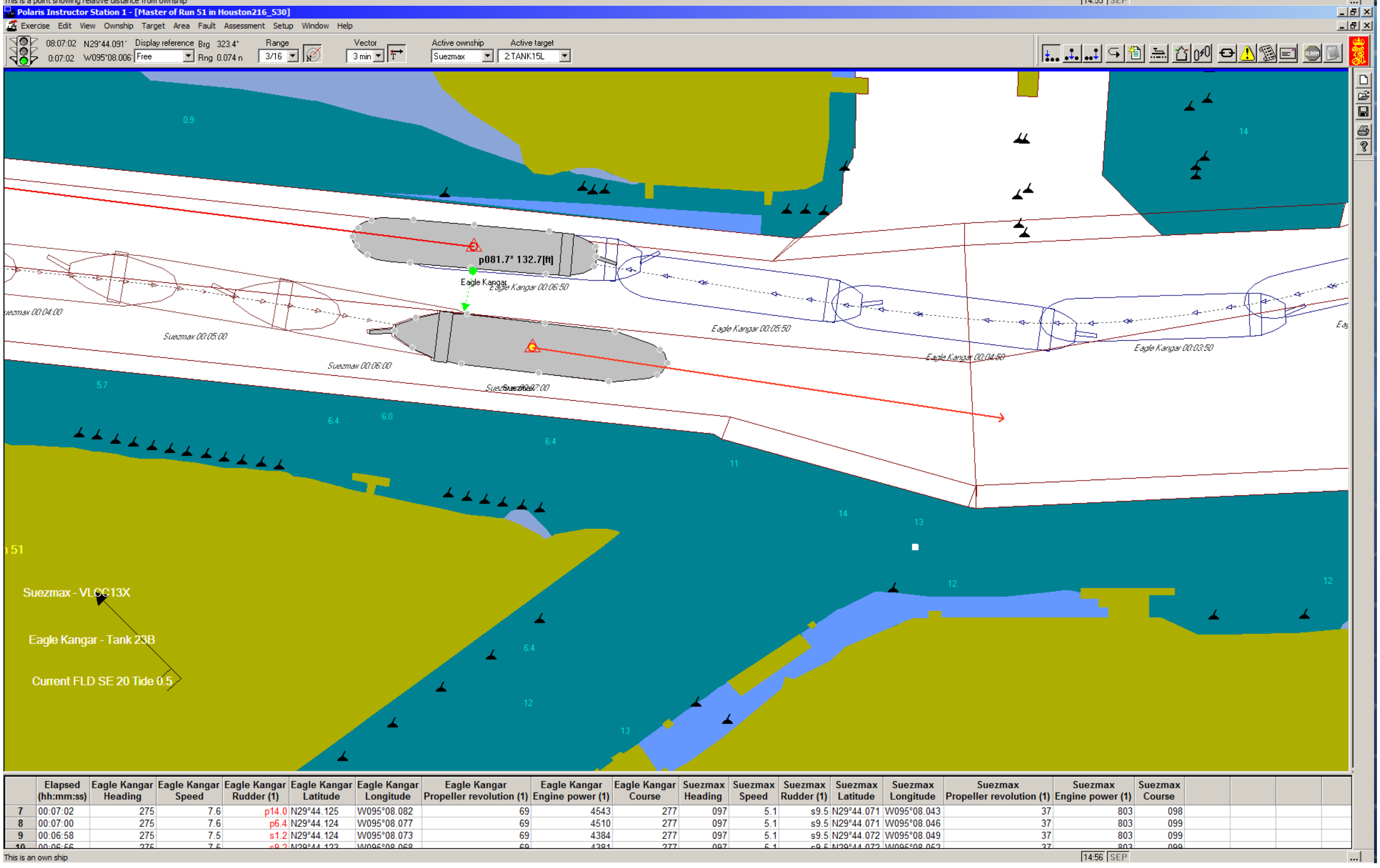


08:05:20 N29°44.189' Display reference Brg 322.9°
0:05:20 W095°08.092' Free Rng 0.196 n
Range 3/8
Vector 3 min
Active ownship Suezmax
Active target 2:TANK15L

	Elapsed (hh:mm:ss)	Eagle Kangar Heading	Eagle Kangar Speed	Eagle Kangar Rudder (1)	Eagle Kangar Latitude	Eagle Kangar Longitude	Eagle Kangar Propeller revolution (1)	Eagle Kangar Engine power (1)	Eagle Kangar Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course				
7	00:05:20	278	7.0	p0.4	N29°44.094	W095°07.851	56	2001	278	100	5.4	p21.6	N29°44.096	W095°08.211	37	789	100				
8	00:05:16	278	6.9	p0.1	N29°44.093	W095°07.842	55	2326	277	100	5.3	p30.1	N29°44.097	W095°08.218	37	791	100				
9	00:05:14	278	6.9	s7.5	N29°44.092	W095°07.838	54	2298	277	100	5.3	p30.1	N29°44.097	W095°08.222	37	791	100				
10	00:05:10	277	6.9	s13.3	N29°44.091	W095°07.829	53	2098	277	100	5.3	p30.1	N29°44.098	W095°08.228	37	793	099				

This is a point showing relative distance from ownship

14:55 SEP

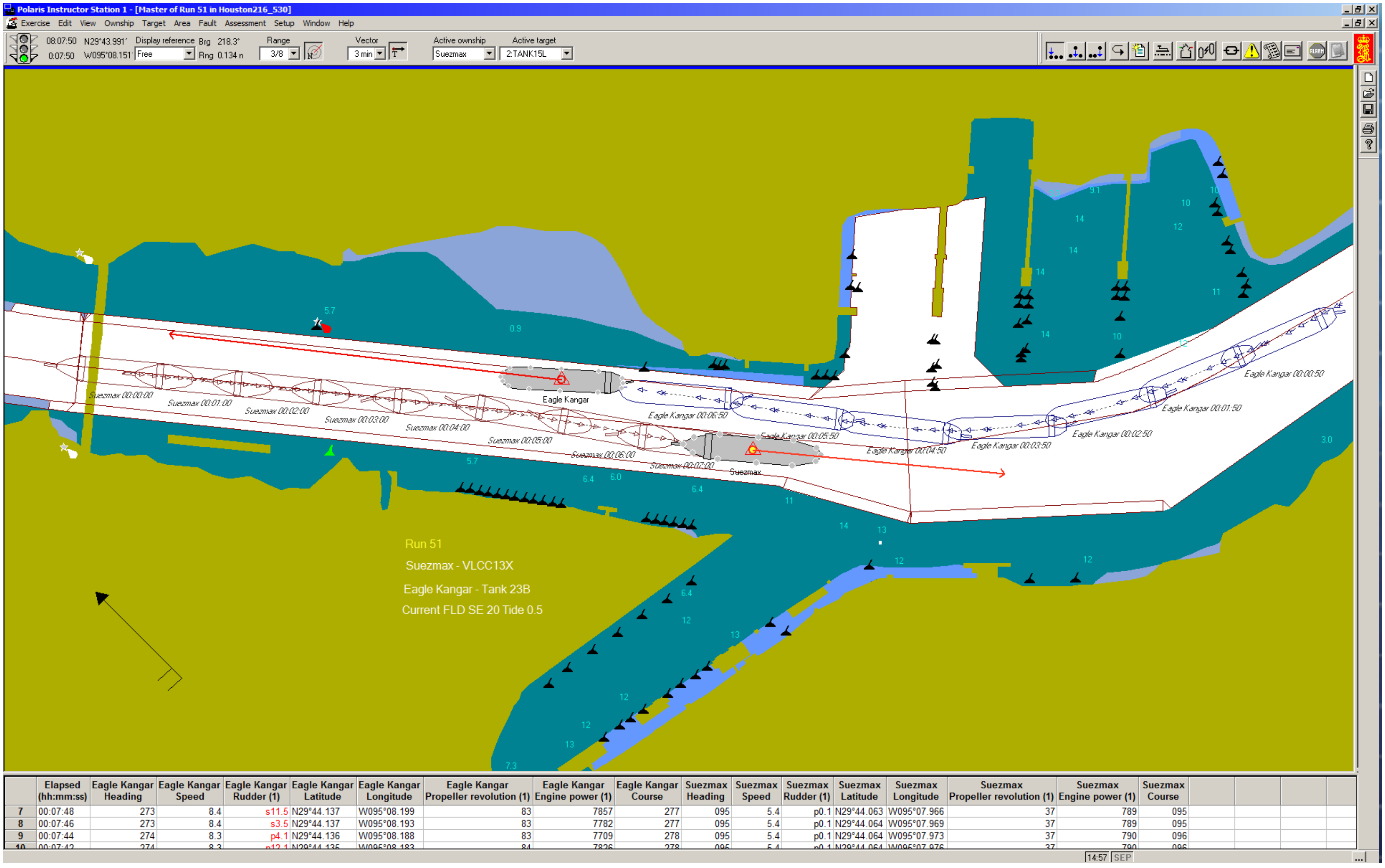


08:07:02 N29°44.091' Display reference Brg 323.4°
0:07:02 W095°08.006' Free Rng 0.074 n
Range 3/16
Vector 3 min
Active ownship Suezmax
Active target 2:TANK15L

	Elapsed (hh:mm:ss)	Eagle Kangar Heading	Eagle Kangar Speed	Eagle Kangar Rudder (1)	Eagle Kangar Latitude	Eagle Kangar Longitude	Eagle Kangar Propeller revolution (1)	Eagle Kangar Engine power (1)	Eagle Kangar Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course				
7	00:07:02	275	7.6	p14.0	N29°44.125	W095°08.082	69	4543	277	097	5.1	s9.5	N29°44.071	W095°08.043	37	803	098				
8	00:07:00	275	7.6	p6.4	N29°44.124	W095°08.077	69	4510	277	097	5.1	s9.5	N29°44.071	W095°08.046	37	803	099				
9	00:06:58	275	7.5	s1.2	N29°44.124	W095°08.073	69	4384	277	097	5.1	s9.5	N29°44.072	W095°08.049	37	803	099				
10	00:06:56	275	7.5	s9.2	N29°44.123	W095°08.068	69	4381	277	097	5.1	s9.5	N29°44.072	W095°08.052	37	803	099				

This is an own ship

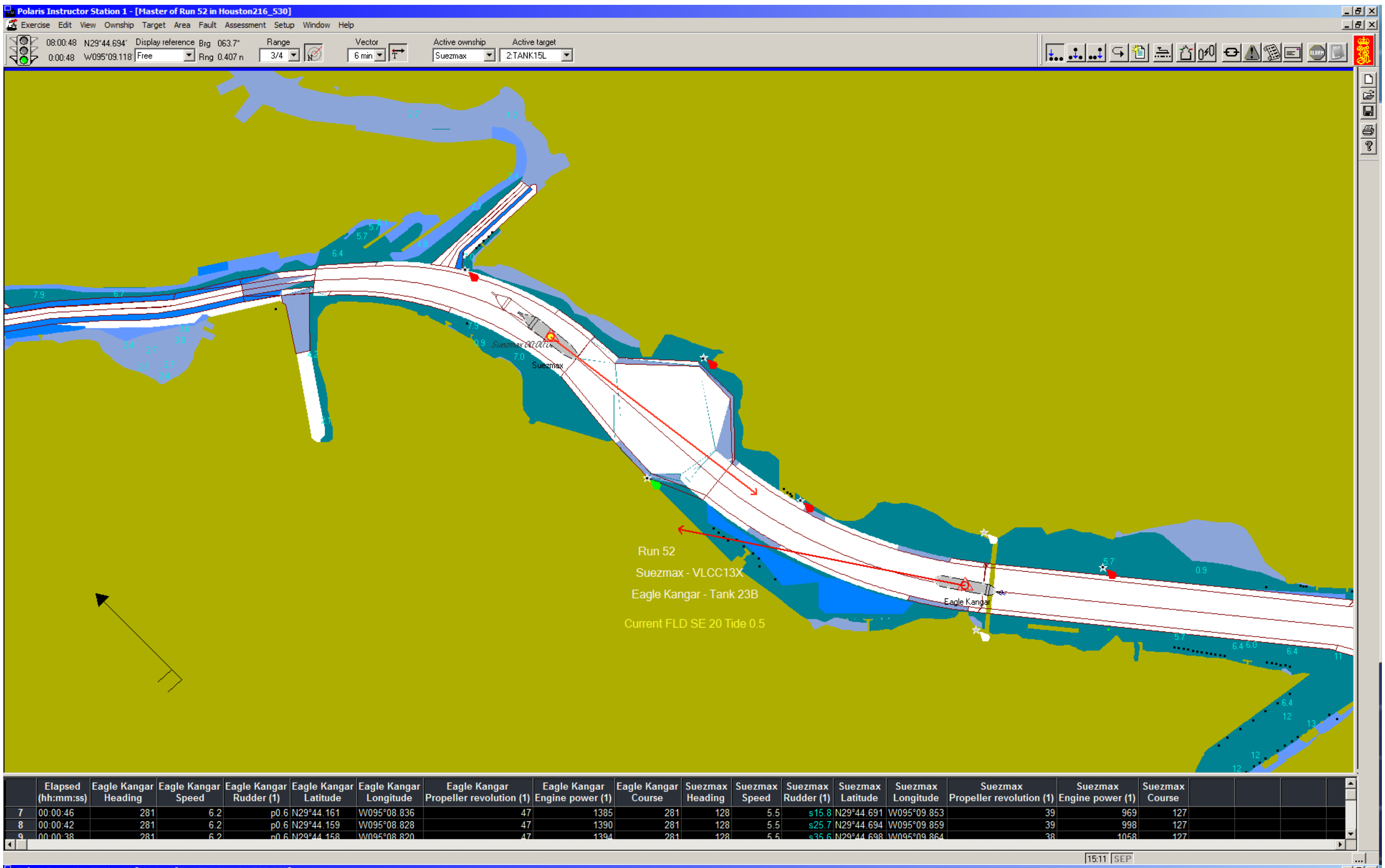
14:56 SEP



08:07:50 N29°43.991´
0:07:50 W095°08.151´
Display reference Free
Brg 218.3°
Rng 0.134 n
Range 3/8
Vector 3 min
Active ownship Suezmax
Active target 2:TANK15L

	Elapsed (hh:mm:ss)	Eagle Kangar Heading	Eagle Kangar Speed	Eagle Kangar Rudder (1)	Eagle Kangar Latitude	Eagle Kangar Longitude	Eagle Kangar Propeller revolution (1)	Eagle Kangar Engine power (1)	Eagle Kangar Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7	00:07:48	273	8.4	s11.5	N29°44.137	W095°08.199	83	7857	277	095	5.4	p0.1	N29°44.063	W095°07.966	37	789	095
8	00:07:46	273	8.4	s3.5	N29°44.137	W095°08.193	83	7782	277	095	5.4	p0.1	N29°44.064	W095°07.969	37	789	095
9	00:07:44	274	8.3	p4.1	N29°44.136	W095°08.188	83	7709	278	095	5.4	p0.1	N29°44.064	W095°07.973	37	790	096
10	00:07:42	274	8.3	p12.1	N29°44.135	W095°08.183	84	7826	278	095	5.4	p0.1	N29°44.064	W095°07.976	37	790	096

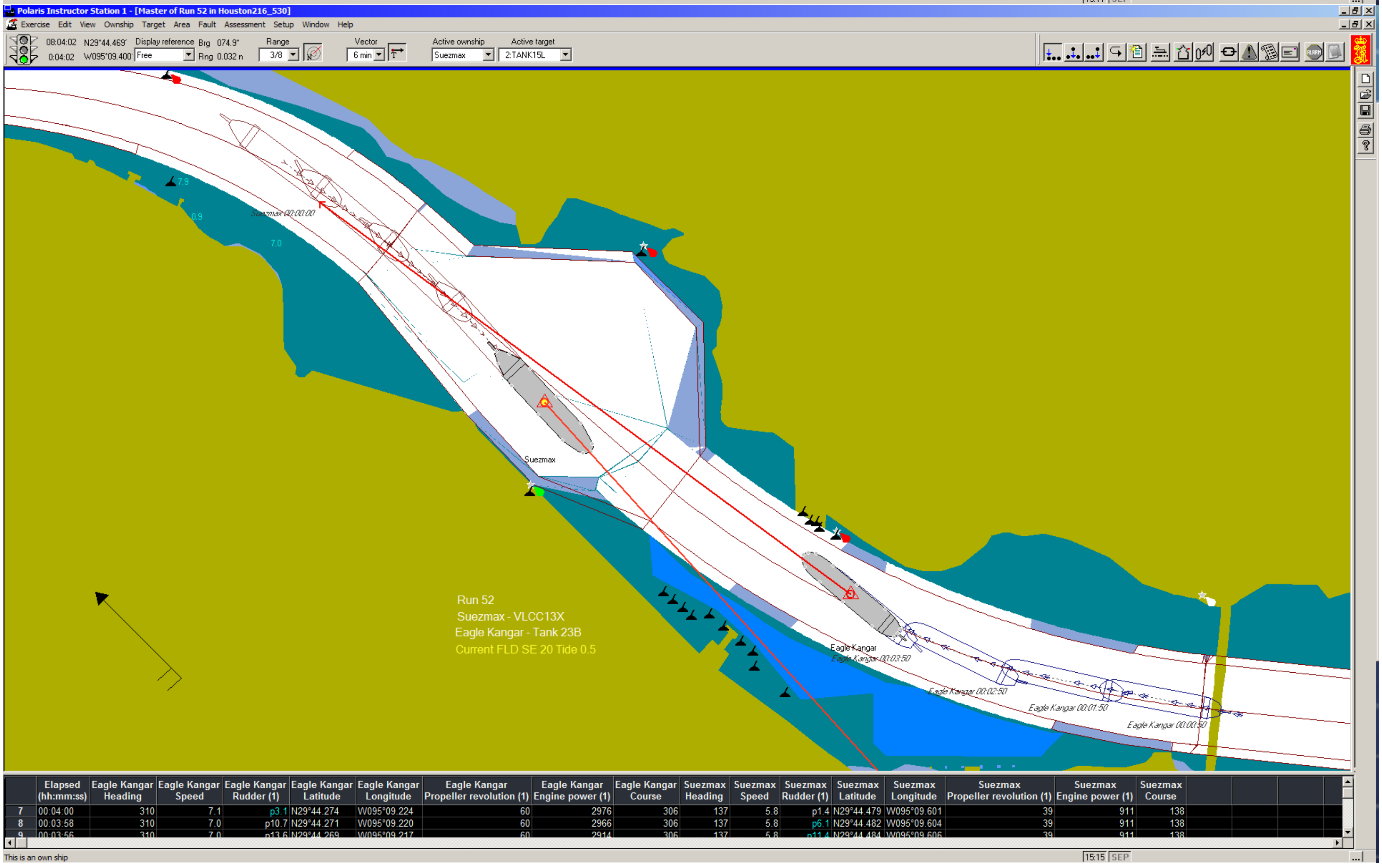
Run 52



08:00:48 N29°44.694'
0.00:48 W095°09.118'
Display reference: Free
Brg 063.7°
Rng 0.407 n
Range: 3/4
Vector: 6 min
Active ownship: Suezmax
Active target: 2:TANK15L

Run 52
Suezmax - VLCC13X
Eagle Kangar - Tank 23B
Current FLD SE 20 Tide 0.5

	Elapsed (hh:mm:ss)	Eagle Kangar Heading	Eagle Kangar Speed	Eagle Kangar Rudder (1)	Eagle Kangar Latitude	Eagle Kangar Longitude	Eagle Kangar Propeller revolution (1)	Eagle Kangar Engine power (1)	Eagle Kangar Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7	00:00:46	281	6.2	p0.6	N29°44.161	W095°08.836	47	1385	281	128	5.5	s15.8	N29°44.691	W095°09.853	39	969	127
8	00:00:42	281	6.2	p0.6	N29°44.159	W095°08.828	47	1390	281	128	5.5	s25.7	N29°44.694	W095°09.859	39	998	127
9	00:00:38	281	6.2	p0.6	N29°44.158	W095°08.820	47	1394	281	128	5.5	s35.6	N29°44.698	W095°09.864	38	1058	127

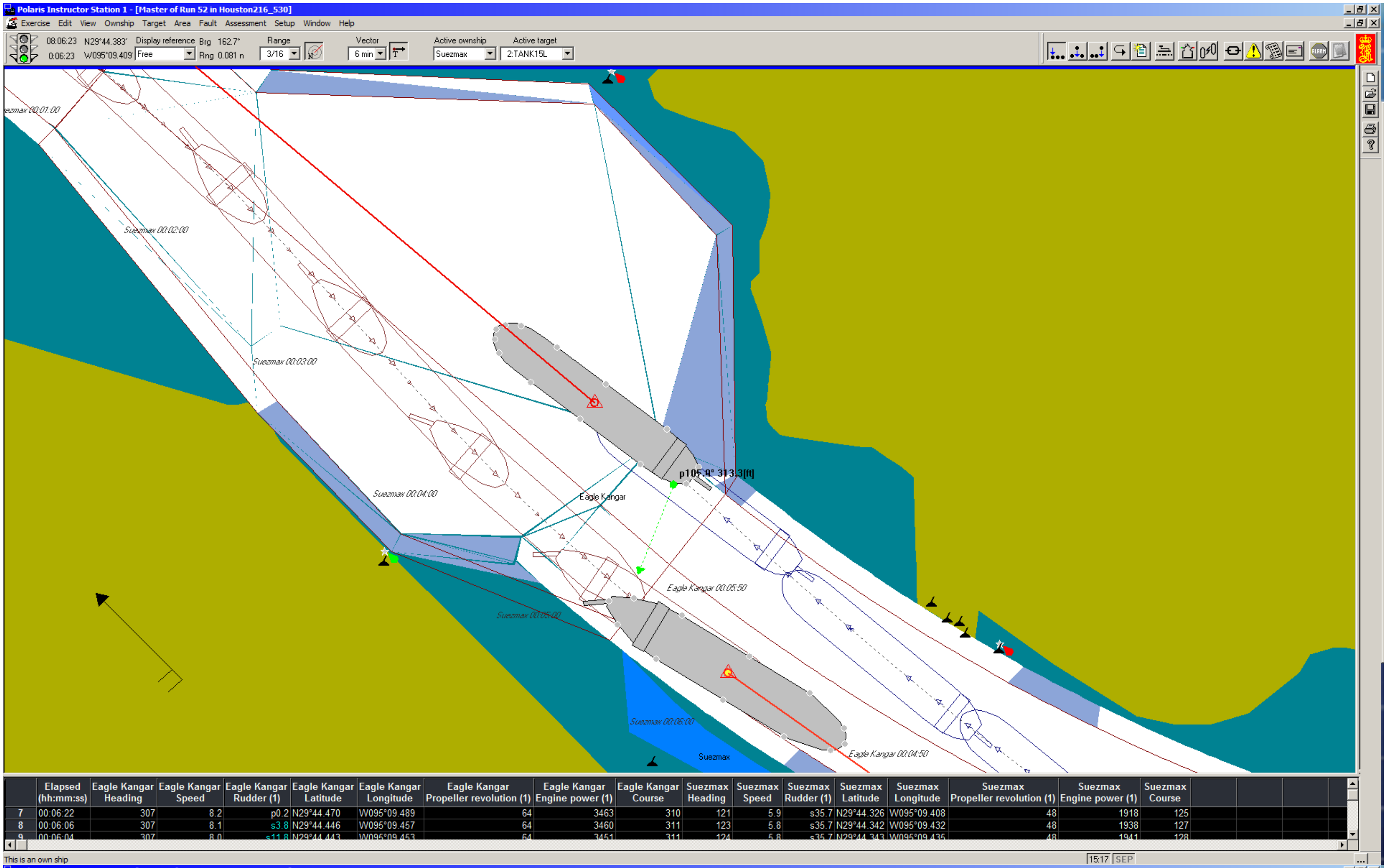


08:04:02 N29°44.469'
0.04:02 W095°09.400'
Display reference: Free
Brg 074.9°
Rng 0.032 n
Range: 3/8
Vector: 6 min
Active ownship: Suezmax
Active target: 2:TANK15L

Run 52
Suezmax - VLCC13X
Eagle Kangar - Tank 23B
Current FLD SE 20 Tide 0.5

	Elapsed (hh:mm:ss)	Eagle Kangar Heading	Eagle Kangar Speed	Eagle Kangar Rudder (1)	Eagle Kangar Latitude	Eagle Kangar Longitude	Eagle Kangar Propeller revolution (1)	Eagle Kangar Engine power (1)	Eagle Kangar Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7	00:04:00	310	7.1	p3.1	N29°44.274	W095°09.224	60	2976	306	137	5.8	p1.4	N29°44.479	W095°09.601	39	911	138
8	00:03:58	310	7.0	p10.7	N29°44.271	W095°09.220	60	2966	306	137	5.8	p6.1	N29°44.482	W095°09.604	39	911	138
9	00:03:56	310	7.0	p13.6	N29°44.269	W095°09.217	60	2914	306	137	5.8	p11.4	N29°44.484	W095°09.606	39	911	138

This is an own ship

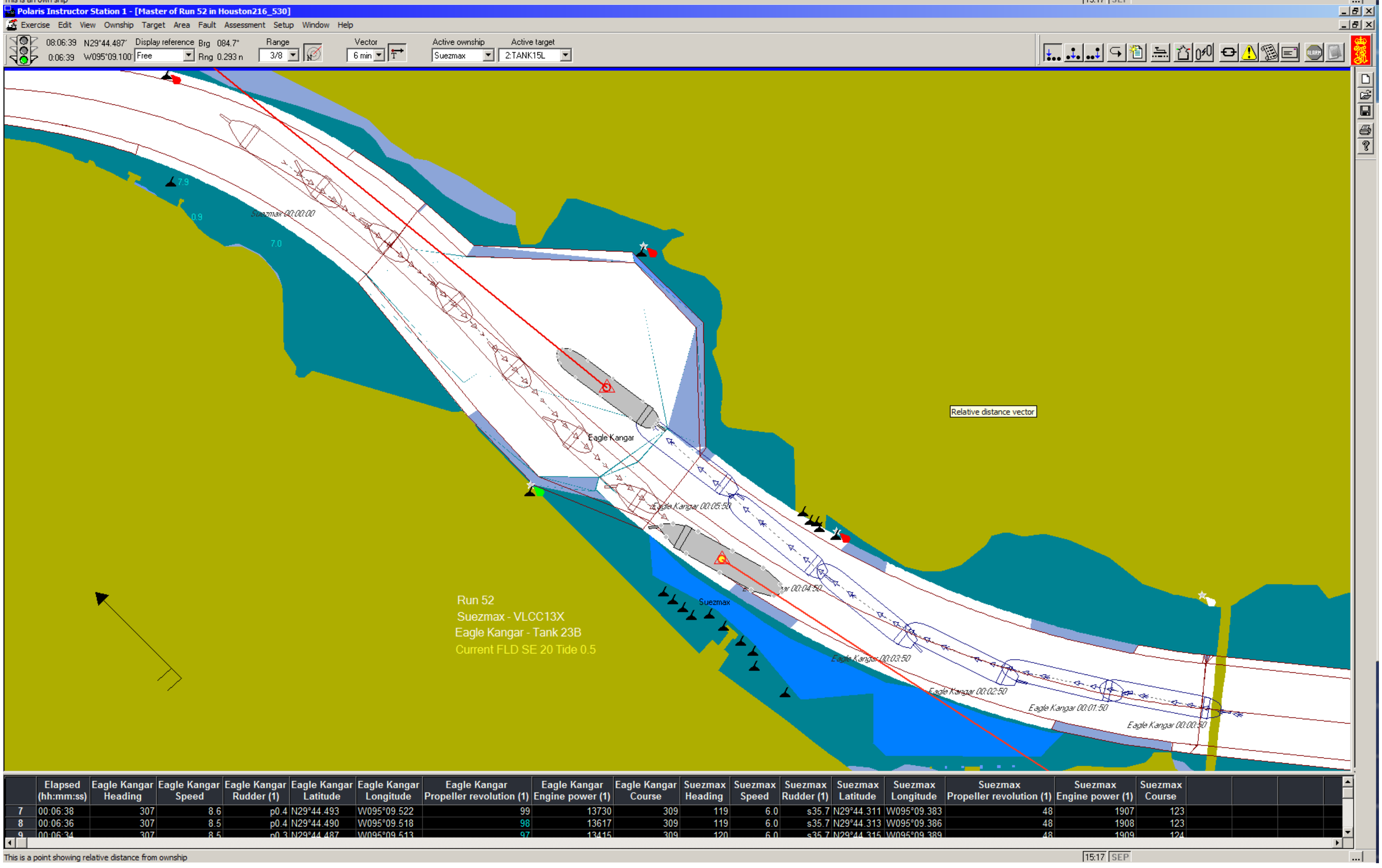


Polaris Instructor Station 1 - [Master of Run 52 in Houston216_530]

08:06:23 N29°44.383′ Display reference Free Brg 162.7° Rng 0.081 n Range 3/16 Vector 6 min Active ownship Suezmax Active target 2:TANK15L

	Elapsed (hh:mm:ss)	Eagle Kangar Heading	Eagle Kangar Speed	Eagle Kangar Rudder (1)	Eagle Kangar Latitude	Eagle Kangar Longitude	Eagle Kangar Propeller revolution (1)	Eagle Kangar Engine power (1)	Eagle Kangar Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7	00:06:22	307	8.2	p0.2	N29°44.470	W095°09.489	64	3463	310	121	5.9	s35.7	N29°44.326	W095°09.408	48	1918	125
8	00:06:06	307	8.1	s3.8	N29°44.446	W095°09.457	64	3460	311	123	5.8	s35.7	N29°44.342	W095°09.432	48	1938	127
9	00:06:04	307	8.0	s11.8	N29°44.443	W095°09.453	64	3451	311	124	5.8	s35.7	N29°44.343	W095°09.435	48	1941	128

This is an own ship



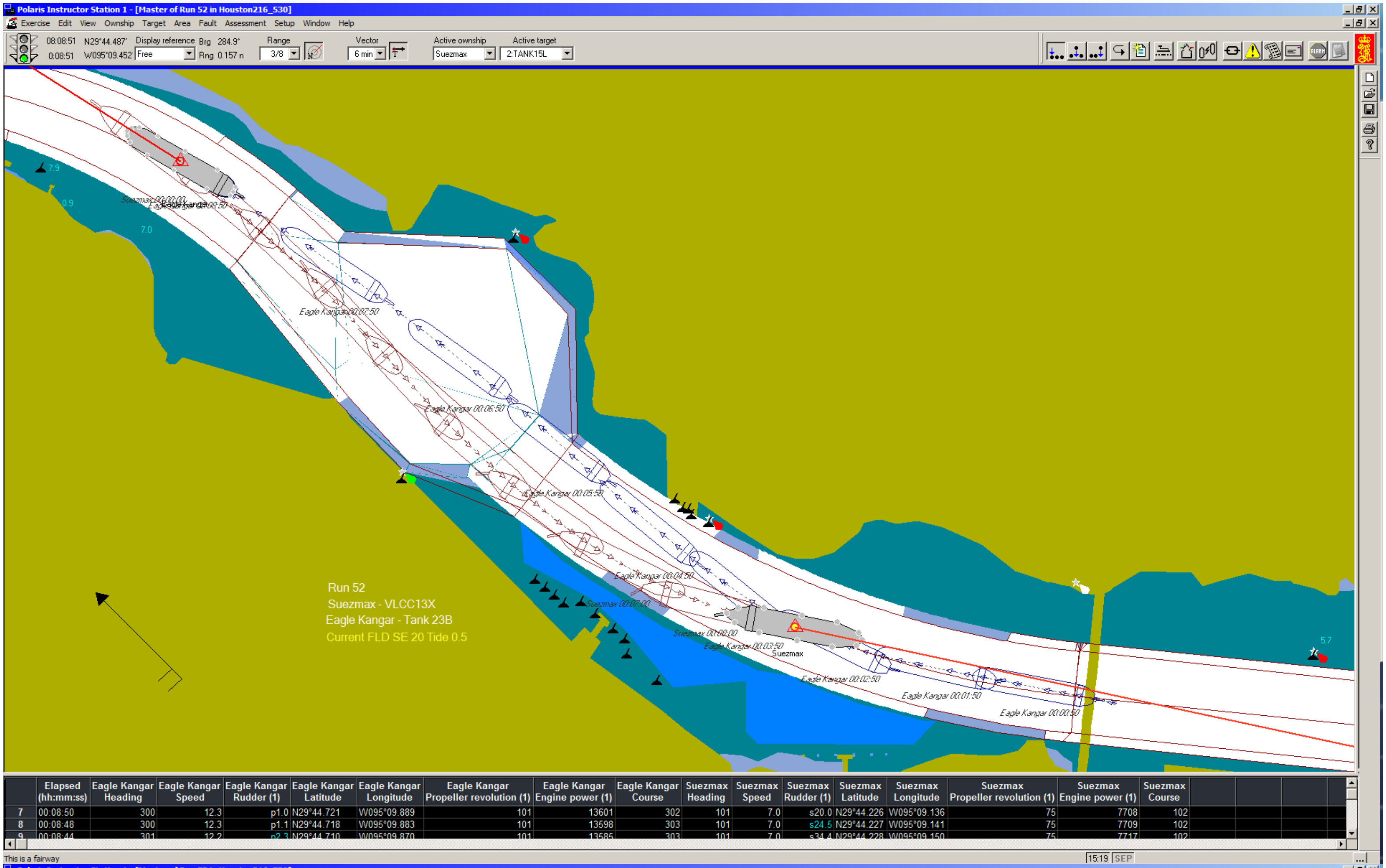
Polaris Instructor Station 1 - [Master of Run 52 in Houston216_530]

08:06:39 N29°44.487′ Display reference Free Brg 084.7° Rng 0.293 n Range 3/8 Vector 6 min Active ownship Suezmax Active target 2:TANK15L

Run 52
Suezmax - VLCC13X
Eagle Kangar - Tank 23B
Current FLD SE 20 Tide 0.5

	Elapsed (hh:mm:ss)	Eagle Kangar Heading	Eagle Kangar Speed	Eagle Kangar Rudder (1)	Eagle Kangar Latitude	Eagle Kangar Longitude	Eagle Kangar Propeller revolution (1)	Eagle Kangar Engine power (1)	Eagle Kangar Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7	00:06:38	307	8.6	p0.4	N29°44.493	W095°09.522	99	13730	309	119	6.0	s35.7	N29°44.311	W095°09.383	48	1907	123
8	00:06:36	307	8.5	p0.4	N29°44.490	W095°09.518	98	13617	309	119	6.0	s35.7	N29°44.313	W095°09.386	48	1908	123
9	00:06:34	307	8.5	p0.3	N29°44.487	W095°09.513	97	13415	309	120	6.0	s35.7	N29°44.315	W095°09.389	48	1909	124

This is a point showing relative distance from ownship



08:08:51 N29°44.487′ Display reference Free Brg 284.9° Rng 0.157 n

0:08:51 W095°09.452′

Range 3/8

Vector 6 min

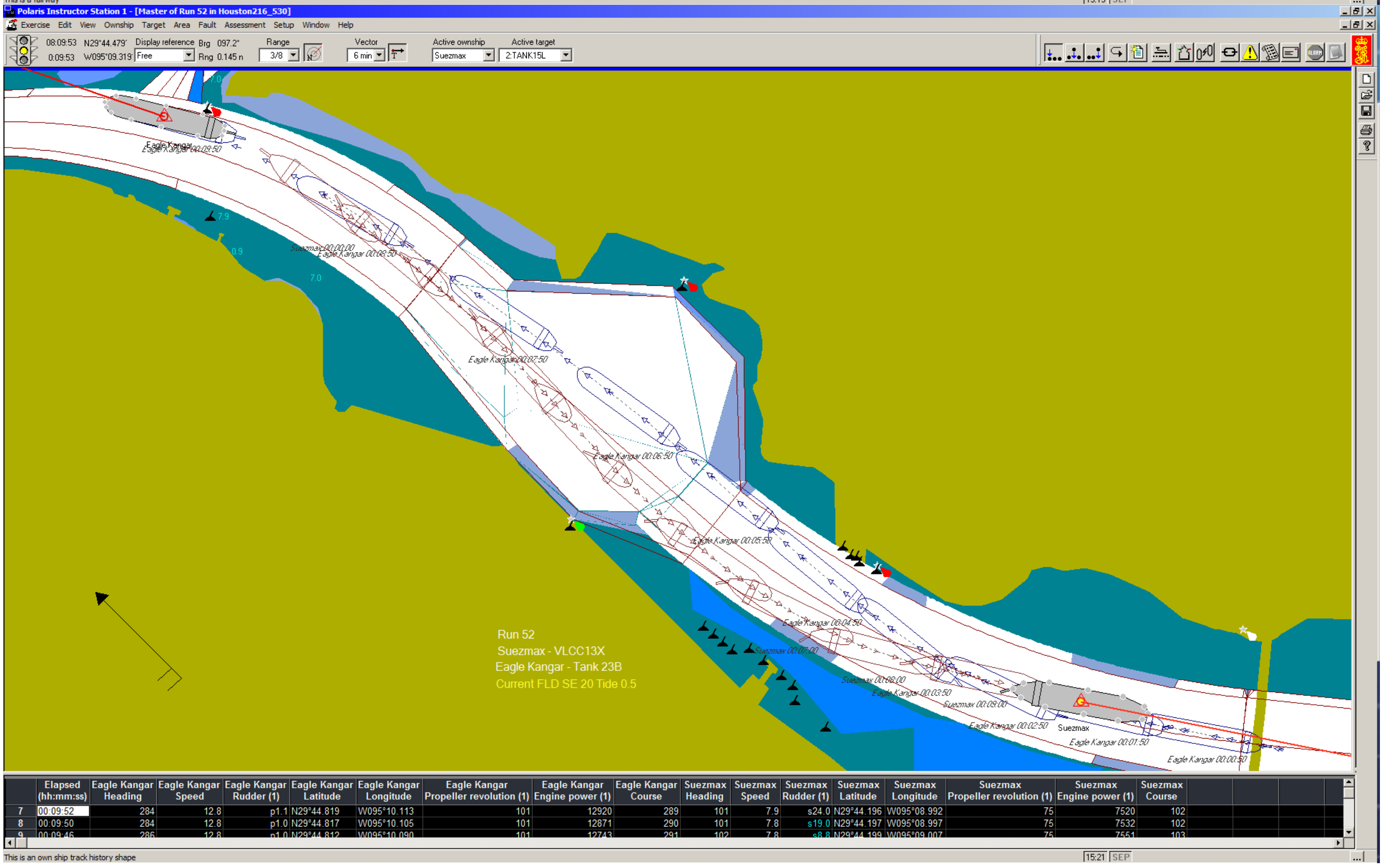
Active ownship Suezmax

Active target 2:TANK15L

	Elapsed (hh:mm:ss)	Eagle Kangar Heading	Eagle Kangar Speed	Eagle Kangar Rudder (1)	Eagle Kangar Latitude	Eagle Kangar Longitude	Eagle Kangar Propeller revolution (1)	Eagle Kangar Engine power (1)	Eagle Kangar Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7	00:08:50	300	12.3	p1.0	N29°44.721	W095°09.889	101	13601	302	101	7.0	s20.0	N29°44.226	W095°09.136	75	7708	102
8	00:08:48	300	12.3	p1.1	N29°44.718	W095°09.883	101	13598	303	101	7.0	s24.5	N29°44.227	W095°09.141	75	7709	102
9	00:08:44	301	12.2	p2.3	N29°44.710	W095°09.870	101	13585	303	101	7.0	s34.4	N29°44.228	W095°09.150	75	7717	102

This is a fairway

15:19 SEP



08:09:53 N29°44.479′ Display reference Free Brg 097.2° Rng 0.145 n

0:09:53 W095°09.319′

Range 3/8

Vector 6 min

Active ownship Suezmax

Active target 2:TANK15L

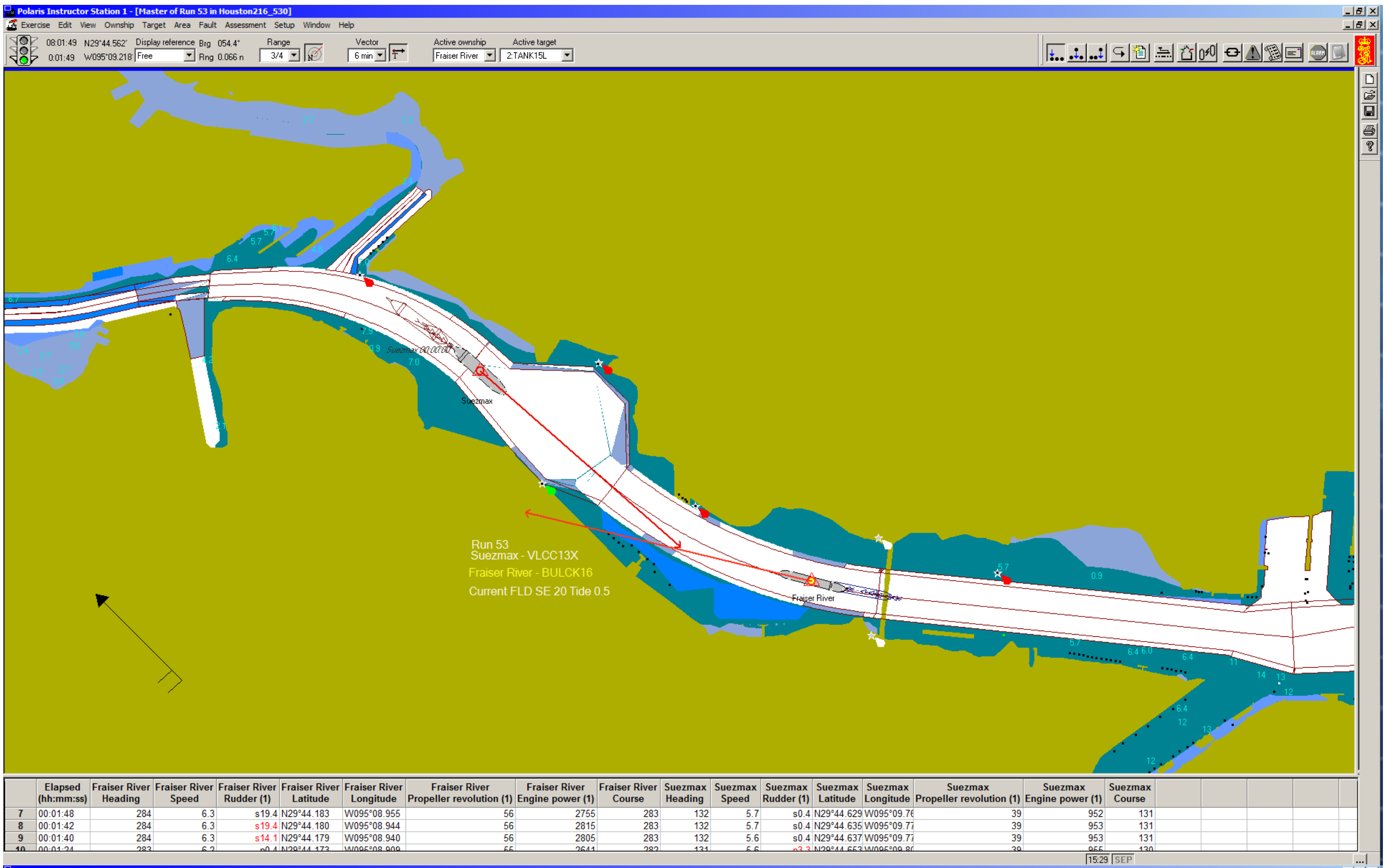
	Elapsed (hh:mm:ss)	Eagle Kangar Heading	Eagle Kangar Speed	Eagle Kangar Rudder (1)	Eagle Kangar Latitude	Eagle Kangar Longitude	Eagle Kangar Propeller revolution (1)	Eagle Kangar Engine power (1)	Eagle Kangar Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7	00:09:52	284	12.8	p1.1	N29°44.819	W095°10.113	101	12920	289	101	7.9	s24.0	N29°44.196	W095°08.992	75	7520	102
8	00:09:50	284	12.8	p1.0	N29°44.817	W095°10.105	101	12871	290	101	7.8	s19.0	N29°44.197	W095°08.997	75	7532	102
9	00:09:46	286	12.8	p1.0	N29°44.812	W095°10.090	101	12743	291	102	7.8	s8.8	N29°44.199	W095°09.007	75	7551	103

This is an own ship track history shape

15:21 SEP

June 26, 2019

Run 53



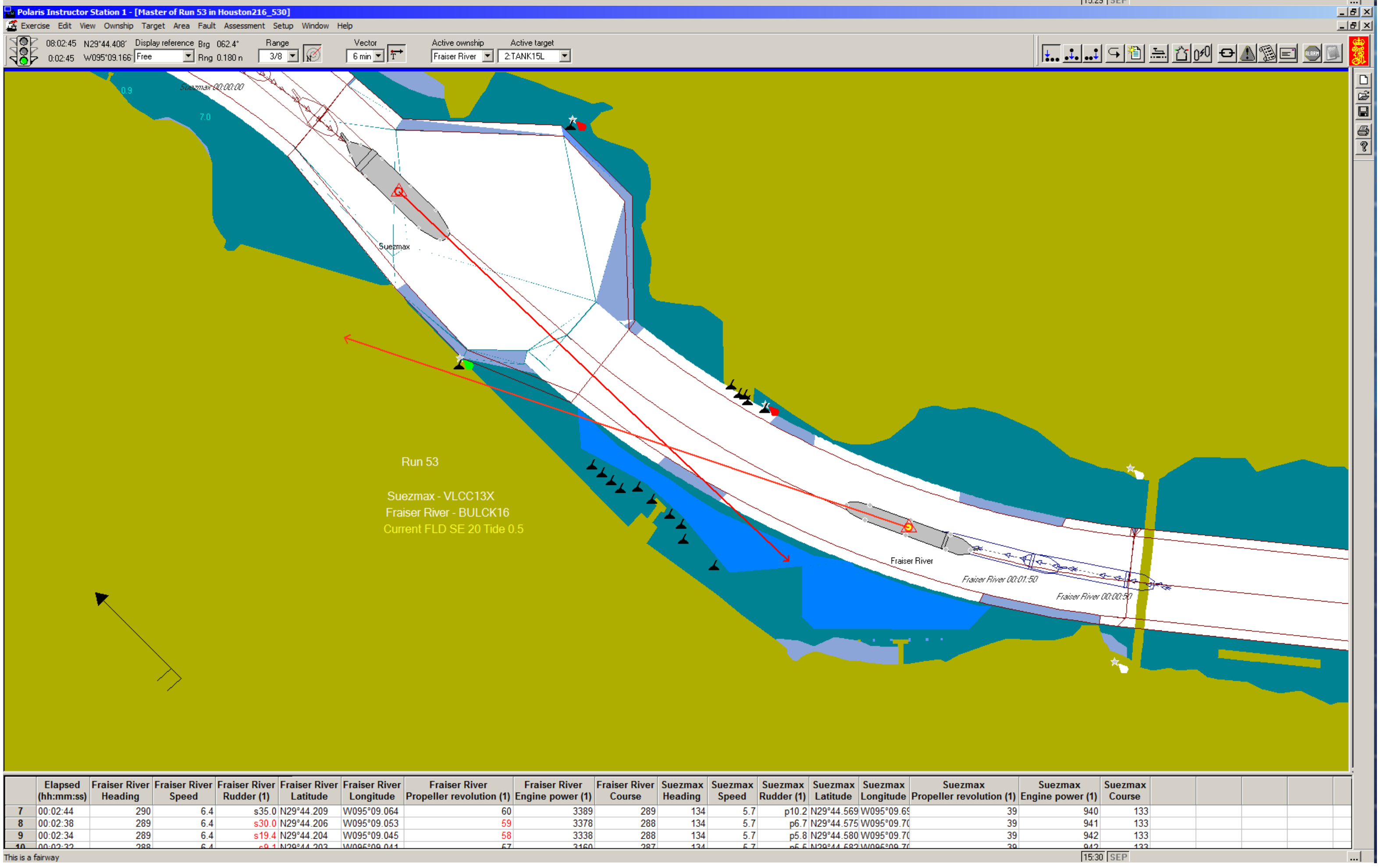
Polaris Instructor Station 1 - [Master of Run 53 in Houston216_530]

08:01:49 N29°44.562' Display reference Free Brg 054.4°
0:01:49 W095°09.218' Rng 0.066 n
Range 3/4
Vector 6 min
Active ownship Fraiser River
Active target 2:TANK15L

Run 53
Suezmax - VLCC13X
Fraiser River - BULCK16
Current FLD SE 20 Tide 0.5

	Elapsed (hh:mm:ss)	Fraiser River Heading	Fraiser River Speed	Fraiser River Rudder (1)	Fraiser River Latitude	Fraiser River Longitude	Fraiser River Propeller revolution (1)	Fraiser River Engine power (1)	Fraiser River Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7	00:01:48	284	6.3	s19.4	N29°44.183	W095°08.955	56	2755	283	132	5.7	s0.4	N29°44.629	W095°09.76	39	952	131
8	00:01:42	284	6.3	s19.4	N29°44.180	W095°08.944	56	2815	283	132	5.7	s0.4	N29°44.635	W095°09.77	39	953	131
9	00:01:40	284	6.3	s14.1	N29°44.179	W095°08.940	56	2805	283	132	5.6	s0.4	N29°44.637	W095°09.77	39	953	131

15:29 SEP



Polaris Instructor Station 1 - [Master of Run 53 in Houston216_530]

08:02:45 N29°44.408' Display reference Free Brg 062.4°
0:02:45 W095°09.166' Rng 0.180 n
Range 3/8
Vector 6 min
Active ownship Fraiser River
Active target 2:TANK15L

Run 53

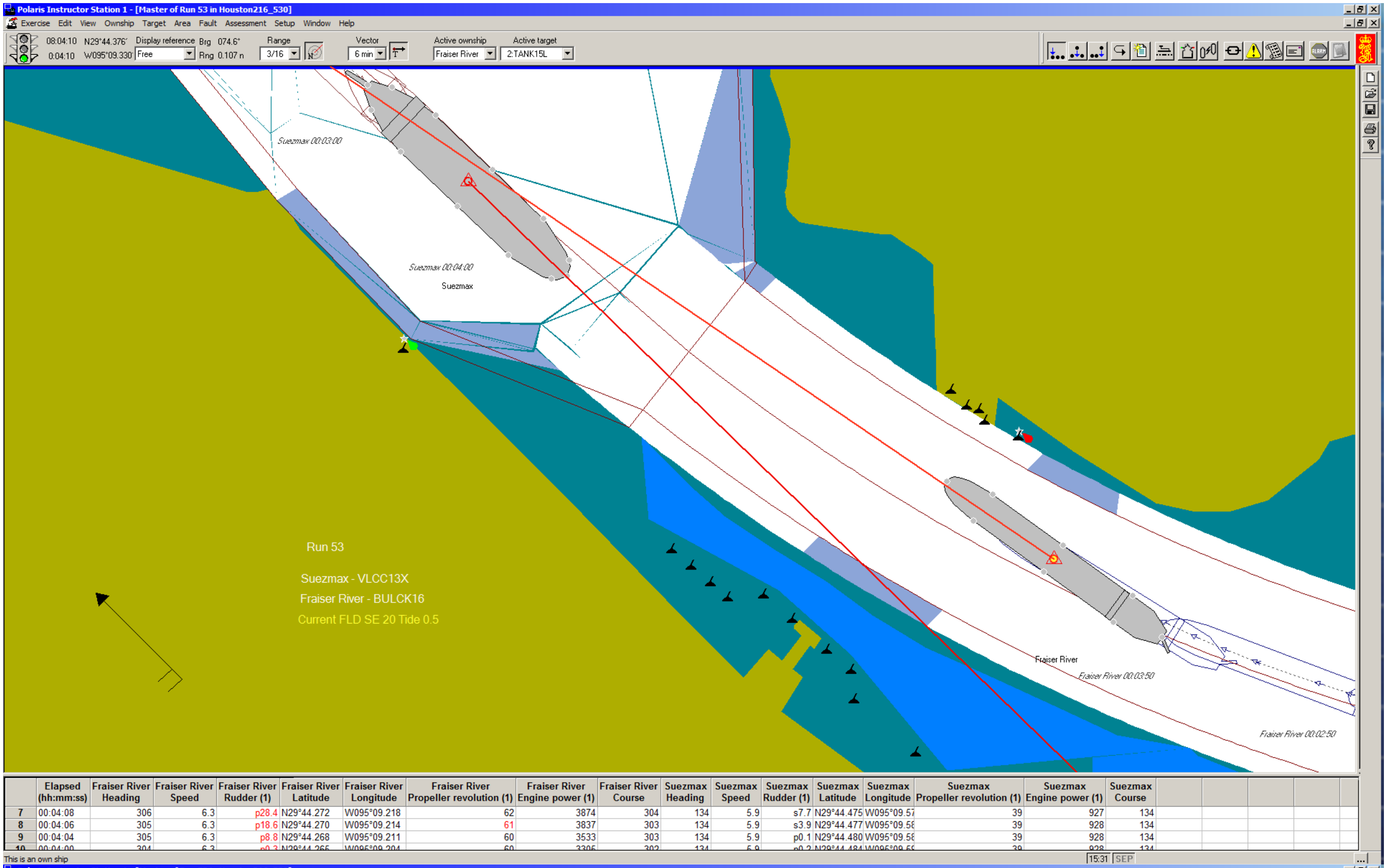
Suezmax - VLCC13X
Fraiser River - BULCK16
Current FLD SE 20 Tide 0.5

	Elapsed (hh:mm:ss)	Fraiser River Heading	Fraiser River Speed	Fraiser River Rudder (1)	Fraiser River Latitude	Fraiser River Longitude	Fraiser River Propeller revolution (1)	Fraiser River Engine power (1)	Fraiser River Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7	00:02:44	290	6.4	s35.0	N29°44.209	W095°09.064	60	3389	289	134	5.7	p10.2	N29°44.569	W095°09.69	39	940	133
8	00:02:38	289	6.4	s30.0	N29°44.206	W095°09.053	59	3378	288	134	5.7	p6.7	N29°44.575	W095°09.70	39	941	133
9	00:02:34	289	6.4	s19.4	N29°44.204	W095°09.045	58	3338	288	134	5.7	p5.8	N29°44.580	W095°09.70	39	942	133

This is a fairway

15:30 SEP

June 26, 2019



Polaris Instructor Station 1 - [Master of Run 53 in Houston216_530]

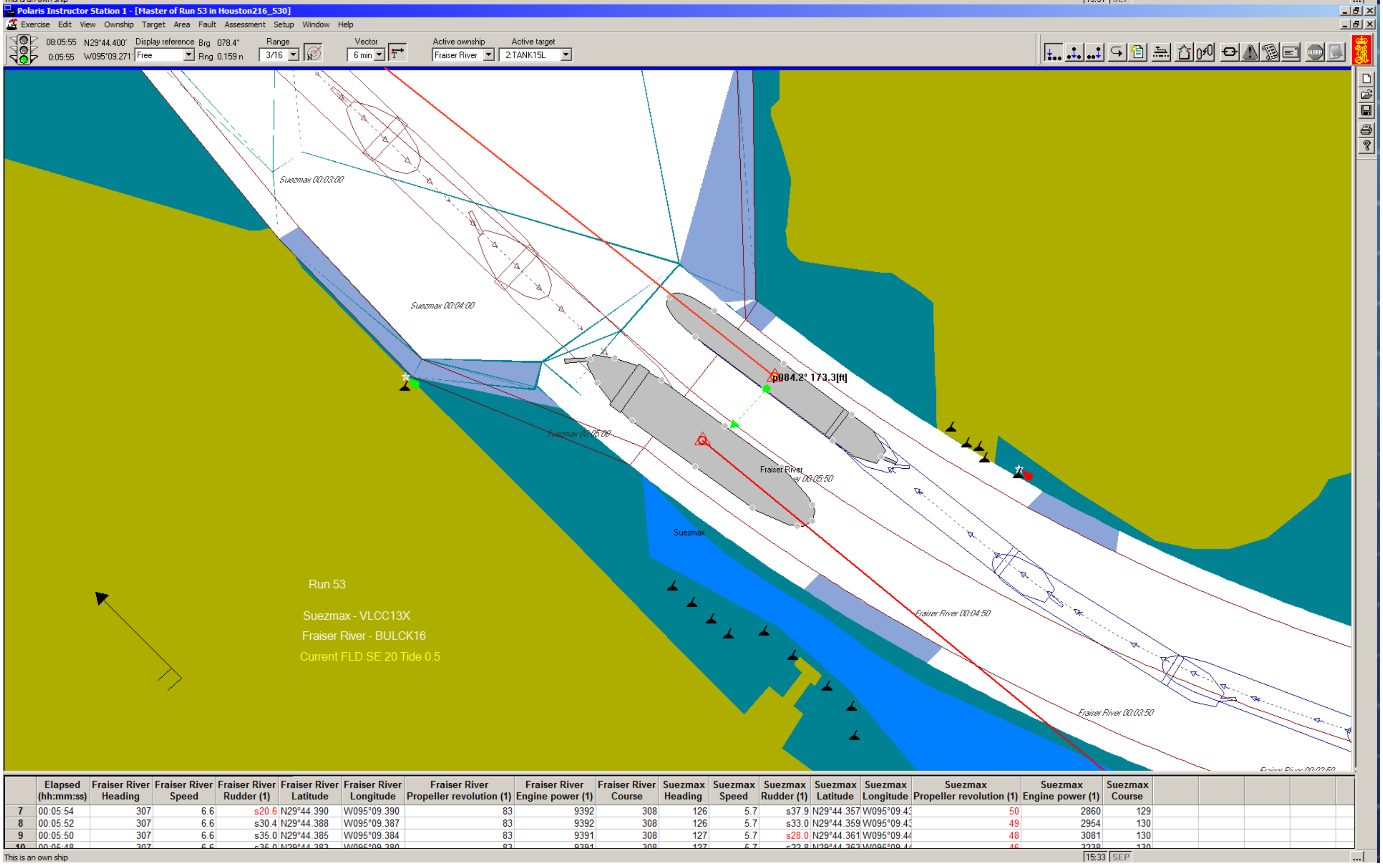
08:04:10 N29°44.376' Display reference Free Brg 074.6° Rng 0.107 n Range 3/16 Vector 6 min Active ownship Fraiser River Active target 2:TANK15L

0:04:10 W095°09.330'

	Elapsed (hh:mm:ss)	Fraiser River Heading	Fraiser River Speed	Fraiser River Rudder (1)	Fraiser River Latitude	Fraiser River Longitude	Fraiser River Propeller revolution (1)	Fraiser River Engine power (1)	Fraiser River Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7	00:04:08	306	6.3	p28.4	N29°44.272	W095°09.218	62	3874	304	134	5.9	s7.7	N29°44.475	W095°09.57	39	927	134
8	00:04:06	305	6.3	p18.6	N29°44.270	W095°09.214	61	3837	303	134	5.9	s3.9	N29°44.477	W095°09.58	39	928	134
9	00:04:04	305	6.3	p8.8	N29°44.268	W095°09.211	60	3533	303	134	5.9	p0.1	N29°44.480	W095°09.58	39	928	134

This is an own ship

15:31 SEP



Polaris Instructor Station 1 - [Master of Run 53 in Houston216_530]

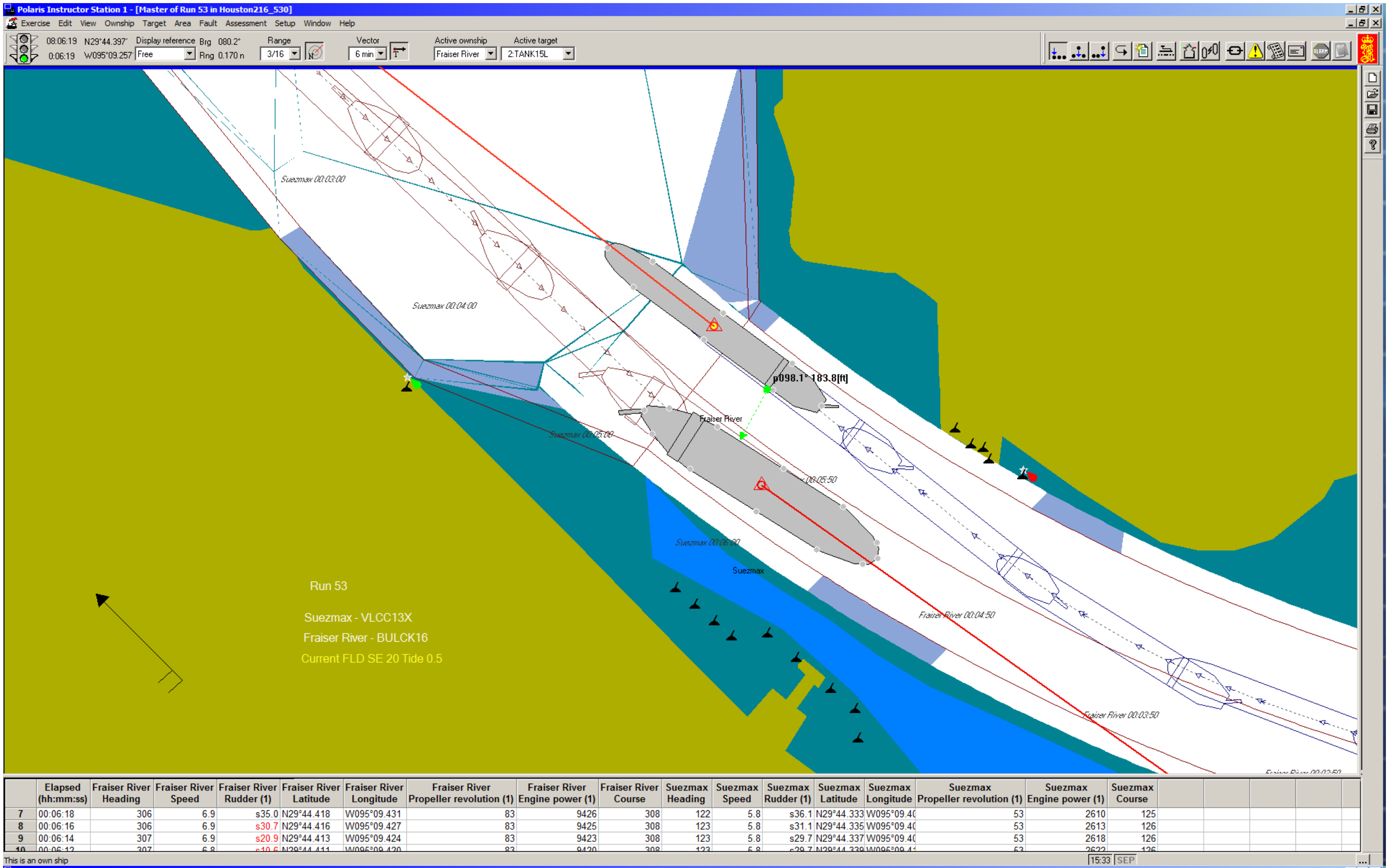
08:05:55 N29°44.400' Display reference Free Brg 078.4° Rng 0.159 n Range 3/16 Vector 6 min Active ownship Fraiser River Active target 2:TANK15L

0:05:55 W095°09.271'

	Elapsed (hh:mm:ss)	Fraiser River Heading	Fraiser River Speed	Fraiser River Rudder (1)	Fraiser River Latitude	Fraiser River Longitude	Fraiser River Propeller revolution (1)	Fraiser River Engine power (1)	Fraiser River Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7	00:05:54	307	6.6	s20.6	N29°44.390	W095°09.390	83	9392	308	126	5.7	s37.9	N29°44.357	W095°09.43	50	2860	129
8	00:05:52	307	6.6	s30.4	N29°44.388	W095°09.387	83	9392	308	126	5.7	s33.0	N29°44.359	W095°09.43	49	2954	130
9	00:05:50	307	6.6	s35.0	N29°44.385	W095°09.384	83	9391	308	127	5.7	s28.0	N29°44.361	W095°09.44	48	3081	130

This is an own ship

15:33 SEP



08:06:19 N29°44.397' Display reference: Free Brg 080.2° Rng 0.170 n Range 3/16 Vector 6 min Active ownship Fraiser River Active target 2:TANK15L
0:06:19 W095°09.257'

Run 53

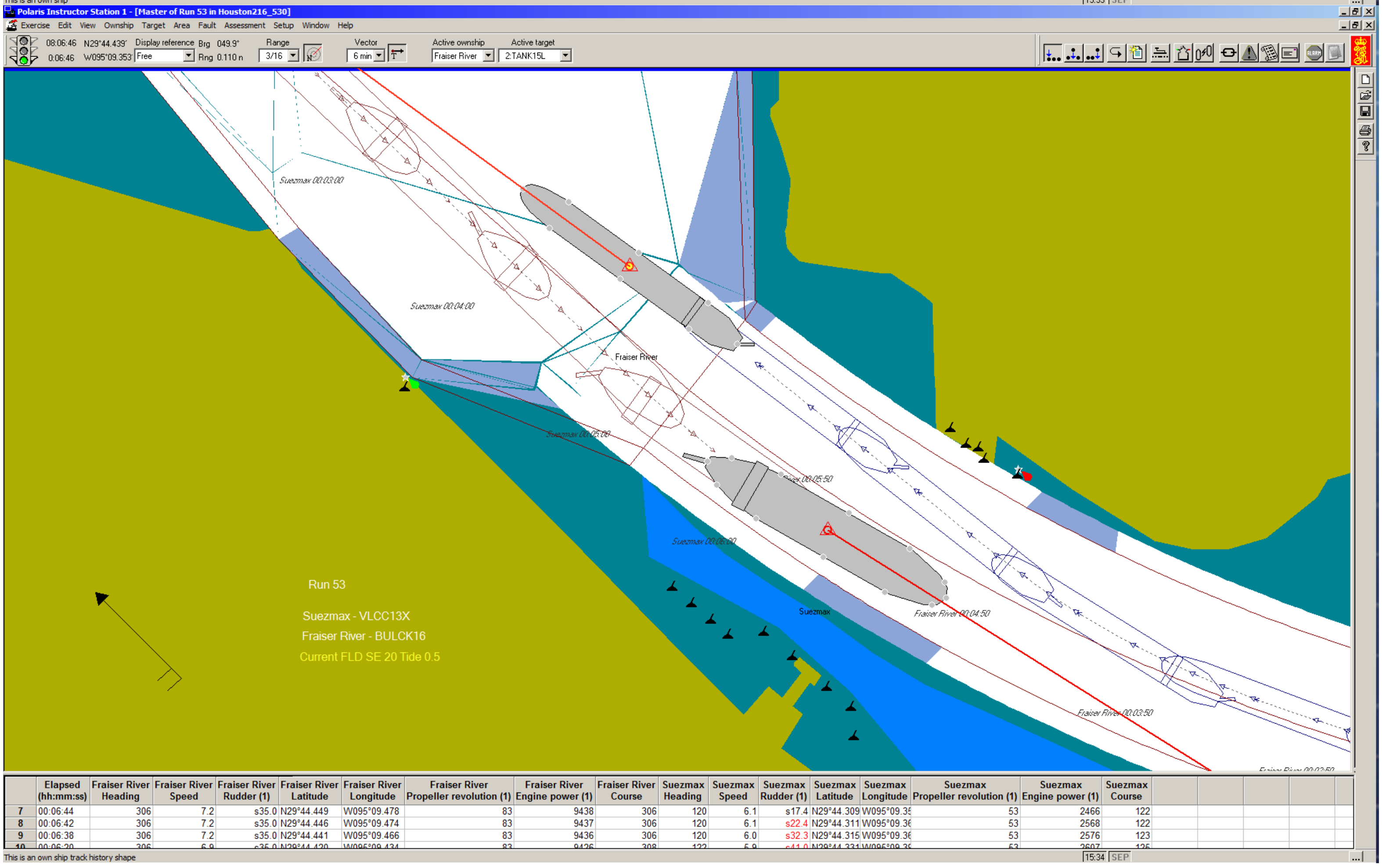
Suezmax - VLCC13X

Fraiser River - BULCK16

Current FLD SE 20 Tide 0.5

	Elapsed (hh:mm:ss)	Fraiser River Heading	Fraiser River Speed	Fraiser River Rudder (1)	Fraiser River Latitude	Fraiser River Longitude	Fraiser River Propeller revolution (1)	Fraiser River Engine power (1)	Fraiser River Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7	00:06:18	306	6.9	s35.0	N29°44.418	W095°09.431	83	9426	308	122	5.8	s36.1	N29°44.333	W095°09.4	53	2610	125
8	00:06:16	306	6.9	s30.7	N29°44.416	W095°09.427	83	9425	308	123	5.8	s31.1	N29°44.335	W095°09.4	53	2613	126
9	00:06:14	307	6.9	s20.9	N29°44.413	W095°09.424	83	9423	308	123	5.8	s29.7	N29°44.337	W095°09.4	53	2618	126
10	00:06:12	307	6.8	s10.6	N29°44.411	W095°09.420	83	9420	308	123	5.8	s29.7	N29°44.339	W095°09.4	53	2622	126

This is an own ship



08:06:46 N29°44.439' Display reference: Free Brg 049.9° Rng 0.110 n Range 3/16 Vector 6 min Active ownship Fraiser River Active target 2:TANK15L
0:06:46 W095°09.353'

Run 53

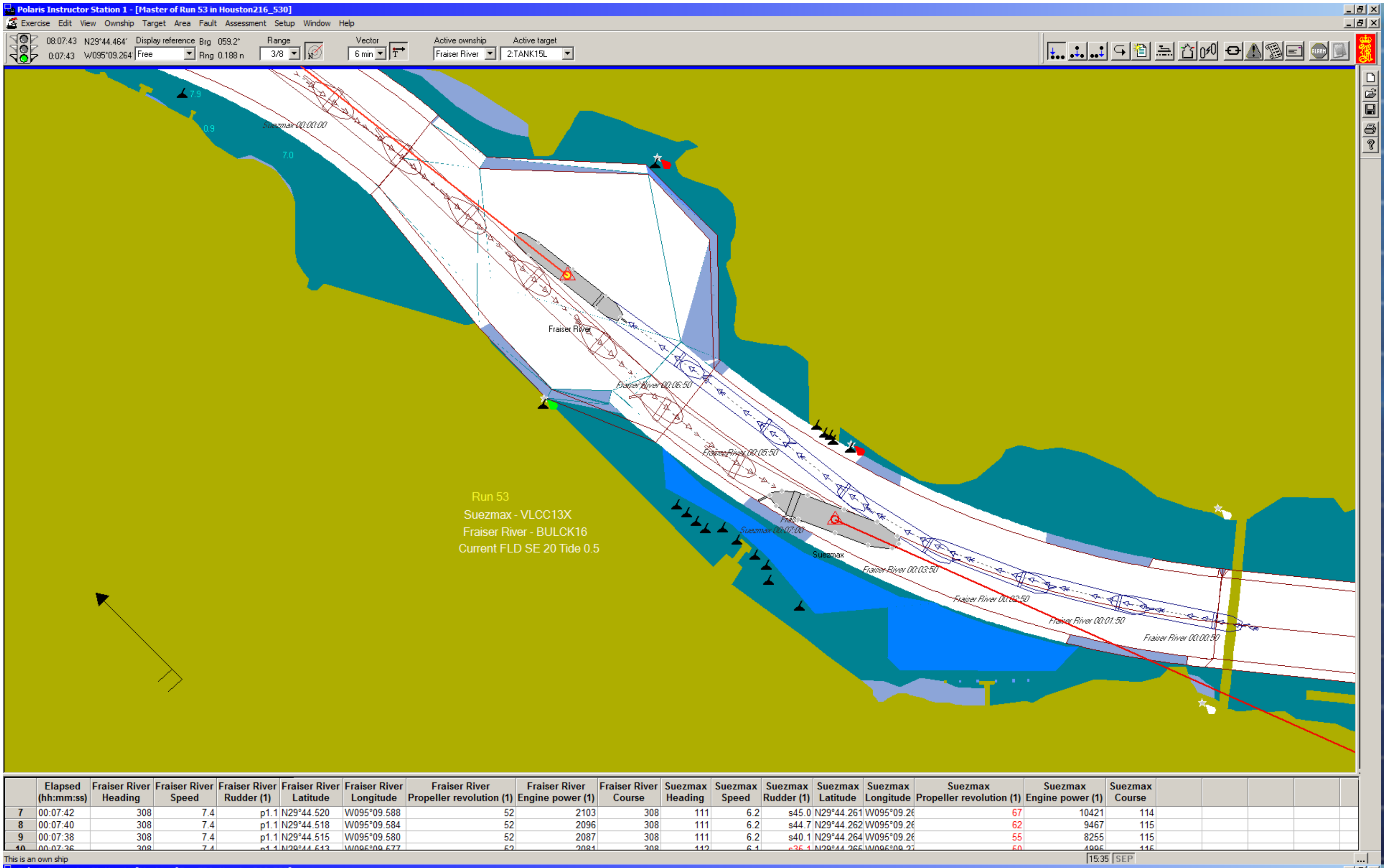
Suezmax - VLCC13X

Fraiser River - BULCK16

Current FLD SE 20 Tide 0.5

	Elapsed (hh:mm:ss)	Fraiser River Heading	Fraiser River Speed	Fraiser River Rudder (1)	Fraiser River Latitude	Fraiser River Longitude	Fraiser River Propeller revolution (1)	Fraiser River Engine power (1)	Fraiser River Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7	00:06:44	306	7.2	s35.0	N29°44.449	W095°09.478	83	9438	306	120	6.1	s17.4	N29°44.309	W095°09.3	53	2466	122
8	00:06:42	306	7.2	s35.0	N29°44.446	W095°09.474	83	9437	306	120	6.1	s22.4	N29°44.311	W095°09.3	53	2568	122
9	00:06:38	306	7.2	s35.0	N29°44.441	W095°09.466	83	9436	306	120	6.0	s32.3	N29°44.315	W095°09.3	53	2576	123
10	00:06:20	306	6.9	s35.0	N29°44.420	W095°09.434	83	9426	308	122	5.9	s41.0	N29°44.331	W095°09.3	53	2607	125

This is an own ship track history shape

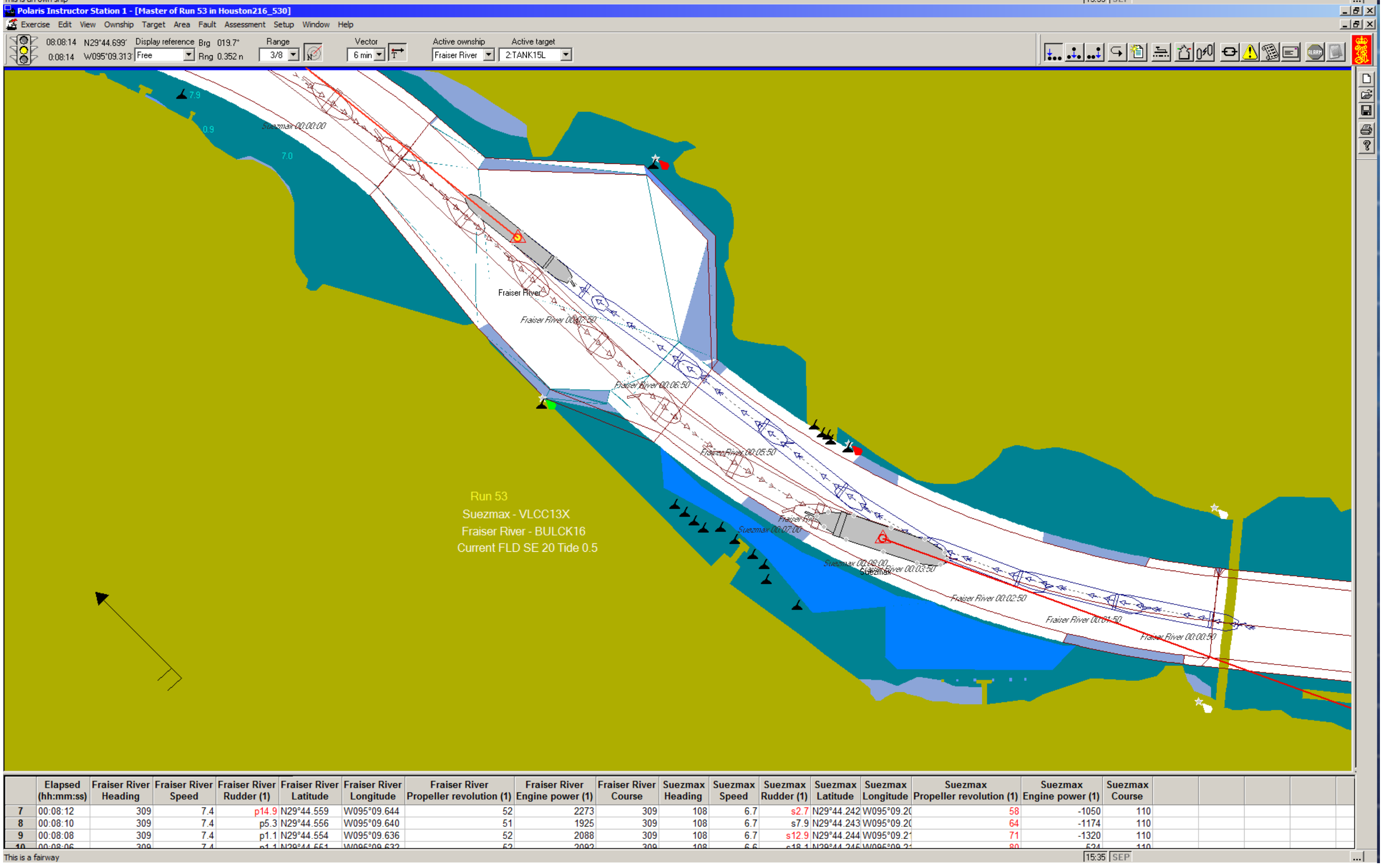


08:07:43 N29°44.464' Display reference Free Brg 059.2° Rng 0.188 n
0:07:43 W095°09.264'
Range 3/8
Vector 6 min
Active ownship Fraiser River
Active target 2:TANK15L

	Elapsed (hh:mm:ss)	Fraiser River Heading	Fraiser River Speed	Fraiser River Rudder (1)	Fraiser River Latitude	Fraiser River Longitude	Fraiser River Propeller revolution (1)	Fraiser River Engine power (1)	Fraiser River Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7	00:07:42	308	7.4	p1.1	N29°44.520	W095°09.588	52	2103	308	111	6.2	s45.0	N29°44.261	W095°09.26	67	10421	114
8	00:07:40	308	7.4	p1.1	N29°44.518	W095°09.584	52	2096	308	111	6.2	s44.7	N29°44.262	W095°09.26	62	9467	115
9	00:07:38	308	7.4	p1.1	N29°44.515	W095°09.580	52	2087	308	111	6.2	s40.1	N29°44.264	W095°09.26	55	8255	115

This is an own ship

15:35 SEP



08:08:14 N29°44.699' Display reference Free Brg 019.7° Rng 0.352 n
0:08:14 W095°09.313'
Range 3/8
Vector 6 min
Active ownship Fraiser River
Active target 2:TANK15L

	Elapsed (hh:mm:ss)	Fraiser River Heading	Fraiser River Speed	Fraiser River Rudder (1)	Fraiser River Latitude	Fraiser River Longitude	Fraiser River Propeller revolution (1)	Fraiser River Engine power (1)	Fraiser River Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7	00:08:12	309	7.4	p14.9	N29°44.559	W095°09.644	52	2273	309	108	6.7	s2.7	N29°44.242	W095°09.20	58	-1050	110
8	00:08:10	309	7.4	p5.3	N29°44.556	W095°09.640	51	1925	309	108	6.7	s7.9	N29°44.243	W095°09.20	64	-1174	110
9	00:08:08	309	7.4	p1.1	N29°44.554	W095°09.636	52	2088	309	108	6.7	s12.9	N29°44.244	W095°09.21	71	-1320	110

This is a fairway

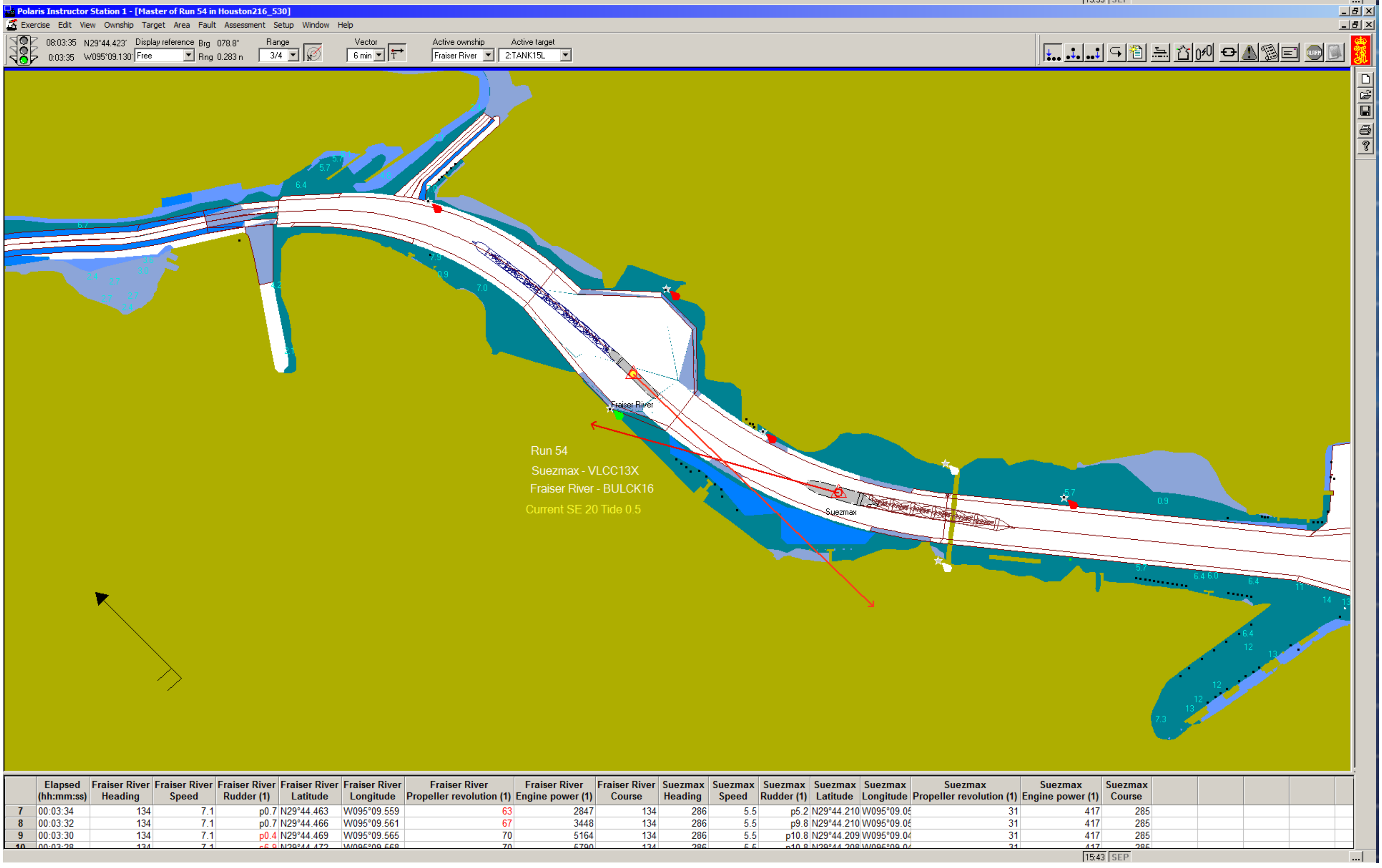
15:35 SEP

Run 54

Polaris Instructor Station 1 - [Master of Run 54 in Houston216_530]

08:00:00 N29°44.440' Display reference: Free Brg 076.1° Rng 0.299 n Range 3/4 Vector 6 min Active ownship: Fraiser River Active target: 2:TANK15L
0:00:00 W095°09.116'

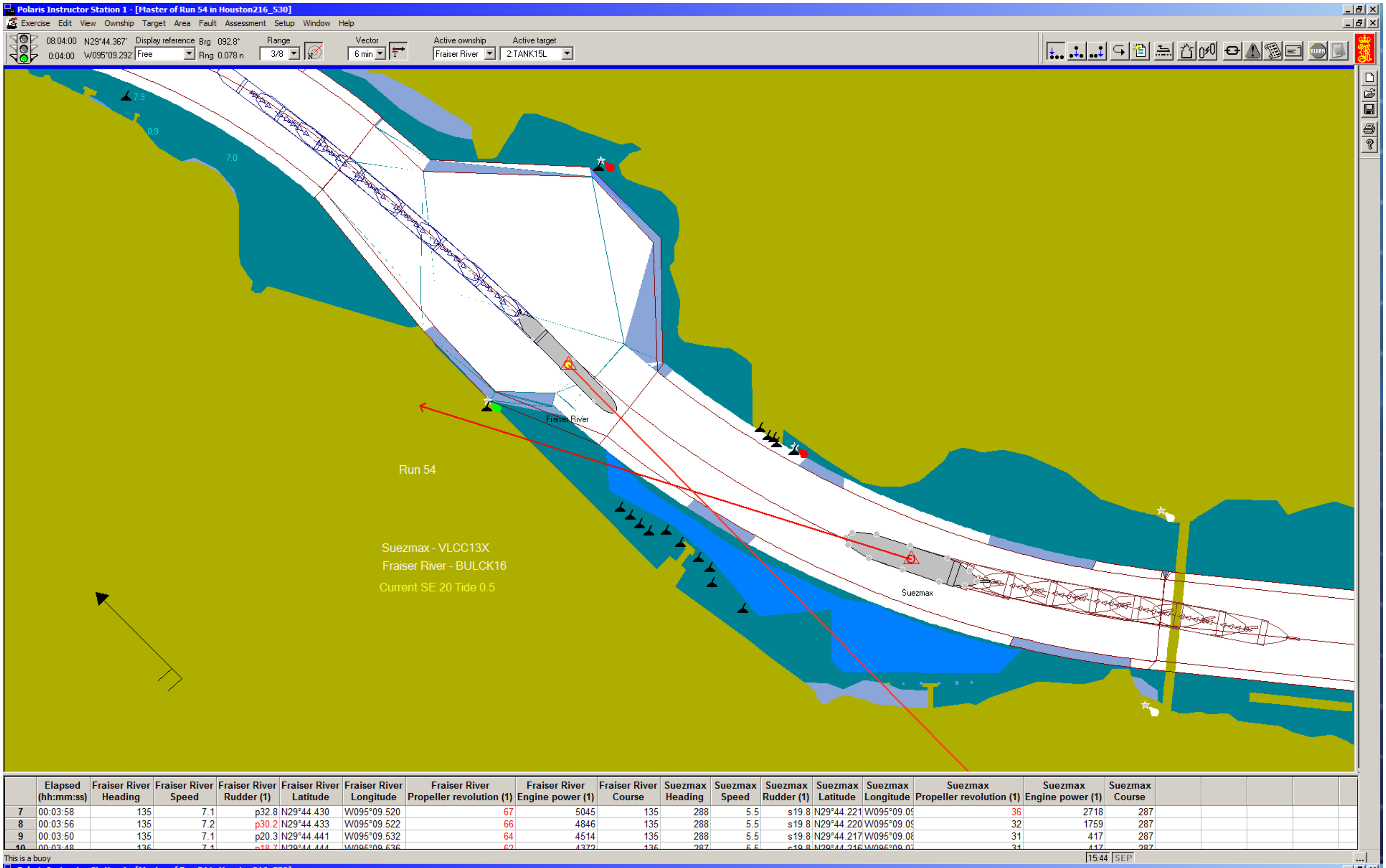
	Elapsed (hh:mm:ss)	Fraiser River Heading	Fraiser River Speed	Fraiser River Rudder (1)	Fraiser River Latitude	Fraiser River Longitude	Fraiser River Propeller revolution (1)	Fraiser River Engine power (1)	Fraiser River Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7																	
8																	
9																	



Polaris Instructor Station 1 - [Master of Run 54 in Houston216_530]

08:03:35 N29°44.423' Display reference: Free Brg 078.8° Rng 0.283 n Range 3/4 Vector 6 min Active ownship: Fraiser River Active target: 2:TANK15L
0:03:35 W095°09.130'

	Elapsed (hh:mm:ss)	Fraiser River Heading	Fraiser River Speed	Fraiser River Rudder (1)	Fraiser River Latitude	Fraiser River Longitude	Fraiser River Propeller revolution (1)	Fraiser River Engine power (1)	Fraiser River Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7	00:03:34	134	7.1	p0.7	N29°44.463	W095°09.559	63	2847	134	286	5.5	p5.2	N29°44.210	W095°09.05	31	417	285
8	00:03:32	134	7.1	p0.7	N29°44.466	W095°09.561	67	3448	134	286	5.5	p9.8	N29°44.210	W095°09.05	31	417	285
9	00:03:30	134	7.1	p0.4	N29°44.469	W095°09.565	70	5164	134	286	5.5	p10.8	N29°44.209	W095°09.04	31	417	285
10	00:03:28	134	7.1	s6.9	N29°44.472	W095°09.568	70	5790	134	286	5.5	p10.8	N29°44.208	W095°09.04	31	417	285



Polaris Instructor Station 1 - [Master of Run 54 in Houston216_530]

Run 54

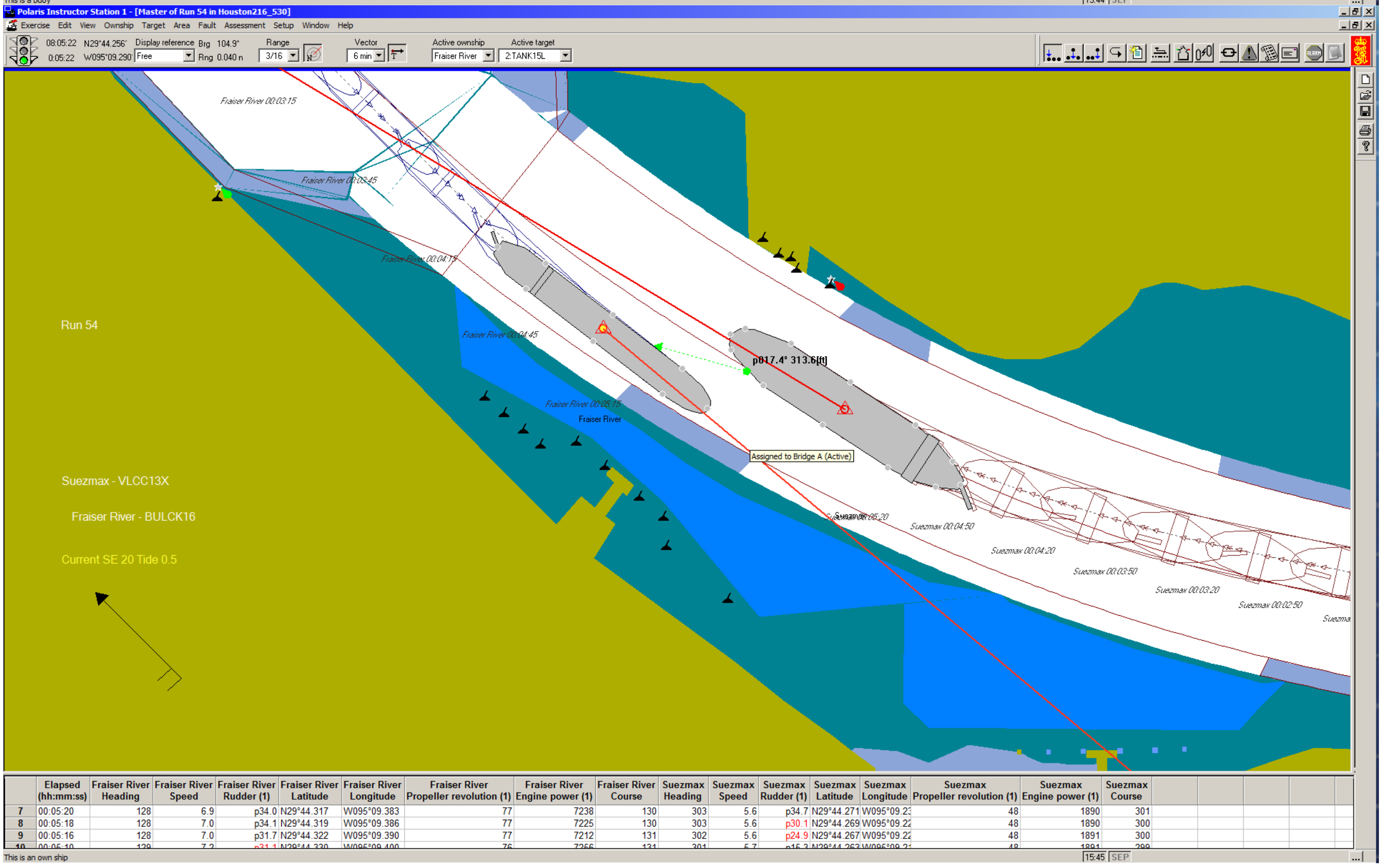
Suezmax - VLCC13X

Fraiser River - BULCK16

Current SE 20 Tide 0.5

	Elapsed (hh:mm:ss)	Fraiser River Heading	Fraiser River Speed	Fraiser River Rudder (1)	Fraiser River Latitude	Fraiser River Longitude	Fraiser River Propeller revolution (1)	Fraiser River Engine power (1)	Fraiser River Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7	00:03:58	135	7.1	p32.8	N29°44.430	W095°09.520	67	5045	135	288	5.5	s19.8	N29°44.221	W095°09.0	36	2718	287
8	00:03:56	135	7.2	p30.2	N29°44.433	W095°09.522	66	4846	135	288	5.5	s19.8	N29°44.220	W095°09.0	32	1759	287
9	00:03:50	135	7.1	p20.3	N29°44.441	W095°09.532	64	4514	135	288	5.5	s19.8	N29°44.217	W095°09.0	31	417	287
10	00:03:48	135	7.1	p18.7	N29°44.444	W095°09.536	62	4372	135	287	5.5	s19.8	N29°44.216	W095°09.0	31	417	287

This is a buoy



Polaris Instructor Station 1 - [Master of Run 54 in Houston216_530]

Run 54

Suezmax - VLCC13X

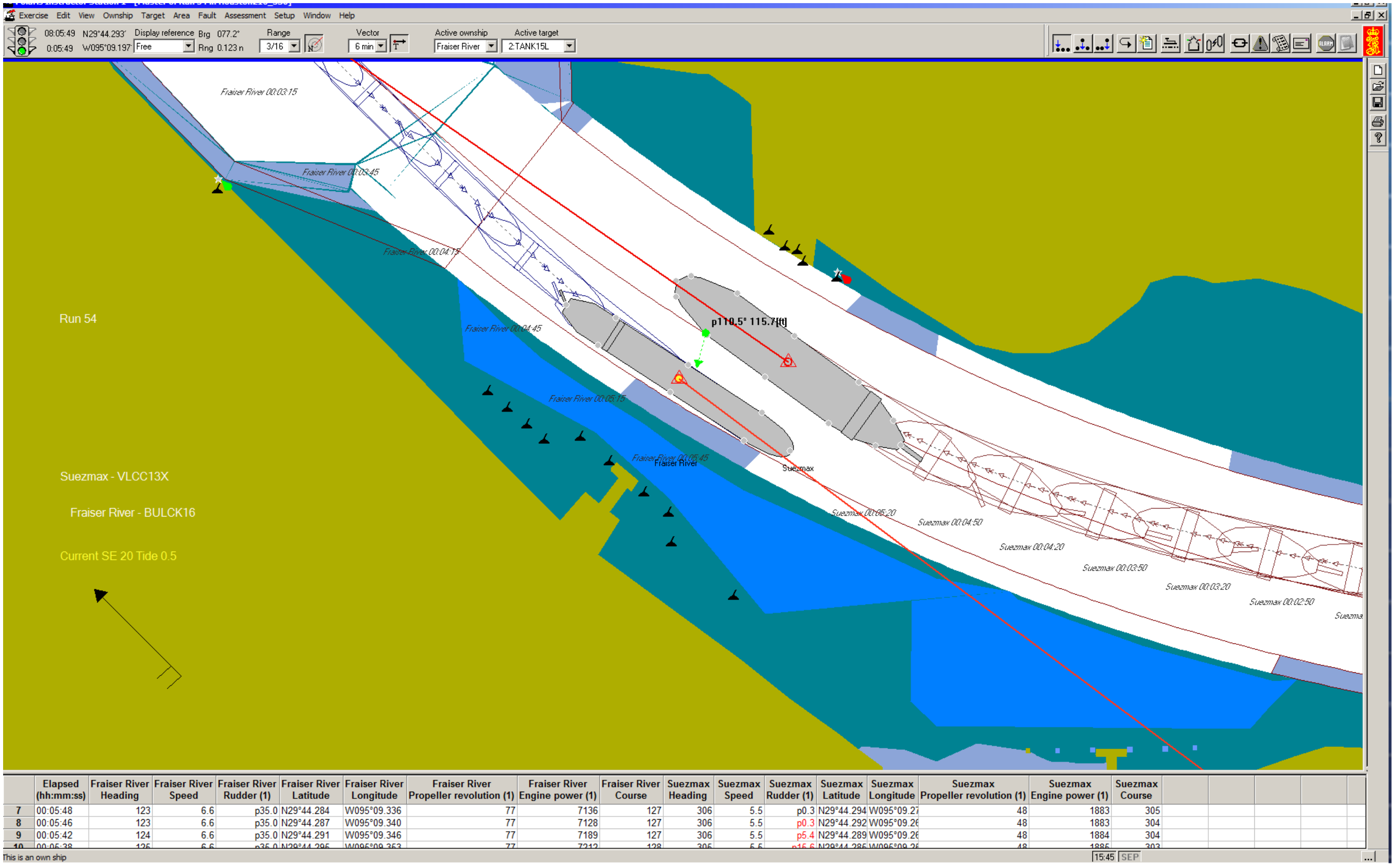
Fraiser River - BULCK16

Current SE 20 Tide 0.5

	Elapsed (hh:mm:ss)	Fraiser River Heading	Fraiser River Speed	Fraiser River Rudder (1)	Fraiser River Latitude	Fraiser River Longitude	Fraiser River Propeller revolution (1)	Fraiser River Engine power (1)	Fraiser River Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7	00:05:20	128	6.9	p34.0	N29°44.317	W095°09.383	77	7238	130	303	5.6	p34.7	N29°44.271	W095°09.2	48	1890	301
8	00:05:18	128	7.0	p34.1	N29°44.319	W095°09.386	77	7225	130	303	5.6	p30.1	N29°44.269	W095°09.2	48	1890	300
9	00:05:16	128	7.0	p31.7	N29°44.322	W095°09.390	77	7212	131	302	5.6	p24.9	N29°44.267	W095°09.2	48	1891	300
10	00:05:10	129	7.2	p31.1	N29°44.330	W095°09.400	76	7256	131	301	5.7	p15.3	N29°44.263	W095°09.2	48	1891	299

This is an own ship

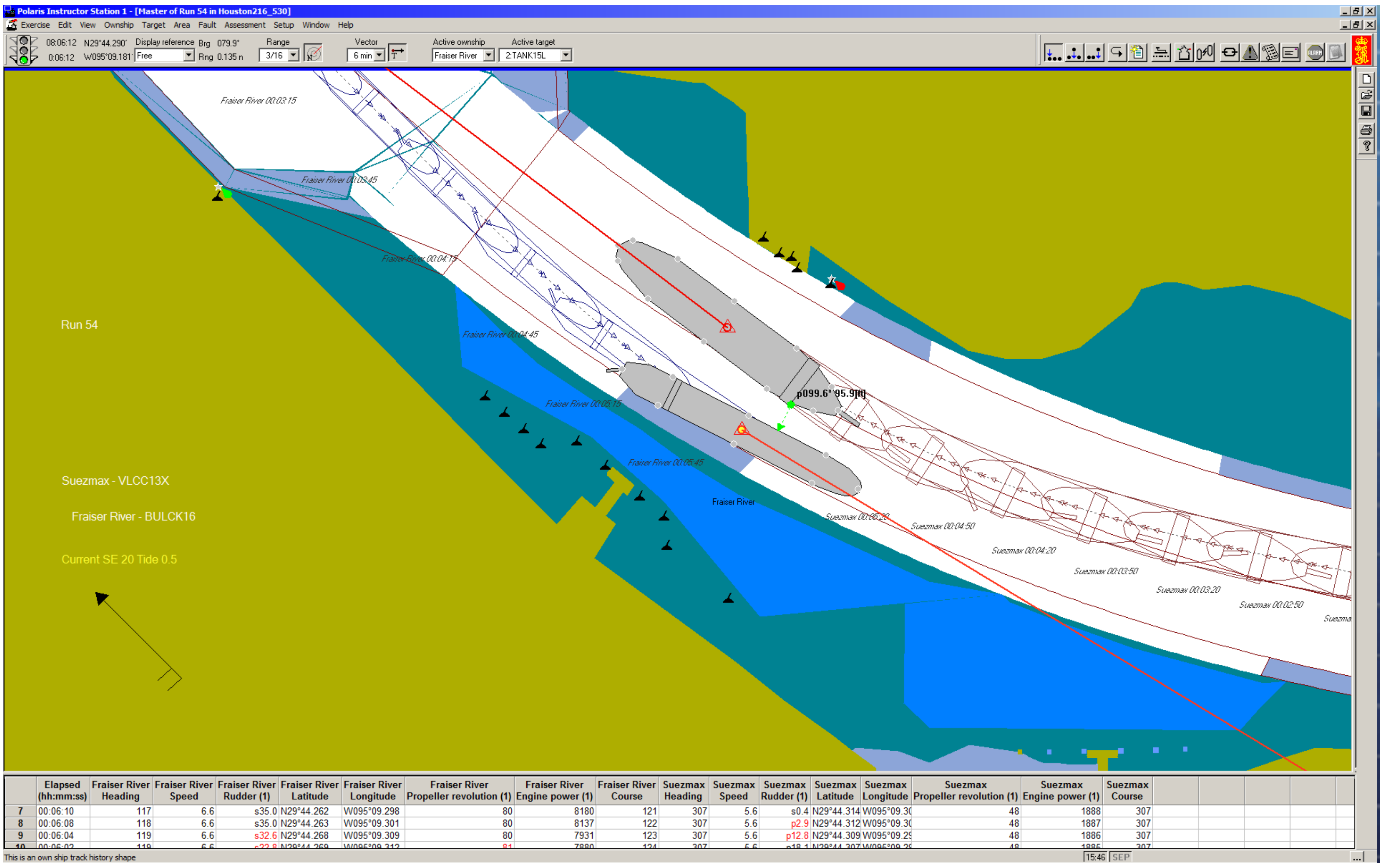
June 26, 2019



08:05:49 N29°44.293' Display reference: Free Brg 077.2° Range 3/16 Vector 6 min Active ownship: Fraiser River Active target: 2:TANK15L
0:05:49 W095°09.197' Rng 0.123 n

	Elapsed (hh:mm:ss)	Fraiser River Heading	Fraiser River Speed	Fraiser River Rudder (1)	Fraiser River Latitude	Fraiser River Longitude	Fraiser River Propeller revolution (1)	Fraiser River Engine power (1)	Fraiser River Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7	00:05:48	123	6.6	p35.0	N29°44.284	W095°09.336	77	7136	127	306	5.5	p0.3	N29°44.294	W095°09.27	48	1883	305
8	00:05:46	123	6.6	p35.0	N29°44.287	W095°09.340	77	7128	127	306	5.5	p0.3	N29°44.292	W095°09.26	48	1883	304
9	00:05:42	124	6.6	p35.0	N29°44.291	W095°09.346	77	7189	127	306	5.5	p5.4	N29°44.289	W095°09.26	48	1884	304

This is an own ship 15:45 SEP



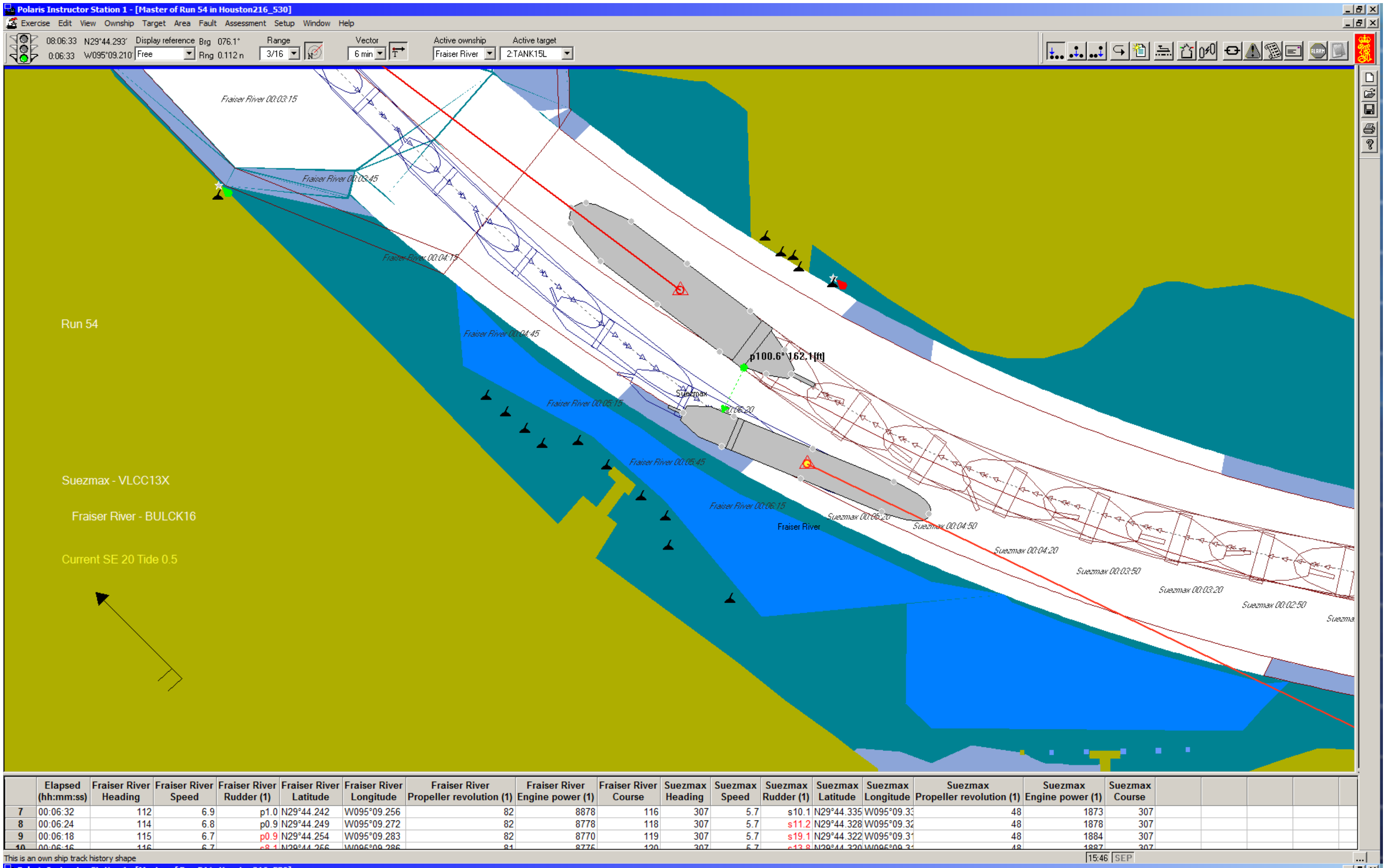
Polaris Instructor Station 1 - [Master of Run 54 in Houston216_530]

08:06:12 N29°44.290' Display reference: Free Brg 079.9° Range 3/16 Vector 6 min Active ownship: Fraiser River Active target: 2:TANK15L
0:06:12 W095°09.181' Rng 0.135 n

	Elapsed (hh:mm:ss)	Fraiser River Heading	Fraiser River Speed	Fraiser River Rudder (1)	Fraiser River Latitude	Fraiser River Longitude	Fraiser River Propeller revolution (1)	Fraiser River Engine power (1)	Fraiser River Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7	00:06:10	117	6.6	s35.0	N29°44.262	W095°09.298	80	8180	121	307	5.6	s0.4	N29°44.314	W095°09.30	48	1888	307
8	00:06:08	118	6.6	s35.0	N29°44.263	W095°09.301	80	8137	122	307	5.6	p2.9	N29°44.312	W095°09.30	48	1887	307
9	00:06:04	119	6.6	s32.6	N29°44.268	W095°09.309	80	7931	123	307	5.6	p12.8	N29°44.309	W095°09.29	48	1886	307

This is an own ship track history shape 15:46 SEP

- Page 486

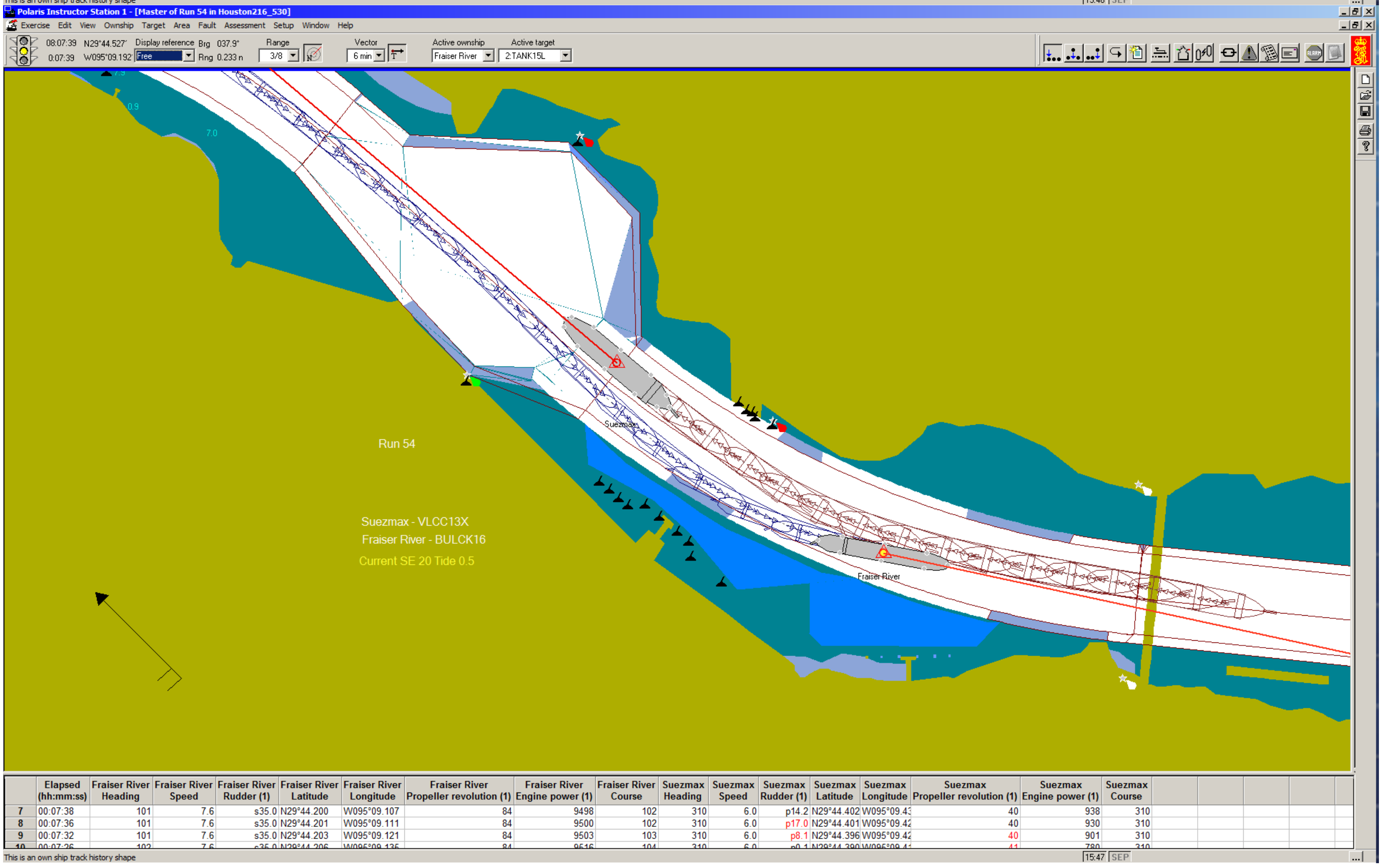


08:06:33 N29°44.293' Display reference Brg 076.1°
0:06:33 W095°09.210' Free Rng 0.112 n
Range 3/16
Vector 6 min
Active ownship Fraiser River
Active target 2:TANK15L

	Elapsed (hh:mm:ss)	Fraiser River Heading	Fraiser River Speed	Fraiser River Rudder (1)	Fraiser River Latitude	Fraiser River Longitude	Fraiser River Propeller revolution (1)	Fraiser River Engine power (1)	Fraiser River Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7	00:06:32	112	6.9	p1.0	N29°44.242	W095°09.256	82	8878	116	307	5.7	s10.1	N29°44.335	W095°09.33	48	1873	307
8	00:06:24	114	6.8	p0.9	N29°44.249	W095°09.272	82	8778	118	307	5.7	s11.2	N29°44.328	W095°09.32	48	1878	307
9	00:06:18	115	6.7	p0.9	N29°44.254	W095°09.283	82	8770	119	307	5.7	s19.1	N29°44.322	W095°09.31	48	1884	307

This is an own ship track history shape

15:46 SEP

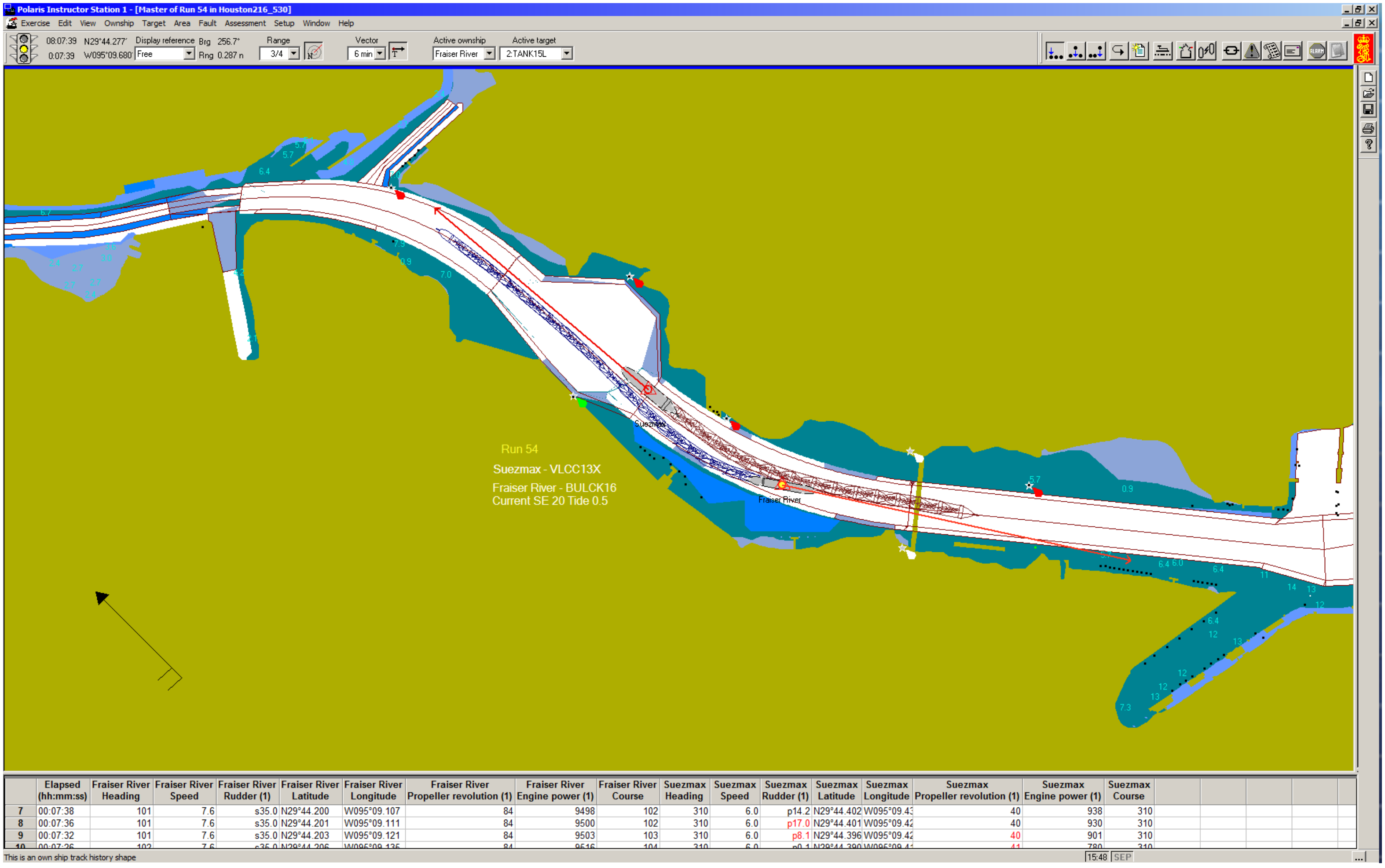


08:07:39 N29°44.527' Display reference Brg 037.9°
0:07:39 W095°09.192' Free Rng 0.233 n
Range 3/8
Vector 6 min
Active ownship Fraiser River
Active target 2:TANK15L

	Elapsed (hh:mm:ss)	Fraiser River Heading	Fraiser River Speed	Fraiser River Rudder (1)	Fraiser River Latitude	Fraiser River Longitude	Fraiser River Propeller revolution (1)	Fraiser River Engine power (1)	Fraiser River Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7	00:07:38	101	7.6	s35.0	N29°44.200	W095°09.107	84	9498	102	310	6.0	p14.2	N29°44.402	W095°09.43	40	938	310
8	00:07:36	101	7.6	s35.0	N29°44.201	W095°09.111	84	9500	102	310	6.0	p17.0	N29°44.401	W095°09.42	40	930	310
9	00:07:32	101	7.6	s35.0	N29°44.203	W095°09.121	84	9503	103	310	6.0	p8.1	N29°44.396	W095°09.42	40	901	310

This is an own ship track history shape

15:47 SEP



Run 54

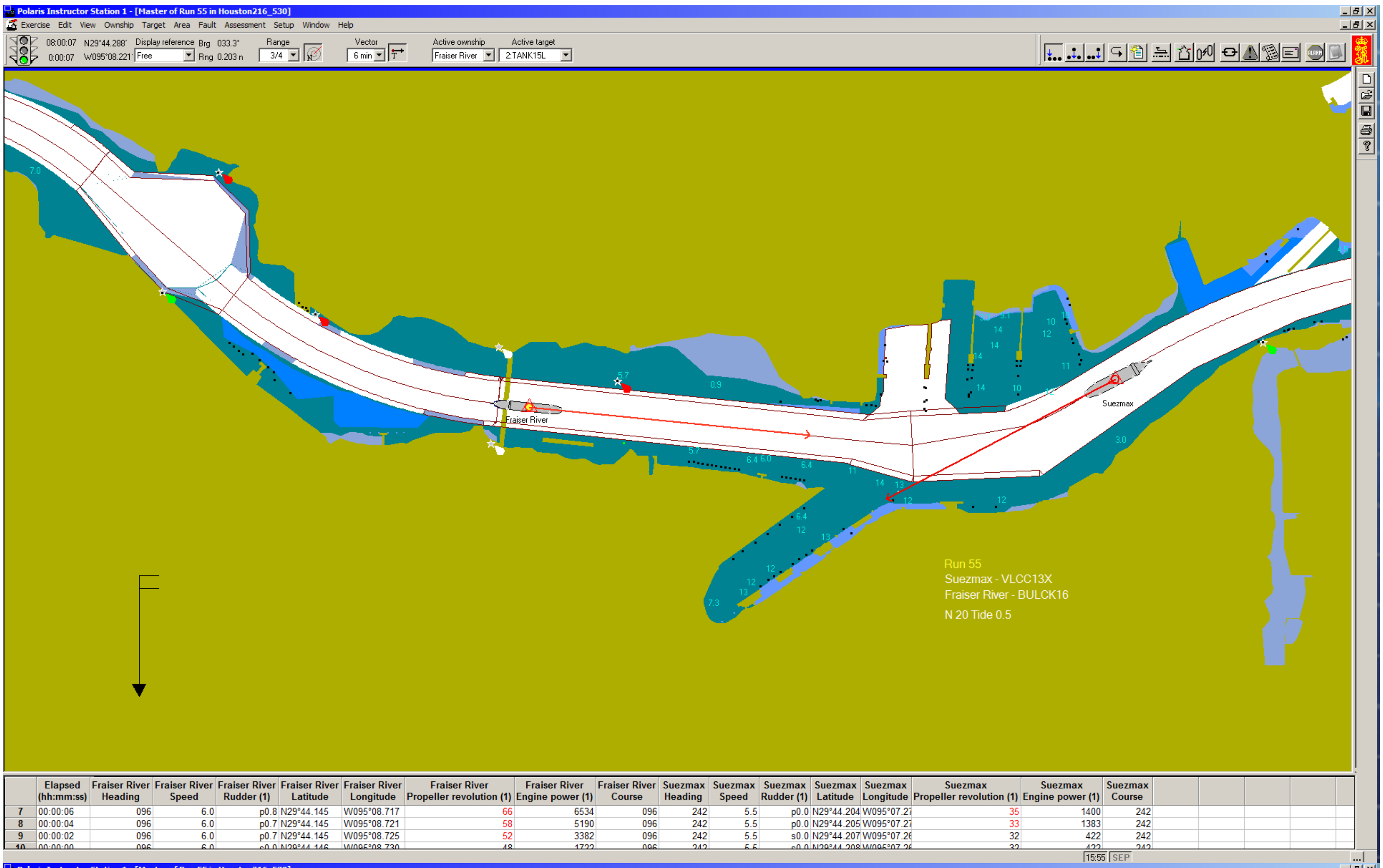
Suezmax - VLCC13X

Fraiser River - BULCK16
Current SE 20 Tide 0.5

	Elapsed (hh:mm:ss)	Fraiser River Heading	Fraiser River Speed	Fraiser River Rudder (1)	Fraiser River Latitude	Fraiser River Longitude	Fraiser River Propeller revolution (1)	Fraiser River Engine power (1)	Fraiser River Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7	00:07:38	101	7.6	s35.0	N29°44.200	W095°09.107	84	9498	102	310	6.0	p14.2	N29°44.402	W095°09.43	40	938	310
8	00:07:36	101	7.6	s35.0	N29°44.201	W095°09.111	84	9500	102	310	6.0	p17.0	N29°44.401	W095°09.42	40	930	310
9	00:07:32	101	7.6	s35.0	N29°44.203	W095°09.121	84	9503	103	310	6.0	p8.1	N29°44.396	W095°09.42	40	901	310
10	00:07:26	102	7.6	s35.0	N29°44.206	W095°09.135	84	9516	104	310	6.0	p0.1	N29°44.390	W095°09.41	41	780	310

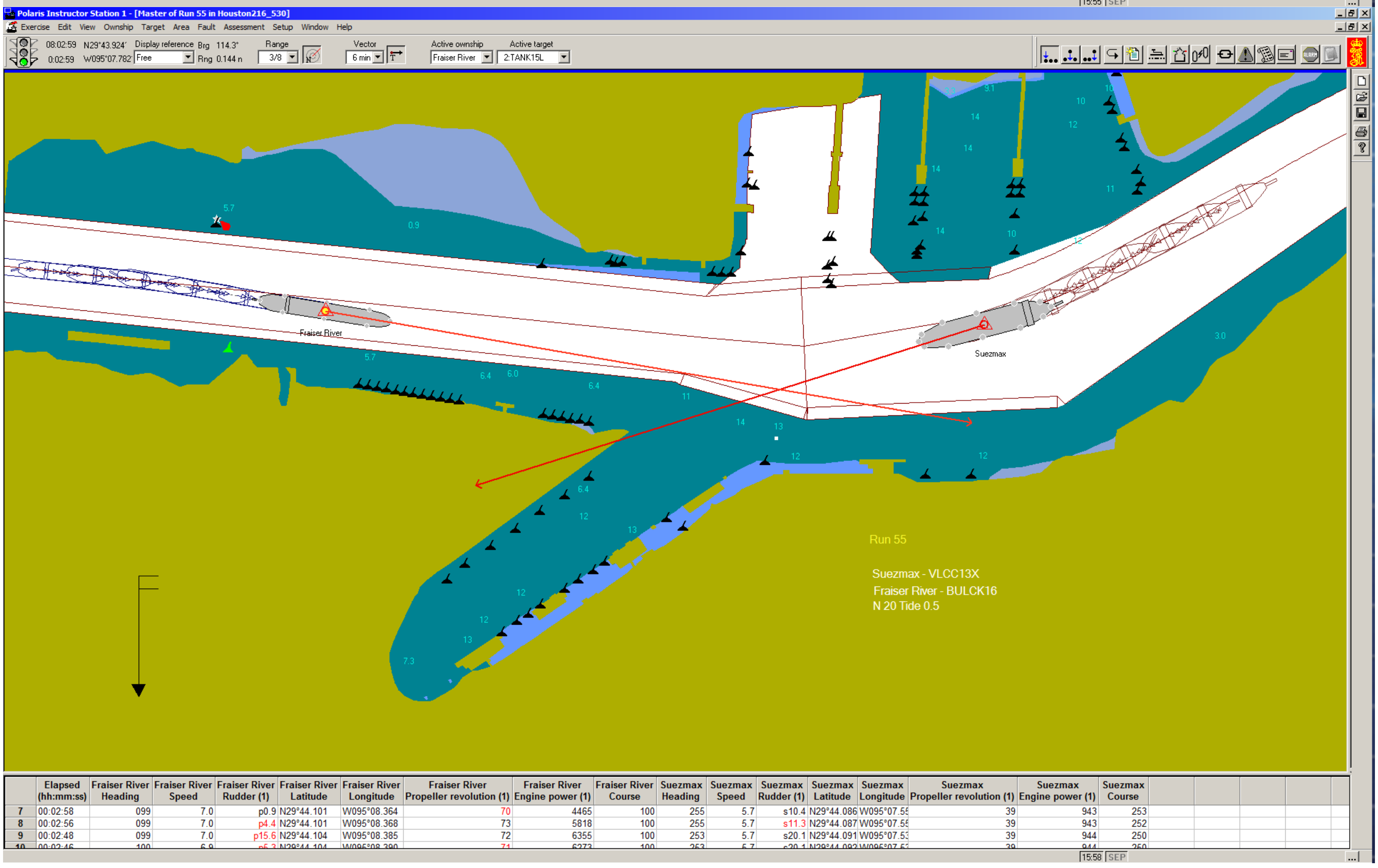
This is an own ship track history shape

Run 55



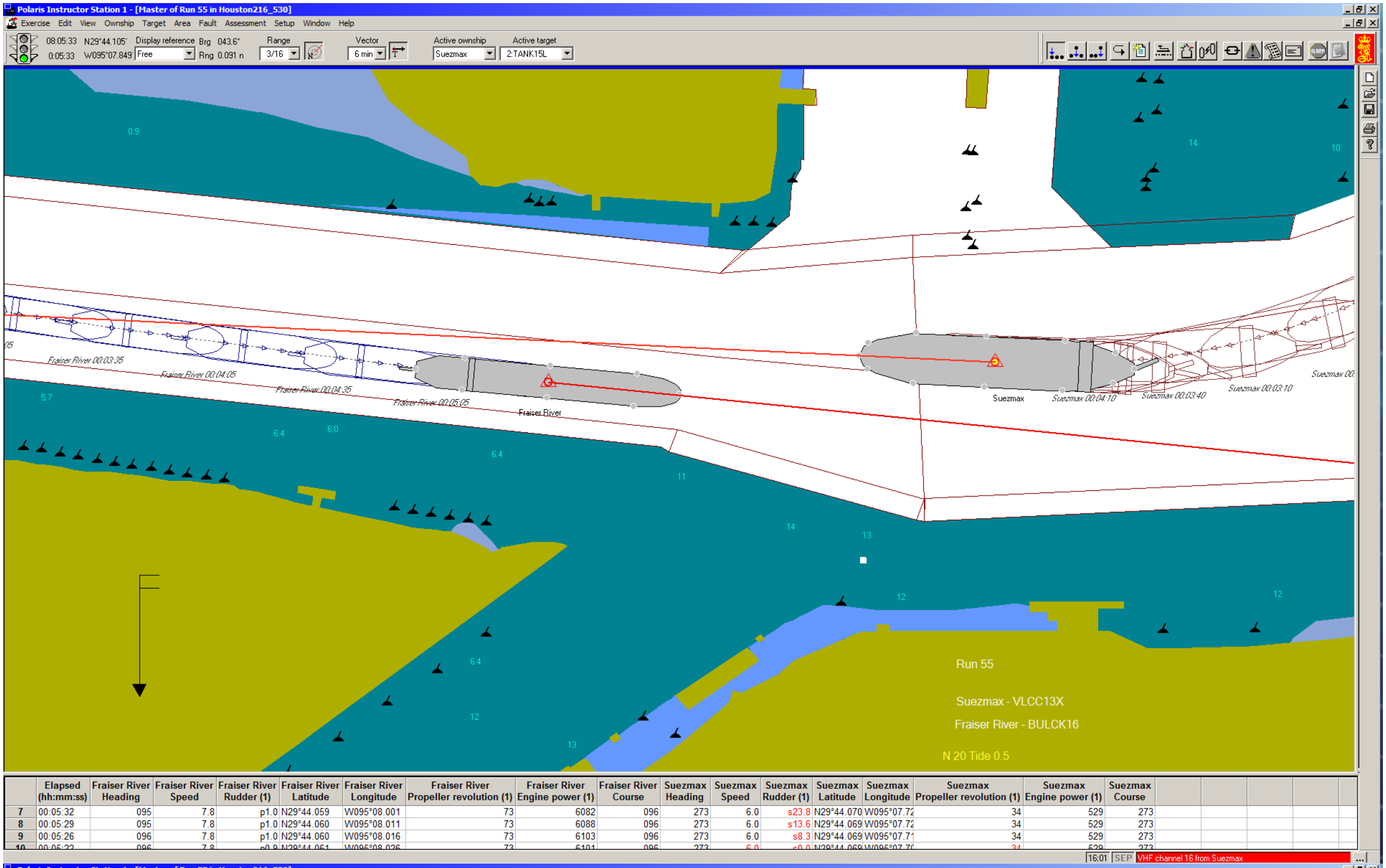
08:00:07 N29°44.288' Display reference Brg 033.3°
0:00:07 W095°08.221' Free Rng 0.203 n
Range 3/4
Vector 6 min
Active ownship Fraiser River
Active target 2:TANK15L

	Elapsed (hh:mm:ss)	Fraiser River Heading	Fraiser River Speed	Fraiser River Rudder (1)	Fraiser River Latitude	Fraiser River Longitude	Fraiser River Propeller revolution (1)	Fraiser River Engine power (1)	Fraiser River Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7	00:00:06	096	6.0	p0.8	N29°44.145	W095°08.717	66	6534	096	242	5.5	p0.0	N29°44.204	W095°07.27	35	1400	242
8	00:00:04	096	6.0	p0.7	N29°44.145	W095°08.721	58	5190	096	242	5.5	p0.0	N29°44.205	W095°07.27	33	1383	242
9	00:00:02	096	6.0	p0.7	N29°44.145	W095°08.725	52	3382	096	242	5.5	s0.0	N29°44.207	W095°07.26	32	422	242



08:02:59 N29°43.924' Display reference Brg 114.3°
0:02:59 W095°07.782' Free Rng 0.144 n
Range 3/8
Vector 6 min
Active ownship Fraiser River
Active target 2:TANK15L

	Elapsed (hh:mm:ss)	Fraiser River Heading	Fraiser River Speed	Fraiser River Rudder (1)	Fraiser River Latitude	Fraiser River Longitude	Fraiser River Propeller revolution (1)	Fraiser River Engine power (1)	Fraiser River Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7	00:02:58	099	7.0	p0.9	N29°44.101	W095°08.364	70	4465	100	255	5.7	s10.4	N29°44.086	W095°07.55	39	943	253
8	00:02:56	099	7.0	p4.4	N29°44.101	W095°08.368	73	5818	100	255	5.7	s11.3	N29°44.087	W095°07.55	39	943	252
9	00:02:48	099	7.0	p15.6	N29°44.104	W095°08.385	72	6355	100	253	5.7	s20.1	N29°44.091	W095°07.53	39	944	250

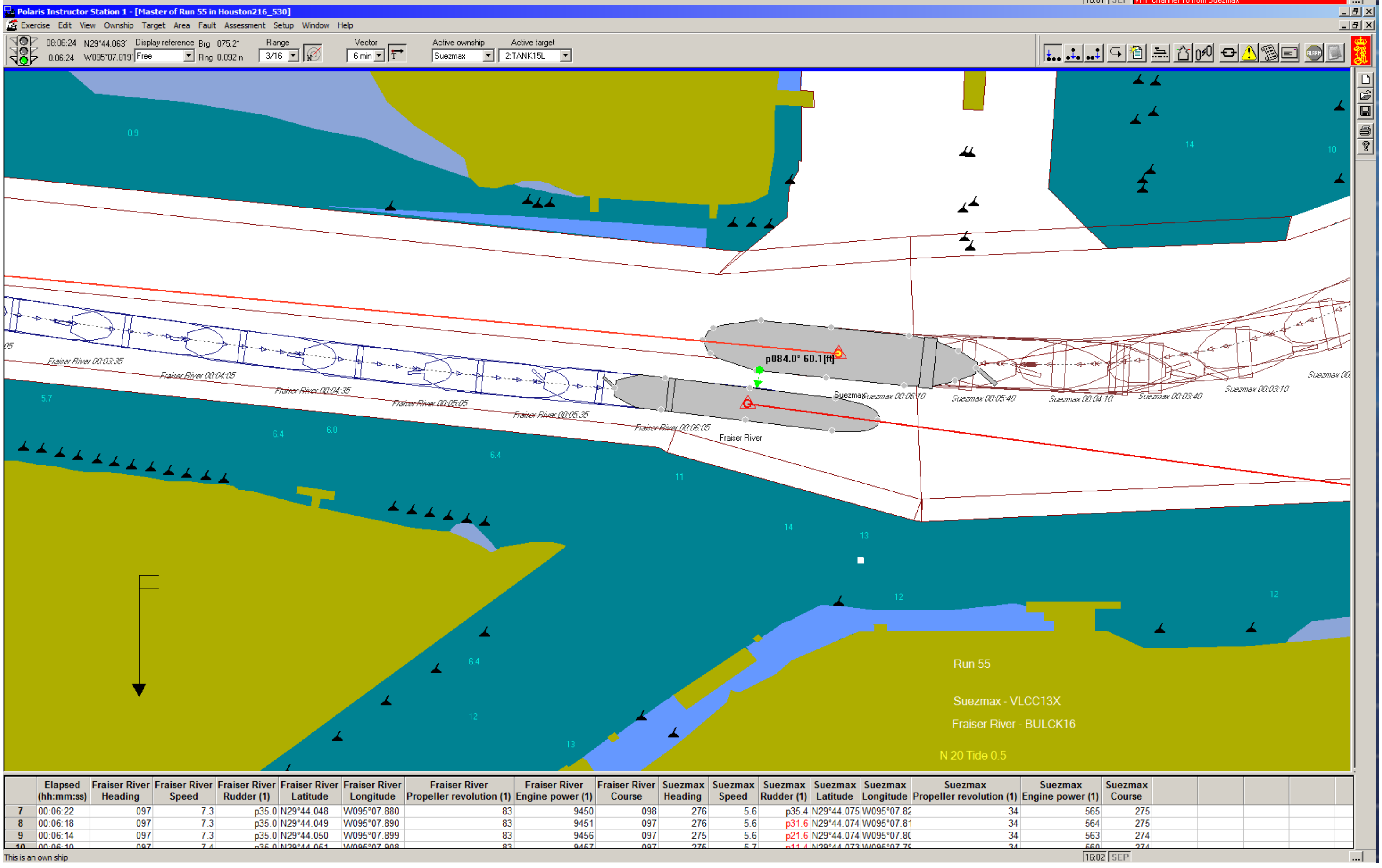


08:05:33 N29°44.105' Display reference Free Brg 043.6° Range 3/16 Vector 6 min Active ownship Suezmax Active target 2:TANK15L

0:05:33 W095°07.849' Rng 0.091 n

	Elapsed (hh:mm:ss)	Fraiser River Heading	Fraiser River Speed	Fraiser River Rudder (1)	Fraiser River Latitude	Fraiser River Longitude	Fraiser River Propeller revolution (1)	Fraiser River Engine power (1)	Fraiser River Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7	00:05:32	095	7.8	p1.0	N29°44.059	W095°08.001	73	6082	096	273	6.0	s23.8	N29°44.070	W095°07.72	34	529	273
8	00:05:29	095	7.8	p1.0	N29°44.060	W095°08.011	73	6088	096	273	6.0	s13.6	N29°44.069	W095°07.72	34	529	273
9	00:05:26	096	7.8	p1.0	N29°44.060	W095°08.016	73	6103	096	273	6.0	s8.3	N29°44.069	W095°07.71	34	529	273

16:01 SEP VHF channel 16 from Suezmax



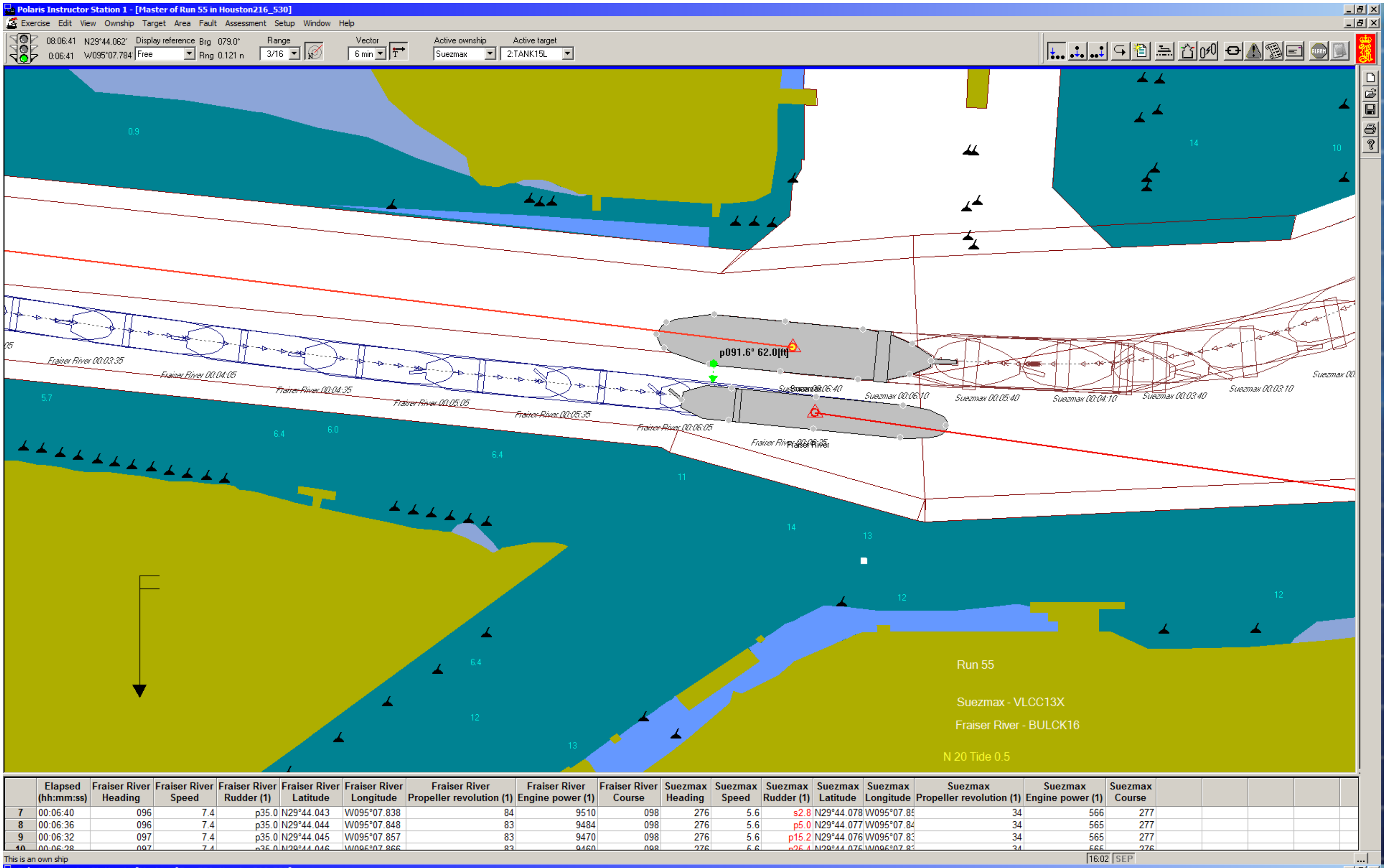
08:06:24 N29°44.063' Display reference Free Brg 075.2° Range 3/16 Vector 6 min Active ownship Suezmax Active target 2:TANK15L

0:06:24 W095°07.819' Rng 0.092 n

	Elapsed (hh:mm:ss)	Fraiser River Heading	Fraiser River Speed	Fraiser River Rudder (1)	Fraiser River Latitude	Fraiser River Longitude	Fraiser River Propeller revolution (1)	Fraiser River Engine power (1)	Fraiser River Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7	00:06:22	097	7.3	p35.0	N29°44.048	W095°07.880	83	9450	098	276	5.6	p35.4	N29°44.075	W095°07.82	34	565	275
8	00:06:18	097	7.3	p35.0	N29°44.049	W095°07.890	83	9451	097	276	5.6	p31.6	N29°44.074	W095°07.81	34	564	275
9	00:06:14	097	7.3	p35.0	N29°44.050	W095°07.899	83	9456	097	275	5.6	p21.6	N29°44.074	W095°07.80	34	563	274

This is an own ship

16:02 SEP



Polaris Instructor Station 1 - [Master of Run 55 in Houston216_530]

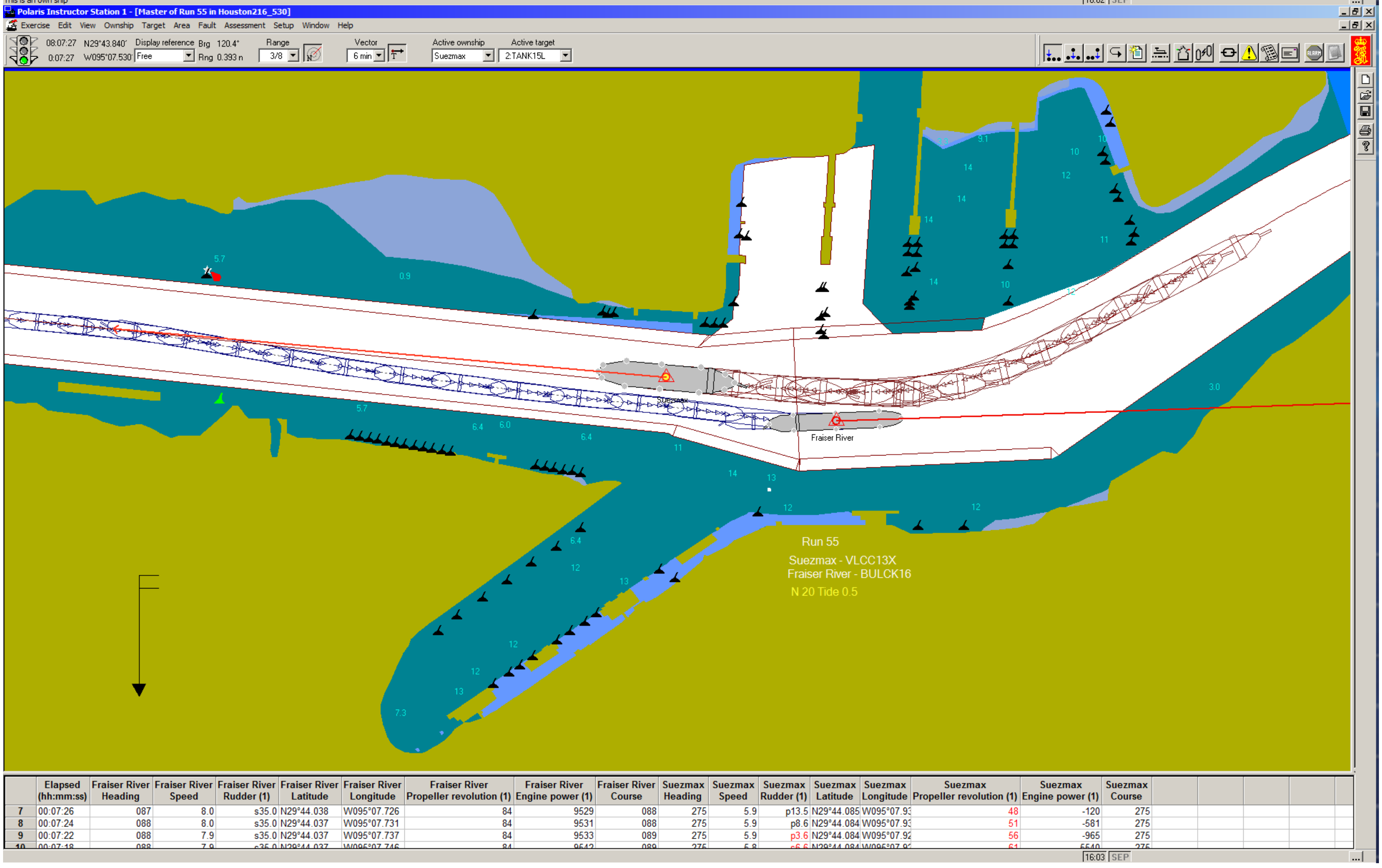
08:06:41 N29°44.062' Display reference Free Brg 079.0° Rng 0.121 n Range 3/16 Vector 6 min Active ownship Suezmax Active target 2:TANK15L

0:06:41 W095°07.784'

	Elapsed (hh:mm:ss)	Fraiser River Heading	Fraiser River Speed	Fraiser River Rudder (1)	Fraiser River Latitude	Fraiser River Longitude	Fraiser River Propeller revolution (1)	Fraiser River Engine power (1)	Fraiser River Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7	00:06:40	096	7.4	p35.0	N29°44.043	W095°07.838	84	9510	098	276	5.6	s2.8	N29°44.078	W095°07.85	34	566	277
8	00:06:36	096	7.4	p35.0	N29°44.044	W095°07.848	83	9484	098	276	5.6	p5.0	N29°44.077	W095°07.84	34	565	277
9	00:06:32	097	7.4	p35.0	N29°44.045	W095°07.857	83	9470	098	276	5.6	p15.2	N29°44.076	W095°07.83	34	565	277
10	00:06:28	097	7.4	p35.0	N29°44.046	W095°07.866	83	9460	098	276	5.6	p25.4	N29°44.075	W095°07.83	34	565	276

This is an own ship

16:02 SEP



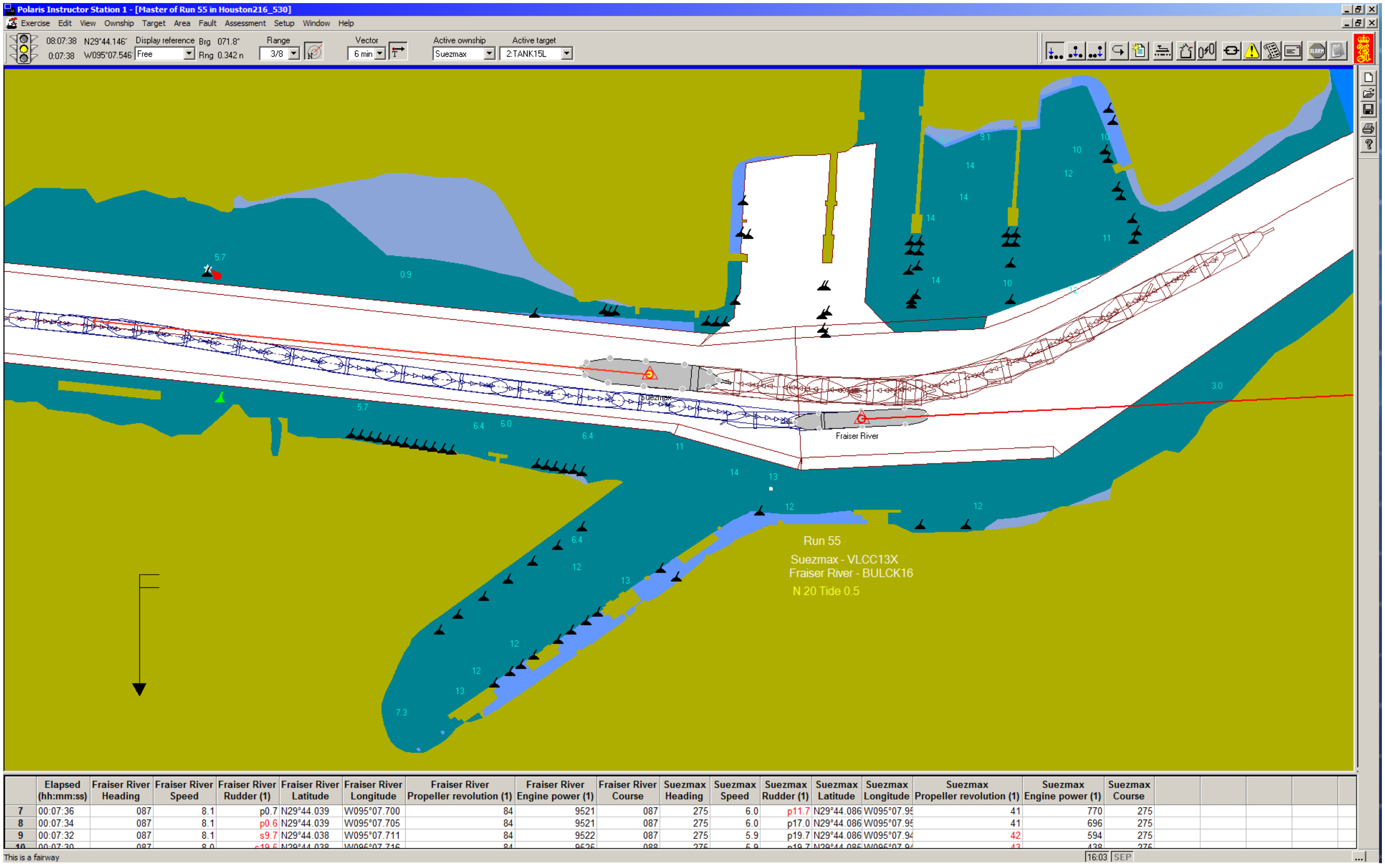
Polaris Instructor Station 1 - [Master of Run 55 in Houston216_530]

08:07:27 N29°43.840' Display reference Free Brg 120.4° Rng 0.393 n Range 3/8 Vector 6 min Active ownship Suezmax Active target 2:TANK15L

0:07:27 W095°07.530'

	Elapsed (hh:mm:ss)	Fraiser River Heading	Fraiser River Speed	Fraiser River Rudder (1)	Fraiser River Latitude	Fraiser River Longitude	Fraiser River Propeller revolution (1)	Fraiser River Engine power (1)	Fraiser River Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7	00:07:26	087	8.0	s35.0	N29°44.038	W095°07.726	84	9529	088	275	5.9	p13.5	N29°44.085	W095°07.93	48	-120	275
8	00:07:24	088	8.0	s35.0	N29°44.037	W095°07.731	84	9531	088	275	5.9	p8.6	N29°44.084	W095°07.93	51	-581	275
9	00:07:22	088	7.9	s35.0	N29°44.037	W095°07.737	84	9533	089	275	5.9	p3.6	N29°44.084	W095°07.92	56	-965	275
10	00:07:18	088	7.9	s35.0	N29°44.037	W095°07.746	84	9542	089	275	5.8	s6.6	N29°44.084	W095°07.92	61	5540	275

16:03 SEP



08:07:38 N29°44.146'
0:07:38 W095°07.546'

Display reference: Free

Brg 071.8°
Rng 0.342 n

Range: 3/8

Vector: 6 min

Active ownship: Suezmax

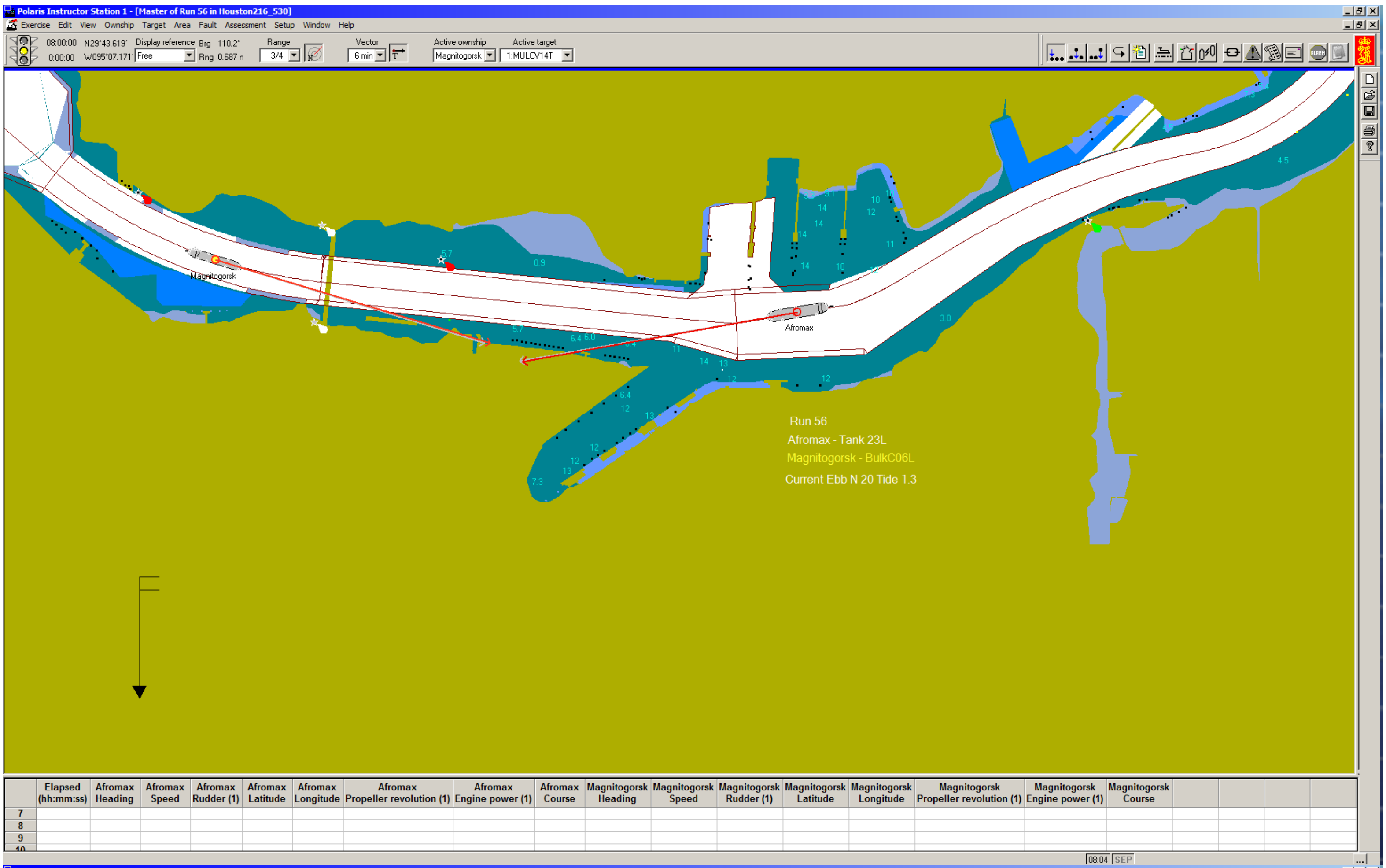
Active target: 2:TANK15L

	Elapsed (hh:mm:ss)	Fraiser River Heading	Fraiser River Speed	Fraiser River Rudder (1)	Fraiser River Latitude	Fraiser River Longitude	Fraiser River Propeller revolution (1)	Fraiser River Engine power (1)	Fraiser River Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7	00:07:36	087	8.1	p0.7	N29°44.039	W095°07.700	84	9521	087	275	6.0	p11.7	N29°44.086	W095°07.95	41	770	275
8	00:07:34	087	8.1	p0.6	N29°44.039	W095°07.705	84	9521	087	275	6.0	p17.0	N29°44.086	W095°07.95	41	696	275
9	00:07:32	087	8.1	s9.7	N29°44.038	W095°07.711	84	9522	087	275	5.9	p19.7	N29°44.086	W095°07.94	42	594	275
10	00:07:30	087	8.0	s19.5	N29°44.038	W095°07.716	84	9525	088	275	5.9	p19.7	N29°44.086	W095°07.94	43	438	275

This is a fairway

16:03 SEP

Run 56



Polaris Instructor Station 1 - [Master of Run 56 in Houston216_530]

08:00:00 N29°43.619' 0:00:00 W095°07.171'

Display reference: Free

Brg 110.2° Rng 0.687 n

Range: 3/4

Vector: 6 min

Active ownship: Magnitogorsk

Active target: 1:MULCV14T

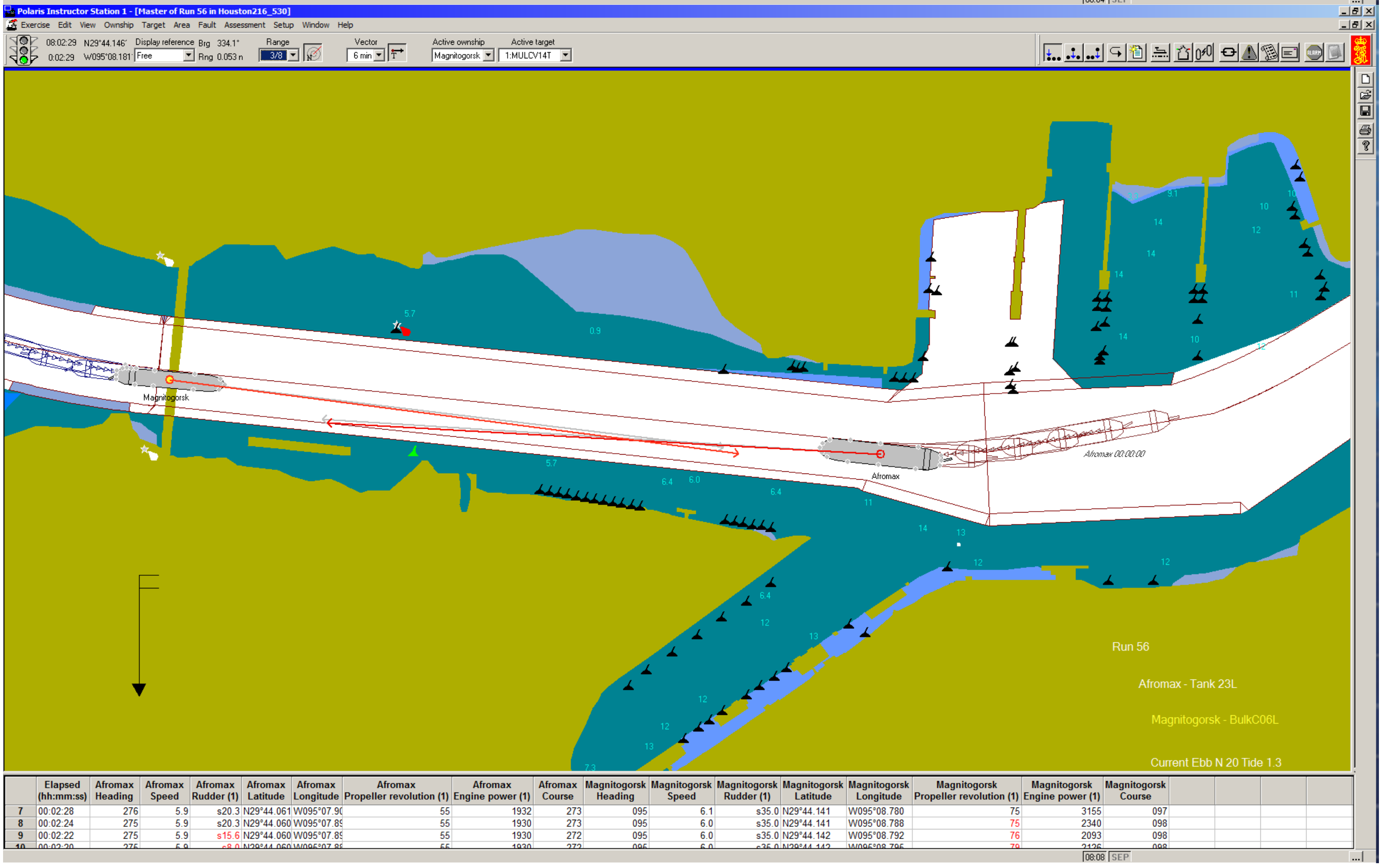
Run 56

Afromax - Tank 23L

Magnitogorsk - BulkC06L

Current Ebb N 20 Tide 1.3

	Elapsed (hh:mm:ss)	Afromax Heading	Afromax Speed	Afromax Rudder (1)	Afromax Latitude	Afromax Longitude	Afromax Propeller revolution (1)	Afromax Engine power (1)	Afromax Course	Magnitogorsk Heading	Magnitogorsk Speed	Magnitogorsk Rudder (1)	Magnitogorsk Latitude	Magnitogorsk Longitude	Magnitogorsk Propeller revolution (1)	Magnitogorsk Engine power (1)	Magnitogorsk Course
7																	
8																	
9																	



Polaris Instructor Station 1 - [Master of Run 56 in Houston216_530]

08:02:29 N29°44.146' 0:02:29 W095°08.181'

Display reference: Free

Brg 334.1° Rng 0.053 n

Range: 3/8

Vector: 6 min

Active ownship: Magnitogorsk

Active target: 1:MULCV14T

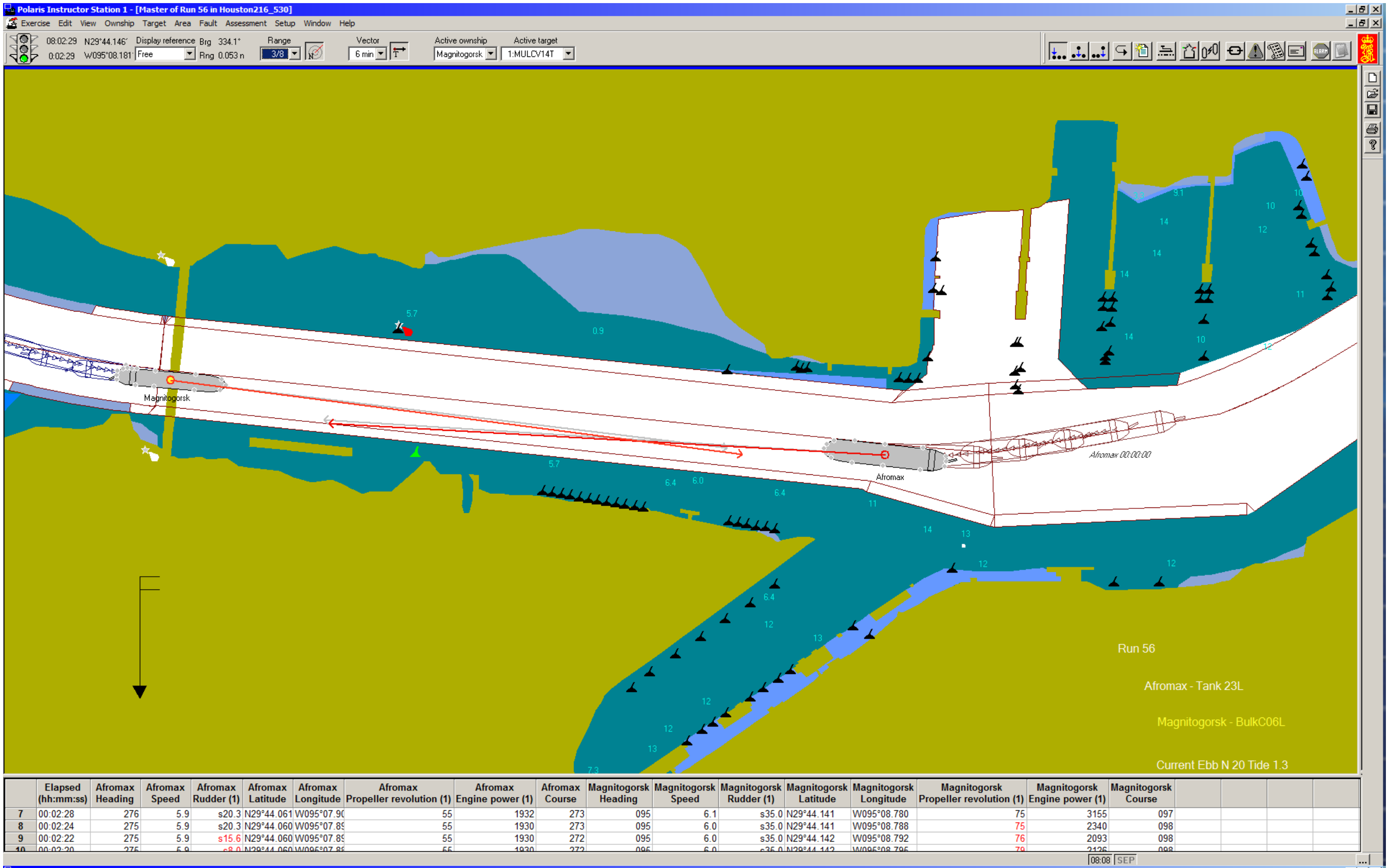
Run 56

Afromax - Tank 23L

Magnitogorsk - BulkC06L

Current Ebb N 20 Tide 1.3

	Elapsed (hh:mm:ss)	Afromax Heading	Afromax Speed	Afromax Rudder (1)	Afromax Latitude	Afromax Longitude	Afromax Propeller revolution (1)	Afromax Engine power (1)	Afromax Course	Magnitogorsk Heading	Magnitogorsk Speed	Magnitogorsk Rudder (1)	Magnitogorsk Latitude	Magnitogorsk Longitude	Magnitogorsk Propeller revolution (1)	Magnitogorsk Engine power (1)	Magnitogorsk Course
7	00:02:28	276	5.9	s20.3	N29°44.061	W095°07.90	55	1932	273	095	6.1	s35.0	N29°44.141	W095°08.780	75	3155	097
8	00:02:24	275	5.9	s20.3	N29°44.060	W095°07.89	55	1930	273	095	6.0	s35.0	N29°44.141	W095°08.788	75	2340	098
9	00:02:22	275	5.9	s15.6	N29°44.060	W095°07.89	55	1930	272	095	6.0	s35.0	N29°44.142	W095°08.792	76	2093	098
10	00:02:20	275	5.9	s8.0	N29°44.060	W095°07.88	55	1930	272	095	6.0	s35.0	N29°44.142	W095°08.796	79	2126	098



Polaris Instructor Station 1 - [Master of Run 56 in Houston216_530]

08:02:29 N29°44.146' Display reference Free Brg 334.1°

0:02:29 W095°08.181 Rng 0.053 n

Range 3/8

Vector 6 min

Active ownship Magnitogorsk

Active target 1:MULCV14T

Run 56

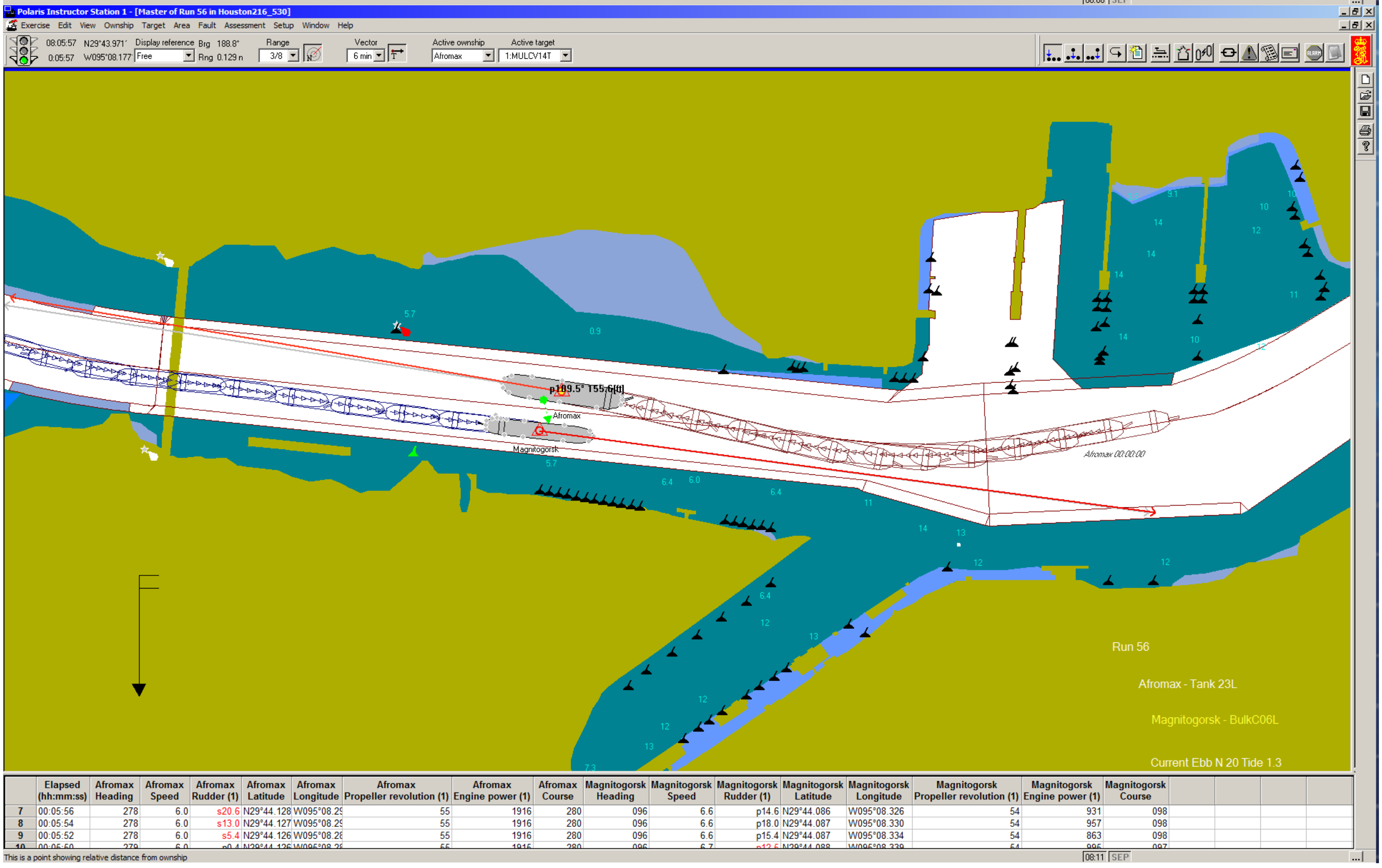
Afromax - Tank 23L

Magnitogorsk - BulkC06L

Current Ebb N 20 Tide 1.3

	Elapsed (hh:mm:ss)	Afromax Heading	Afromax Speed	Afromax Rudder (1)	Afromax Latitude	Afromax Longitude	Afromax Propeller revolution (1)	Afromax Engine power (1)	Afromax Course	Magnitogorsk Heading	Magnitogorsk Speed	Magnitogorsk Rudder (1)	Magnitogorsk Latitude	Magnitogorsk Longitude	Magnitogorsk Propeller revolution (1)	Magnitogorsk Engine power (1)	Magnitogorsk Course
7	00:02:28	276	5.9	s20.3	N29°44.061	W095°07.90	55	1932	273	095	6.1	s35.0	N29°44.141	W095°08.780	75	3155	097
8	00:02:24	275	5.9	s20.3	N29°44.060	W095°07.89	55	1930	273	095	6.0	s35.0	N29°44.141	W095°08.788	75	2340	098
9	00:02:22	275	5.9	s15.6	N29°44.060	W095°07.89	55	1930	272	095	6.0	s35.0	N29°44.142	W095°08.792	76	2093	098

08:08 SEP



Polaris Instructor Station 1 - [Master of Run 56 in Houston216_530]

08:05:57 N29°43.971' Display reference Free Brg 188.8°

0:05:57 W095°08.177 Rng 0.129 n

Range 3/8

Vector 6 min

Active ownship Afromax

Active target 1:MULCV14T

Run 56

Afromax - Tank 23L

Magnitogorsk - BulkC06L

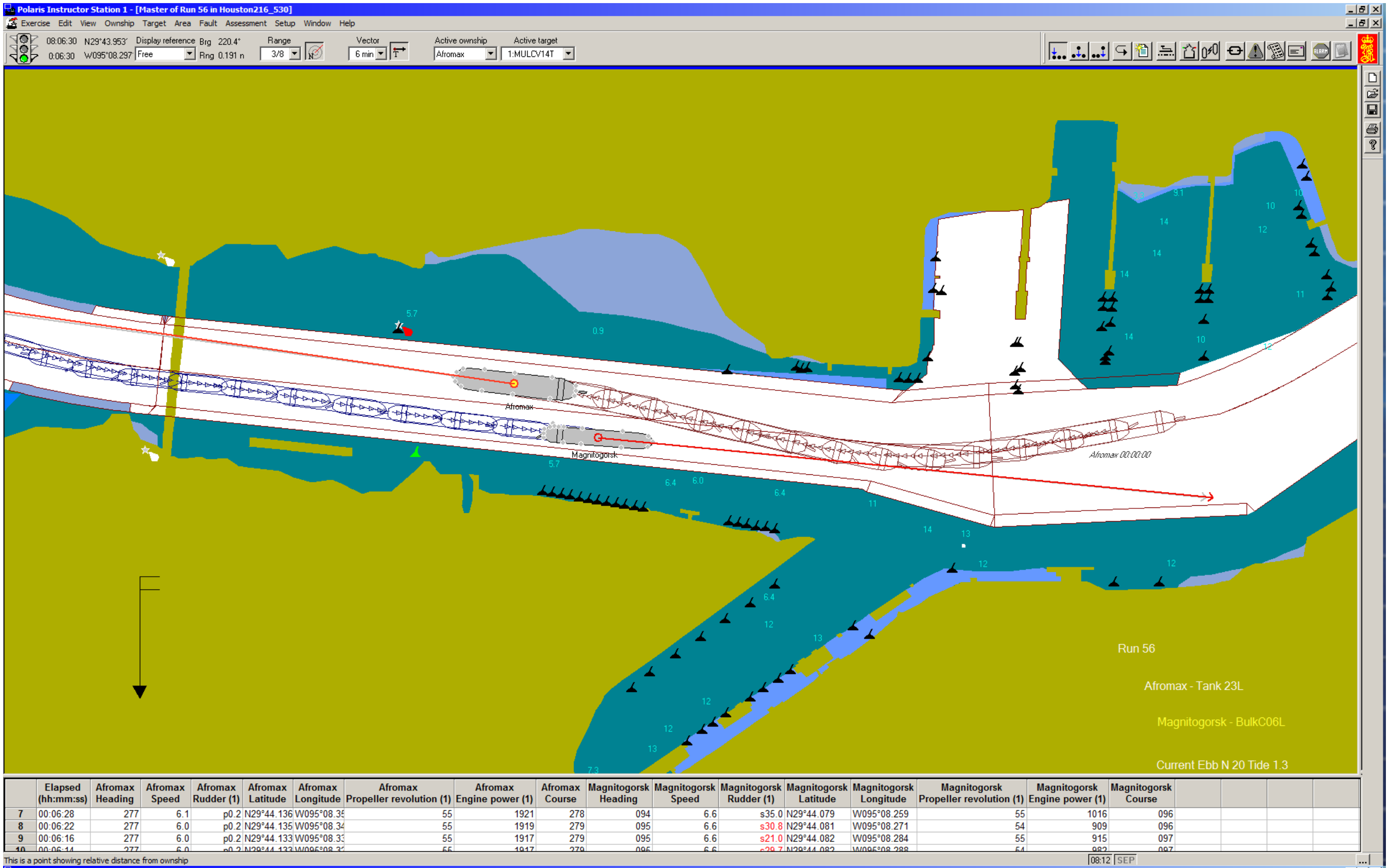
Current Ebb N 20 Tide 1.3

	Elapsed (hh:mm:ss)	Afromax Heading	Afromax Speed	Afromax Rudder (1)	Afromax Latitude	Afromax Longitude	Afromax Propeller revolution (1)	Afromax Engine power (1)	Afromax Course	Magnitogorsk Heading	Magnitogorsk Speed	Magnitogorsk Rudder (1)	Magnitogorsk Latitude	Magnitogorsk Longitude	Magnitogorsk Propeller revolution (1)	Magnitogorsk Engine power (1)	Magnitogorsk Course
7	00:05:56	278	6.0	s20.6	N29°44.128	W095°08.29	55	1916	280	096	6.6	p14.6	N29°44.086	W095°08.326	54	931	098
8	00:05:54	278	6.0	s13.0	N29°44.127	W095°08.29	55	1916	280	096	6.6	p18.0	N29°44.087	W095°08.330	54	957	098
9	00:05:52	278	6.0	s5.4	N29°44.126	W095°08.28	55	1916	280	096	6.6	p15.4	N29°44.087	W095°08.334	54	863	098

This is a point showing relative distance from ownship

08:11 SEP

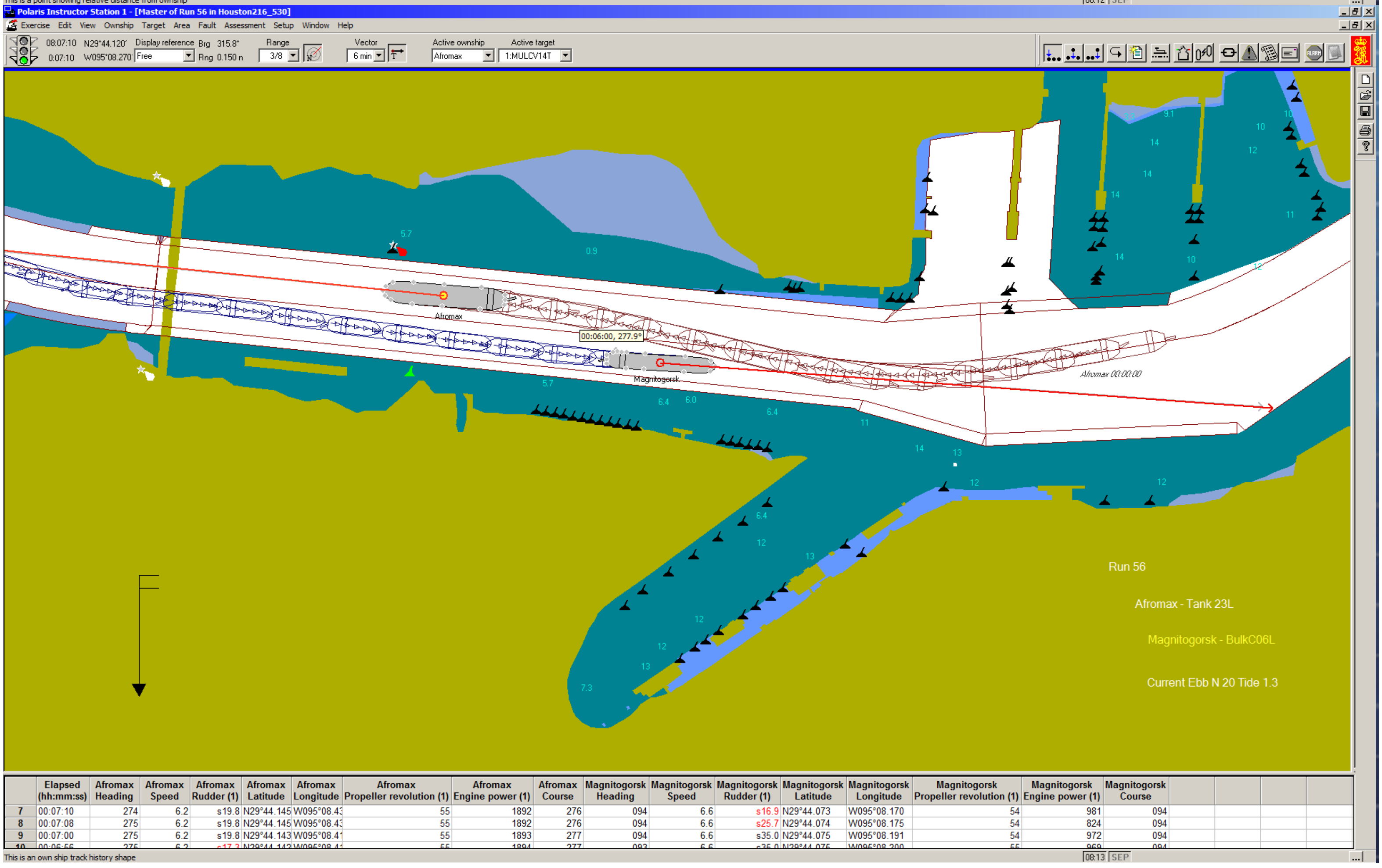
June 26, 2019



08:06:30 N29°43.953' Display reference Free Brg 220.4° Rng 0.191 n Range 3/8 Vector 6 min Active ownship Afromax Active target 1:MULCV14T
0:06:30 W095°08.297'

	Elapsed (hh:mm:ss)	Afromax Heading	Afromax Speed	Afromax Rudder (1)	Afromax Latitude	Afromax Longitude	Afromax Propeller revolution (1)	Afromax Engine power (1)	Afromax Course	Magnitogorsk Heading	Magnitogorsk Speed	Magnitogorsk Rudder (1)	Magnitogorsk Latitude	Magnitogorsk Longitude	Magnitogorsk Propeller revolution (1)	Magnitogorsk Engine power (1)	Magnitogorsk Course				
7	00:06:28	277	6.1	p0.2	N29°44.136	W095°08.35	55	1921	278	094	6.6	s35.0	N29°44.079	W095°08.259	55	1016	096				
8	00:06:22	277	6.0	p0.2	N29°44.135	W095°08.34	55	1919	279	095	6.6	s30.8	N29°44.081	W095°08.271	54	909	096				
9	00:06:16	277	6.0	p0.2	N29°44.133	W095°08.33	55	1917	279	095	6.6	s21.0	N29°44.082	W095°08.284	55	915	097				
10	00:06:14	277	6.0	p0.2	N29°44.133	W095°08.32	55	1917	279	096	6.6	s29.7	N29°44.082	W095°08.288	54	982	097				

This is a point showing relative distance from ownship



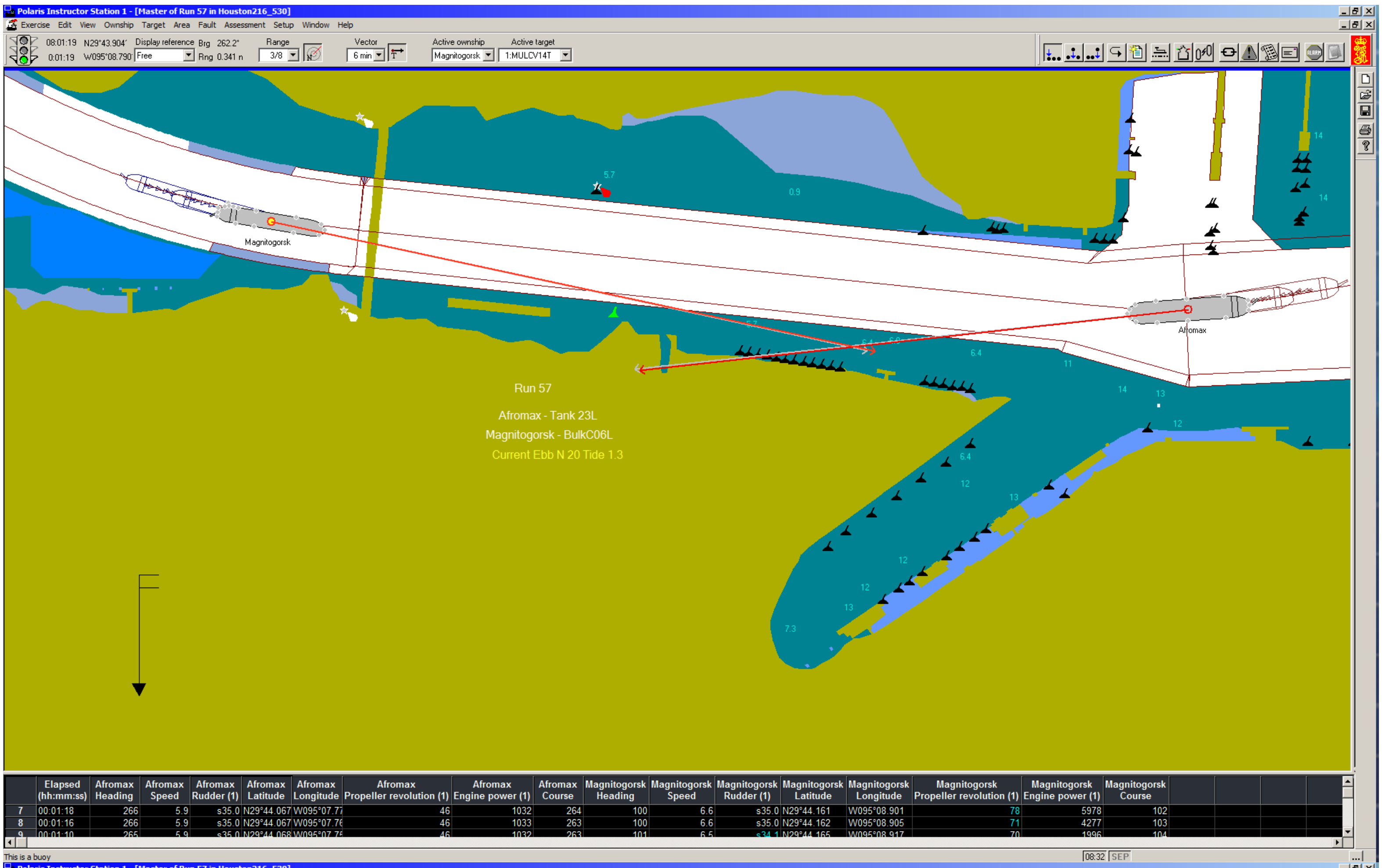
08:07:10 N29°44.120' Display reference Free Brg 315.8° Rng 0.150 n Range 3/8 Vector 6 min Active ownship Afromax Active target 1:MULCV14T
0:07:10 W095°08.270'

	Elapsed (hh:mm:ss)	Afromax Heading	Afromax Speed	Afromax Rudder (1)	Afromax Latitude	Afromax Longitude	Afromax Propeller revolution (1)	Afromax Engine power (1)	Afromax Course	Magnitogorsk Heading	Magnitogorsk Speed	Magnitogorsk Rudder (1)	Magnitogorsk Latitude	Magnitogorsk Longitude	Magnitogorsk Propeller revolution (1)	Magnitogorsk Engine power (1)	Magnitogorsk Course				
7	00:07:10	274	6.2	s19.8	N29°44.145	W095°08.43	55	1892	276	094	6.6	s16.9	N29°44.073	W095°08.170	54	981	094				
8	00:07:08	275	6.2	s19.8	N29°44.145	W095°08.43	55	1892	276	094	6.6	s25.7	N29°44.074	W095°08.175	54	824	094				
9	00:07:00	275	6.2	s19.8	N29°44.143	W095°08.41	55	1893	277	094	6.6	s35.0	N29°44.075	W095°08.191	54	972	094				
10	00:06:56	275	6.2	s17.3	N29°44.142	W095°08.41	55	1894	277	093	6.6	s35.0	N29°44.075	W095°08.200	55	969	094				

This is an own ship track history shape

June 26, 2019

Run 57



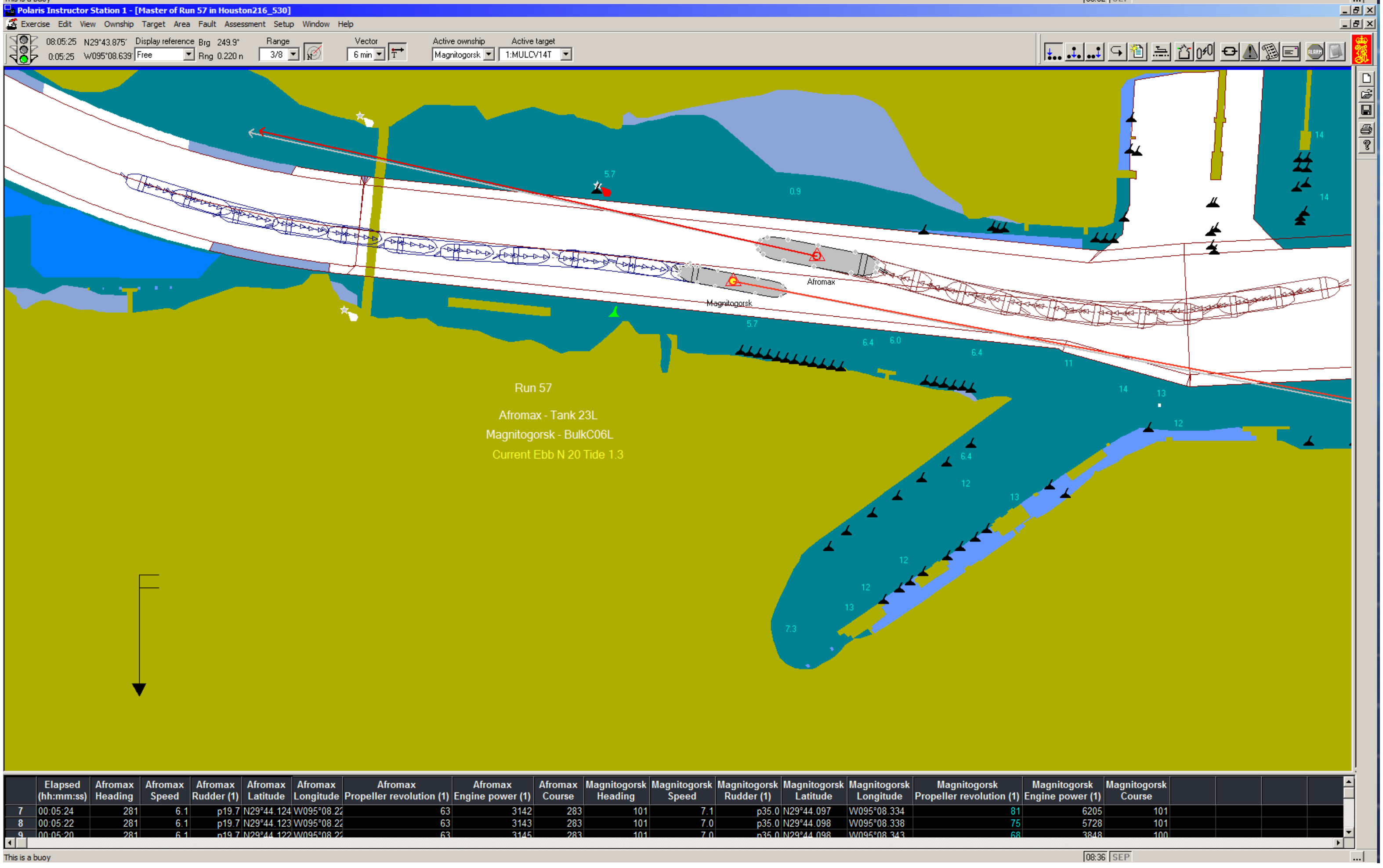
Polaris Instructor Station 1 - [Master of Run 57 in Houston216_530]

08:01:19 N29°43.904′ Display reference Free Brg 262.2° Rng 0.341 n Range 3/8 Vector 6 min Active ownship Magnitogorsk Active target 1:MULCV14T
0:01:19 W095°08.790′

	Elapsed (hh:mm:ss)	Afromax Heading	Afromax Speed	Afromax Rudder (1)	Afromax Latitude	Afromax Longitude	Afromax Propeller revolution (1)	Afromax Engine power (1)	Afromax Course	Magnitogorsk Heading	Magnitogorsk Speed	Magnitogorsk Rudder (1)	Magnitogorsk Latitude	Magnitogorsk Longitude	Magnitogorsk Propeller revolution (1)	Magnitogorsk Engine power (1)	Magnitogorsk Course
7	00:01:18	266	5.9	s35.0	N29°44.067	W095°07.77	46	1032	264	100	6.6	s35.0	N29°44.161	W095°08.901	78	5978	102
8	00:01:16	266	5.9	s35.0	N29°44.067	W095°07.76	46	1033	263	100	6.6	s35.0	N29°44.162	W095°08.905	71	4277	103
9	00:01:10	265	5.9	s35.0	N29°44.068	W095°07.75	46	1032	263	101	6.5	s34.1	N29°44.165	W095°08.917	70	1996	104

This is a buoy

08:32 SEP



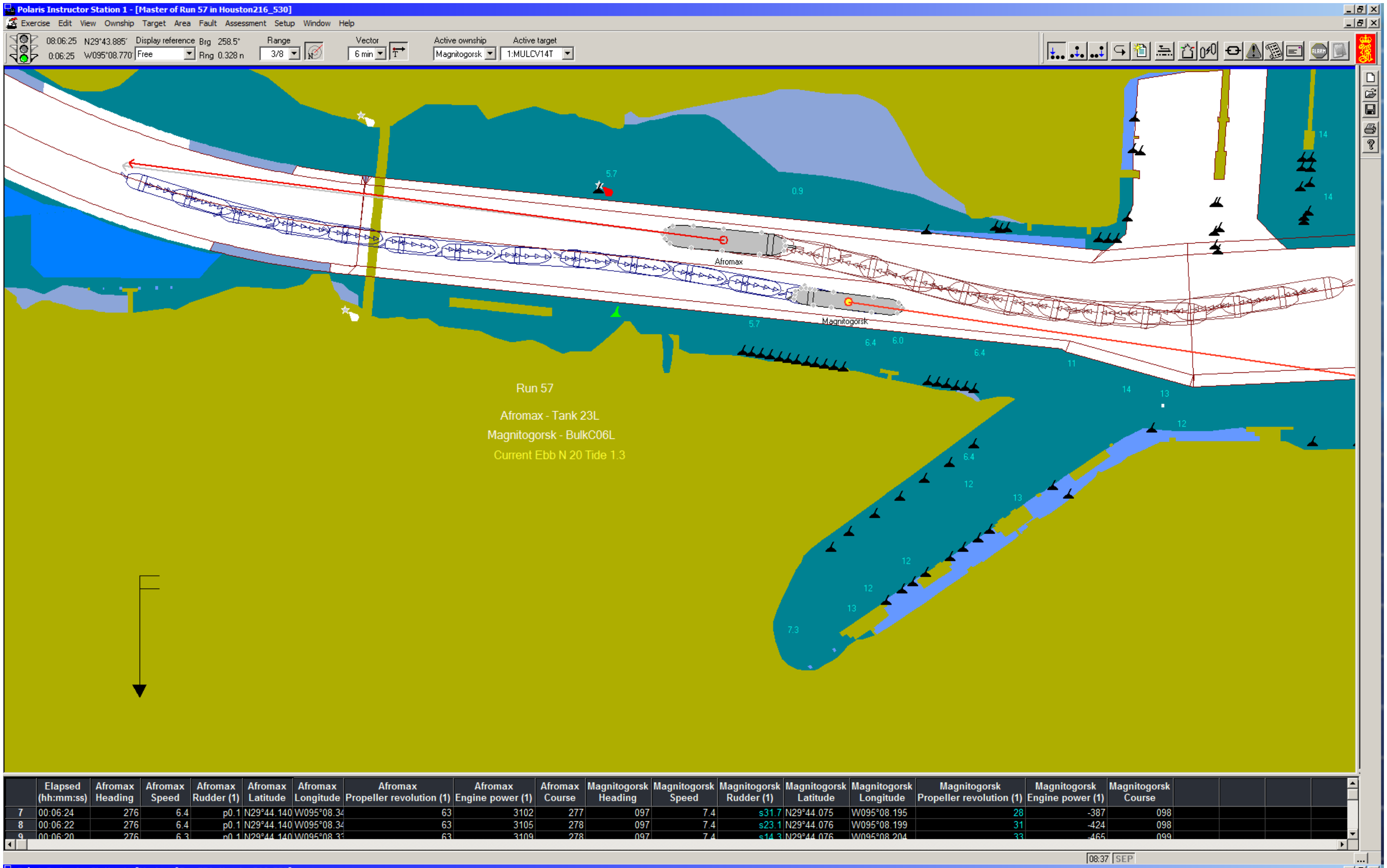
Polaris Instructor Station 1 - [Master of Run 57 in Houston216_530]

08:05:25 N29°43.875′ Display reference Free Brg 249.9° Rng 0.220 n Range 3/8 Vector 6 min Active ownship Magnitogorsk Active target 1:MULCV14T
0:05:25 W095°08.639′

	Elapsed (hh:mm:ss)	Afromax Heading	Afromax Speed	Afromax Rudder (1)	Afromax Latitude	Afromax Longitude	Afromax Propeller revolution (1)	Afromax Engine power (1)	Afromax Course	Magnitogorsk Heading	Magnitogorsk Speed	Magnitogorsk Rudder (1)	Magnitogorsk Latitude	Magnitogorsk Longitude	Magnitogorsk Propeller revolution (1)	Magnitogorsk Engine power (1)	Magnitogorsk Course
7	00:05:24	281	6.1	p19.7	N29°44.124	W095°08.22	63	3142	283	101	7.1	p35.0	N29°44.097	W095°08.334	81	6205	101
8	00:05:22	281	6.1	p19.7	N29°44.123	W095°08.22	63	3143	283	101	7.0	p35.0	N29°44.098	W095°08.338	75	5728	101
9	00:05:20	281	6.1	p19.7	N29°44.122	W095°08.22	63	3145	283	101	7.0	p35.0	N29°44.098	W095°08.343	68	3848	100

This is a buoy

08:36 SEP



Polaris Instructor Station 1 - [Master of Run 57 in Houston216_530]

08:06:25 N29°43.885' Display reference Free Brg 258.5° Rng 0.328 n

0:06:25 W095°08.770'

Range 3/8

Vector 6 min

Active ownship Magnitogorsk

Active target 1:MULCV14T

Run 57

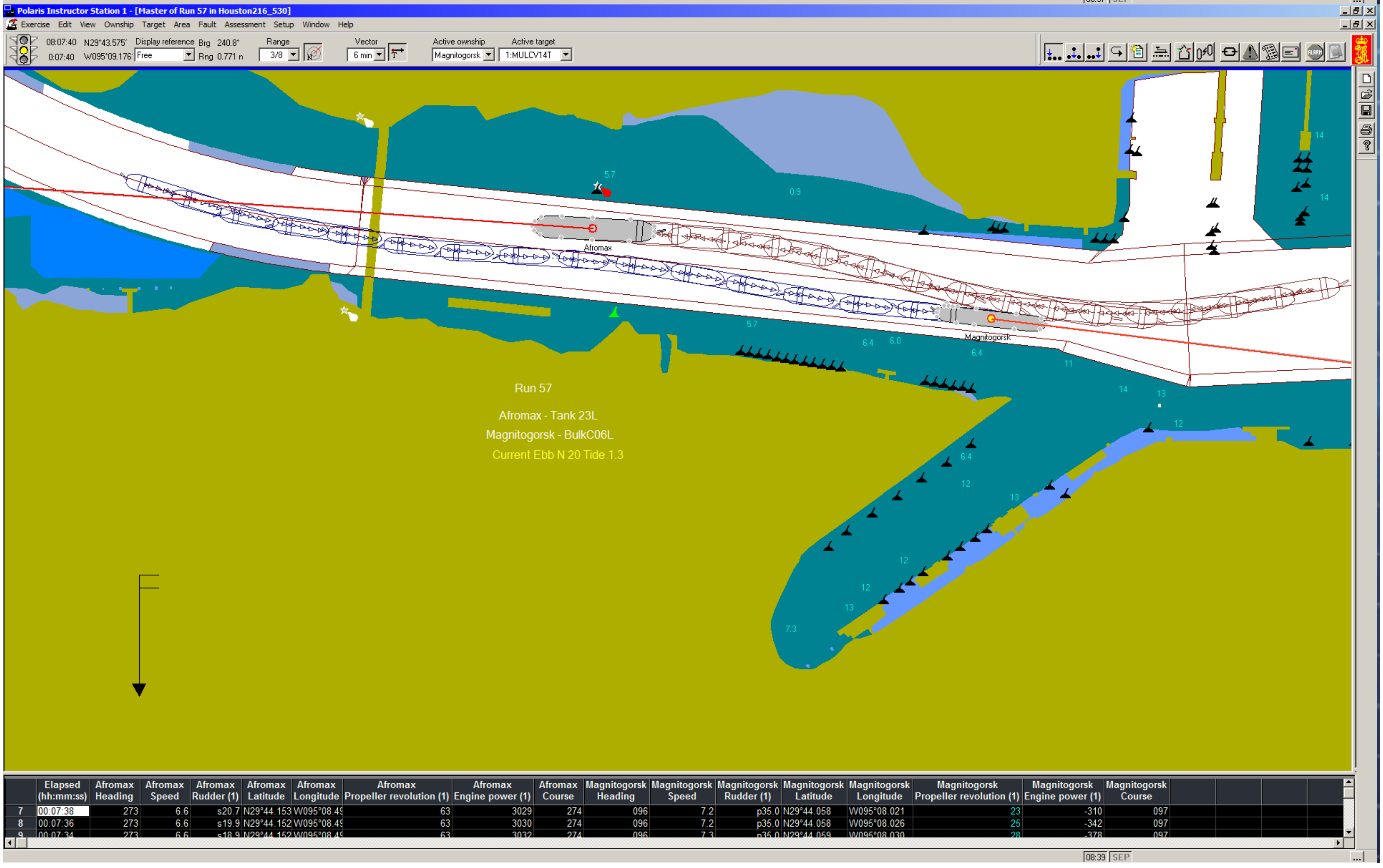
Afromax - Tank 23L

Magnitogorsk - BulkC06L

Current Ebb N 20 Tide 1.3

	Elapsed (hh:mm:ss)	Afromax Heading	Afromax Speed	Afromax Rudder (1)	Afromax Latitude	Afromax Longitude	Afromax Propeller revolution (1)	Afromax Engine power (1)	Afromax Course	Magnitogorsk Heading	Magnitogorsk Speed	Magnitogorsk Rudder (1)	Magnitogorsk Latitude	Magnitogorsk Longitude	Magnitogorsk Propeller revolution (1)	Magnitogorsk Engine power (1)	Magnitogorsk Course
7	00:06:24	276	6.4	p0.1	N29°44.140	W095°08.34	63	3102	277	097	7.4	s31.7	N29°44.075	W095°08.195	28	-387	098
8	00:06:22	276	6.4	p0.1	N29°44.140	W095°08.34	63	3105	278	097	7.4	s23.1	N29°44.076	W095°08.199	31	-424	098
9	00:06:20	276	6.3	p0.1	N29°44.140	W095°08.33	63	3109	278	097	7.4	s14.3	N29°44.076	W095°08.204	33	-465	099

08:37 SEP



Polaris Instructor Station 1 - [Master of Run 57 in Houston216_530]

08:07:40 N29°43.575' Display reference Free Brg 240.8° Rng 0.771 n

0:07:40 W095°09.176'

Range 3/8

Vector 6 min

Active ownship Magnitogorsk

Active target 1:MULCV14T

Run 57

Afromax - Tank 23L

Magnitogorsk - BulkC06L

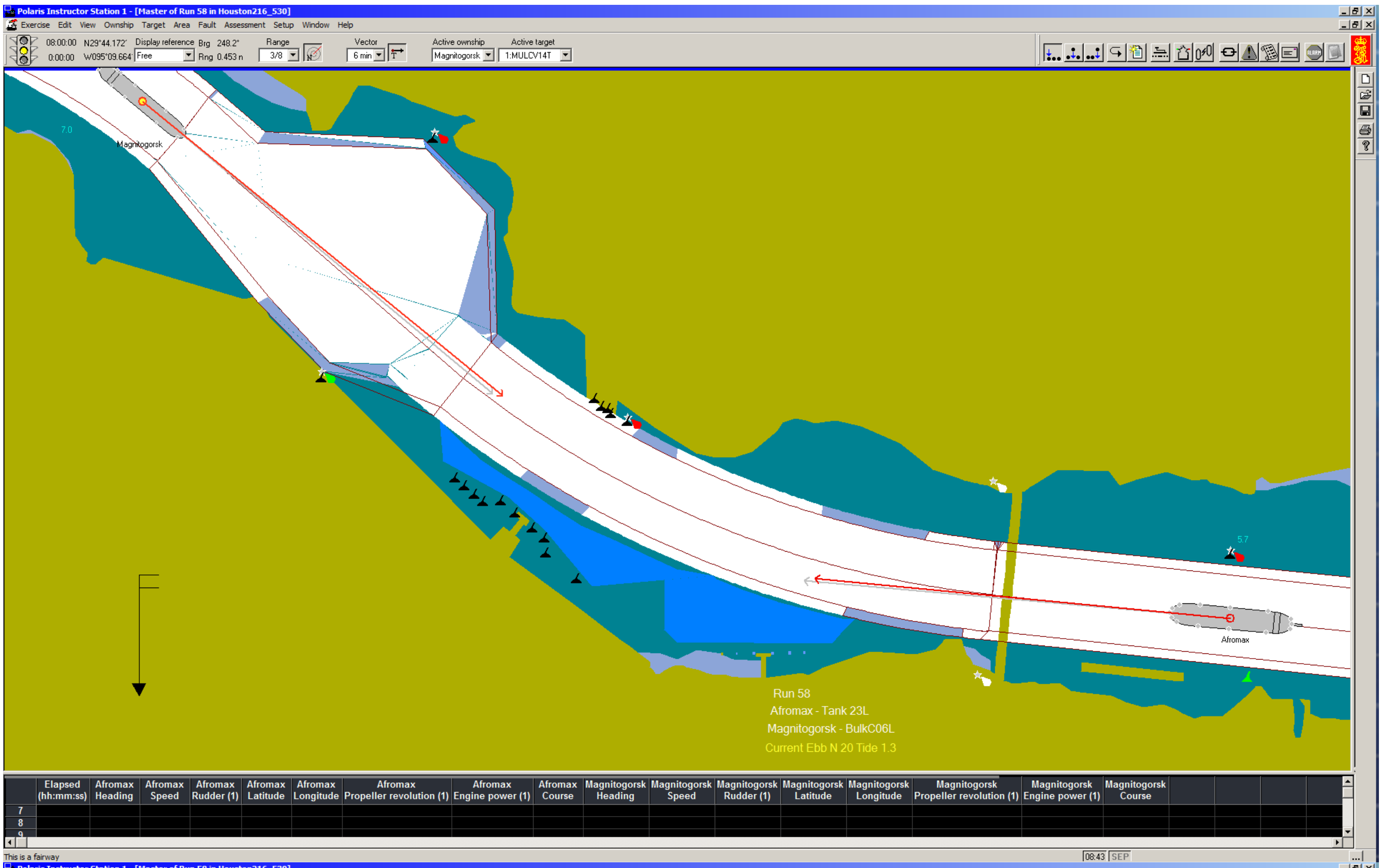
Current Ebb N 20 Tide 1.3

	Elapsed (hh:mm:ss)	Afromax Heading	Afromax Speed	Afromax Rudder (1)	Afromax Latitude	Afromax Longitude	Afromax Propeller revolution (1)	Afromax Engine power (1)	Afromax Course	Magnitogorsk Heading	Magnitogorsk Speed	Magnitogorsk Rudder (1)	Magnitogorsk Latitude	Magnitogorsk Longitude	Magnitogorsk Propeller revolution (1)	Magnitogorsk Engine power (1)	Magnitogorsk Course
7	00:07:38	273	6.6	s20.7	N29°44.153	W095°08.49	63	3029	274	096	7.2	p35.0	N29°44.058	W095°08.021	23	-310	097
8	00:07:36	273	6.6	s19.9	N29°44.152	W095°08.49	63	3030	274	096	7.2	p35.0	N29°44.058	W095°08.026	25	-342	097
9	00:07:34	273	6.6	s18.9	N29°44.152	W095°08.49	63	3032	274	096	7.3	p35.0	N29°44.059	W095°08.030	28	-378	097

08:39 SEP

June 26, 2019

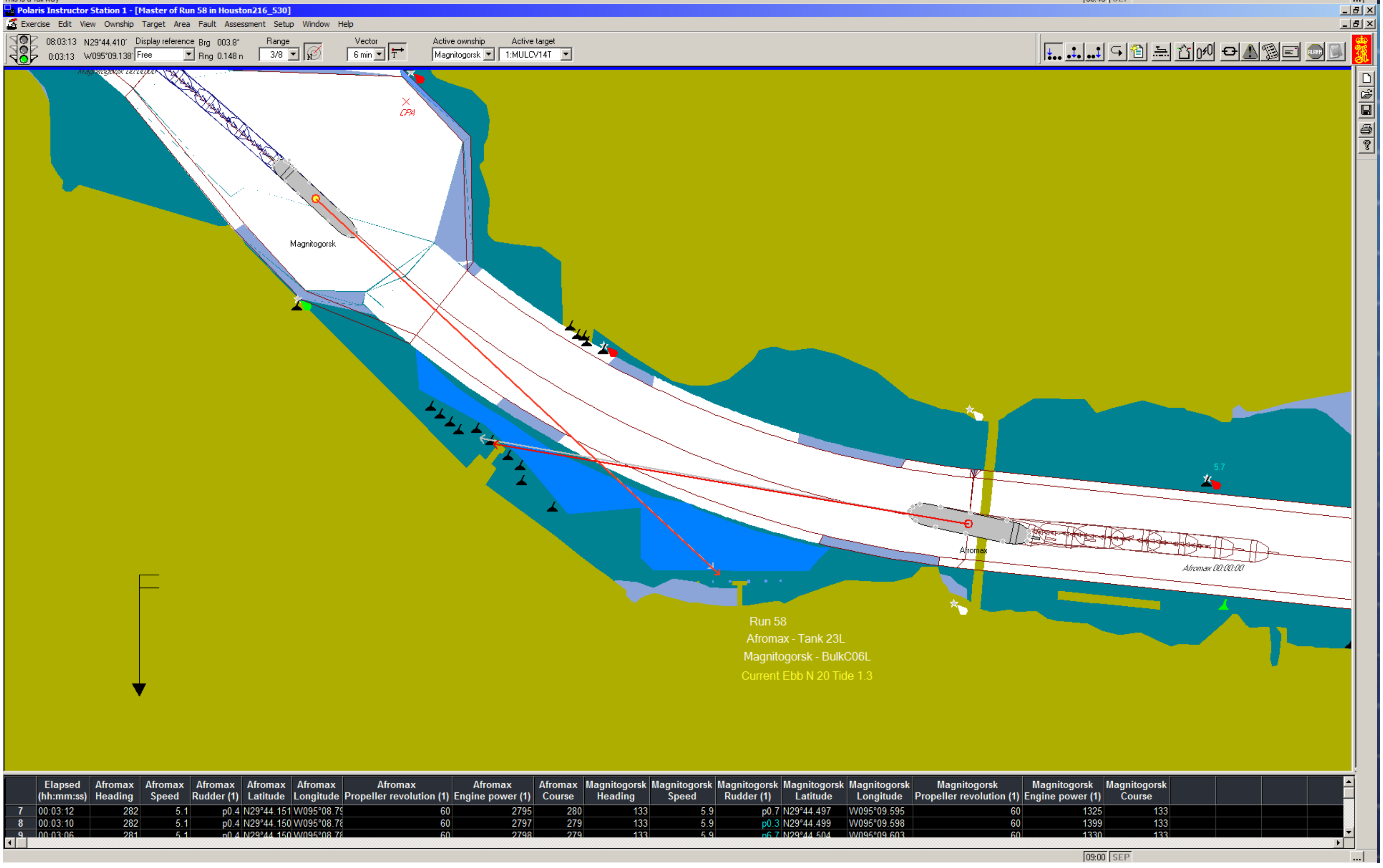
Run 58


Polaris Instructor Station 1 - [Master of Run 58 in Houston216_530]

Run 58
Afromax - Tank 23L
Magnitogorsk - BulkC06L
Current Ebb N 20 Tide 1.3

	Elapsed (hh:mm:ss)	Afromax Heading	Afromax Speed	Afromax Rudder (1)	Afromax Latitude	Afromax Longitude	Afromax Propeller revolution (1)	Afromax Engine power (1)	Afromax Course	Magnitogorsk Heading	Magnitogorsk Speed	Magnitogorsk Rudder (1)	Magnitogorsk Latitude	Magnitogorsk Longitude	Magnitogorsk Propeller revolution (1)	Magnitogorsk Engine power (1)	Magnitogorsk Course
7																	
8																	
9																	

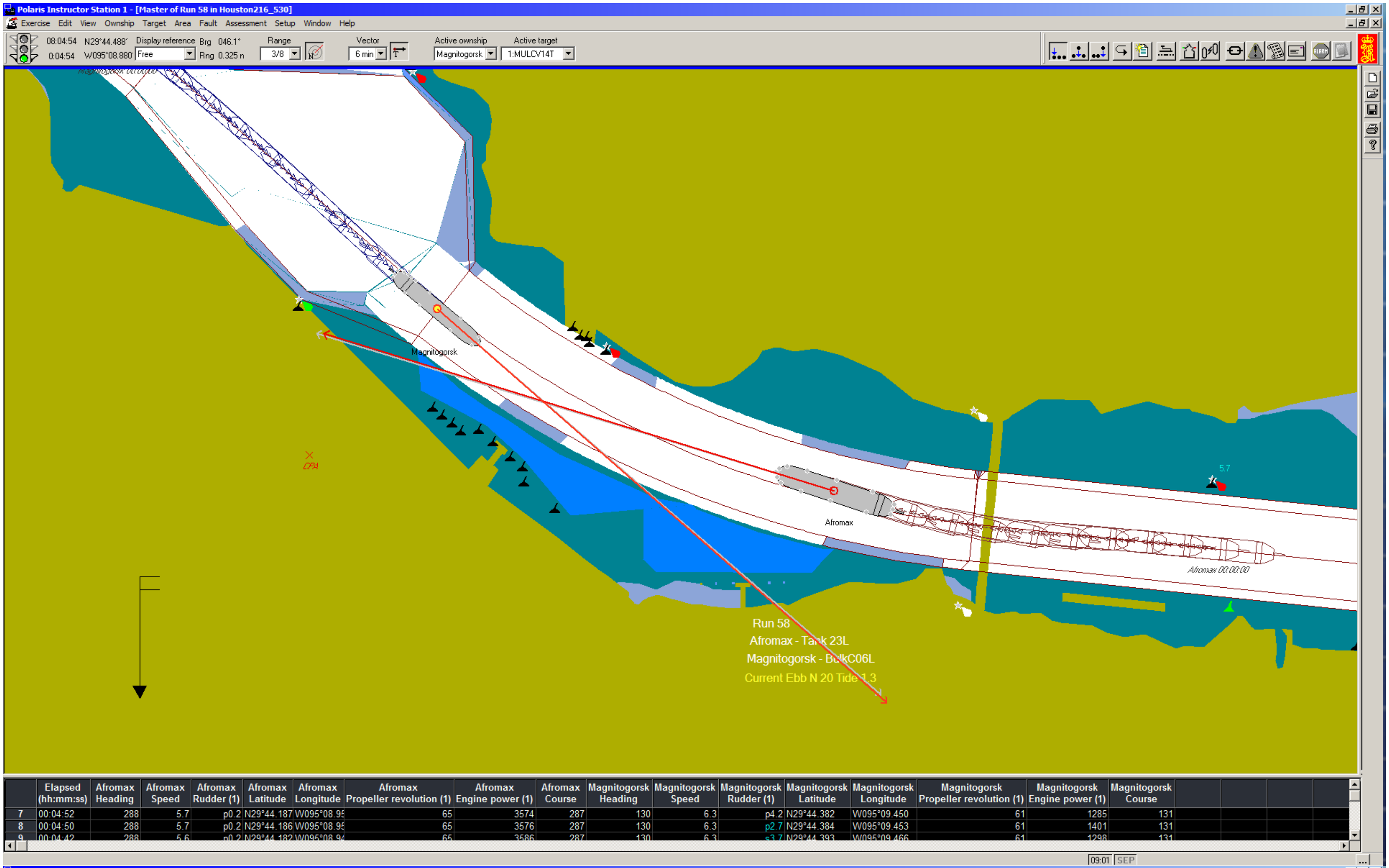
This is a fairway


Polaris Instructor Station 1 - [Master of Run 58 in Houston216_530]

Run 58
Afromax - Tank 23L
Magnitogorsk - BulkC06L
Current Ebb N 20 Tide 1.3

	Elapsed (hh:mm:ss)	Afromax Heading	Afromax Speed	Afromax Rudder (1)	Afromax Latitude	Afromax Longitude	Afromax Propeller revolution (1)	Afromax Engine power (1)	Afromax Course	Magnitogorsk Heading	Magnitogorsk Speed	Magnitogorsk Rudder (1)	Magnitogorsk Latitude	Magnitogorsk Longitude	Magnitogorsk Propeller revolution (1)	Magnitogorsk Engine power (1)	Magnitogorsk Course
7	00:03:12	282	5.1	p0.4	N29°44.151	W095°08.79	60	2795	280	133	5.9	p0.7	N29°44.497	W095°09.595	60	1325	133
8	00:03:10	282	5.1	p0.4	N29°44.150	W095°08.78	60	2797	279	133	5.9	p0.3	N29°44.499	W095°09.598	60	1399	133
9	00:03:06	281	5.1	p0.4	N29°44.150	W095°08.78	60	2798	279	133	5.9	p6.7	N29°44.504	W095°09.603	60	1330	133

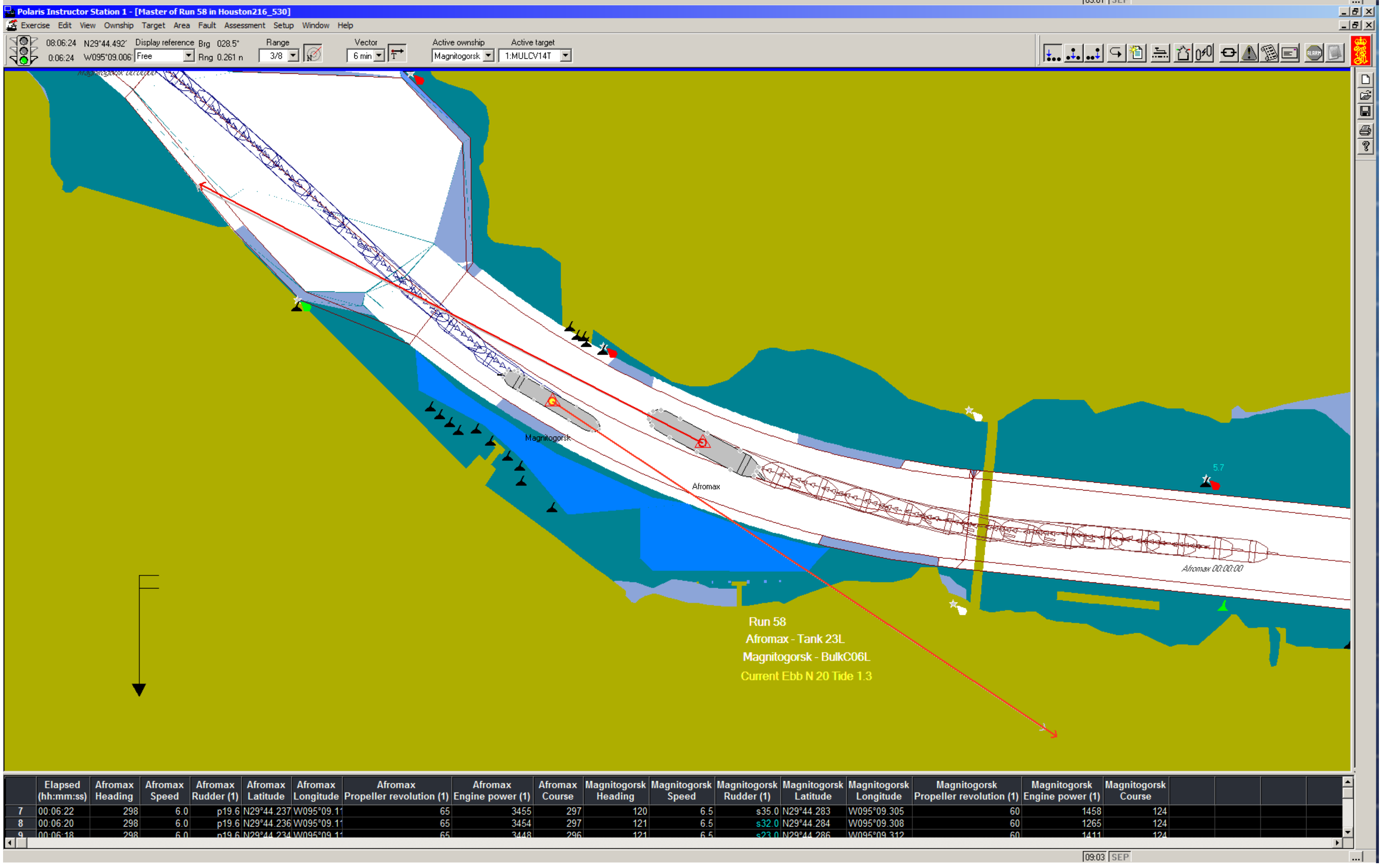
June 26, 2019



Polaris Instructor Station 1 - [Master of Run 58 in Houston216_530]

08:04:54 N29°44.488' Display reference Free Brg 046.1° Rng 0.325 n Range 3/8 Vector 6 min Active ownship Magnitogorsk Active target 1:MULCV14T
0:04:54 W095°08.880'

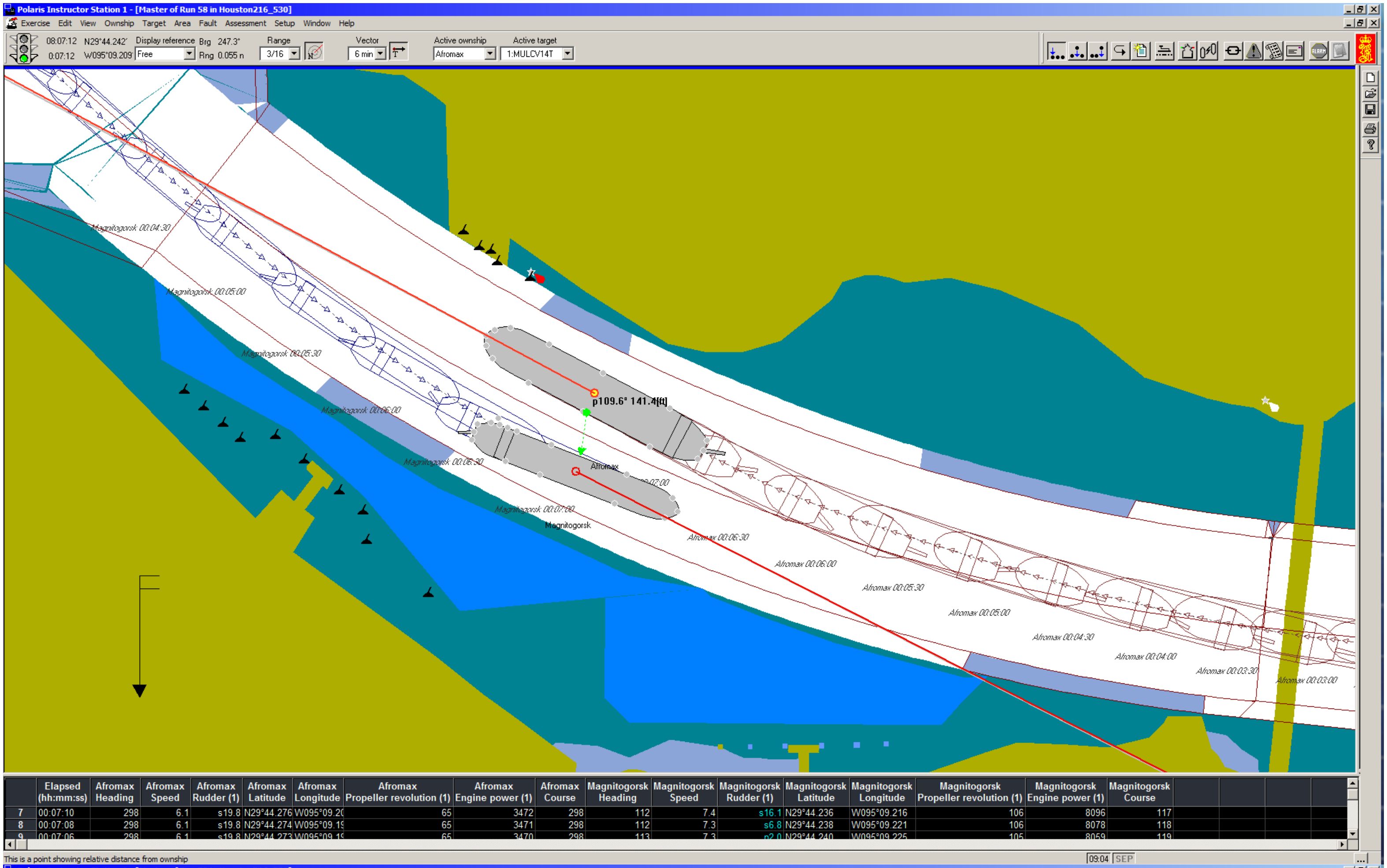
	Elapsed (hh:mm:ss)	Afromax Heading	Afromax Speed	Afromax Rudder (1)	Afromax Latitude	Afromax Longitude	Afromax Propeller revolution (1)	Afromax Engine power (1)	Afromax Course	Magnitogorsk Heading	Magnitogorsk Speed	Magnitogorsk Rudder (1)	Magnitogorsk Latitude	Magnitogorsk Longitude	Magnitogorsk Propeller revolution (1)	Magnitogorsk Engine power (1)	Magnitogorsk Course
7	00:04:52	288	5.7	p0.2	N29°44.187	W095°08.95	65	3574	287	130	6.3	p4.2	N29°44.382	W095°09.450	61	1285	131
8	00:04:50	288	5.7	p0.2	N29°44.186	W095°08.95	65	3576	287	130	6.3	p2.7	N29°44.384	W095°09.453	61	1401	131
9	00:04:42	288	5.6	p0.2	N29°44.182	W095°08.94	65	3586	287	130	6.3	s3.7	N29°44.393	W095°09.466	61	1298	131



Polaris Instructor Station 1 - [Master of Run 58 in Houston216_530]

08:06:24 N29°44.492' Display reference Free Brg 028.5° Rng 0.261 n Range 3/8 Vector 6 min Active ownship Magnitogorsk Active target 1:MULCV14T
0:06:24 W095°09.006'

	Elapsed (hh:mm:ss)	Afromax Heading	Afromax Speed	Afromax Rudder (1)	Afromax Latitude	Afromax Longitude	Afromax Propeller revolution (1)	Afromax Engine power (1)	Afromax Course	Magnitogorsk Heading	Magnitogorsk Speed	Magnitogorsk Rudder (1)	Magnitogorsk Latitude	Magnitogorsk Longitude	Magnitogorsk Propeller revolution (1)	Magnitogorsk Engine power (1)	Magnitogorsk Course
7	00:06:22	298	6.0	p19.6	N29°44.237	W095°09.11	65	3455	297	120	6.5	s35.0	N29°44.283	W095°09.305	60	1458	124
8	00:06:20	298	6.0	p19.6	N29°44.236	W095°09.11	65	3454	297	121	6.5	s32.0	N29°44.284	W095°09.308	60	1265	124
9	00:06:18	298	6.0	p19.6	N29°44.234	W095°09.11	65	3448	296	121	6.5	s23.0	N29°44.286	W095°09.312	60	1411	124

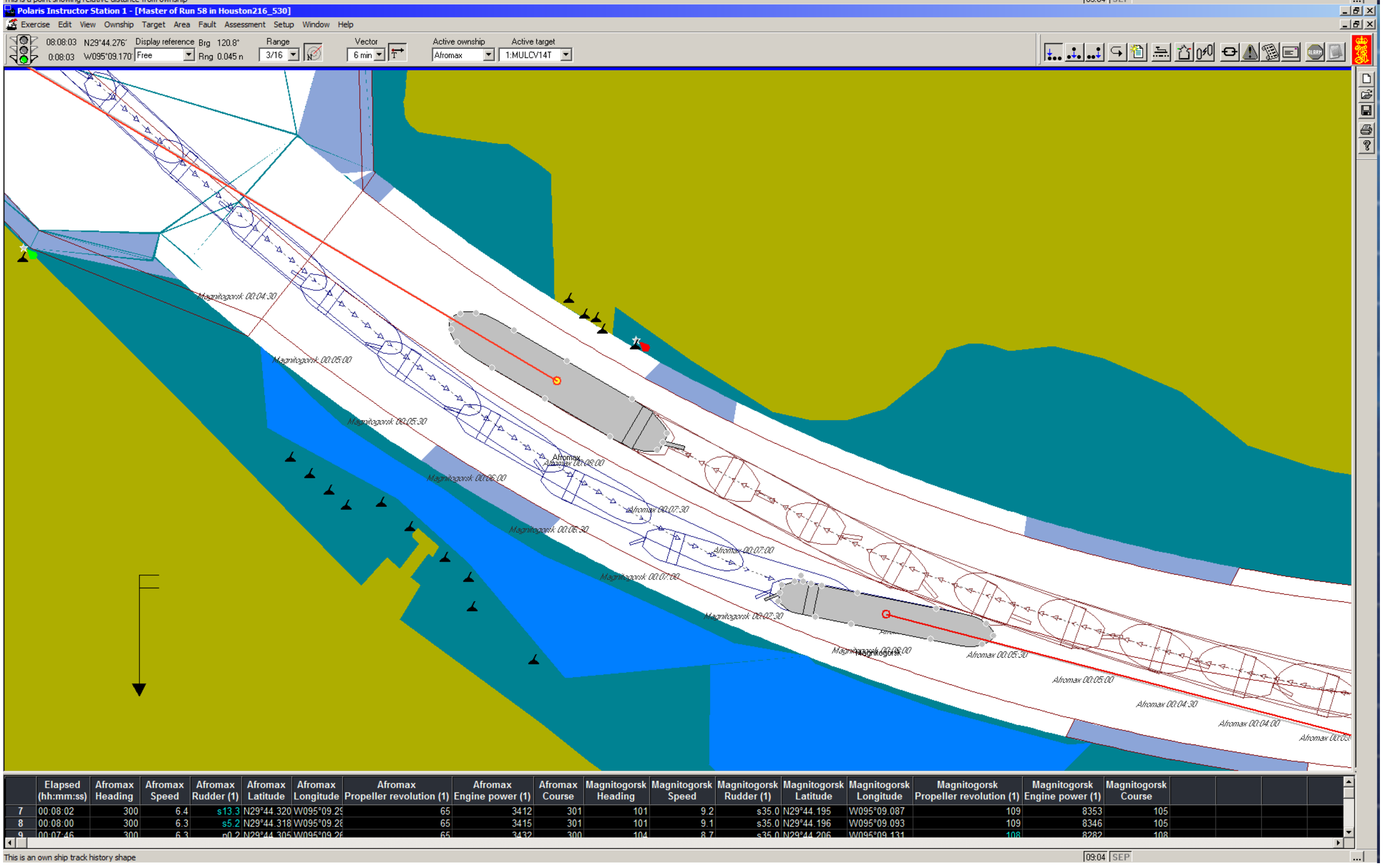


08:07:12 N29°44.242' Display reference Brg 247.3°
0:07:12 W095°09.209 Free Rng 0.055 n
Range 3/16
Vector 6 min
Active ownship Afromax
Active target 1:MULCV14T

	Elapsed (hh:mm:ss)	Afromax Heading	Afromax Speed	Afromax Rudder (1)	Afromax Latitude	Afromax Longitude	Afromax Propeller revolution (1)	Afromax Engine power (1)	Afromax Course	Magnitogorsk Heading	Magnitogorsk Speed	Magnitogorsk Rudder (1)	Magnitogorsk Latitude	Magnitogorsk Longitude	Magnitogorsk Propeller revolution (1)	Magnitogorsk Engine power (1)	Magnitogorsk Course
7	00:07:10	298	6.1	s19.8	N29°44.276	W095°09.20	65	3472	298	112	7.4	s16.1	N29°44.236	W095°09.216	106	8096	117
8	00:07:08	298	6.1	s19.8	N29°44.274	W095°09.19	65	3471	298	112	7.3	s6.8	N29°44.238	W095°09.221	106	8078	118
9	00:07:06	298	6.1	s19.8	N29°44.273	W095°09.19	65	3470	298	113	7.3	p2.0	N29°44.240	W095°09.225	105	8059	119

This is a point showing relative distance from ownship

09:04 SEP

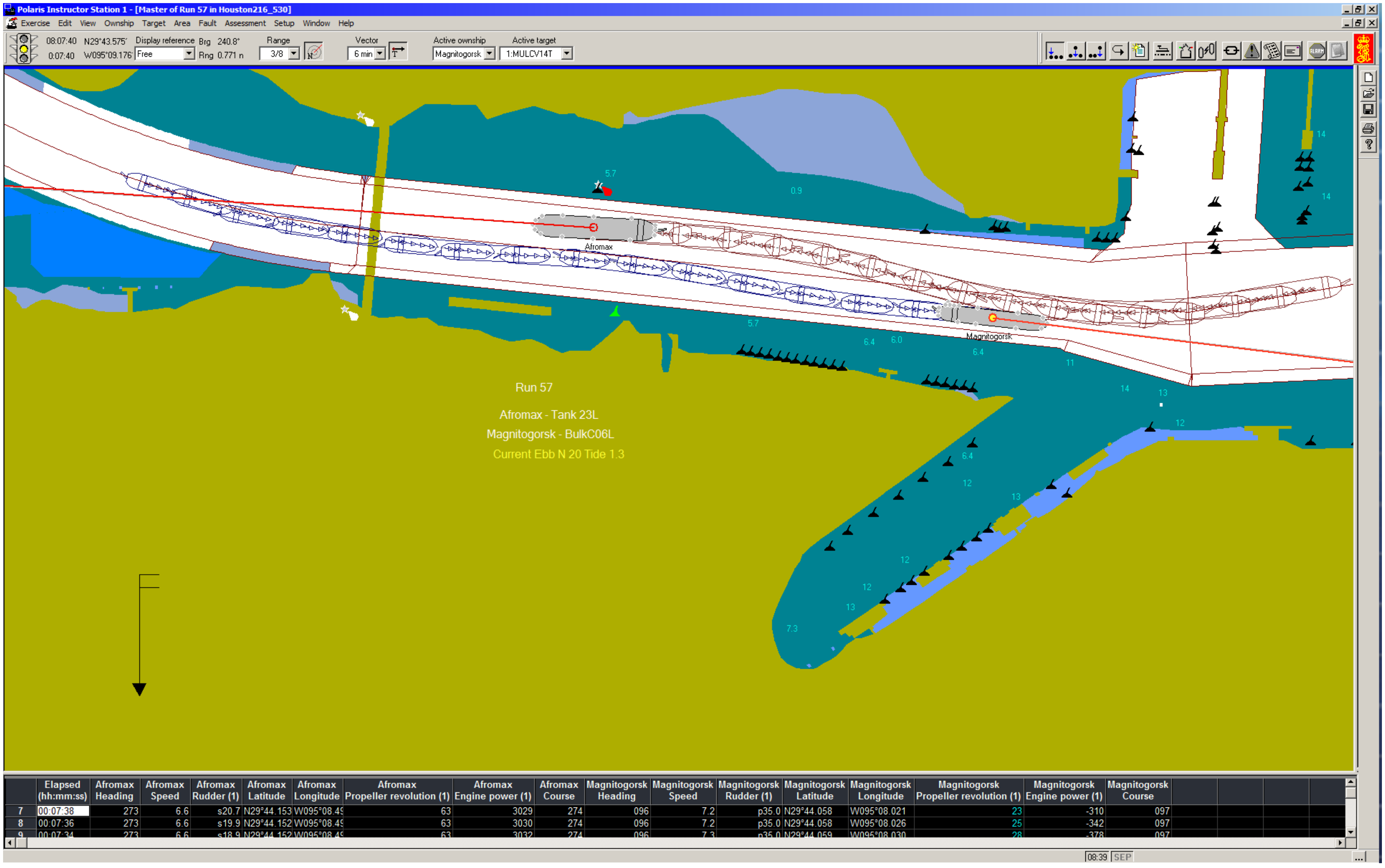


08:08:03 N29°44.276' Display reference Brg 120.8°
0:08:03 W095°09.170 Free Rng 0.045 n
Range 3/16
Vector 6 min
Active ownship Afromax
Active target 1:MULCV14T

	Elapsed (hh:mm:ss)	Afromax Heading	Afromax Speed	Afromax Rudder (1)	Afromax Latitude	Afromax Longitude	Afromax Propeller revolution (1)	Afromax Engine power (1)	Afromax Course	Magnitogorsk Heading	Magnitogorsk Speed	Magnitogorsk Rudder (1)	Magnitogorsk Latitude	Magnitogorsk Longitude	Magnitogorsk Propeller revolution (1)	Magnitogorsk Engine power (1)	Magnitogorsk Course
7	00:08:02	300	6.4	s13.3	N29°44.320	W095°09.29	65	3412	301	101	9.2	s35.0	N29°44.195	W095°09.087	109	8353	105
8	00:08:00	300	6.3	s5.2	N29°44.318	W095°09.28	65	3415	301	101	9.1	s35.0	N29°44.196	W095°09.093	109	8346	105
9	00:07:46	300	6.3	p0.2	N29°44.305	W095°09.26	65	3432	300	104	8.7	s35.0	N29°44.206	W095°09.131	108	8282	108

This is an own ship track history shape

09:04 SEP



08:07:40 N29°43.575'
0:07:40 W095°09.176'

Display reference: Free

Brg 240.8°
Rng 0.771 n

Range: 3/8

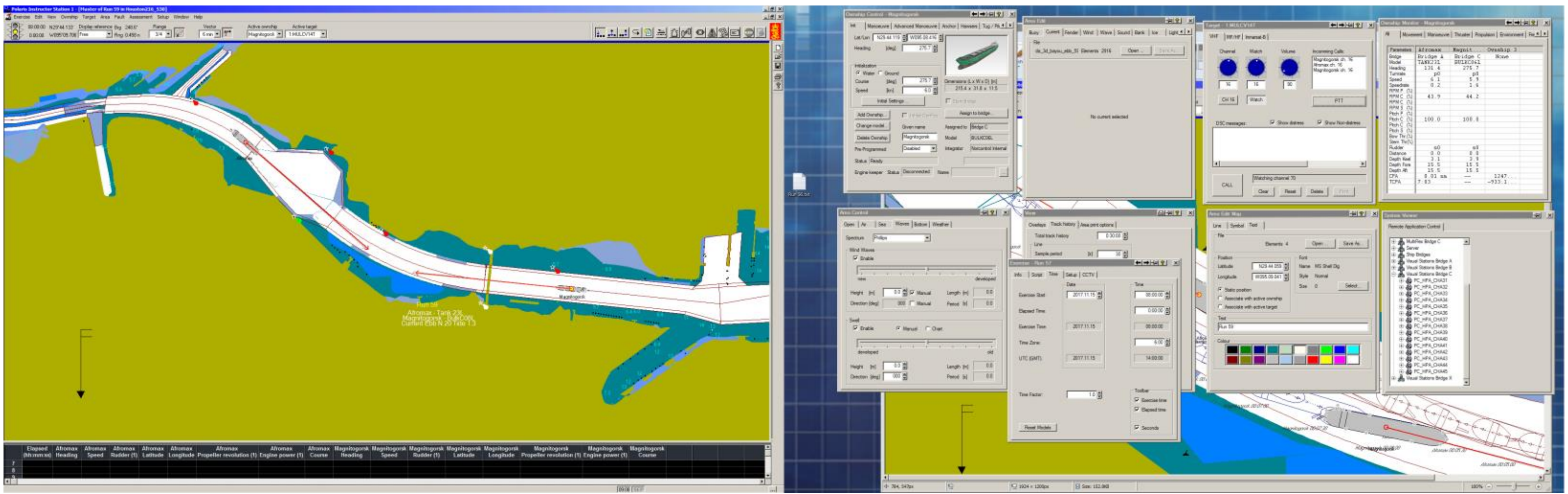
Vector: 6 min

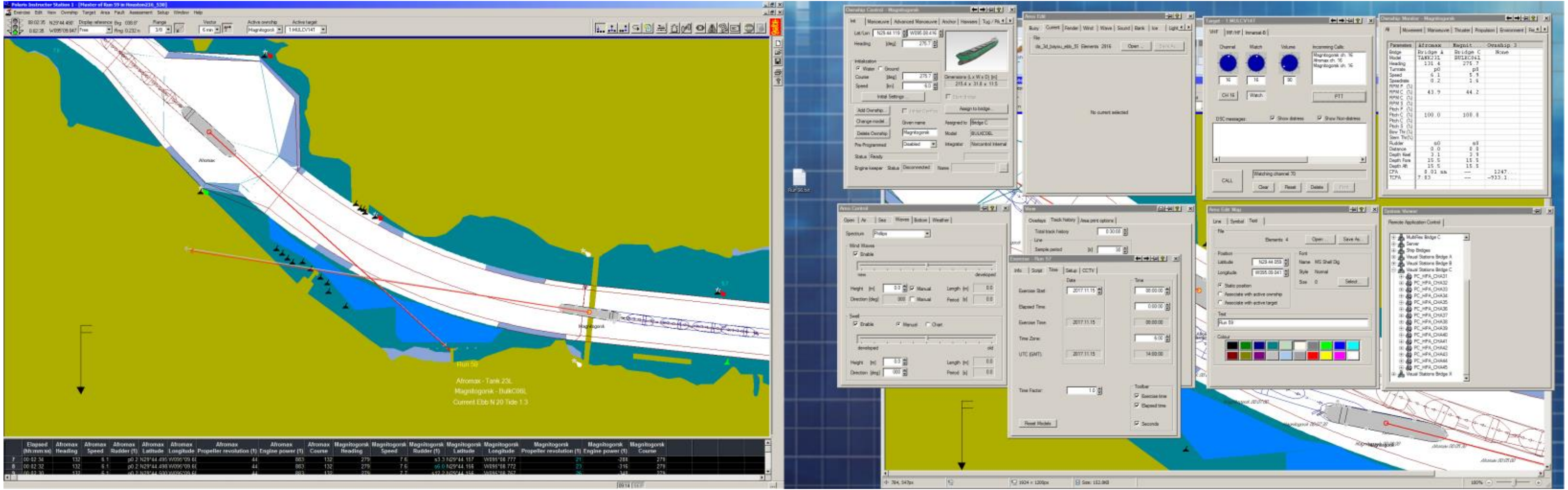
Active ownship: Magnitogorsk

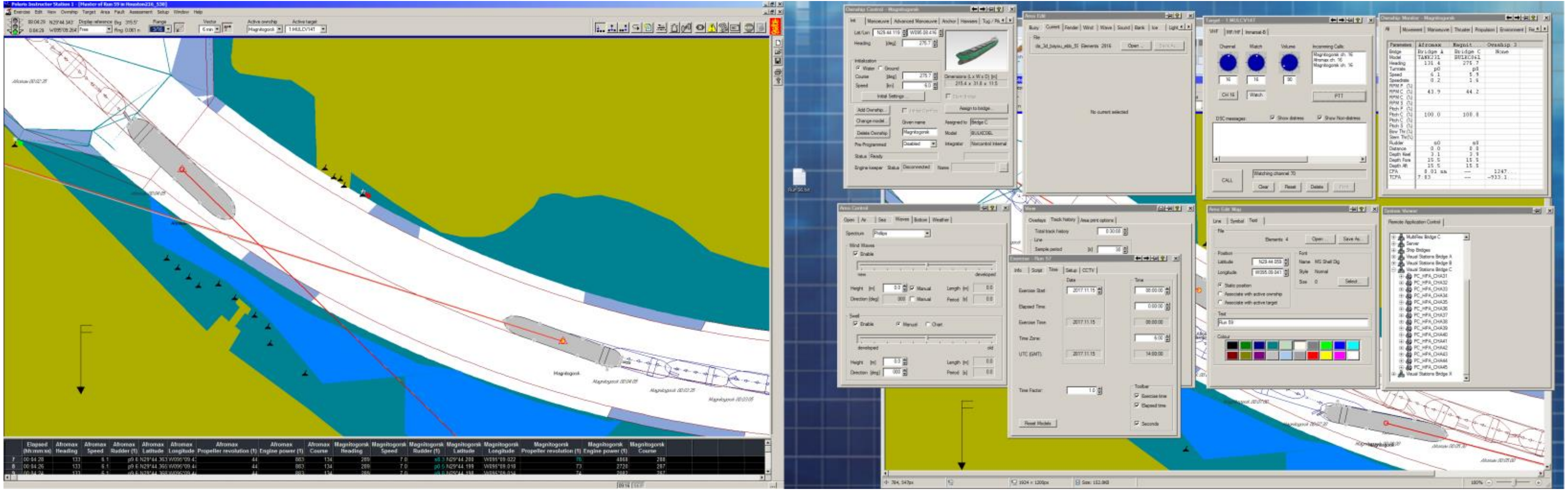
Active target: 1:MULCV14T

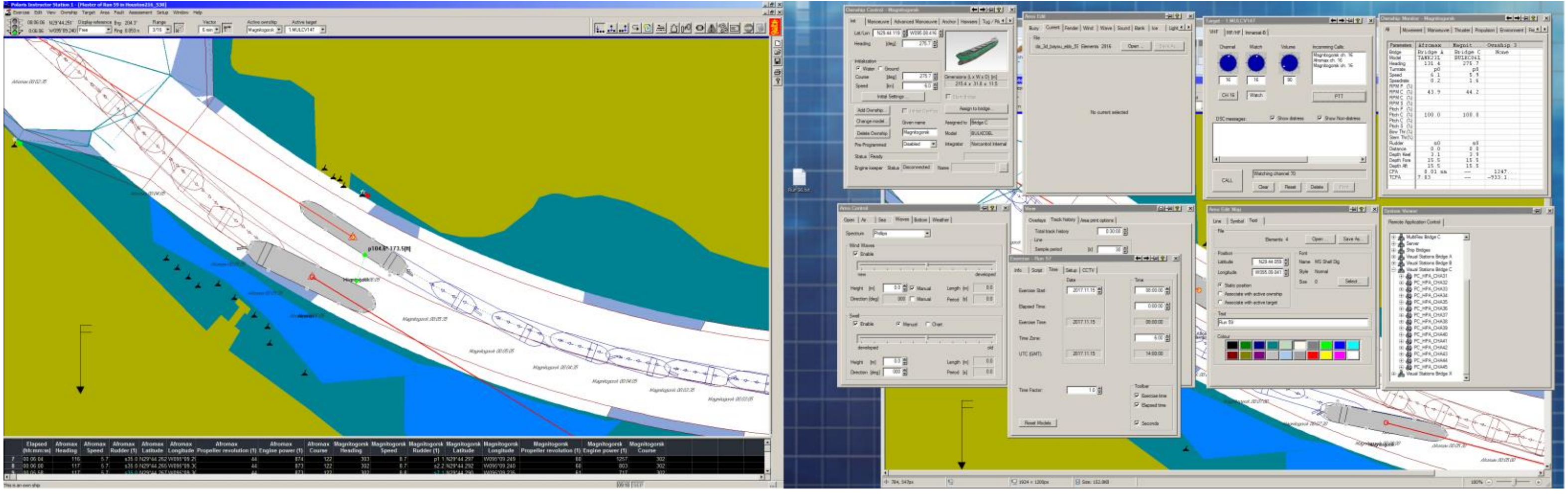
	Elapsed (hh:mm:ss)	Afromax Heading	Afromax Speed	Afromax Rudder (1)	Afromax Latitude	Afromax Longitude	Afromax Propeller revolution (1)	Afromax Engine power (1)	Afromax Course	Magnitogorsk Heading	Magnitogorsk Speed	Magnitogorsk Rudder (1)	Magnitogorsk Latitude	Magnitogorsk Longitude	Magnitogorsk Propeller revolution (1)	Magnitogorsk Engine power (1)	Magnitogorsk Course
7	00:07:38	273	6.6	s20.7	N29°44.153	W095°08.4	63	3029	274	096	7.2	p35.0	N29°44.058	W095°08.021	23	-310	097
8	00:07:36	273	6.6	s19.9	N29°44.152	W095°08.4	63	3030	274	096	7.2	p35.0	N29°44.058	W095°08.026	25	-342	097
9	00:07:34	273	6.6	s18.9	N29°44.152	W095°08.4	63	3032	274	096	7.3	p35.0	N29°44.059	W095°08.030	28	-378	097

Run 59

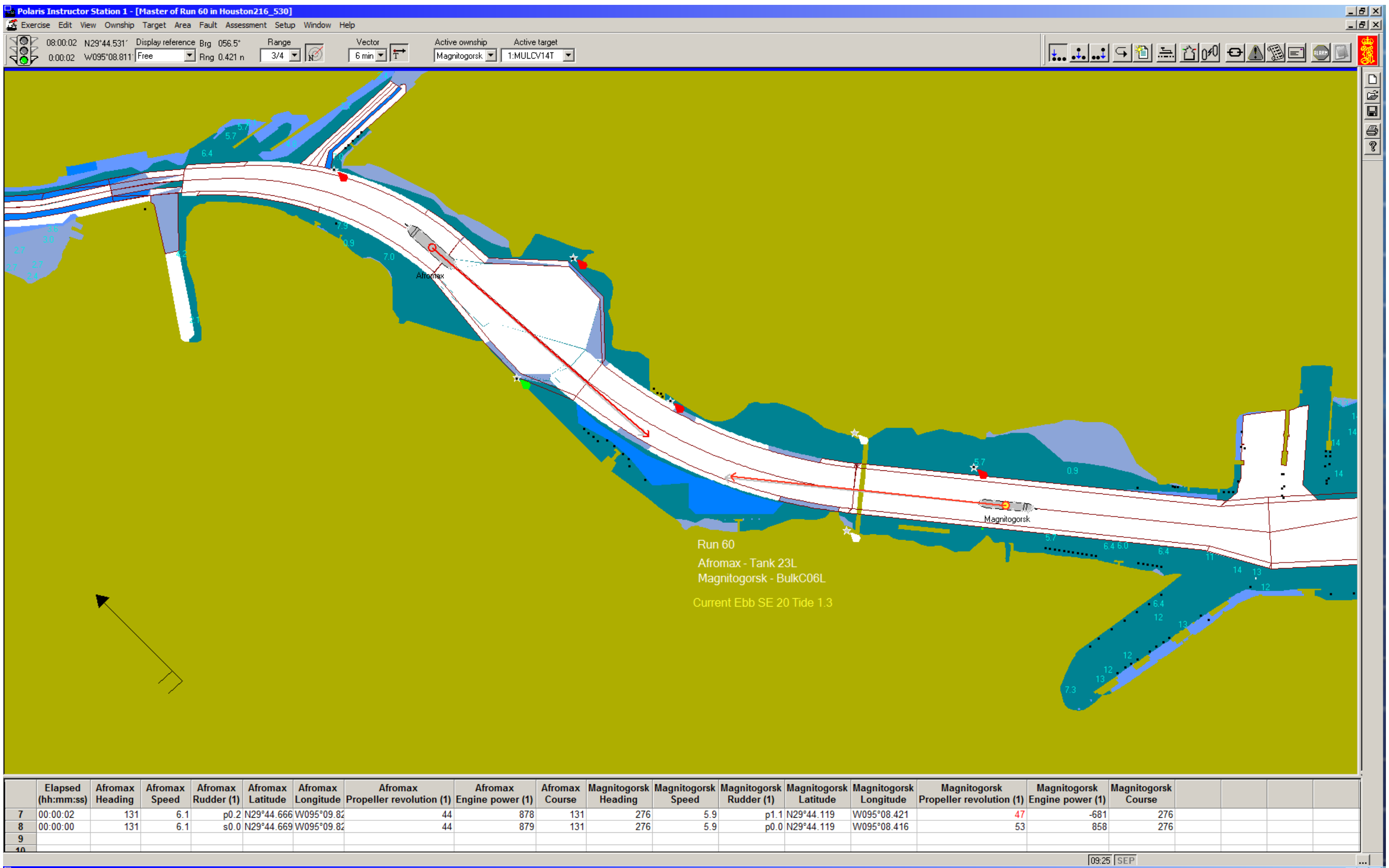

Aframax - Tank 23L
Magnitogorsk - BulkC08L
Current Ebb N 20 Tide 1.3
Magnitogorsk


Run 59
Aframax - Tank 23L
Magnitogorsk - BulkC08L
Current Ebb N 20 Tide 1.3
Aframax
Magnitogorsk


Magnitogorsk


Magnitogorsk

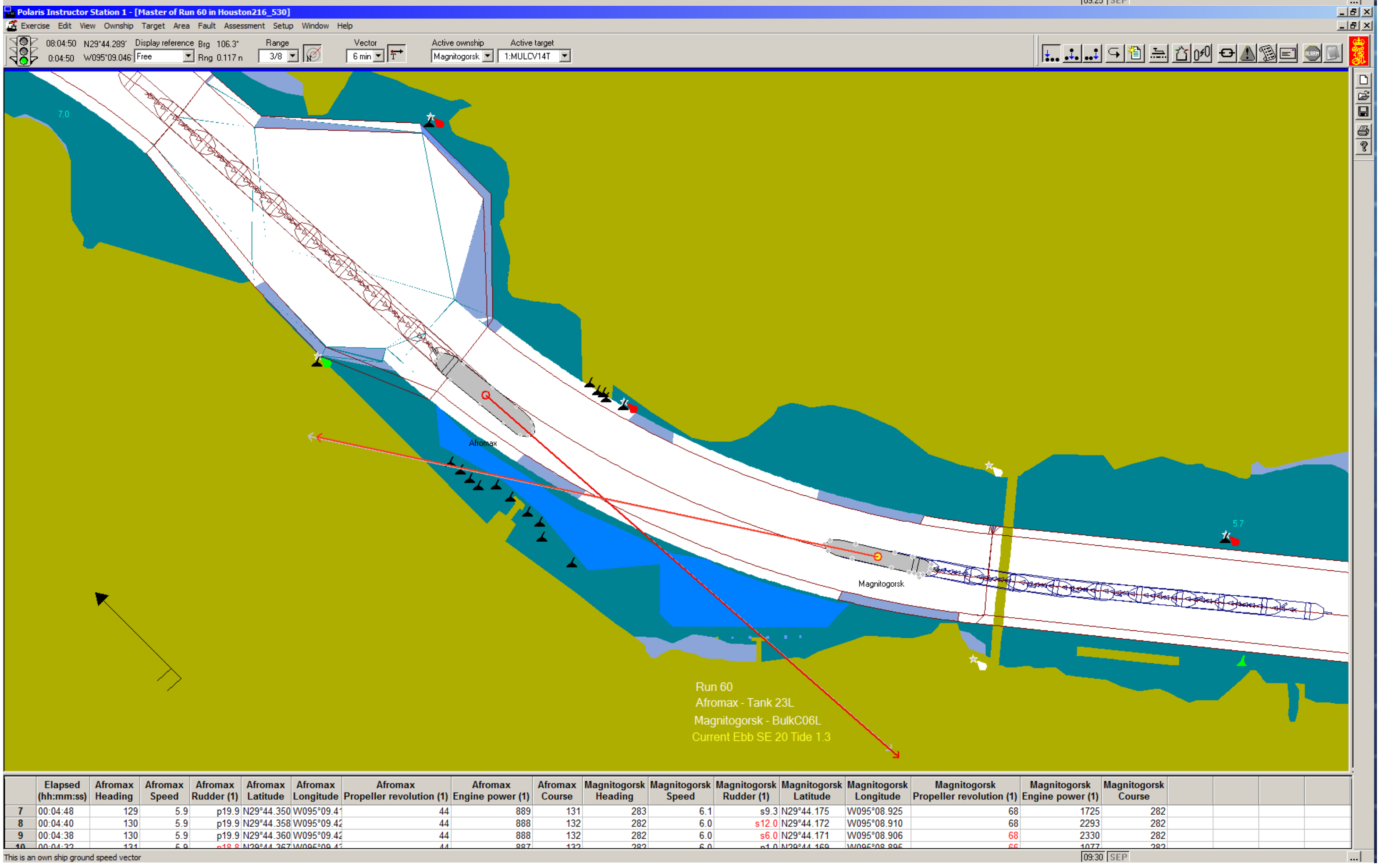
Run 60



08:00:02 N29°44.531' Display reference Brg 056.5°
0:00:02 W095°08.811' Free Rng 0.421 n
Range 3/4
Vector 6 min
Active ownship Magnitogorsk
Active target 1:MULCV14T

Run 60
Afromax - Tank 23L
Magnitogorsk - BulkC06L
Current Ebb SE 20 Tide 1.3

	Elapsed (hh:mm:ss)	Afromax Heading	Afromax Speed	Afromax Rudder (1)	Afromax Latitude	Afromax Longitude	Afromax Propeller revolution (1)	Afromax Engine power (1)	Afromax Course	Magnitogorsk Heading	Magnitogorsk Speed	Magnitogorsk Rudder (1)	Magnitogorsk Latitude	Magnitogorsk Longitude	Magnitogorsk Propeller revolution (1)	Magnitogorsk Engine power (1)	Magnitogorsk Course
7	00:00:02	131	6.1	p0.2	N29°44.666	W095°09.82	44	878	131	276	5.9	p1.1	N29°44.119	W095°08.421	47	-681	276
8	00:00:00	131	6.1	s0.0	N29°44.669	W095°09.82	44	879	131	276	5.9	p0.0	N29°44.119	W095°08.416	53	858	276
9																	
10																	

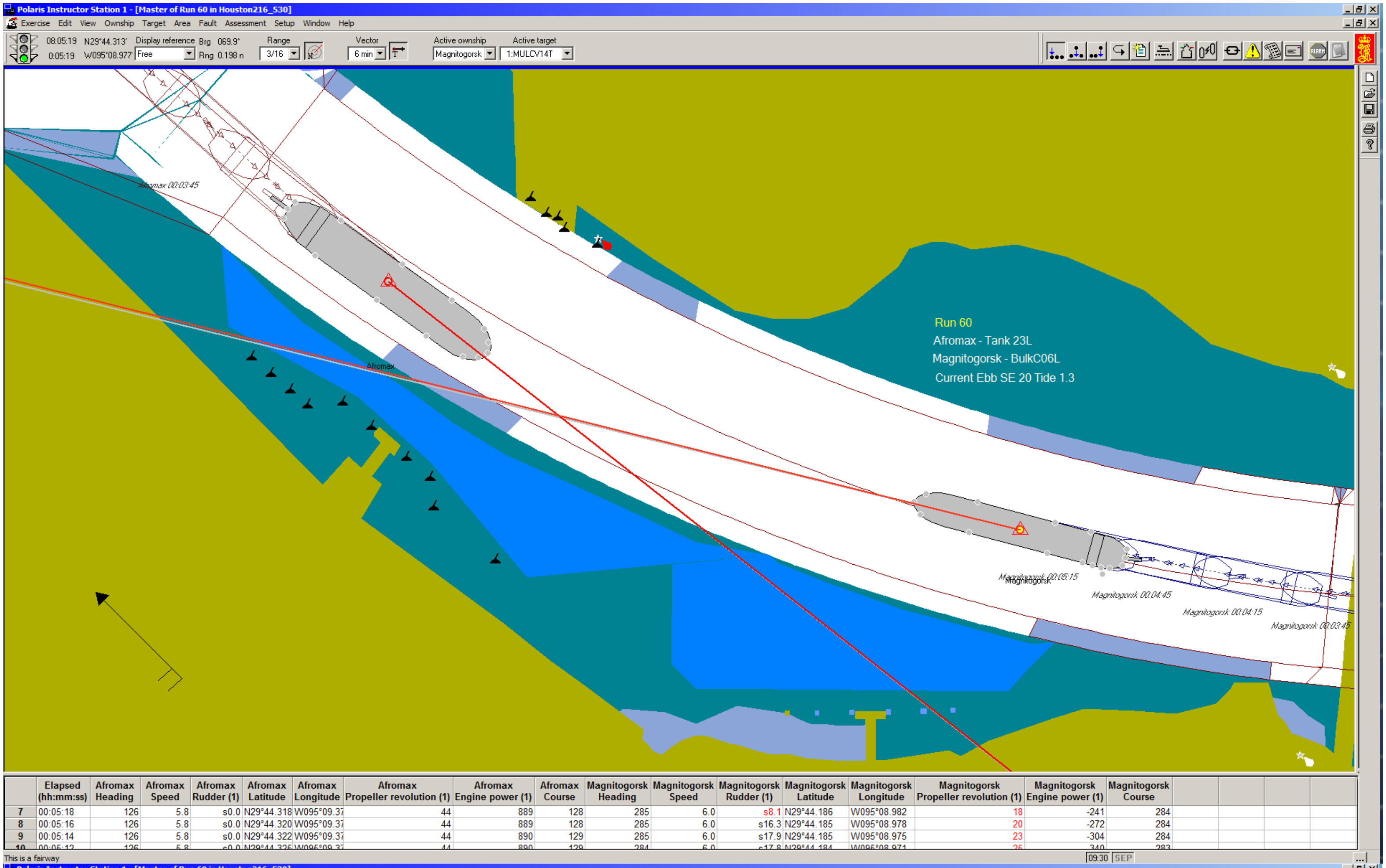


08:04:50 N29°44.289' Display reference Brg 106.3°
0:04:50 W095°09.046' Free Rng 0.117 n
Range 3/8
Vector 6 min
Active ownship Magnitogorsk
Active target 1:MULCV14T

Run 60
Afromax - Tank 23L
Magnitogorsk - BulkC06L
Current Ebb SE 20 Tide 1.3

	Elapsed (hh:mm:ss)	Afromax Heading	Afromax Speed	Afromax Rudder (1)	Afromax Latitude	Afromax Longitude	Afromax Propeller revolution (1)	Afromax Engine power (1)	Afromax Course	Magnitogorsk Heading	Magnitogorsk Speed	Magnitogorsk Rudder (1)	Magnitogorsk Latitude	Magnitogorsk Longitude	Magnitogorsk Propeller revolution (1)	Magnitogorsk Engine power (1)	Magnitogorsk Course
7	00:04:48	129	5.9	p19.9	N29°44.350	W095°09.41	44	889	131	283	6.1	s9.3	N29°44.175	W095°08.925	68	1725	282
8	00:04:40	130	5.9	p19.9	N29°44.358	W095°09.42	44	888	132	282	6.0	s12.0	N29°44.172	W095°08.910	68	2293	282
9	00:04:38	130	5.9	p19.9	N29°44.360	W095°09.42	44	888	132	282	6.0	s6.0	N29°44.171	W095°08.906	68	2330	282
10	00:04:32	131	5.9	p18.8	N29°44.367	W095°09.4	44	887	132	282	6.0	p1.0	N29°44.169	W095°08.895	66	1077	282

This is an own ship ground speed vector

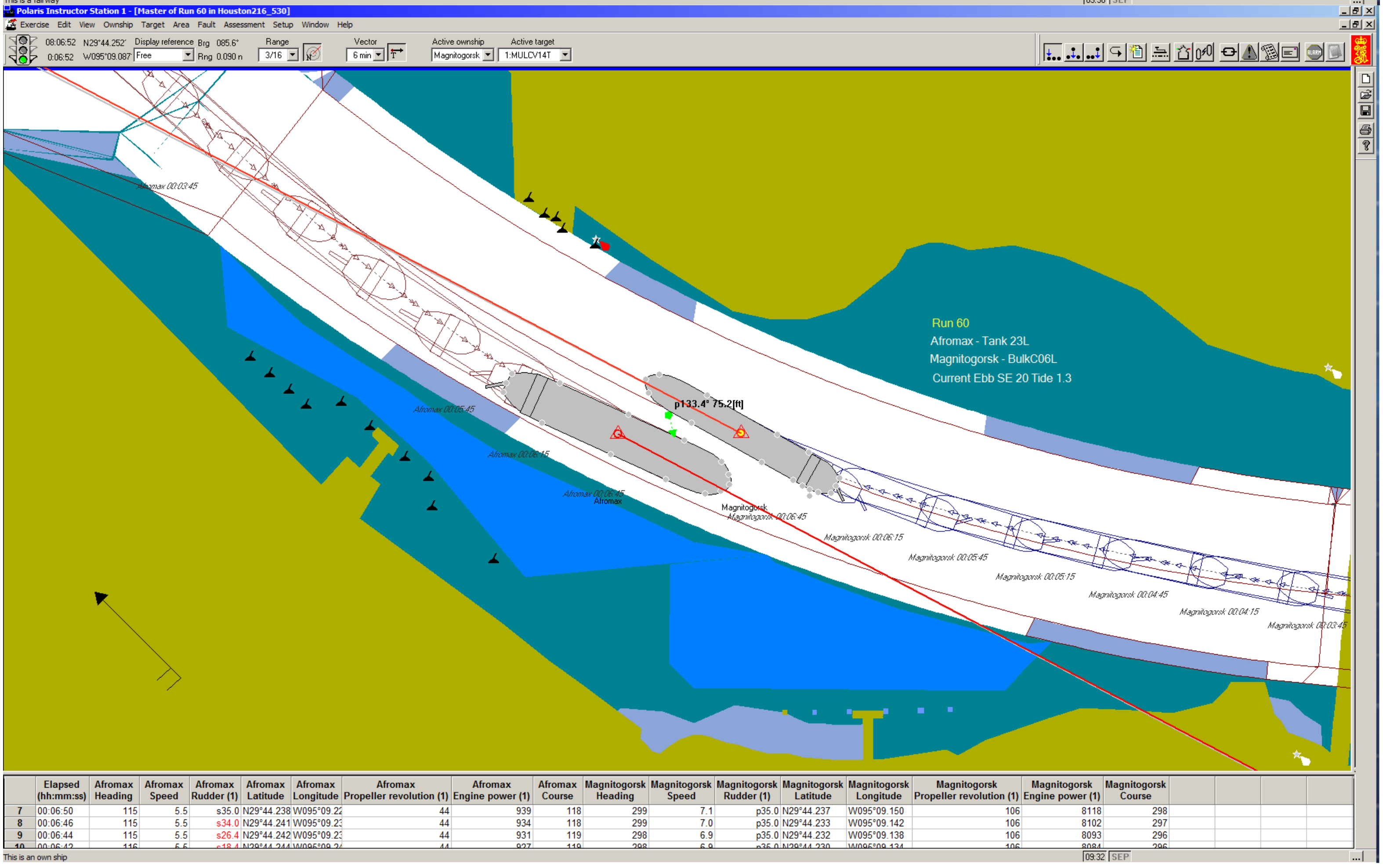


Polaris Instructor Station 1 - [Master of Run 60 in Houston216_530]

08:05:19 N29°44.313' Display reference Free Brg 069.9° Rng 0.198 n
0:05:19 W095°08.977'
Range 3/16
Vector 6 min
Active ownship Magnitogorsk
Active target 1:MULCV14T

	Elapsed (hh:mm:ss)	Afromax Heading	Afromax Speed	Afromax Rudder (1)	Afromax Latitude	Afromax Longitude	Afromax Propeller revolution (1)	Afromax Engine power (1)	Afromax Course	Magnitogorsk Heading	Magnitogorsk Speed	Magnitogorsk Rudder (1)	Magnitogorsk Latitude	Magnitogorsk Longitude	Magnitogorsk Propeller revolution (1)	Magnitogorsk Engine power (1)	Magnitogorsk Course
7	00:05:18	126	5.8	s0.0	N29°44.318	W095°09.37	44	889	128	285	6.0	s8.1	N29°44.186	W095°08.982	18	-241	284
8	00:05:16	126	5.8	s0.0	N29°44.320	W095°09.37	44	889	128	285	6.0	s16.3	N29°44.185	W095°08.978	20	-272	284
9	00:05:14	126	5.8	s0.0	N29°44.322	W095°09.37	44	890	129	285	6.0	s17.9	N29°44.185	W095°08.975	23	-304	284

This is a fairway
09:30 SEP

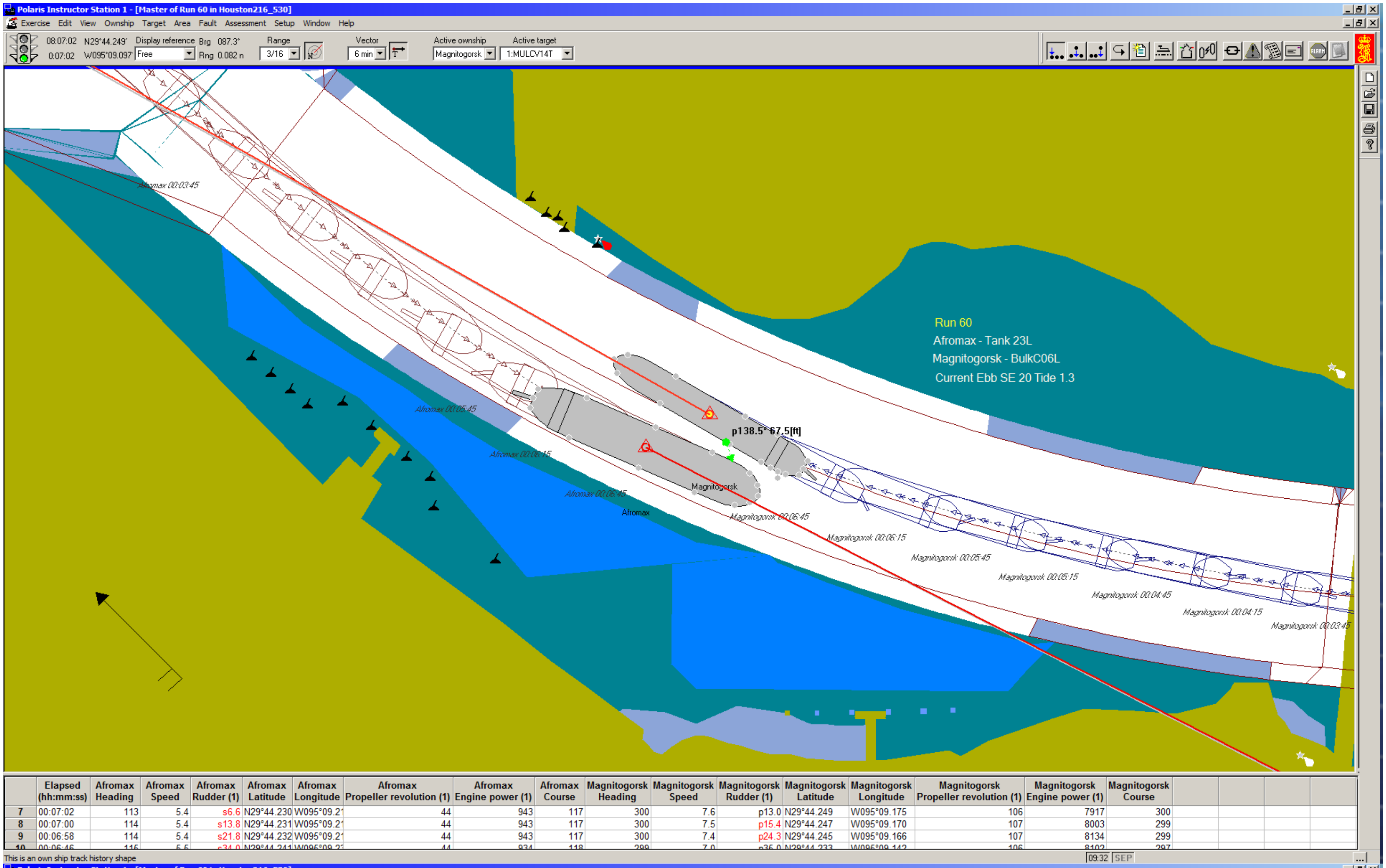


Polaris Instructor Station 1 - [Master of Run 60 in Houston216_530]

08:06:52 N29°44.252' Display reference Free Brg 085.6° Rng 0.090 n
0:06:52 W095°09.087'
Range 3/16
Vector 6 min
Active ownship Magnitogorsk
Active target 1:MULCV14T

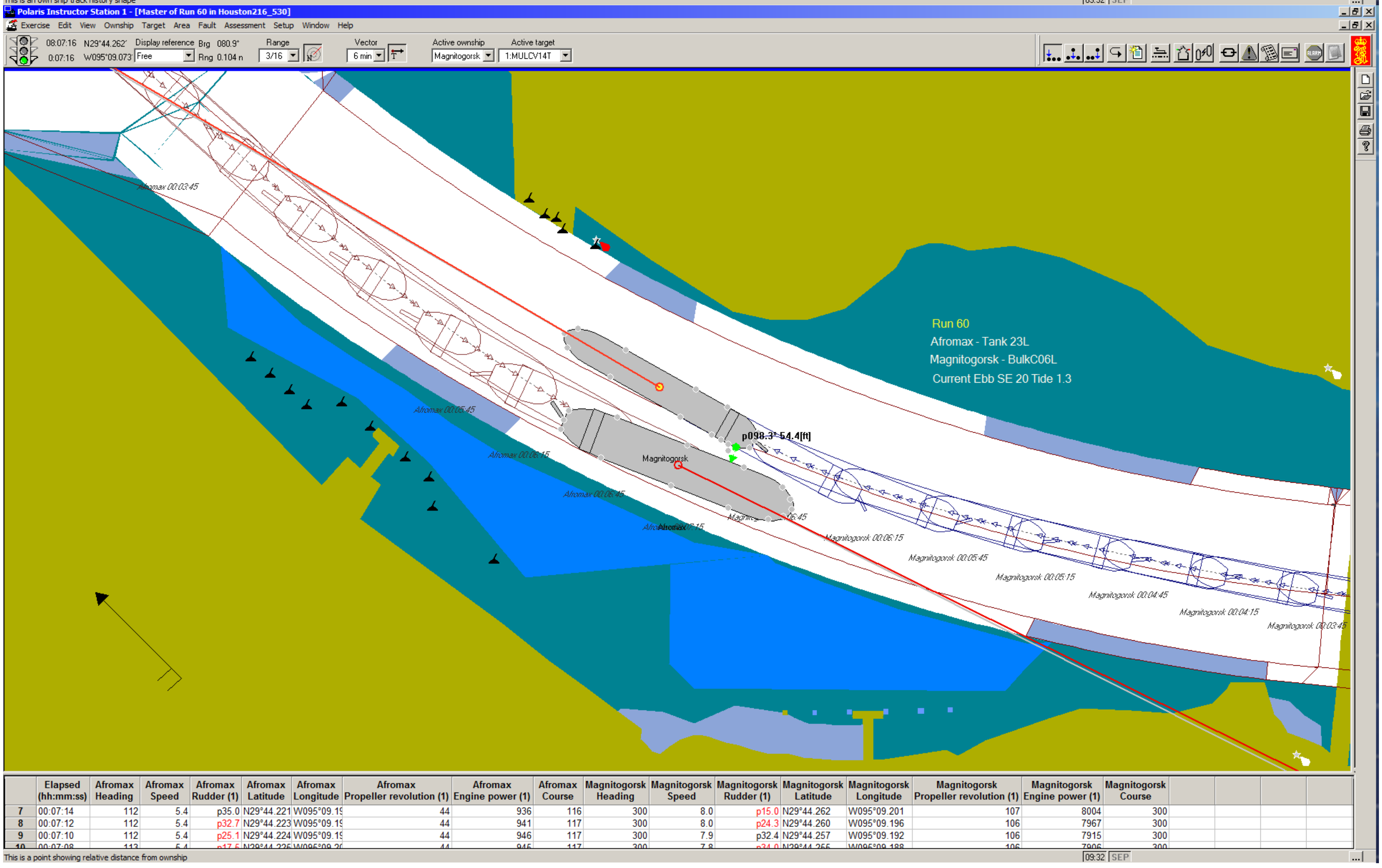
	Elapsed (hh:mm:ss)	Afromax Heading	Afromax Speed	Afromax Rudder (1)	Afromax Latitude	Afromax Longitude	Afromax Propeller revolution (1)	Afromax Engine power (1)	Afromax Course	Magnitogorsk Heading	Magnitogorsk Speed	Magnitogorsk Rudder (1)	Magnitogorsk Latitude	Magnitogorsk Longitude	Magnitogorsk Propeller revolution (1)	Magnitogorsk Engine power (1)	Magnitogorsk Course
7	00:06:50	115	5.5	s35.0	N29°44.238	W095°09.22	44	939	118	299	7.1	p35.0	N29°44.237	W095°09.150	106	8118	298
8	00:06:46	115	5.5	s34.0	N29°44.241	W095°09.23	44	934	118	299	7.0	p35.0	N29°44.233	W095°09.142	106	8102	297
9	00:06:44	115	5.5	s26.4	N29°44.242	W095°09.23	44	931	119	298	6.9	p35.0	N29°44.232	W095°09.138	106	8093	296

This is an own ship
09:32 SEP



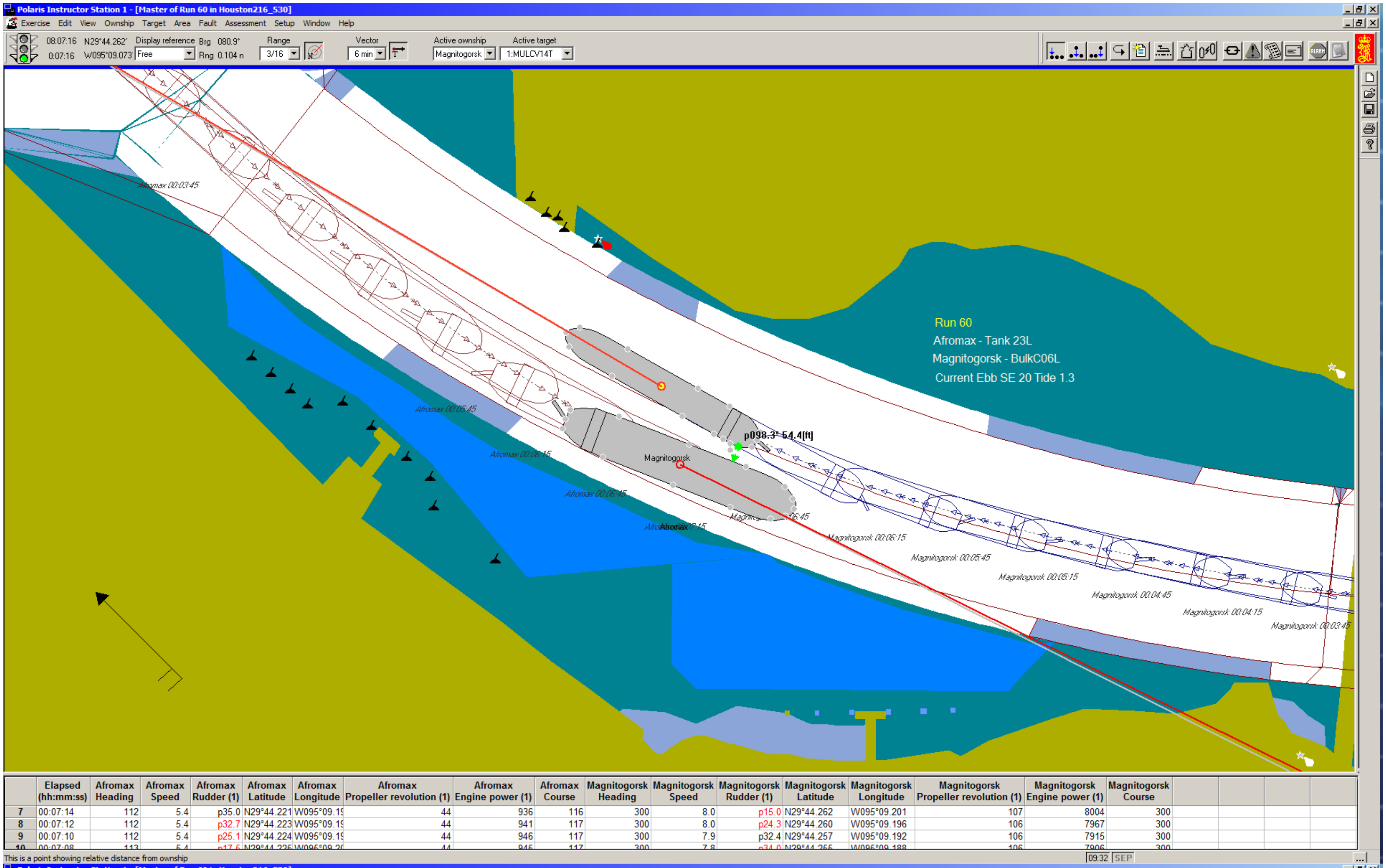
	Elapsed (hh:mm:ss)	Afromax Heading	Afromax Speed	Afromax Rudder (1)	Afromax Latitude	Afromax Longitude	Afromax Propeller revolution (1)	Afromax Engine power (1)	Afromax Course	Magnitogorsk Heading	Magnitogorsk Speed	Magnitogorsk Rudder (1)	Magnitogorsk Latitude	Magnitogorsk Longitude	Magnitogorsk Propeller revolution (1)	Magnitogorsk Engine power (1)	Magnitogorsk Course
7	00:07:02	113	5.4	s6.6	N29°44.230	W095°09.2	44	943	117	300	7.6	p13.0	N29°44.249	W095°09.175	106	7917	300
8	00:07:00	114	5.4	s13.8	N29°44.231	W095°09.2	44	943	117	300	7.5	p15.4	N29°44.247	W095°09.170	107	8003	299
9	00:06:58	114	5.4	s21.8	N29°44.232	W095°09.2	44	943	117	300	7.4	p24.3	N29°44.245	W095°09.166	107	8134	299

This is an own ship track history shape



	Elapsed (hh:mm:ss)	Afromax Heading	Afromax Speed	Afromax Rudder (1)	Afromax Latitude	Afromax Longitude	Afromax Propeller revolution (1)	Afromax Engine power (1)	Afromax Course	Magnitogorsk Heading	Magnitogorsk Speed	Magnitogorsk Rudder (1)	Magnitogorsk Latitude	Magnitogorsk Longitude	Magnitogorsk Propeller revolution (1)	Magnitogorsk Engine power (1)	Magnitogorsk Course
7	00:07:14	112	5.4	p35.0	N29°44.221	W095°09.1	44	936	116	300	8.0	p15.0	N29°44.262	W095°09.201	107	8004	300
8	00:07:12	112	5.4	p32.7	N29°44.223	W095°09.1	44	941	117	300	8.0	p24.3	N29°44.260	W095°09.196	106	7967	300
9	00:07:10	112	5.4	p25.1	N29°44.224	W095°09.1	44	946	117	300	7.9	p32.4	N29°44.257	W095°09.192	106	7915	300

This is a point showing relative distance from ownship

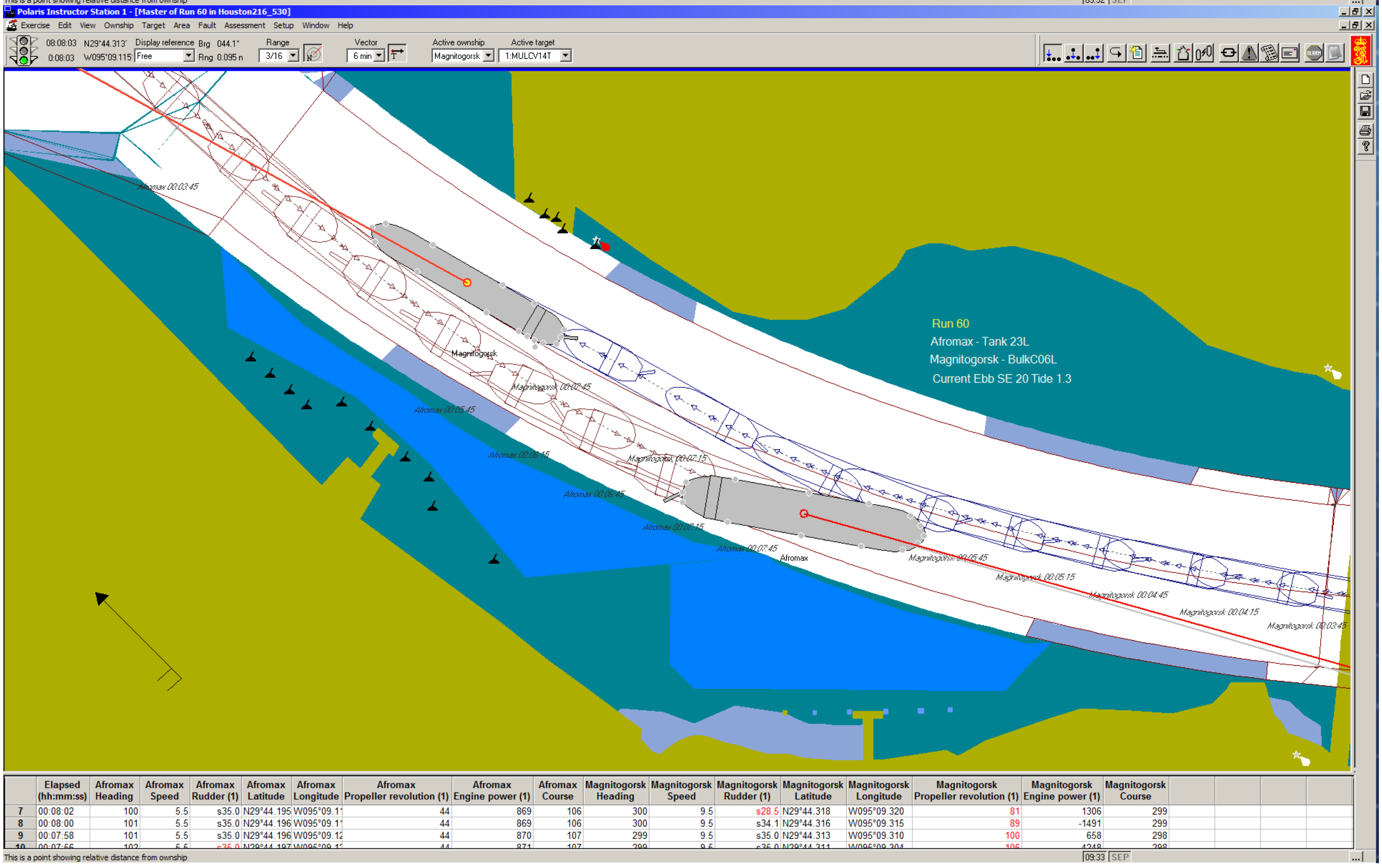


08:07:16 N29°44.262' Display reference Free Brg 080.9° Range 3/16 Vector 6 min Active ownship Magnitogorsk Active target 1:MULCV14T
0:07:16 W095°09.073' Rng 0.104 n

Run 60
Afromax - Tank 23L
Magnitogorsk - BulkC06L
Current Ebb SE 20 Tide 1.3

	Elapsed (hh:mm:ss)	Afromax Heading	Afromax Speed	Afromax Rudder (1)	Afromax Latitude	Afromax Longitude	Afromax Propeller revolution (1)	Afromax Engine power (1)	Afromax Course	Magnitogorsk Heading	Magnitogorsk Speed	Magnitogorsk Rudder (1)	Magnitogorsk Latitude	Magnitogorsk Longitude	Magnitogorsk Propeller revolution (1)	Magnitogorsk Engine power (1)	Magnitogorsk Course
7	00:07:14	112	5.4	p35.0	N29°44.221	W095°09.1	44	936	116	300	8.0	p15.0	N29°44.262	W095°09.201	107	8004	300
8	00:07:12	112	5.4	p32.7	N29°44.223	W095°09.1	44	941	117	300	8.0	p24.3	N29°44.260	W095°09.196	106	7967	300
9	00:07:10	112	5.4	p25.1	N29°44.224	W095°09.1	44	946	117	300	7.9	p32.4	N29°44.257	W095°09.192	106	7915	300
10	00:07:08	113	5.4	p17.6	N29°44.226	W095°09.2	44	945	117	300	7.8	p34.0	N29°44.255	W095°09.188	106	7906	300

This is a point showing relative distance from ownship



08:08:03 N29°44.313' Display reference Free Brg 044.1° Range 3/16 Vector 6 min Active ownship Magnitogorsk Active target 1:MULCV14T
0:08:03 W095°09.115' Rng 0.095 n

Run 60
Afromax - Tank 23L
Magnitogorsk - BulkC06L
Current Ebb SE 20 Tide 1.3

	Elapsed (hh:mm:ss)	Afromax Heading	Afromax Speed	Afromax Rudder (1)	Afromax Latitude	Afromax Longitude	Afromax Propeller revolution (1)	Afromax Engine power (1)	Afromax Course	Magnitogorsk Heading	Magnitogorsk Speed	Magnitogorsk Rudder (1)	Magnitogorsk Latitude	Magnitogorsk Longitude	Magnitogorsk Propeller revolution (1)	Magnitogorsk Engine power (1)	Magnitogorsk Course
7	00:08:02	100	5.5	s35.0	N29°44.195	W095°09.1	44	869	106	300	9.5	s28.5	N29°44.318	W095°09.320	81	1306	299
8	00:08:00	101	5.5	s35.0	N29°44.196	W095°09.1	44	869	106	300	9.5	s34.1	N29°44.316	W095°09.315	89	-1491	299
9	00:07:58	101	5.5	s35.0	N29°44.196	W095°09.1	44	870	107	299	9.5	s35.0	N29°44.313	W095°09.310	100	658	298
10	00:07:56	102	5.5	s35.0	N29°44.197	W095°09.1	44	871	107	299	9.5	s35.0	N29°44.311	W095°09.304	106	4248	298

This is a point showing relative distance from ownship

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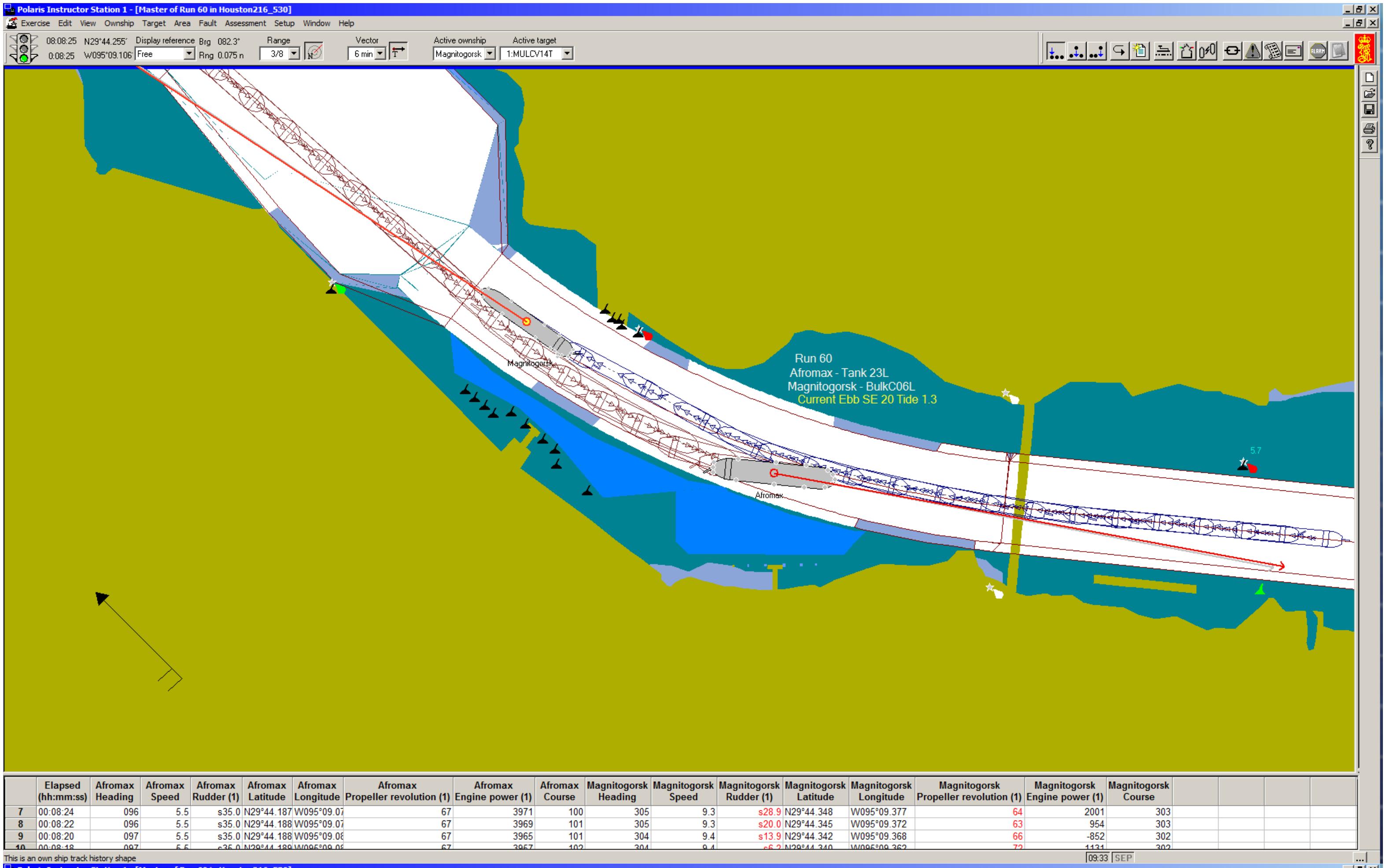
June 26, 2019



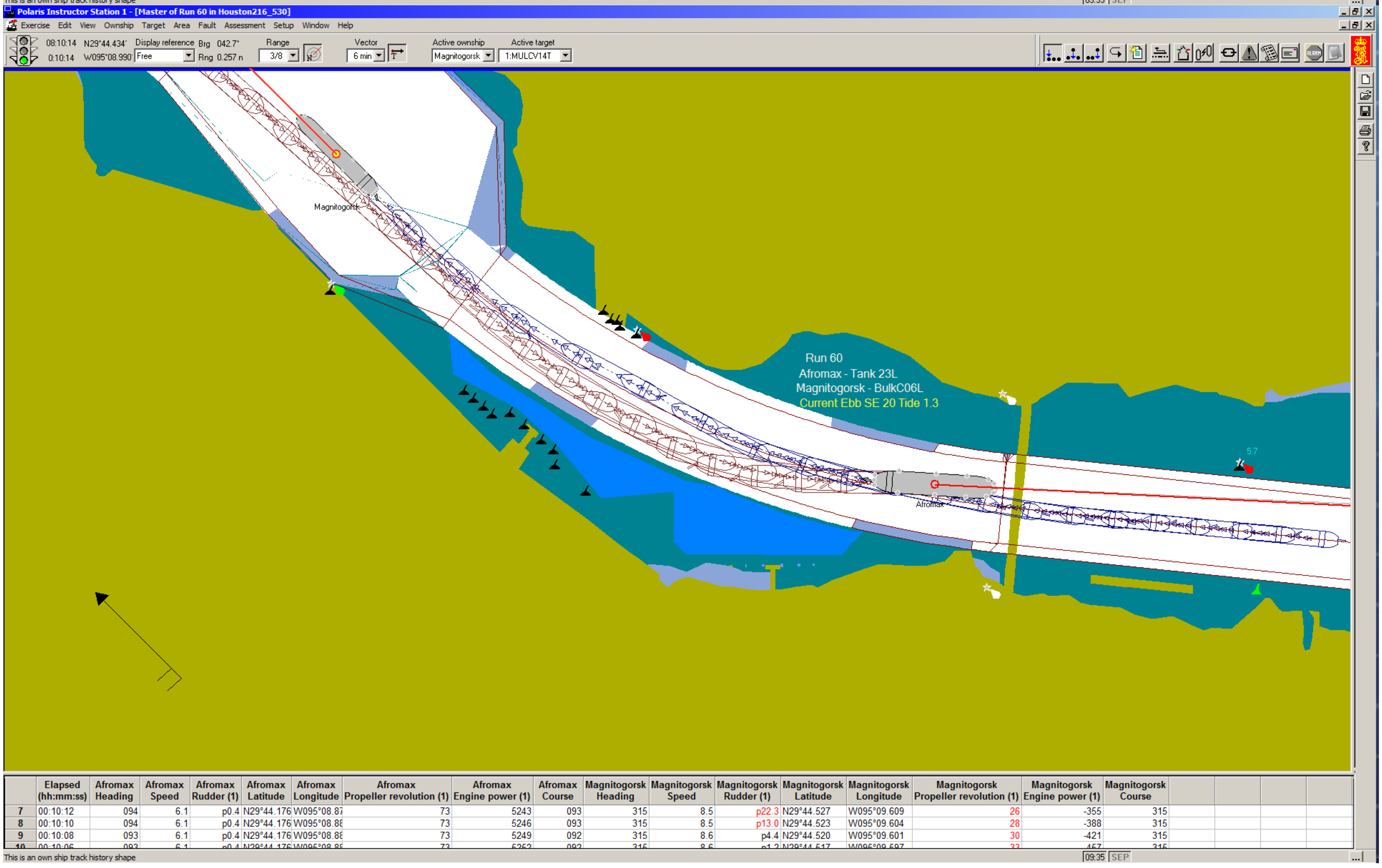
Polaris Instructor Station 1 - [Master of Run 60 in Houston216_530]

08:08:25 N29°44.255' Display reference: Free Brg 082.3°
0:08:25 W095°09.106' Rng 0.075 n
Range: 3/8
Vector: 6 min
Active ownship: Magnitogorsk
Active target: 1:MULCV14T

	Elapsed (hh:mm:ss)	Afromax Heading	Afromax Speed	Afromax Rudder (1)	Afromax Latitude	Afromax Longitude	Afromax Propeller revolution (1)	Afromax Engine power (1)	Afromax Course	Magnitogorsk Heading	Magnitogorsk Speed	Magnitogorsk Rudder (1)	Magnitogorsk Latitude	Magnitogorsk Longitude	Magnitogorsk Propeller revolution (1)	Magnitogorsk Engine power (1)	Magnitogorsk Course
7	00:08:24	096	5.5	s35.0	N29°44.187	W095°09.07	67	3971	100	305	9.3	s28.9	N29°44.348	W095°09.377	64	2001	303
8	00:08:22	096	5.5	s35.0	N29°44.188	W095°09.07	67	3969	101	305	9.3	s20.0	N29°44.345	W095°09.372	63	954	303
9	00:08:20	097	5.5	s35.0	N29°44.188	W095°09.08	67	3965	101	304	9.4	s13.9	N29°44.342	W095°09.368	66	-852	302

This is an own ship track history shape

09:33 SEP



Polaris Instructor Station 1 - [Master of Run 60 in Houston216_530]

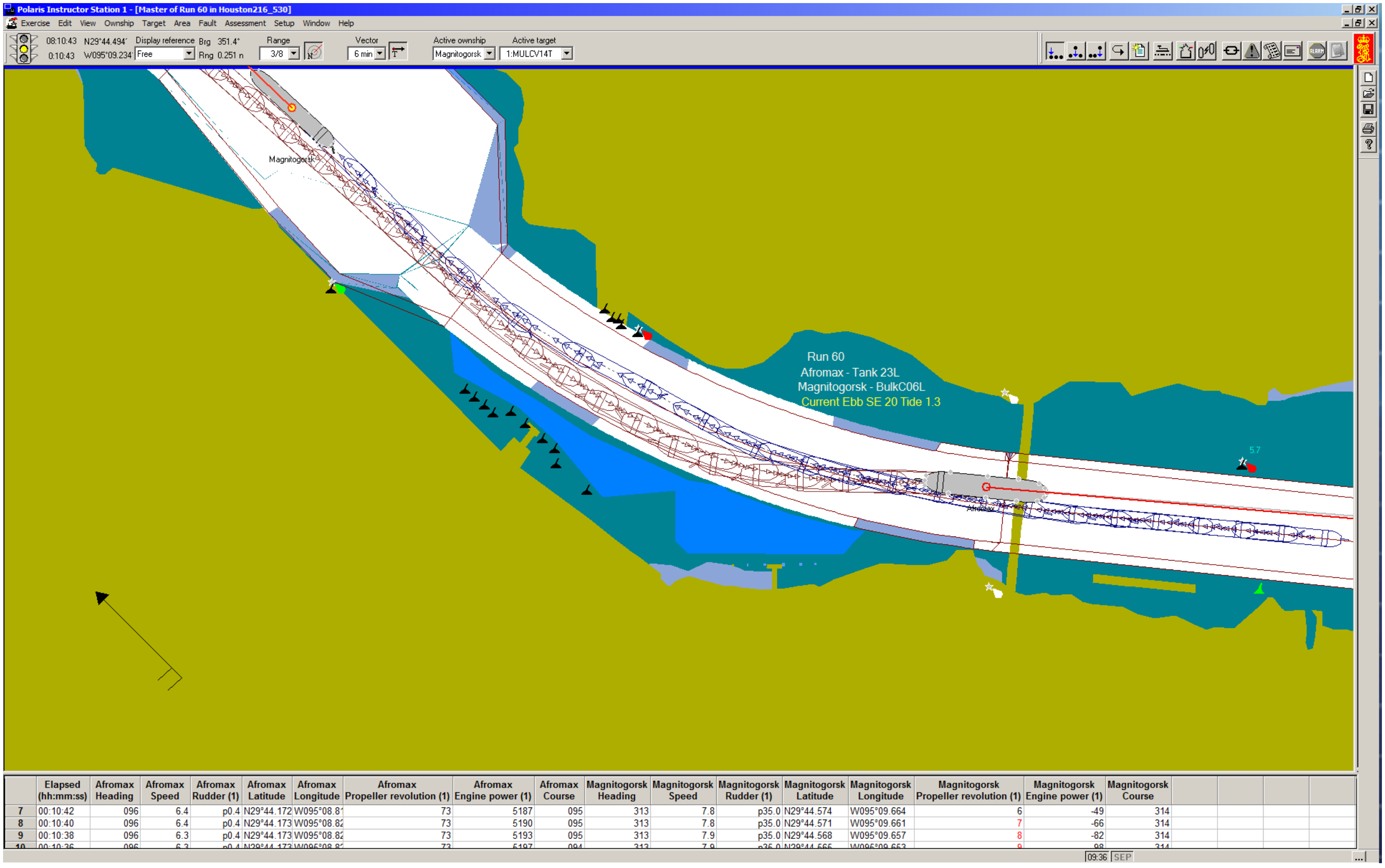
08:10:14 N29°44.434' Display reference: Free Brg 042.7°
0:10:14 W095°08.990' Rng 0.257 n
Range: 3/8
Vector: 6 min
Active ownship: Magnitogorsk
Active target: 1:MULCV14T

	Elapsed (hh:mm:ss)	Afromax Heading	Afromax Speed	Afromax Rudder (1)	Afromax Latitude	Afromax Longitude	Afromax Propeller revolution (1)	Afromax Engine power (1)	Afromax Course	Magnitogorsk Heading	Magnitogorsk Speed	Magnitogorsk Rudder (1)	Magnitogorsk Latitude	Magnitogorsk Longitude	Magnitogorsk Propeller revolution (1)	Magnitogorsk Engine power (1)	Magnitogorsk Course
7	00:10:12	094	6.1	p0.4	N29°44.176	W095°08.87	73	5243	093	315	8.5	p22.3	N29°44.527	W095°09.609	26	-355	315
8	00:10:10	094	6.1	p0.4	N29°44.176	W095°08.88	73	5246	093	315	8.5	p13.0	N29°44.523	W095°09.604	28	-388	315
9	00:10:08	093	6.1	p0.4	N29°44.176	W095°08.88	73	5249	092	315	8.6	p4.4	N29°44.520	W095°09.601	30	-421	315

This is an own ship track history shape

09:35 SEP

June 26, 2019



08:10:43 N29°44.494'
0:10:43 W095°09.234'

Display reference: Free

Brg 351.4°
Rng 0.251 n

Range: 3/8

Vector: 6 min

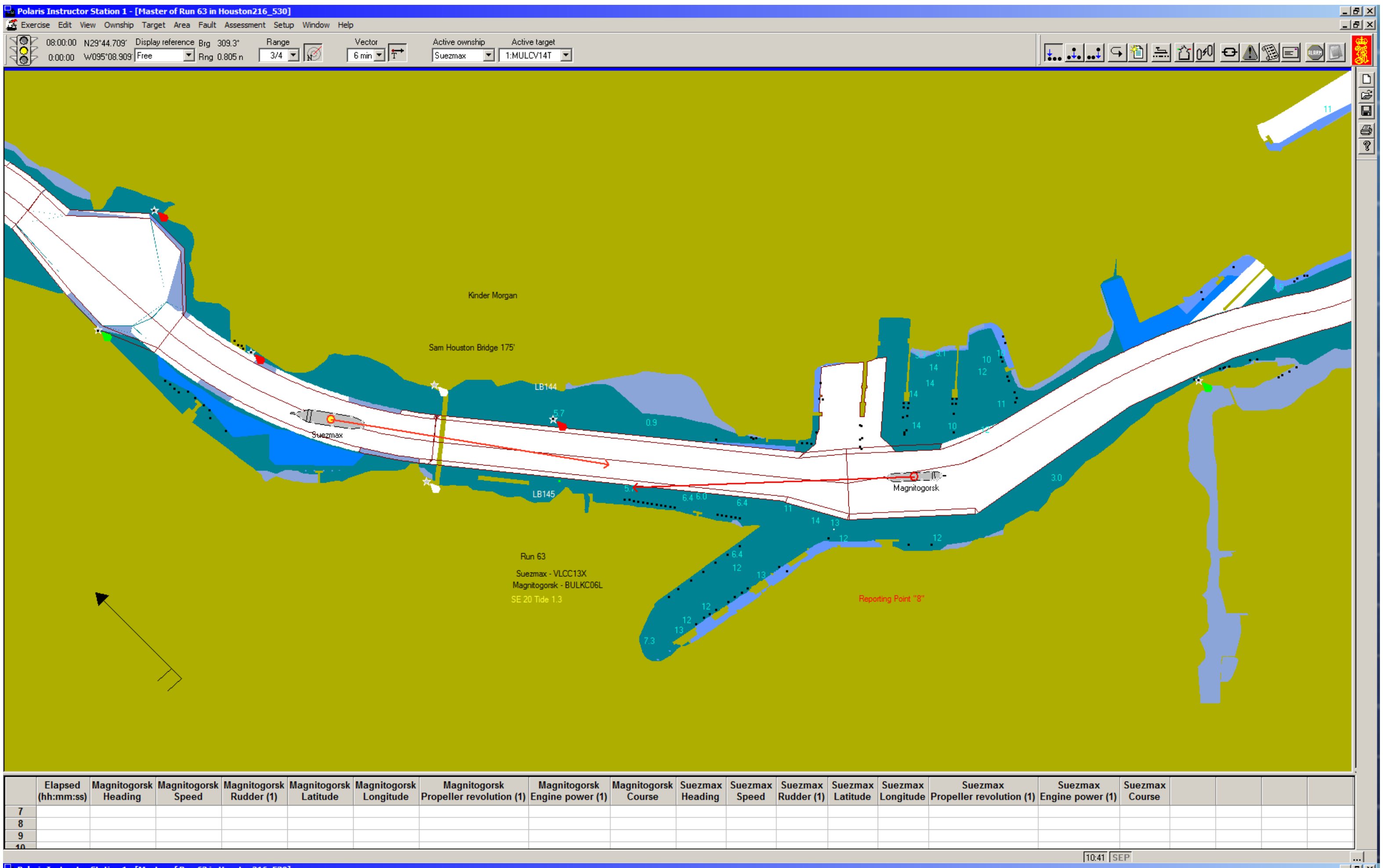
Active ownship: Magnitogorsk

Active target: 1:MULCV14T

	Elapsed (hh:mm:ss)	Afromax Heading	Afromax Speed	Afromax Rudder (1)	Afromax Latitude	Afromax Longitude	Afromax Propeller revolution (1)	Afromax Engine power (1)	Afromax Course	Magnitogorsk Heading	Magnitogorsk Speed	Magnitogorsk Rudder (1)	Magnitogorsk Latitude	Magnitogorsk Longitude	Magnitogorsk Propeller revolution (1)	Magnitogorsk Engine power (1)	Magnitogorsk Course
7	00:10:42	096	6.4	p0.4	N29°44.172	W095°08.81	73	5187	095	313	7.8	p35.0	N29°44.574	W095°09.664	6	-49	314
8	00:10:40	096	6.4	p0.4	N29°44.173	W095°08.82	73	5190	095	313	7.8	p35.0	N29°44.571	W095°09.661	7	-66	314
9	00:10:38	096	6.3	p0.4	N29°44.173	W095°08.82	73	5193	095	313	7.9	p35.0	N29°44.568	W095°09.657	8	-82	314
10	00:10:36	096	6.3	p0.4	N29°44.173	W095°08.82	73	5197	094	313	7.9	p35.0	N29°44.565	W095°09.653	9	98	314

June 26, 2019

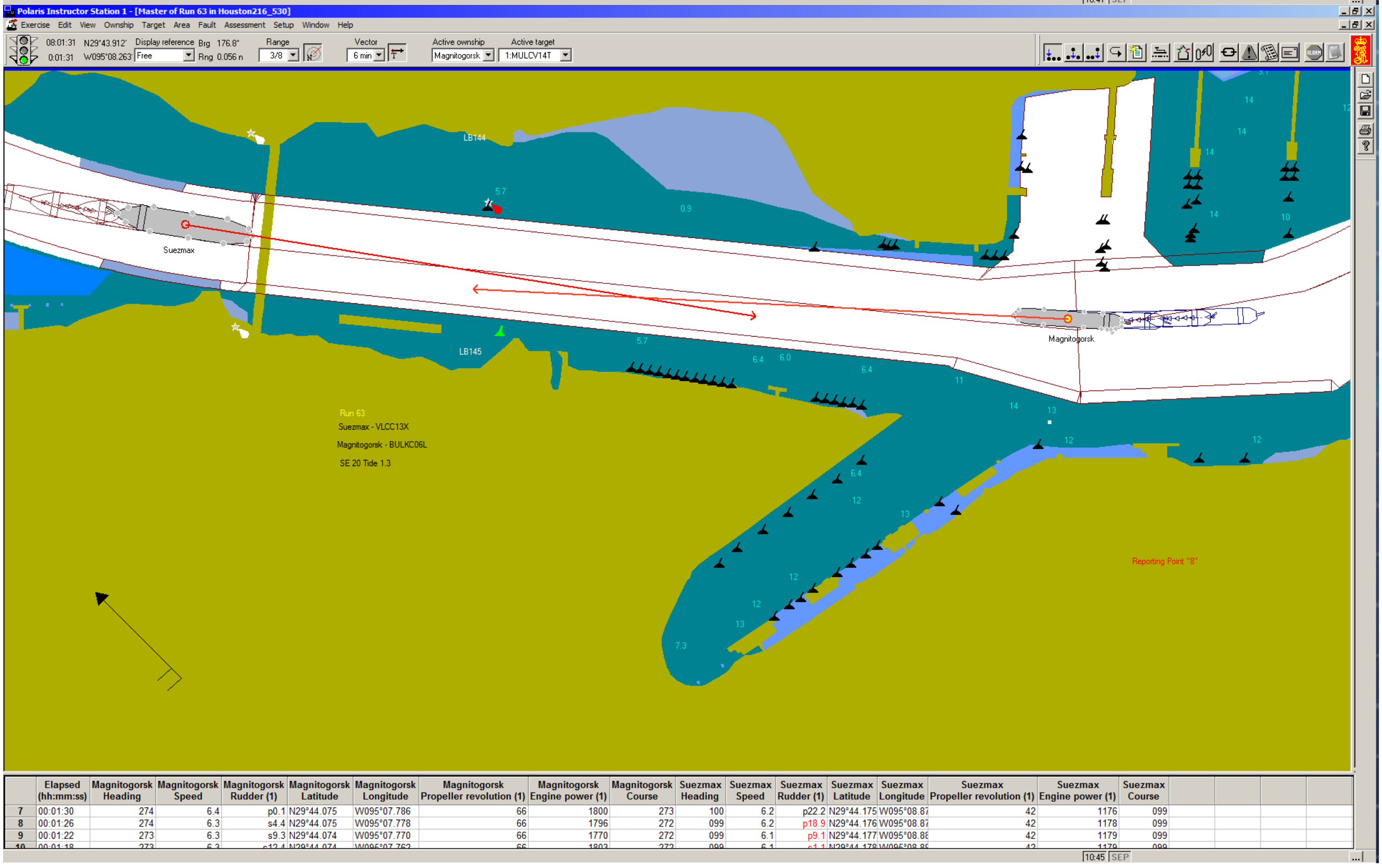
Run 63



08:00:00 N29°44.709' Display reference Free Brg 309.3° Rng 0.805 n Range 3/4 Vector 6 min Active ownship Suezmax Active target 1:MULCV14T

0:00:00 W095°08.909'

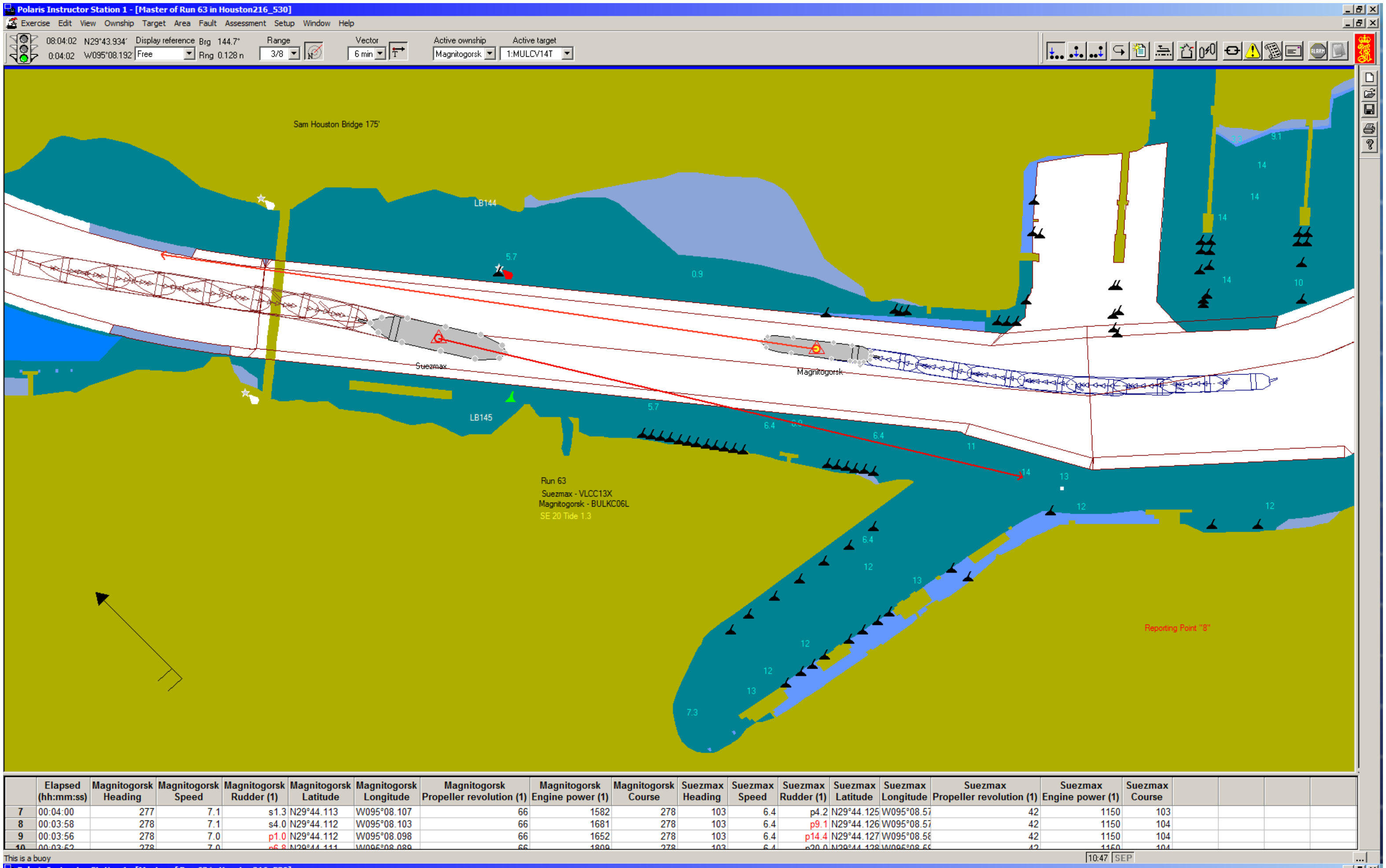
	Elapsed (hh:mm:ss)	Magnitogorsk Heading	Magnitogorsk Speed	Magnitogorsk Rudder (1)	Magnitogorsk Latitude	Magnitogorsk Longitude	Magnitogorsk Propeller revolution (1)	Magnitogorsk Engine power (1)	Magnitogorsk Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7																	
8																	
9																	



08:01:31 N29°43.912' Display reference Free Brg 176.8° Rng 0.056 n Range 3/8 Vector 6 min Active ownship Magnitogorsk Active target 1:MULCV14T

0:01:31 W095°08.263'

	Elapsed (hh:mm:ss)	Magnitogorsk Heading	Magnitogorsk Speed	Magnitogorsk Rudder (1)	Magnitogorsk Latitude	Magnitogorsk Longitude	Magnitogorsk Propeller revolution (1)	Magnitogorsk Engine power (1)	Magnitogorsk Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7	00:01:30	274	6.4	p0.1	N29°44.075	W095°07.786	66	1800	273	100	6.2	p22.2	N29°44.175	W095°08.87	42	1176	099
8	00:01:26	274	6.3	s4.4	N29°44.075	W095°07.778	66	1796	272	099	6.2	p18.9	N29°44.176	W095°08.87	42	1178	099
9	00:01:22	273	6.3	s9.3	N29°44.074	W095°07.770	66	1770	272	099	6.1	p9.1	N29°44.177	W095°08.88	42	1179	099
10	00:01:18	273	6.3	s12.4	N29°44.074	W095°07.762	66	1803	272	099	6.1	s1.1	N29°44.178	W095°08.89	42	1179	099



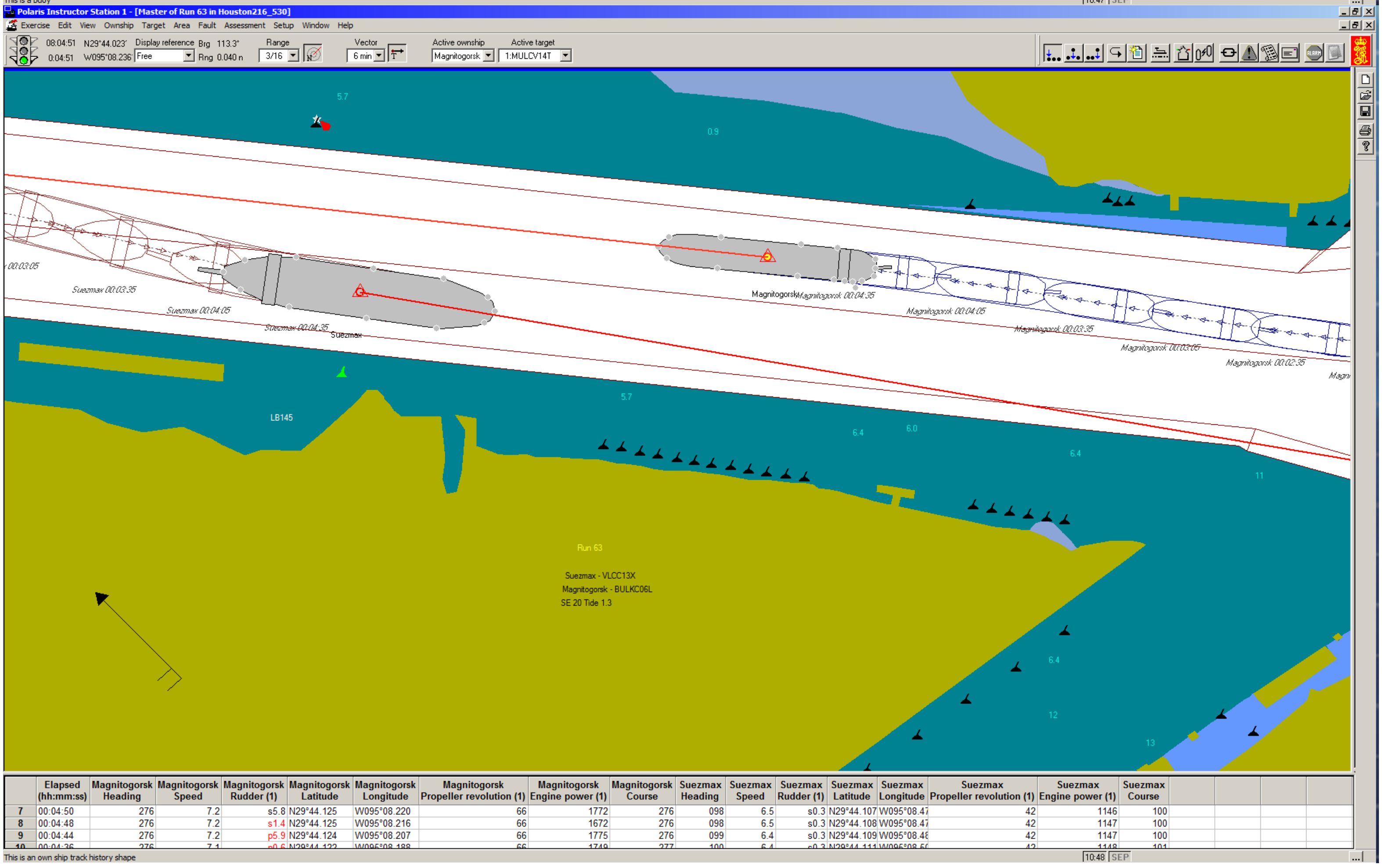
08:04:02 N29°43.934' Display reference Free Brg 144.7° Rng 0.128 n Range 3/8 Vector 6 min Active ownship Magnitogorsk Active target 1:MULCV14T

0:04:02 W095°08.192'

Run 63
Suezmax - VLCC13X
Magnitogorsk - BULKC06L
SE 20 Tide 1.3

	Elapsed (hh:mm:ss)	Magnitogorsk Heading	Magnitogorsk Speed	Magnitogorsk Rudder (1)	Magnitogorsk Latitude	Magnitogorsk Longitude	Magnitogorsk Propeller revolution (1)	Magnitogorsk Engine power (1)	Magnitogorsk Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7	00:04:00	277	7.1	s1.3	N29°44.113	W095°08.107	66	1582	278	103	6.4	p4.2	N29°44.125	W095°08.57	42	1150	103
8	00:03:58	278	7.1	s4.0	N29°44.112	W095°08.103	66	1681	278	103	6.4	p9.1	N29°44.126	W095°08.57	42	1150	104
9	00:03:56	278	7.0	p1.0	N29°44.112	W095°08.098	66	1652	278	103	6.4	p14.4	N29°44.127	W095°08.58	42	1150	104
10	00:03:52	278	7.0	p6.8	N29°44.111	W095°08.089	66	1809	278	103	6.4	p20.0	N29°44.128	W095°08.59	42	1150	104

This is a buoy



08:04:51 N29°44.023' Display reference Free Brg 113.3° Rng 0.040 n Range 3/16 Vector 6 min Active ownship Magnitogorsk Active target 1:MULCV14T

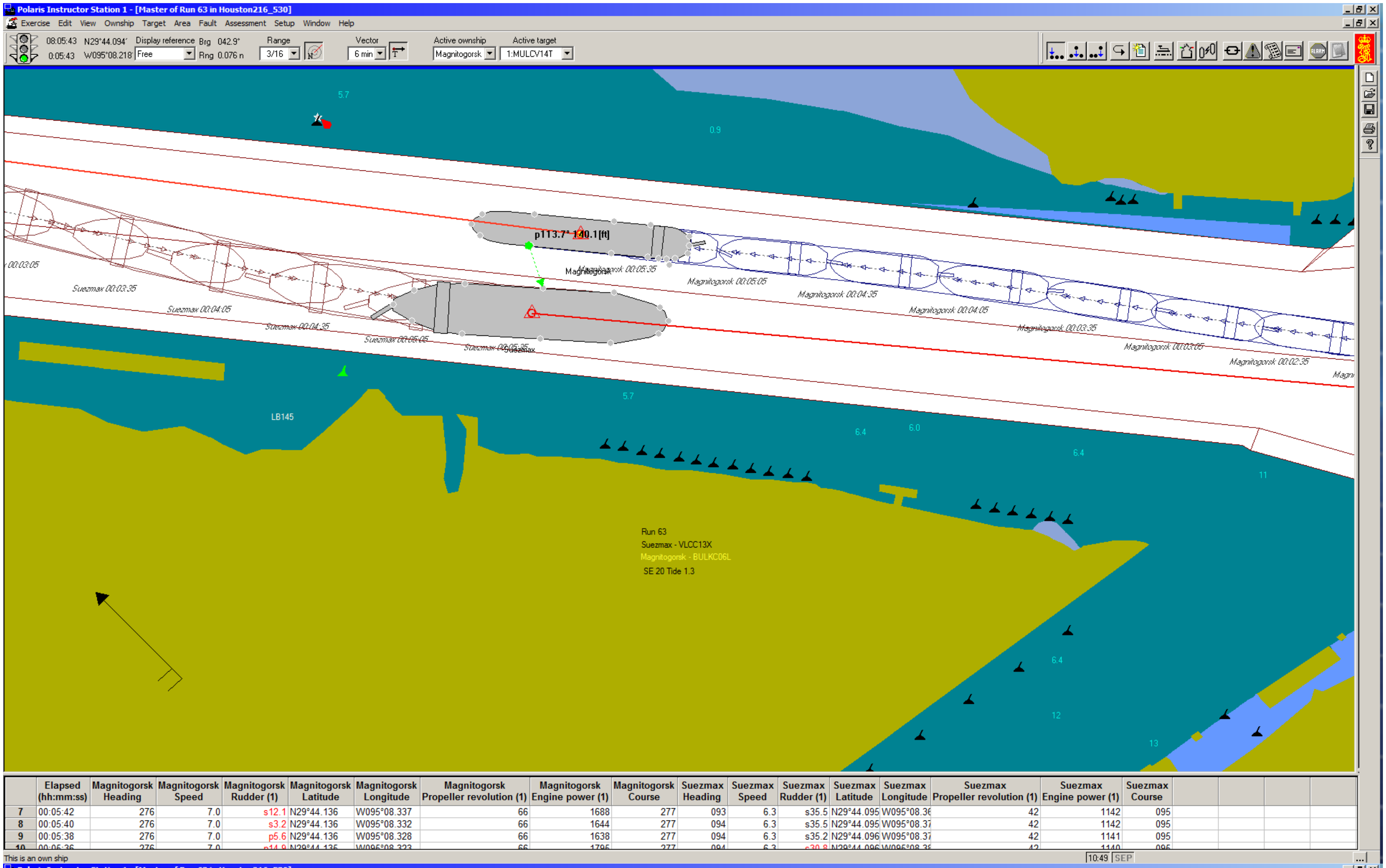
0:04:51 W095°08.236'

Run 63

Suezmax - VLCC13X
Magnitogorsk - BULKC06L
SE 20 Tide 1.3

	Elapsed (hh:mm:ss)	Magnitogorsk Heading	Magnitogorsk Speed	Magnitogorsk Rudder (1)	Magnitogorsk Latitude	Magnitogorsk Longitude	Magnitogorsk Propeller revolution (1)	Magnitogorsk Engine power (1)	Magnitogorsk Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7	00:04:50	276	7.2	s5.8	N29°44.125	W095°08.220	66	1772	276	098	6.5	s0.3	N29°44.107	W095°08.47	42	1146	100
8	00:04:48	276	7.2	s1.4	N29°44.125	W095°08.216	66	1672	276	098	6.5	s0.3	N29°44.108	W095°08.47	42	1147	100
9	00:04:44	276	7.2	p5.9	N29°44.124	W095°08.207	66	1775	276	099	6.4	s0.3	N29°44.109	W095°08.48	42	1147	100
10	00:04:36	276	7.1	p0.6	N29°44.122	W095°08.188	66	1749	277	100	6.4	s0.3	N29°44.111	W095°08.50	42	1148	101

This is an own ship track history shape

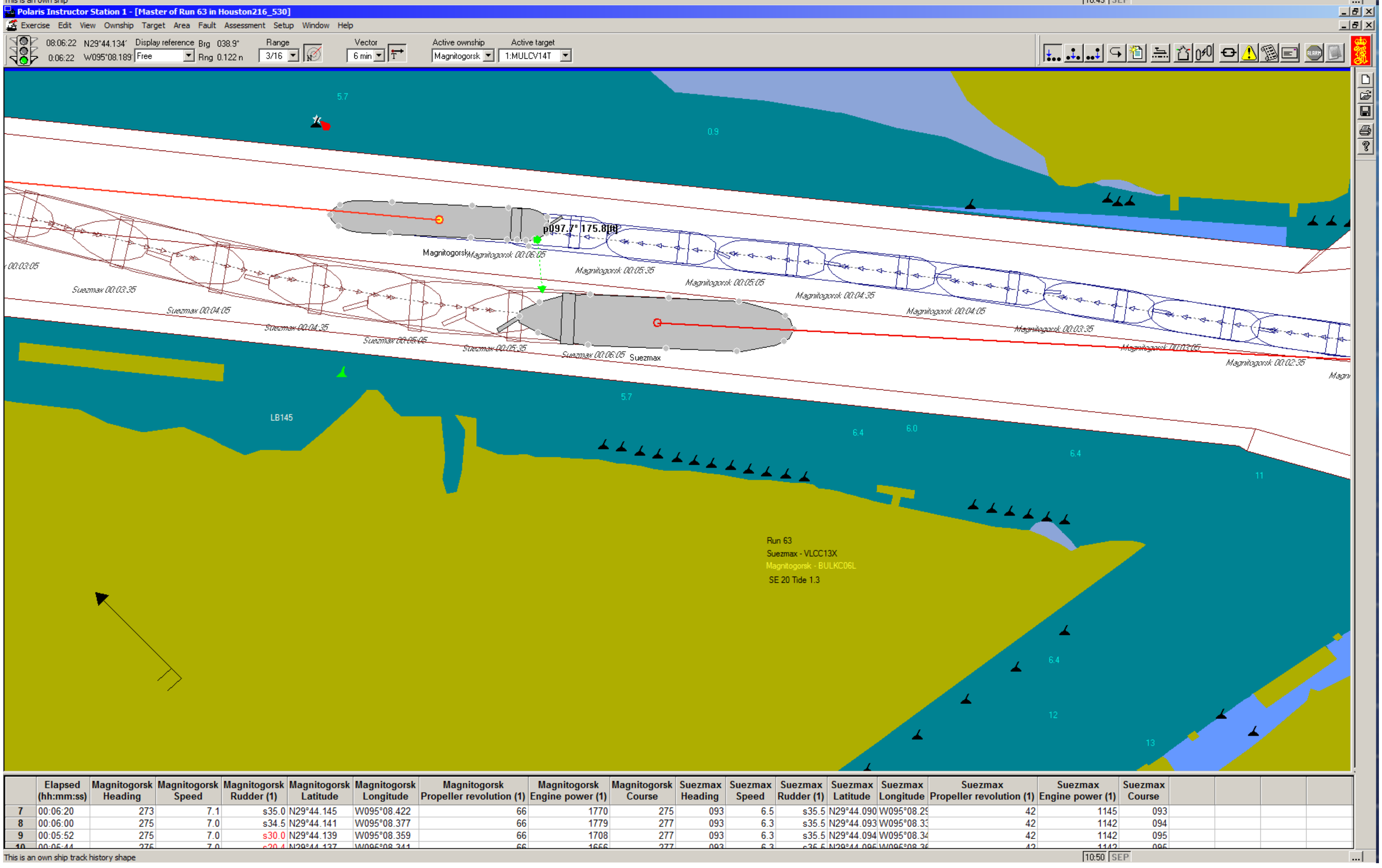


08:05:43 N29°44.094' Display reference: Free Brg 042.9°
0:05:43 W095°08.218 Rng 0.076 n
Range: 3/16
Vector: 6 min
Active ownship: Magnitogorsk
Active target: 1:MULCV14T

	Elapsed (hh:mm:ss)	Magnitogorsk Heading	Magnitogorsk Speed	Magnitogorsk Rudder (1)	Magnitogorsk Latitude	Magnitogorsk Longitude	Magnitogorsk Propeller revolution (1)	Magnitogorsk Engine power (1)	Magnitogorsk Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7	00:05:42	276	7.0	s12.1	N29°44.136	W095°08.337	66	1688	277	093	6.3	s35.5	N29°44.095	W095°08.36	42	1142	095
8	00:05:40	276	7.0	s3.2	N29°44.136	W095°08.332	66	1644	277	094	6.3	s35.5	N29°44.095	W095°08.37	42	1142	095
9	00:05:38	276	7.0	p5.6	N29°44.136	W095°08.328	66	1638	277	094	6.3	s35.2	N29°44.096	W095°08.37	42	1141	095

This is an own ship

10:49 SEP



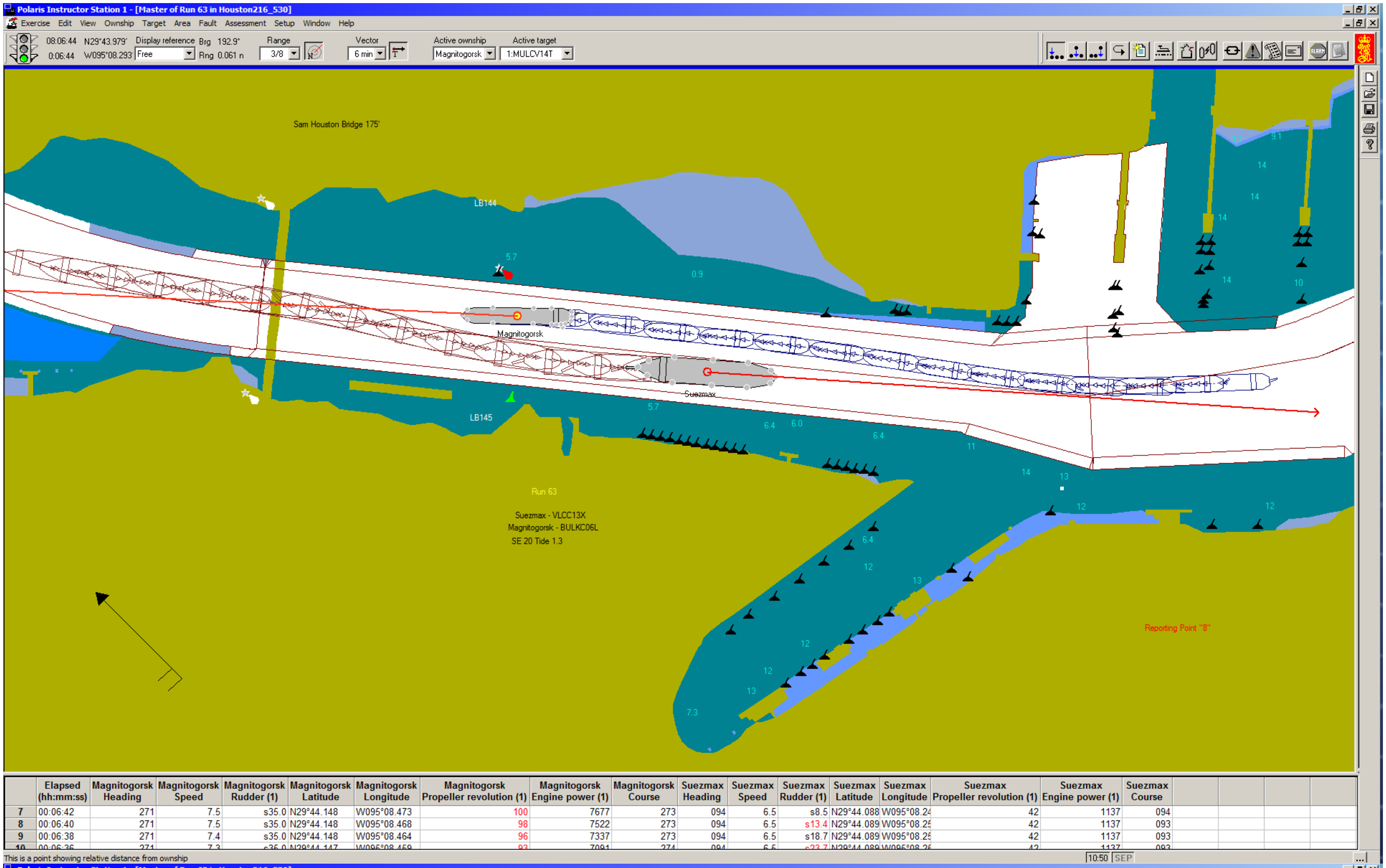
08:06:22 N29°44.134' Display reference: Free Brg 038.9°
0:06:22 W095°08.189 Rng 0.122 n
Range: 3/16
Vector: 6 min
Active ownship: Magnitogorsk
Active target: 1:MULCV14T

	Elapsed (hh:mm:ss)	Magnitogorsk Heading	Magnitogorsk Speed	Magnitogorsk Rudder (1)	Magnitogorsk Latitude	Magnitogorsk Longitude	Magnitogorsk Propeller revolution (1)	Magnitogorsk Engine power (1)	Magnitogorsk Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7	00:06:20	273	7.1	s35.0	N29°44.145	W095°08.422	66	1770	275	093	6.5	s35.5	N29°44.090	W095°08.29	42	1145	093
8	00:06:00	275	7.0	s34.5	N29°44.141	W095°08.377	66	1779	277	093	6.3	s35.5	N29°44.093	W095°08.33	42	1142	094
9	00:05:52	275	7.0	s30.0	N29°44.139	W095°08.359	66	1708	277	093	6.3	s35.5	N29°44.094	W095°08.34	42	1142	095

This is an own ship track history shape

10:50 SEP

June 26, 2019



08:06:44 N29°43.979' Display reference Free Brg 192.9° Rng 0.061 n

0:06:44 W095°08.293'

Range 3/8

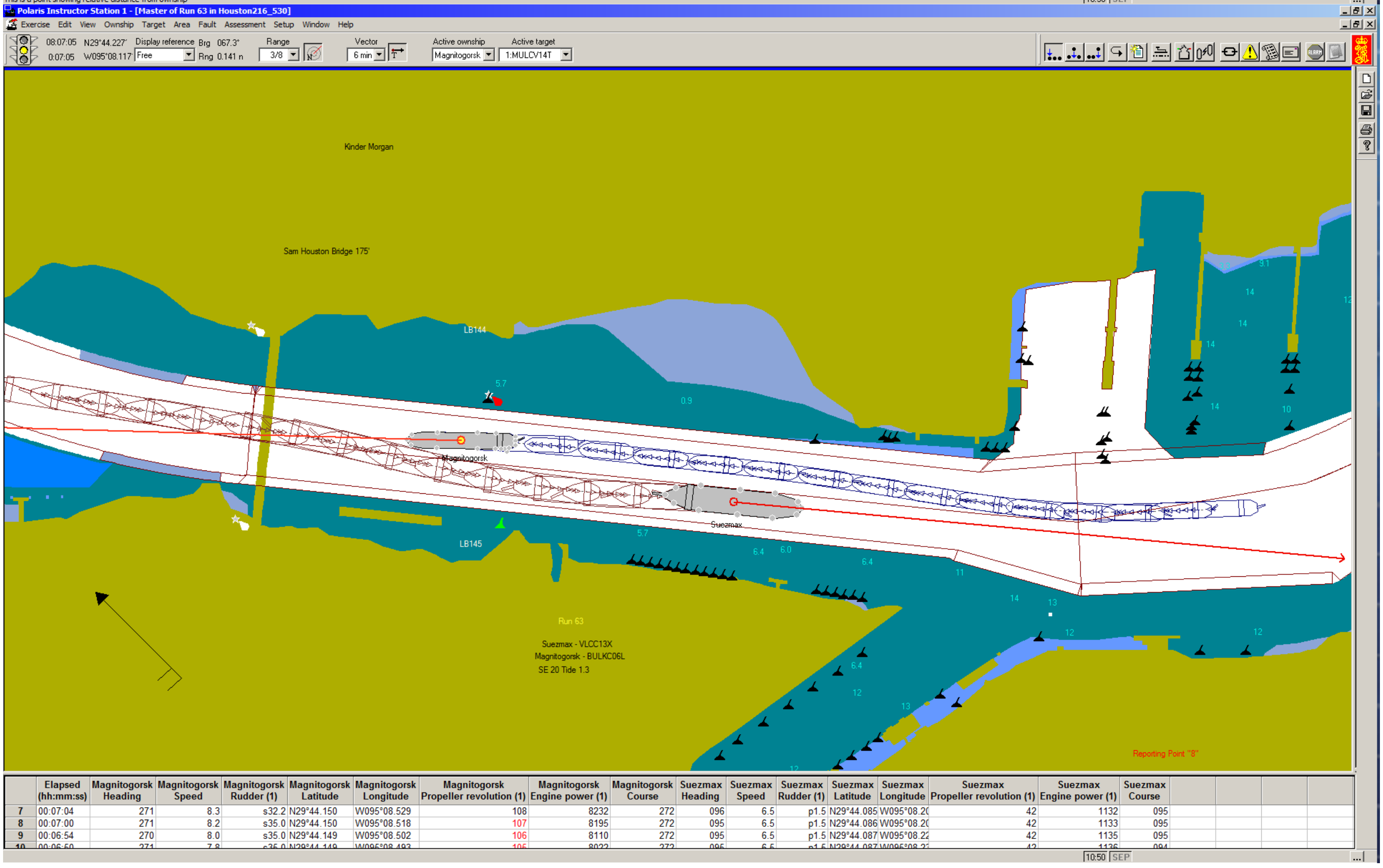
Vector 6 min

Active ownship Magnitogorsk

Active target 1:MULCV14T

	Elapsed (hh:mm:ss)	Magnitogorsk Heading	Magnitogorsk Speed	Magnitogorsk Rudder (1)	Magnitogorsk Latitude	Magnitogorsk Longitude	Magnitogorsk Propeller revolution (1)	Magnitogorsk Engine power (1)	Magnitogorsk Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7	00:06:42	271	7.5	s35.0	N29°44.148	W095°08.473	100	7677	273	094	6.5	s8.5	N29°44.088	W095°08.24	42	1137	094
8	00:06:40	271	7.5	s35.0	N29°44.148	W095°08.468	98	7522	273	094	6.5	s13.4	N29°44.089	W095°08.25	42	1137	093
9	00:06:38	271	7.4	s35.0	N29°44.148	W095°08.464	96	7337	273	094	6.5	s18.7	N29°44.089	W095°08.25	42	1137	093

This is a point showing relative distance from ownship



08:07:05 N29°44.227' Display reference Free Brg 067.3° Rng 0.141 n

0:07:05 W095°08.117'

Range 3/8

Vector 6 min

Active ownship Magnitogorsk

Active target 1:MULCV14T

	Elapsed (hh:mm:ss)	Magnitogorsk Heading	Magnitogorsk Speed	Magnitogorsk Rudder (1)	Magnitogorsk Latitude	Magnitogorsk Longitude	Magnitogorsk Propeller revolution (1)	Magnitogorsk Engine power (1)	Magnitogorsk Course	Suezmax Heading	Suezmax Speed	Suezmax Rudder (1)	Suezmax Latitude	Suezmax Longitude	Suezmax Propeller revolution (1)	Suezmax Engine power (1)	Suezmax Course
7	00:07:04	271	8.3	s32.2	N29°44.150	W095°08.529	108	8232	272	096	6.5	p1.5	N29°44.085	W095°08.20	42	1132	095
8	00:07:00	271	8.2	s35.0	N29°44.150	W095°08.518	107	8195	272	095	6.5	p1.5	N29°44.086	W095°08.20	42	1133	095
9	00:06:54	270	8.0	s35.0	N29°44.149	W095°08.502	106	8110	272	095	6.5	p1.5	N29°44.087	W095°08.22	42	1135	095