Report

Maritime Simulation Evaluation of a Proposed Container Terminal Located in Violet, Louisiana, for the Port of New Orleans

Conducted by LOCUS LLC at Maritime Pilots Institute in Covington, LA

Simulations: January 28-29, 2021

Final Report: 8/24/2021

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Simulation Participants

Name	Role	Organization
Capt. Jack Anderson	Pilot	CRPPA
Capt. Blaine Donner	Pilot	CRPPA
Capt. Dan Laporte	Retired Pilot/Teacher	LOCUS LLC
Mr. Chris Gilmore	Engineer	Port NOLA
Mr. Anthony Evett	Engineer	Port NOLA
Mr. G. Burkley	Researcher	LOCUS LLC
Ms. A. Stauffer	Research Assistant	LOCUS LLC
Mr. A. Russel	Simulation Operation	LOCUS LLC
Mr. F. Lagunes	Simulation Engineer	LOCUS LLC

Note: Participants included a number of short visits by various engineers from the Port of New Orleans.

Summary

On January 27-28th, 2021, LOCUS LLC conducted two days of maritime simulation using a Kongsberg Full Mission Ship Simulator located at the Maritime Pilots Institute in Covington, LA. This research was conducted on behalf of the Port of New Orleans for the purpose of evaluating the feasibility of a proposed container terminal located at Mississippi River Mile 83, on the left descending bank, near Violet, Louisiana. The research focused on operations with 400-meter length, 23,000 TEU capacity, Ultra-Large Container Vessels "ULCV". Two Pilot members of the Crescent River Port Pilots (CRPPA) conducted 21 simulations using ULCV-class vessel models. Simulations included operations in low and high river current and utilized four, 70-ton bollard pull capacity, Azimuth Stern Drive (ASD) assist "tractor" tugs.

Overall, the Pilots are supportive of the location for the proposed Violet container terminal. They note the proposed site is well-oriented to the prevailing current and is in a wide, straight, and deeper part of the river. The only primary concern found in research is the unsafe presence of anchored vessels in 9-Mile anchorage, opposite the proposed container vessel berths. Simulations found, if ships are anchored in the lower part of 9-Mile anchorage, it was not safe to turn 400m length ULCV container vessels directly from the proposed berths. This research recommends the lower three berthing spots in the 9-Mile anchorage be removed to provide safe turning space for containership operations.

Other items noted in simulation include:

1. Considering a ULCV departing the proposed berths, going upriver to turn the vessel is impractical, causes excessive river traffic delays, and is less safe than turning directly from the berth.
2. Undocking and turning directly from the proposed berths is safer with no vessels in the lower three spaces of the 9-Mile anchorage.
3. No additional marine traffic should be navigating in the river area while a ULCV is undocking.
4. Turning directly off the dock takes 15 to 20 minutes, which is consistent with the time for current container vessels to depart Nashville Ave. Terminal.
5. Additional dredging may be needed on the west side of the channel across from Berth 3 to allow for sufficient water depth for turning 52' draft, loaded ULCV's in conditions of low river stage.
6. The addition of a mid-stream mooring operations above the proposed site was found to be an unsafe obstacle for container vessel operations and for transits of other large vessels passing the container berths. The pilots do not recommend a mid-stream mooring operation in this area.

Pilots Report: Capt. Anderson and Donner

Overall, we agree that the proposed Violet site is an excellent location for a new container terminal and is safe for piloting ULCV class vessels to and from the proposed facility. Our opinion is based on our piloting experience and the completion of 21 simulations using a model of the new class of ULCV vessel. We found the ULCV model to be authentic and believable in its behavior. This 23,000 TEU ULCV model at 52' of draft (full load capacity), is a large, heavy ship, that is relatively underpowered in comparison to smaller "large" container vessels of 9,000 to 14,000 TEU capacities. The 23,000 TEU ULCV model represents a vessel of 1312' x 192', which is longer in length, wider in beam, and 100,000 tons larger in displacement, than any vessel in current service on the Mississippi River. Regardless of the increased vessel size and lower engine power, the ULCV was manageable in all tested conditions using standard river piloting techniques and practices.

Removal of Anchorage Area

The safest way to undock a containership from the proposed terminal is pilot the vessel from its static position at the berth into a position off the berth clear of other moored vessels, holding the vessel straight with the current. From this holding position, the vessel is maneuvered by turning to the left, directly off the dock, and proceeding downriver. The piloting maneuver is based on controlling vessel position, rate of turn, and vessel motion, by working with the river current, wind, ship's power and the assist tugs. River piloting coordination with natural forces and man-made forces requires safe space to turn the ship and to account for variables in operations from any of the natural or man-made assets being used by the pilot. Simulations demonstrated unsafe clearances with anchored vessels under conventional piloting conditions. Given any unforeseen variables in piloting conditions, the risk of striking a vessel in the 9-mile anchorage is high. It is our opinion that having vessels anchored in the 9-mile anchorage opposite the proposed container facility berths poses an unsafe hazard for vessels departing the container terminal berths.

An additional seasonal issue for anchored vessels in 9-mile anchorage regards low river conditions and westerly winds. Vessels in the anchorage can, under these conditions, "tail-out" into the river. In this situation, the stern's of the anchored ships will be nearly in the middle of the river. The location of anchored vessels in this "tailed-out" condition would create an unsafe hazard to arrival and departing vessels from the proposed container facility. We recommend modifying the anchorage at 9-mile by removing the bottom three berths, amounting to 5300' of removed anchorage.

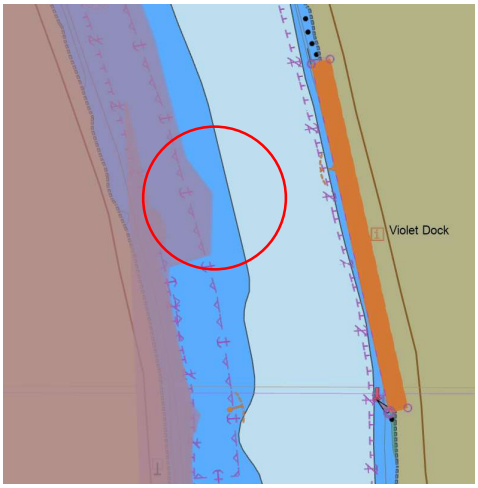
Alternate Maneuvers for Departing Vessels

During simulations we tested departing the proposed berths and proceeding upriver to turn the vessel. These maneuvers were generally not successful due to unsafe clearance issues, and they took a great deal of time. As such, we do not recommend departing the proposed berth and proceeding upriver to turn. Rather, we endorse turning directly from the berth, as is conventional and safe for all other berths in our pilotage area.

Dredging

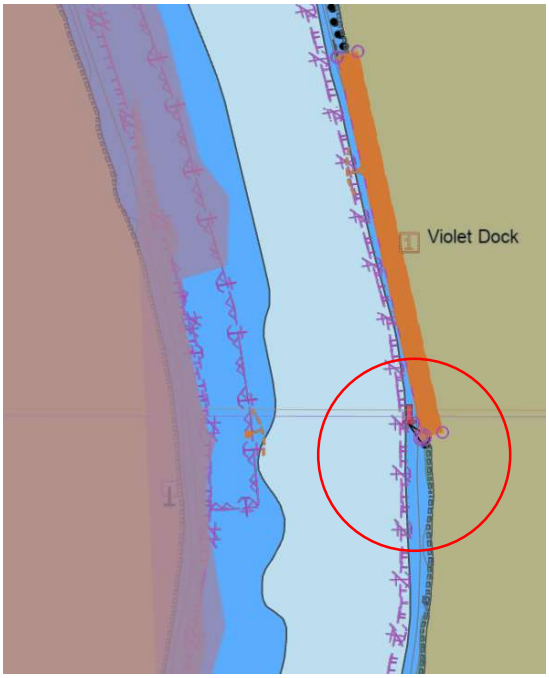
There is a shallow spot in the river just to the east of the existing anchorage, positioned directly adjacent to the proposed berths 2 and 3. The 52' draft ULCV would potentially ground in this location in low river conditions when turning off the berth during a departure maneuver. We recommend this area be dredged to 55' MLLW or greater and be regularly surveyed for silting.

Figure: Shallow area near anchorage requiring dredging noted by red circle



Additionally, the area downriver of the proposed berth has shallow water that will need to be dredged to 55' MLLW or greater.

Figure: Area requiring dredging below the berth



Use of Tugs

The provided four, 70-ton tractor tugs, had sufficient power to assist controlling the ship in all but the highest current scenarios. In the event of extreme high-river conditions, we would recommend adding a fifth tug for departures of this class of vessel. We note that if a ULCV vessel were to arrive today, requiring four 70-ton tractor tugs, this would essentially obligate every large tug in the Port of New Orleans. We recommend that in the planning for this proposed facility it is imperative to address the availability of capable tugs, including the consideration of providing dedicated tugs for the facility.

In piloting the ULCV, we found it challenging when departing the lower berth in high river conditions to develop enough vessel headway through the water to achieve sufficient steerage to safely navigate through the turn in the river below the berth. This is due to the nearness of the berth from the turn and the large ULCV being relatively underpowered. Under these high river conditions, when leaving the lower berth, we may need to use the tugs to assist the ship in gaining headway in order to gain steerage for the upcoming river turn at 12-Mile point.

Although we understand this tug assist strategy is a regular practice in other ports with large vessels, it would locally be a novel and unconventional use of tugs to pull a ship downriver after a turn to gain headway. Given the newness of this operational idea, we believe there is attendant risk to be mitigated. We recommended that the pilots and the tug masters develop standards of care for this headway-assist maneuver, and other issues associated with controlling ULCV's in the Mississippi River. It is also

recommended the pilots and tug companied consider joint training to ensure safe operations.

Impact of Mid-Stream Operations Near the Proposed Terminal

During the simulations we evaluated the impact of a proposed mid-stream facility in a location above the proposed container docks. We found the mid-stream facility to be a hazard to navigation for the area and we do not recommend this operation be allowed in the vicinity of the proposed Violet container terminal. If the mid-stream facility, with attendant barges, cranes and assist vessels, were moved out of the main river area towards the bank, as with a conventional dock, the issue and our concerns would be alleviated.

River Traffic Time Delays Resulting from Terminal Operations

Container vessel arrivals to the proposed terminal will have no special effect on local traffic. For departure operations, marine traffic will be required to hold so as not to transit through the area of the proposed berths.

Upbound traffic would hold below the point (12-mile Point) and downbound traffic would delay well-above the area to keep clear. Simulations and experience concur that it takes about 15 to 20 minutes to depart the berth. Given upbound vessels are holding under 12-Mile point, which is approximately 2.5 river miles from the berth, this would add another 8 to 10 minutes of travel to pass clear of waiting vessels. Overall, it is expected that departing vessels from the proposed terminal create an approximate 30-minute maximum delay for passing traffic.

With regard to maximum delays of 30-minutes, it is important to note that timing will be different for different types, sizes and drafts of vessels, and will vary according to river stage, current, visibility and other factors. For instance, a pilot aboard a loaded ship in high river might well hold below 12-mile point, waiting 30 minutes for a departing containership; whereby a light-draft smaller vessel, which is overall faster, might pass by the area prior to turning the containership. A likely scenario for the loaded upbound ship approaching the facility is that the pilot would communicate and slow earlier, delaying entry into the area, to allow the container vessel to depart first.

Thus, it would be incorrect to characterize the proposed facility as one that would create new, unusual delays. CRPPA pilots and the other river users regularly self-manage traffic to account for delay variables. It is expected that the proposed container facility would not create unconventional delays but would have conventional traffic management accommodated in a conventional fashion. Pilots and local traffic would coordinate, “windows of opportunity” to clear the area prior to container vessel departures.

Lastly, in terms of timing, we investigated departing the berth and proceeding up the river to turn. This creates far longer delays for traffic as the container vessel would likely have delays with meeting certain classes of large downbound vessels and would have to appreciably slow to prepare to turn in the river. These slow river piloting maneuvers could create delays for up to an hour or more, as upbound traffic holding downriver of the containership must wait as the vessel is piloted though its turn position and navigated again downriver past the waiting vessels. Again, we do not recommend turning vessels from this proposed facility upriver of the site.

Transit Behavior of ULCV in River Turns

We also conducted transit-speed simulations in the bend at Fort Jackson and found the vessels to be consistent in behavior to other large vessels in the river. We have no concern for enroute navigation of ULCV's in the Mississippi River, CRPPA pilotage area.

Synopsis of Pilot Recommendations

1. Remove the lower three berths in the 9-Mile anchorage.
2. Plan to have departing container vessels turn directly off the berth.
3. Provide a fifth, 70-ton capacity tractor tug, during high river conditions.
4. Plan for tug resources for the facility, including options for dedicated tugs.
5. Endorse joint training for pilots and tug masters in accordance with developed standards of care for ULCV operations.
6. Dredge to 55' MLLW the waterway on the eastern edge of the 9-mile anchorage and the shallows at the lower end of the proposed berth.
7. It is not recommended for departing vessels to go upriver to turn as it increases traffic delays and overall risk.
8. It is not recommended to allow a mid-stream mooring facility near the new container facility.

Capt. Jack Anderson, CRPPA

Capt. Blaine Donner, CRPPA

Research Recommendations

Overall, the Pilots and research team endorse the location for the proposed Violet container terminal as safe for navigation with ULCV operations, given the anchorage area opposite the proposed berths is removed. The pilots noted the proposed site is well-oriented to the prevailing current, and is in a wide, straight, and deeper part of the river. The site is, from the briefings and feedback collected during simulations, considered an excellent location for the project. The following recommendations are offered. Note that these and the Pilot's recommendations are the same.

1. Remove the lower three berths in the 9-Mile anchorage.
2. Plan to have departing container vessels turn directly off the berth.
3. Provide a fifth, 70-ton capacity tractor tug, during high river conditions.
4. Plan for tug resources for the facility, including options for dedicated tugs.
5. Endorse joint training for pilots and tug masters in accordance with developed standards of care for ULCV operations.
6. Dredge to 55' MLLW the waterway on the eastern edge of the 9-mile anchorage and the shallows at the lower end of the proposed berth.
7. It is not recommended for departing vessels to go upriver to turn as it increases traffic delays and overall risk.
8. It is not recommended to allow a mid-stream mooring facility near the new container facility.

Project Area Depths

The project used an ensemble of depth data considering the most recent depth survey (2012) and information from the NOAA electronic nautical chart "S-57" depth data. The Kongsberg instructor station chart illustrates the "NOAA" 50' contour line from the 2012 survey and the NOAA 59.7' contour from the nautical chart. The X,Y,Z depth data from the NOAA 2012 Survey was used for the depth bottom mesh in the simulator.

Figure: 2012 NOAA Survey Data for the Violet Area

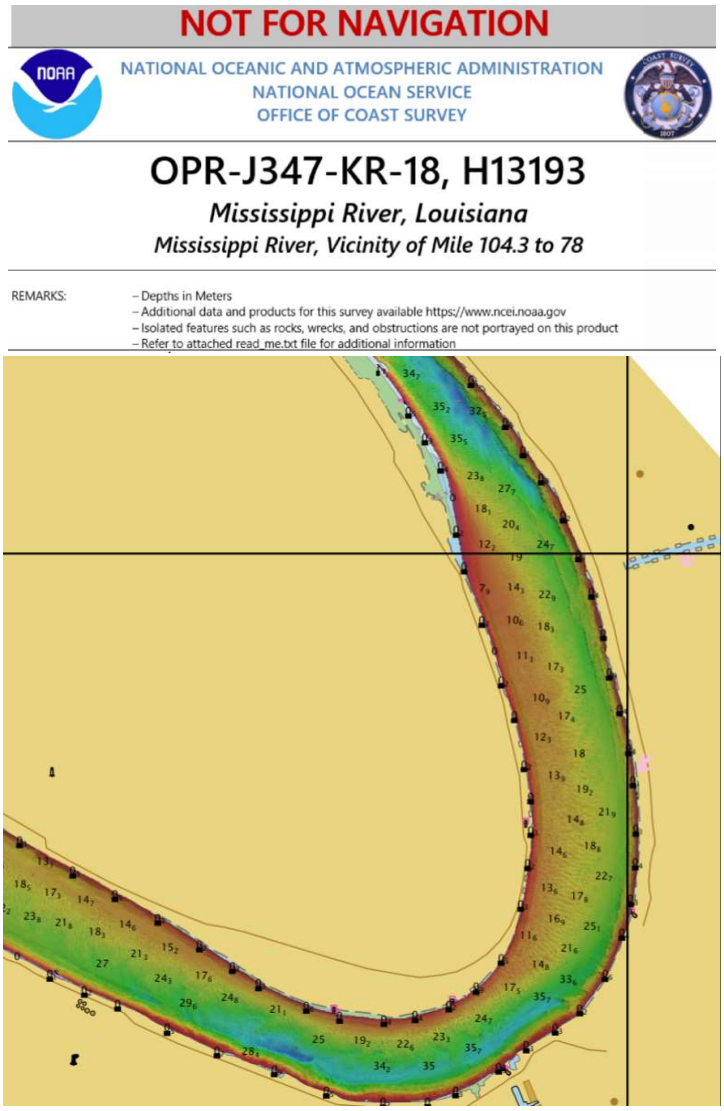
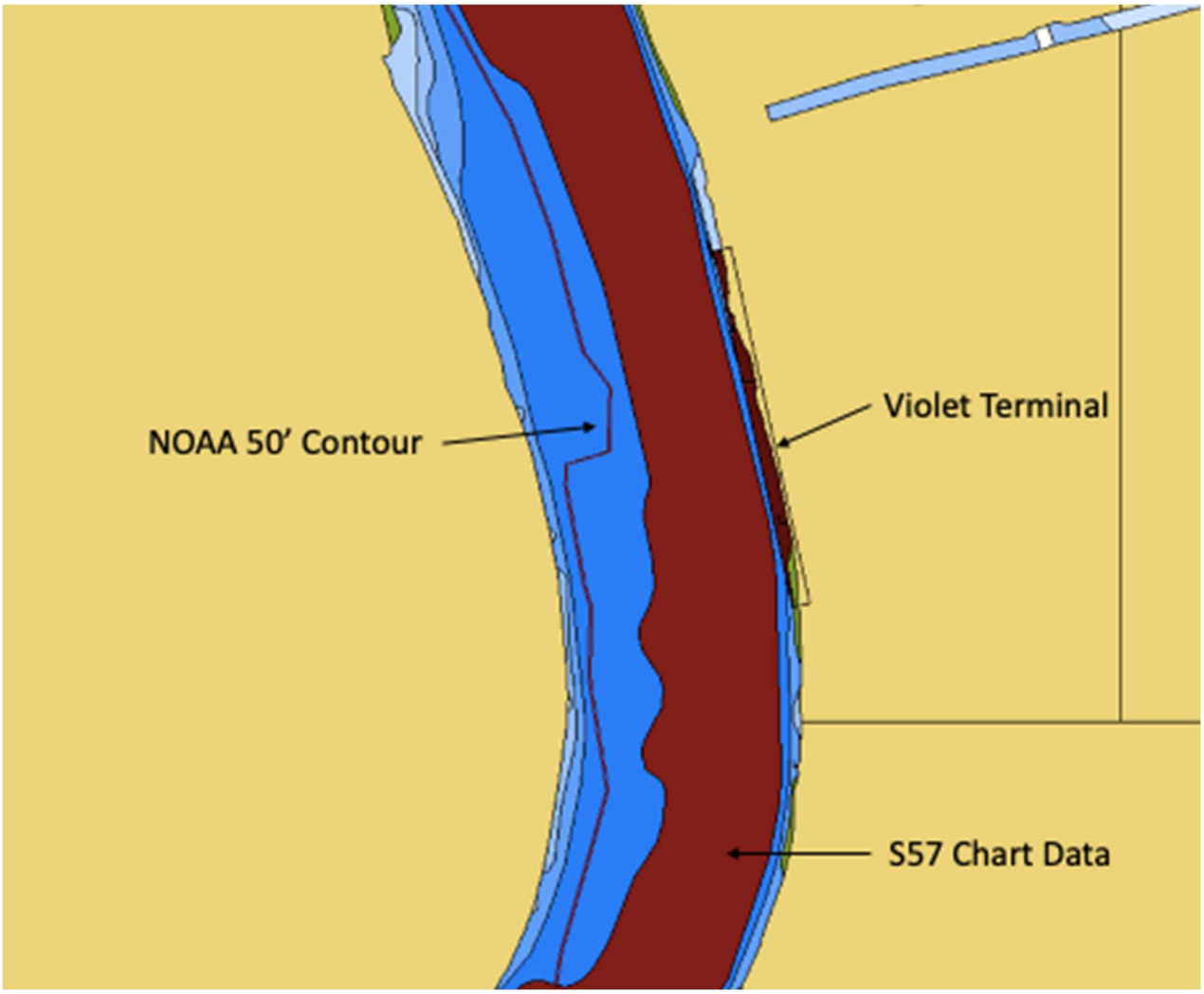
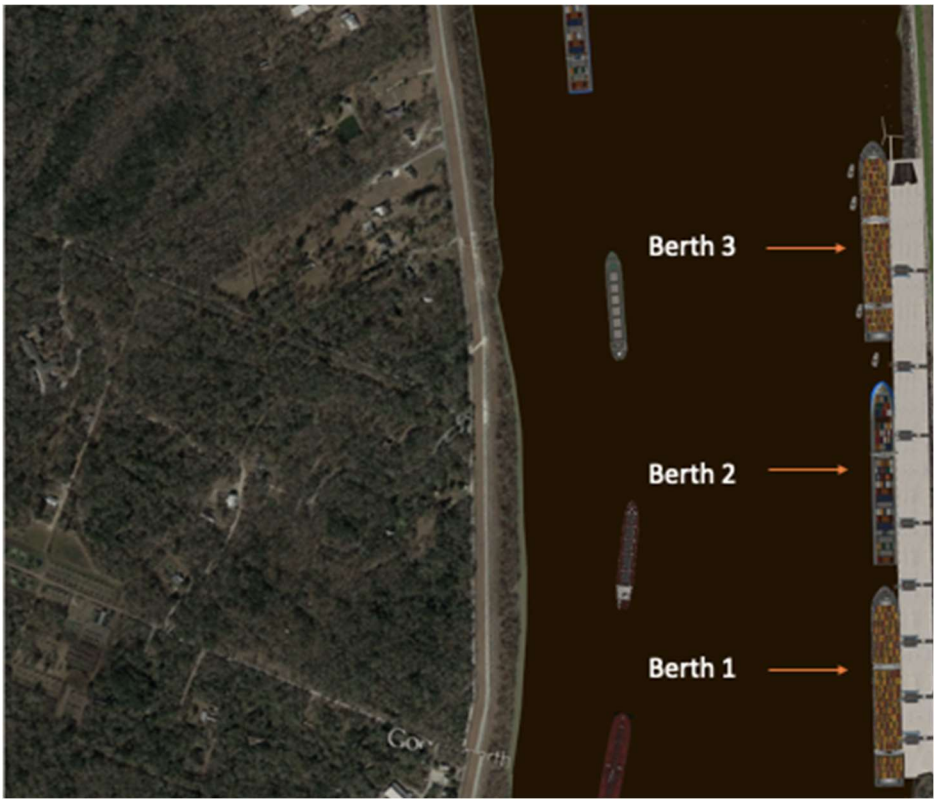
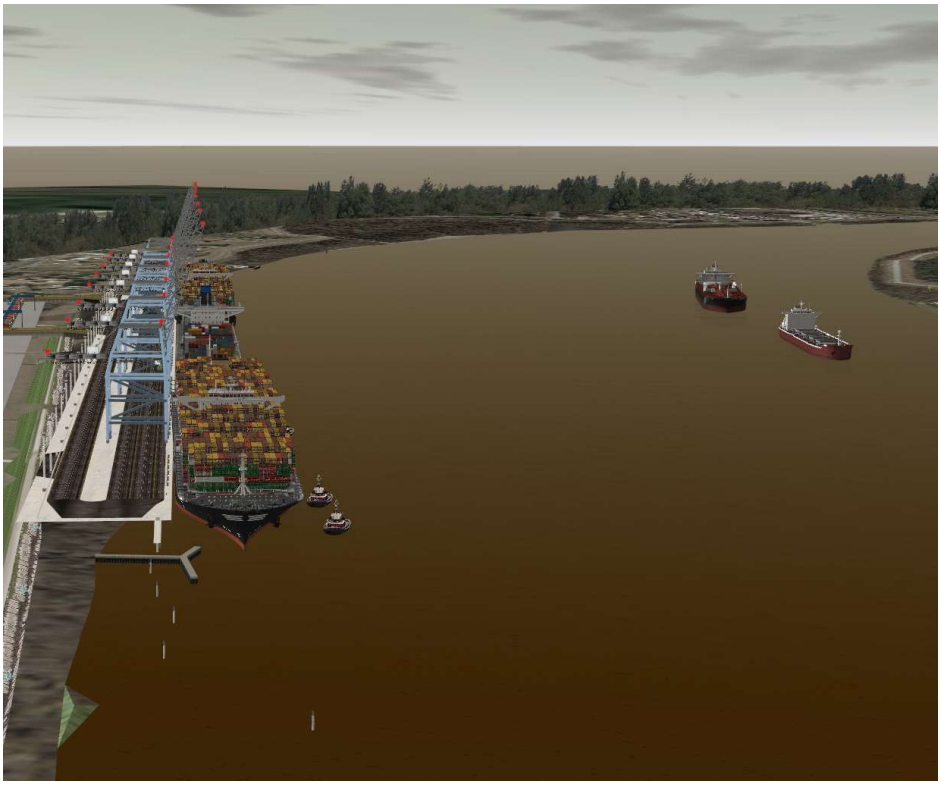


Figure: 50 Foot Contour from 2012 NOAA Survey and 59.7' Contour from NOAA ENC Chart



Simulation Database Images





Vessel Pilot Card

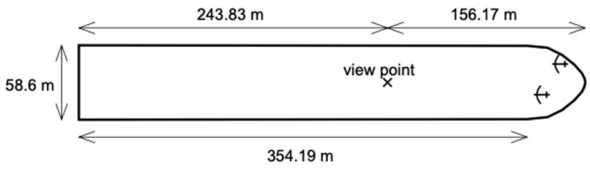
PILOT CARD

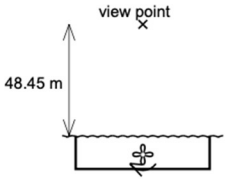
ULCV400O
Version 1

Ship's name 400 ULCV 21K **Date** _____
Call Sign _____ **Deadweight** 0 tonnes **Year built** _____
Draught aft 14.5 m / 47 ft 7 in **Forward** 13.5 m / 44 ft 3 in **Displacement** 246050 tonnes

SHIP'S PARTICULARS

Length overall 399.9 m **Anchor chain:** **Port** 14.0 shackles **Starboard** 14.0 shackles
Breadth 58.6 m **Stern** _____ shackles
Bulbous bow Yes **(1 shackle = 27.432 m = 15 fathoms)**





PROPULSION PARTICULARS

Type of engine Diesel **Maximum power** 57900 kW (78722 hp)

Manoeuvring engine order		RPM	Pitch	Speed (knots) Loaded	Speed (knots) Ballast
Full sea speed	**1**	80.0		20.0	
Full Ahead	**0.8**	60.0		16.4	
Half Ahead	**0.5**	46.0		12.6	
Slow Ahead	**0.25**	36.0		9.8	
Dead Slow Ahead	**0.125**	24.0		6.1	
Dead Slow Astern	**-0.125**	-24.0			
Slow Astern	**-0.25**	-36.0			
Half Astern	**-0.5**	-46.0			
Full Astern	**-1**	-69.6			

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

ULCV400P
Version 1

Ship's name 400 ULCV 23K **Date** _____

Call Sign _____ **Deadweight** 0 tonnes **Year built** _____

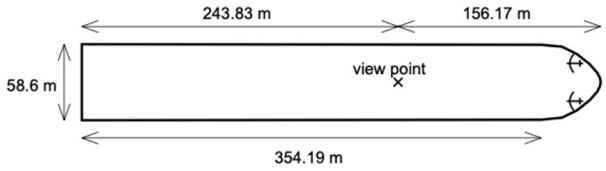
Draught aft 15.74 m / 51 ft 8 in **Forward** 14.74 m / 48 ft 4 in **Displacement** 267832 tonnes

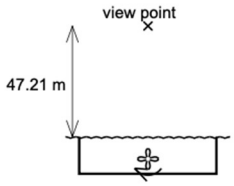
SHIP'S PARTICULARS

Length overall 399.9 m **Anchor chain:** **Port** 14.0 shackles **Starboard** 14.0 shackles

Breadth 58.6 m **Stern** _____ shackles

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





PROPULSION PARTICULARS

Type of engine Diesel **Maximum power** 57900 kW (78722 hp)

Manoeuvring engine order		RPM	Pitch	Speed (knots) Loaded	Ballast
Full sea speed	**1**	80.0		20.0	
Full Ahead	**0.8**	60.0		16.4	
Half Ahead	**0.5**	46.0		12.6	
Slow Ahead	**0.25**	36.0		9.8	
Dead Slow Ahead	**0.125**	24.0		6.1	
Dead Slow Astern	**-0.125**	-24.0			
Slow Astern	**-0.25**	-36.0			
Half Astern	**-0.5**	-46.0			
Full Astern	**-1**	-69.6			

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

ULCV366
Version 1

Ship's name 366 ULCV 14K **Date** _____

Call Sign _____ **Deadweight** 133500 tonnes **Year built** _____

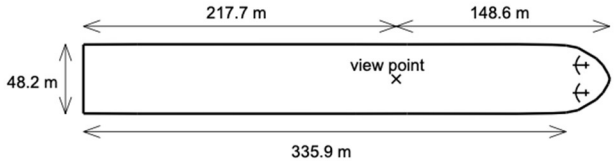
Draught aft 15.2 m / 49 ft 10 in **Forward** 15.2 m / 49 ft 10 in **Displacement** 178766 tonnes

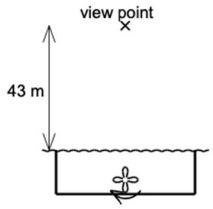
SHIP'S PARTICULARS

Length overall 366.5 m **Anchor chain:** **Port** 28.0 shackles **Starboard** 28.0 shackles

Breadth 48.2 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**	102.0		24.5	
Full Ahead	**0.8**	90.0		22.2	
Half Ahead	**0.5**	60.0		15.1	
Slow Ahead	**0.25**	31.0		7.2	
Dead Slow Ahead	**0.125**	20.0		4.8	
Dead Slow Astern	**-0.125**	-20.0			
Slow Astern	**-0.25**	-31.0			
Half Astern	**-0.5**	-51.0			
Full Astern	**-1**	-67.0			

Time limit astern _____ min:sec

Full ahead to full astern _____ min:sec

Max. No. of consecutive starts _____

Minimum RPM _____ _____ knots

Astern power _____ % ahead

MTGMOST1
Version 0

Ship's name GBF **Date**

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

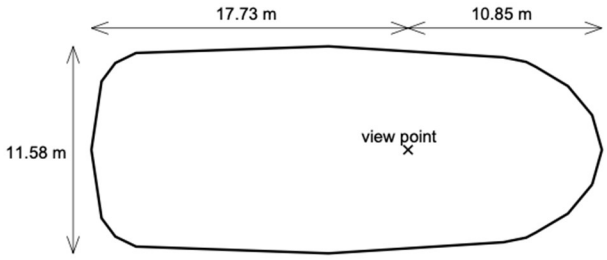
Draught aft 4 m / 13 ft 1 in **Forward** 4 m / 13 ft 1 in **Displacement** 728 tonnes

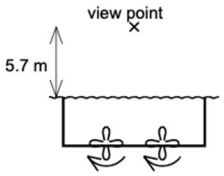
SHIP'S PARTICULARS

Length overall 28.04 m **Anchor chain:** **Port** shackles **Starboard** shackles

Breadth 11.58 m **Stern** shackles

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





PROPULSION PARTICULARS

Type of engine Diesel **Maximum power** 3791 kW (5155 hp)

Manoeuvring engine order		RPM	Pitch	Speed (knots) Loaded	Ballast
Full sea speed	**1**	238.0		12.5	
Full Ahead	**0.8**	222.0		11.7	
Half Ahead	**0.5**	190.0		10.1	
Slow Ahead	**0.25**	148.3		7.9	
Dead Slow Ahead	**0.125**	110.0		5.9	
Dead Slow Astern	**-0.125**	110.0		5.9	
Slow Astern	**-0.25**	148.3			
Half Astern	**-0.5**	190.0			
Full Astern	**-1**	238.0			

Time limit astern min:sec

Full ahead to full astern min:sec

Max. No. of consecutive starts

Minimum RPM knots

Astern power % ahead

Simulation Run Matrix

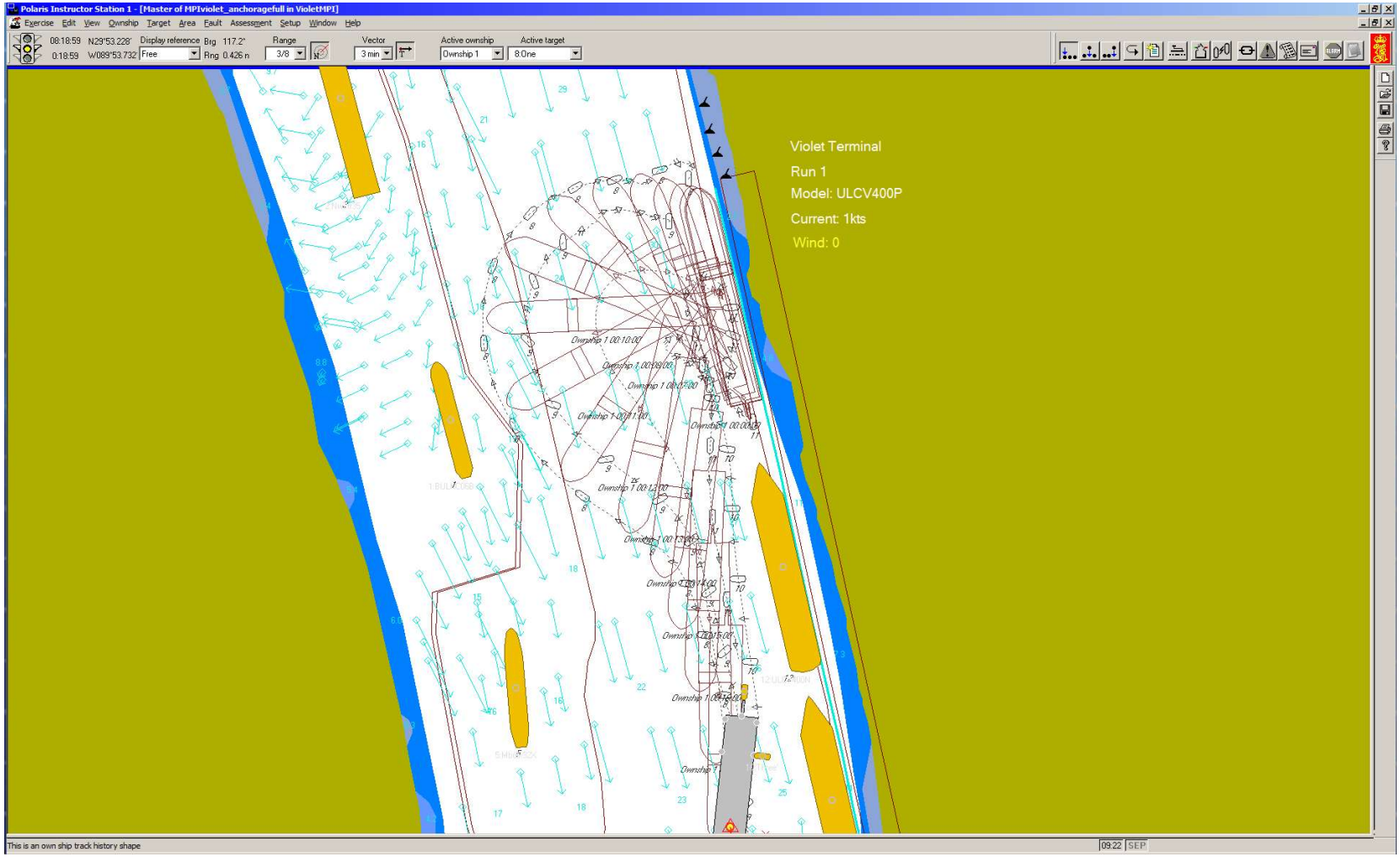
Run#	Run Type / Setup	Ship Model	Tug Models	Current (kn)	Tide (m)	Wind Dir / kn	Day/Night	Pilot Comments	Run Comments
1	Undocking berth 3	ULCV400P	4-MTGMOST1	1	1	0	Day	Capt. BD - Have to keep the ship tight to the berth because it is such a large vessel turning in a small area and timing is very importatnt. The maneuver is doable but need electronic onboard the vessel due to lack of visibility and to ensure a safe turn. Pilot noted that he would have prefered to drive out further after clearing the 50' contour to give more room between the stern and the dock.	Reorient pilot with simulator.
2	Undocking berth 3	ULCV400P	4-MTGMOST1	3	2.5	0	Day	Capt. BD - Felt like in real life the current would have set him further down river but the maneuver was manageable. Pilot would change the tug location for future runs to have two on the quarter instead of the stern because the stern tug was not able to assist much due to proximity to the dock.	Concern aross that the ship does not set down the river with the current vector file as it should in real life.
3	Undocking berth 3	ULCV400P	4-MTGMOST1	3	2.5	0	Day	Capt. JA - The maneuver was more realistic with the global current regarding the drift because the current started pushing the vessel when it got about 45 degrees turned from the berth. Vessels stern stayed about 20' off of the dock during the entire turn. The pilot did not need to check up the vessel or use excessive tug power for the undocking or turning	Replaced current vectors with global currents to see if the ship gets more drift during the maneuver. Vessel was about 80' from the anchored ship during the turn.
4	Undocking berth 3	ULCV400P	4-MTGMOST1	5	3.5	0	Day	Capt. BD - 5 knots of current is hard to do but he was satisfied with his timing for the turn. Utilized all tugs to there full power and stern backing full to keep the ship in good position. Wouldn't want to perform this maneuver with these enviromental factors and ships at anchorage. Stern was about 35' off of the dock while turning.	Vessel was about 80' from the anchored ship during the turn. Not a safe maneuver to complete due to using maximum power, creating no reserve power.
5	Undocking berth 3, turn	ULCV400P	4-MTGMOST1	1	1	0	Day	Capt. JA - The ship is unmanageable at low speeds and you have to ensure that the ship is parallel with the current. Creates a hard time to get to the tunrning location and makes it more difficult.	
6	Undocking berth 1	ULCV400P	4-MTGMOST1	3	2.5	0	Day	Capt. BD - Used tugs to there maximum power but did not have to back to full power. The main concern during the maneuver was the ships in the anchorage.	Performing the manuever with ships in the anchorage across from the berthing location.
7	Undocking berth 1	ULCV400P	4-MTGMOST1	3	2.5	0	Day	Capt. JA - Less then 75% of tug power was used simulating a "normal" situation. The turn is much easier without ships at anchorage and allowed for about 250-300 feet from the stern to the dock. This set up was much easier.	Removed the ships at anchorage to try and perform a "textbook" undocking. Global currents were used.

Run#	Run Type / Setup	Ship Model	Tug Models	Current (kn)	Tide (m)	Wind Dir / kn	Day/Night	Pilot Comments	Run Comments
8	Double encounter meeting two ULCV400P	ULCV400P	None	2	1	0	Day	Capt. BD - The manuever is doable. Feels like he could make it around the second point but would use more rudder when not in the simulator. Did not feel as much pressure as expected when meeting vessels this size.	Transit navigation at Fort Jackson to test how the vessel would react during meets. About 600' apart during the meets.
9	Undocking berth 1	ULCV400P	4-MTGMOST1	5	3.5	0	Day	Capt. JA - Felt like there was a simulator malfunction during this run due to the vessel not reacting to commands.	Bow ran aground due to getting in shallow water. Simulator issues and not a piloting issue.
10	Undocking berth 1	ULCV400P	4-MTGMOST1	5	3.5	0	Day	Capt. JA - With a 165 current at 5 kn, it is just too hard to maintain control of the vessel.	Redo of last run. Vessel ran aground from losing control after completing the turn off of the dock.
11	Undocking berth 1	ULCV400P	4-MTGMOST1	5	3.5	0	Day	Capt. BD - Did not have to use above 75% tug power and minimal backing power. It is a manageable maneuver but timing is very important due to the strong current.	Successful turn off the dock.
12	Undocking berth 1, turn	ULCV400P	4-MTGMOST1	5	3.5	0	Day	Capt. BD - Doable in the simulator but would not do it in real life. There is no room for error in this situation.	This simulation type may need a fifth tug to safely perform.
13	Undocking berth 1, pass midstream mooring ops, turn	ULCV400P	4-MTGMOST1	5	2.5	0	Day	Capt. BD - This maneuver was a reckless plan, which ended as we expected. The ULCV vessel lacked sufficient room to safely turn in the high river conditions due to the mid-stream mooring facility blocking the exit from the turn. No pilot would attempt this maneuver.	This was a demonstration run to clarify the consequences of installing a mid-stream mooring above the Violet facility berths
14	Passing vessel	ULCV400P	none	3	2.5	270/ 20	Day	Capt. JA - Ship is poor handling due to current and extreme size/discplacement, unsafe in the following current, needs tractor escort assistance	Downbounds loaded vessel steers poorly in the following current. Will likely handle better using an escort tug.

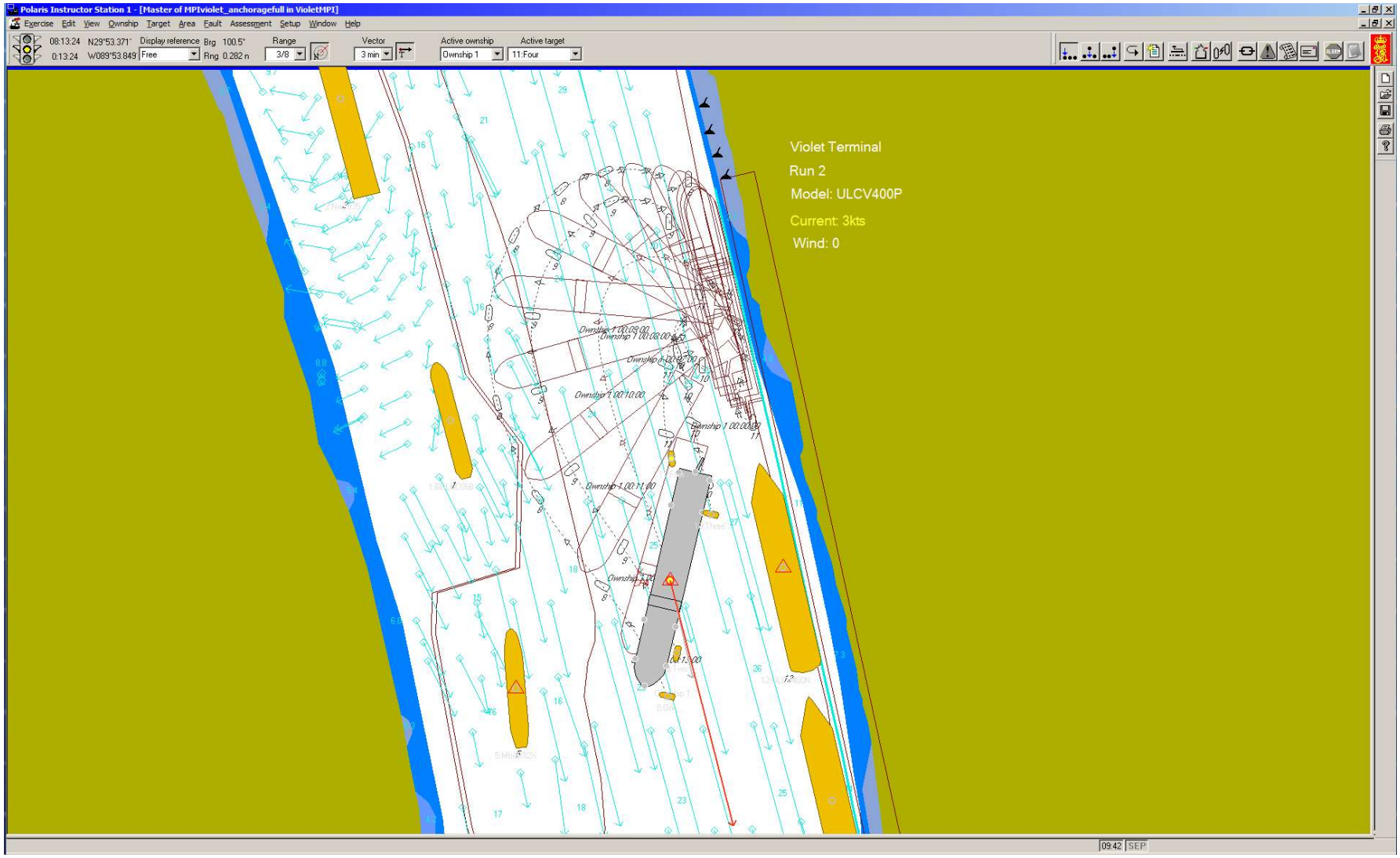
Run#	Run Type / Setup	Ship Model	Tug Models	Current (kn)	Tide (m)	Wind Dir / kn	Day/Night	Pilot Comments	Run Comments
15	Passing vessel	ULCV400P	1-MTGMOST1	3	2.5	270/ 20	Day	Capt. JA - Reduced vessel speed and using the tug half and slow. The vessel is handling much better. Without a tug, the maneuvering would have been impossible. Recommend that vessels of this size have an escort tug when transiting past the Violet Terminal.	While attempting to slow the ship on approach to the dock to respect the 7kn passing speed, the ULCV vessel became difficult to steer. Pilot use a powered indirect tug maneuver (135T) and did regain control. Was an emergency maneuver. Passed berths safely and maintained positive control of the vessel for the remainder of the trip.
16	Undocking berth 2	ULCV400P	4-MTGMOST1	3	2.5	150/ 20	Day	Capt. JA - Only used 75% of tug power, except on the aft tugs to push (this is a normal situation). Did not need to use any excessive bells, including backing power. It was a standard turn off the dock.	Ships placed at anchorage across from the berth.
17	Undocking berth 3	ULCV400P	4-MTGMOST1	3	2.5	270/ 20	Day	Capt. BD - Vessel came out slow because they focused on using the curent to walk the vessel over. Used less then 75% of tug power and minimal backing power. It was an easy turn because there were no ships at anchorage.	
18	Undocking berth 3	ULCV400P	4-MTGMOST1	5	2.5	000/ 25	Day	Capt. JA - The vessel acted realistically with the conditions. Had to stopped the headway from pushing the ship into the shallow by changing the pivot point to the center of the ship. After rotating, we were able to drive into the current and get headway.	Map out the clearance turn without getting too much headway from the current and wind with no ships in anchorage across from the berth. Vessel fell about 0.25 miles down river before being able to gain control.
19	Undocking berth 3	ULCV400P	4-MTGMOST1	5	2.5	000/ 25	Day	Capt. BD - Three out of four tugs were working full force to keep the bow up. Would request a fifth tugboat to place on the quarter in real life to help maintain control.	Repeat of last run with second pilot. Vessel fell about 0.50 miles down river before being able to gain control.
20	Undocking berth 3	ULCV366X	3-MTGMOST1	3	2.5	000/ 20	Day	Capt. BD - This vessel handles better than the larger vessel, more manueverable in this area. The ship fell into the current and wind making it a much more manageable turn. Only need three tugs to perform this turn with this size ship.	Demonstration run to test the maneuver with a smaller container vessel (14K TEU).
21	Undocking berth 1	ULCV400P	4-MTGMOST1	5	3	000/ 25	Day	Capt. JA - Kept the stern close to the dock while turning then kept her pointing towards 12 mile point to avoid drfiting into shallow water. This is a maneuver that you have to be very careful with and pay close attention to successfully complete it. The extra 5 knots of wind make a difference, wind restrictions may be needed.	This run is to attempt to maintain headway with enviromental conditions working against the vessel while undocking from the lowest berth with no ships at anchorage across from the berth.

Simulation Screenshots

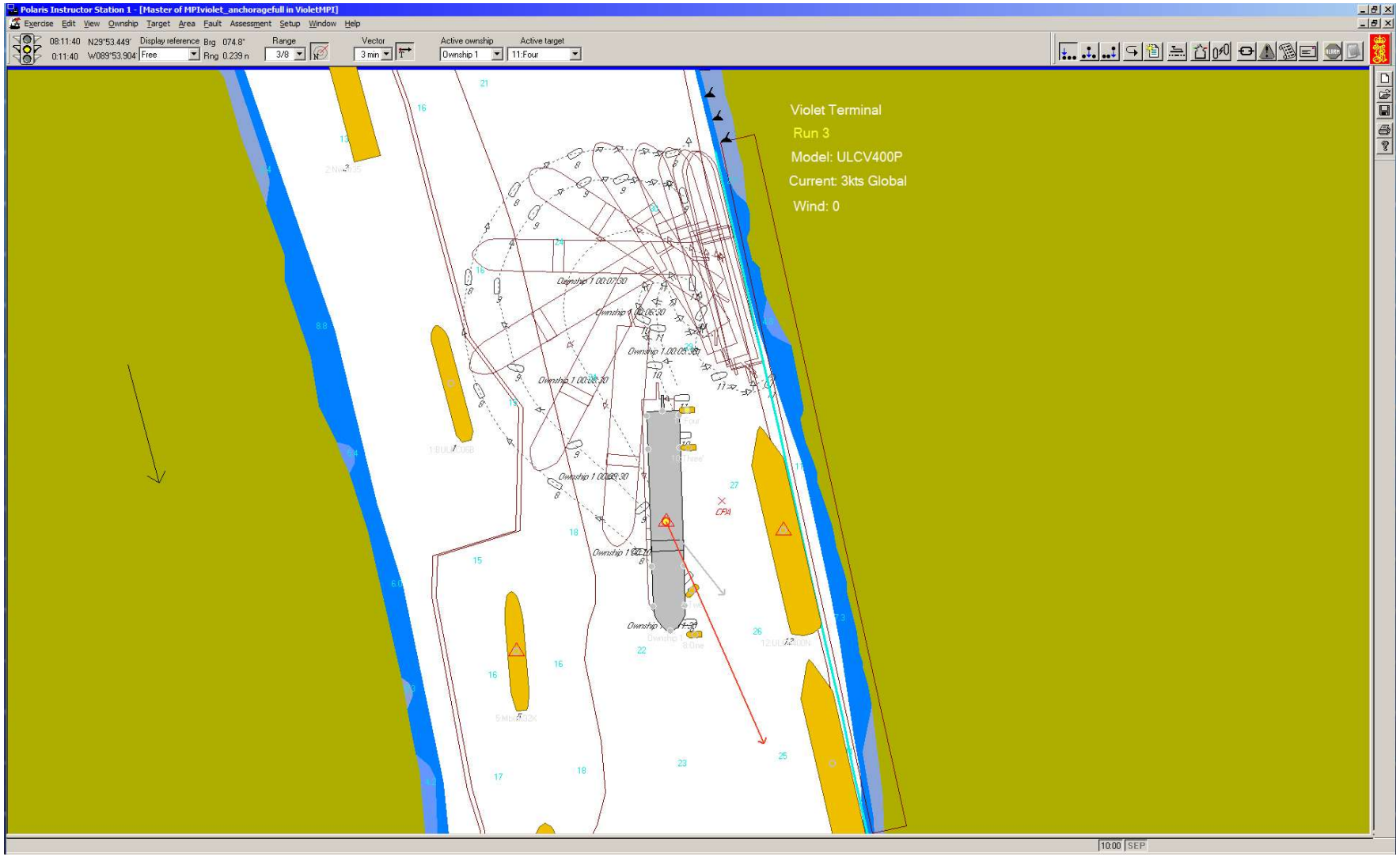
Run 1: Undocking berth 3, No Wind, 1 Kn Current, Day



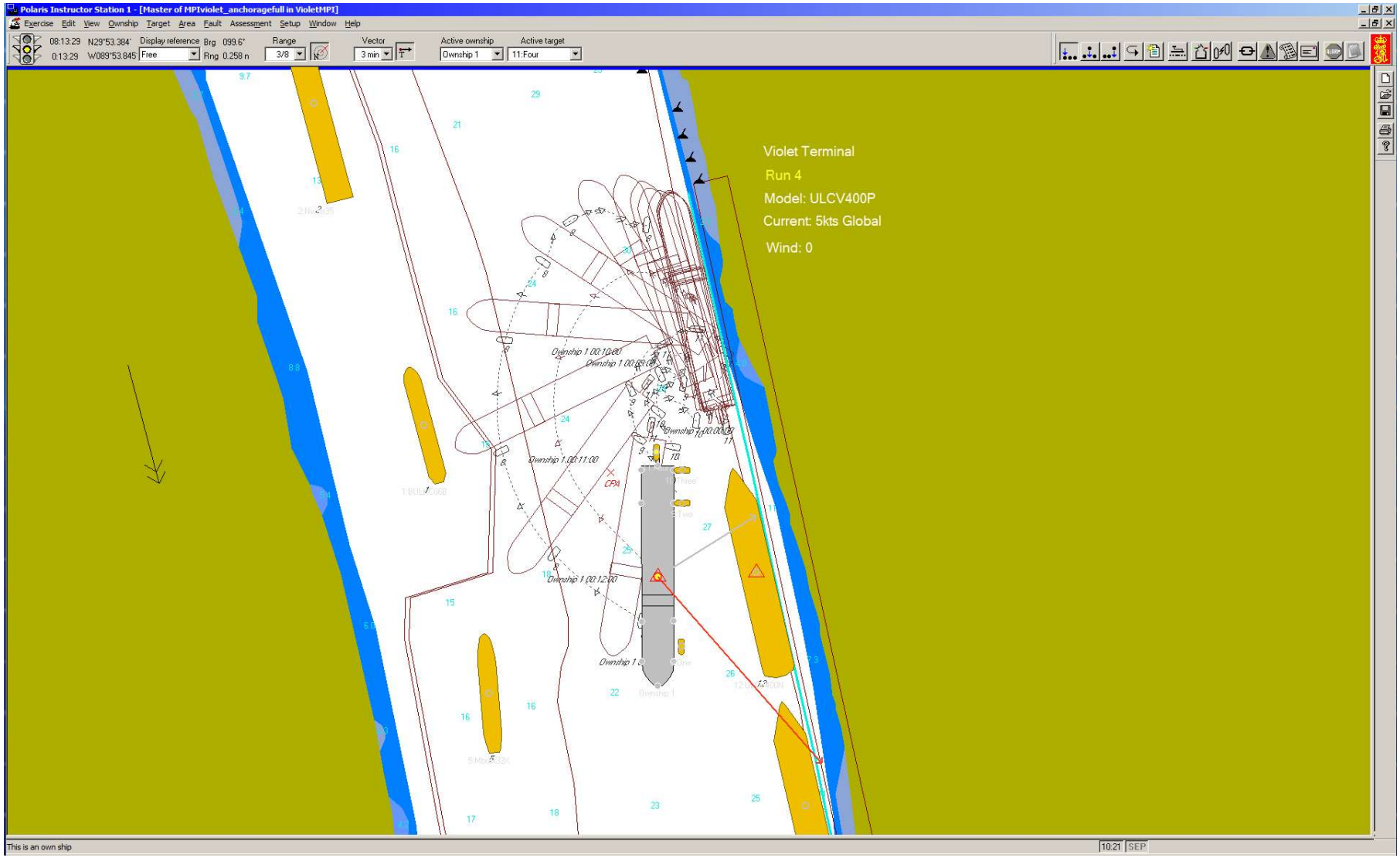
Run 2: Undocking berth 3, No Wind, 3 Kns Current, Day



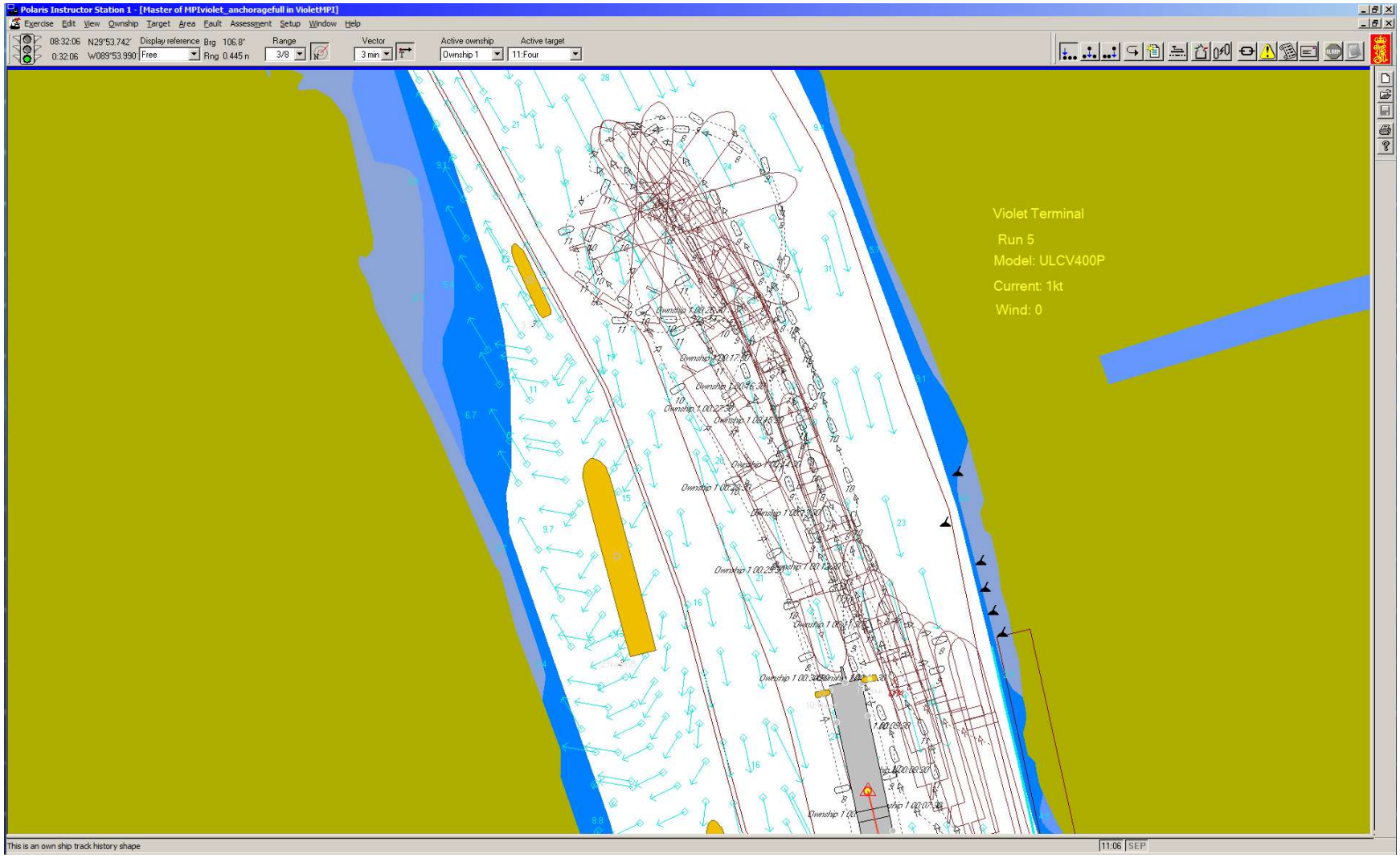
Run 3: Undocking berth 3, No Wind, 3 Kns Current, Day



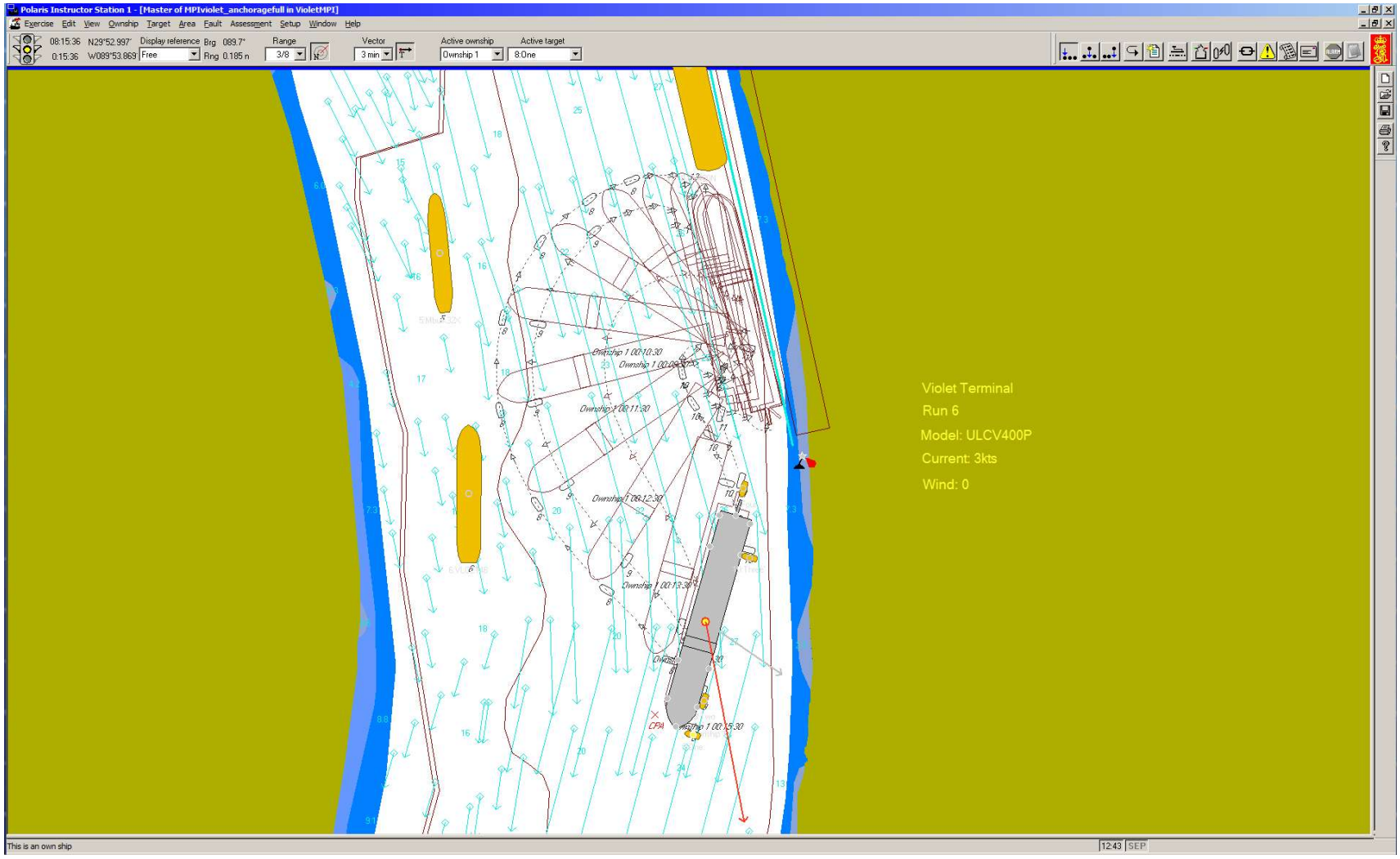
Run 4: Undocking berth 3, No Wind, 5 Kns Current, Day



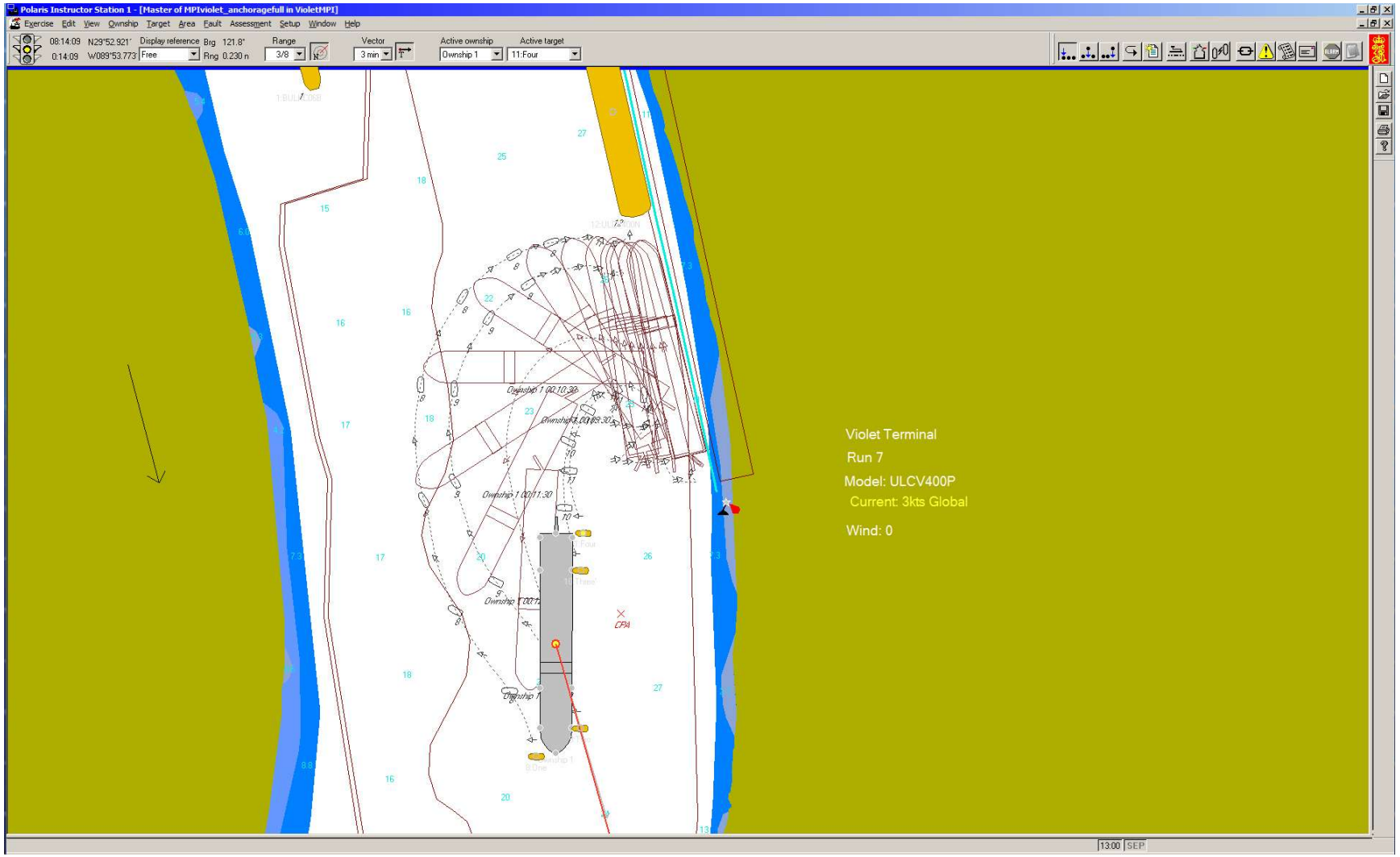
Run 5: Undocking berth 3 with turn, No Wind, 1 Kn Current, Day



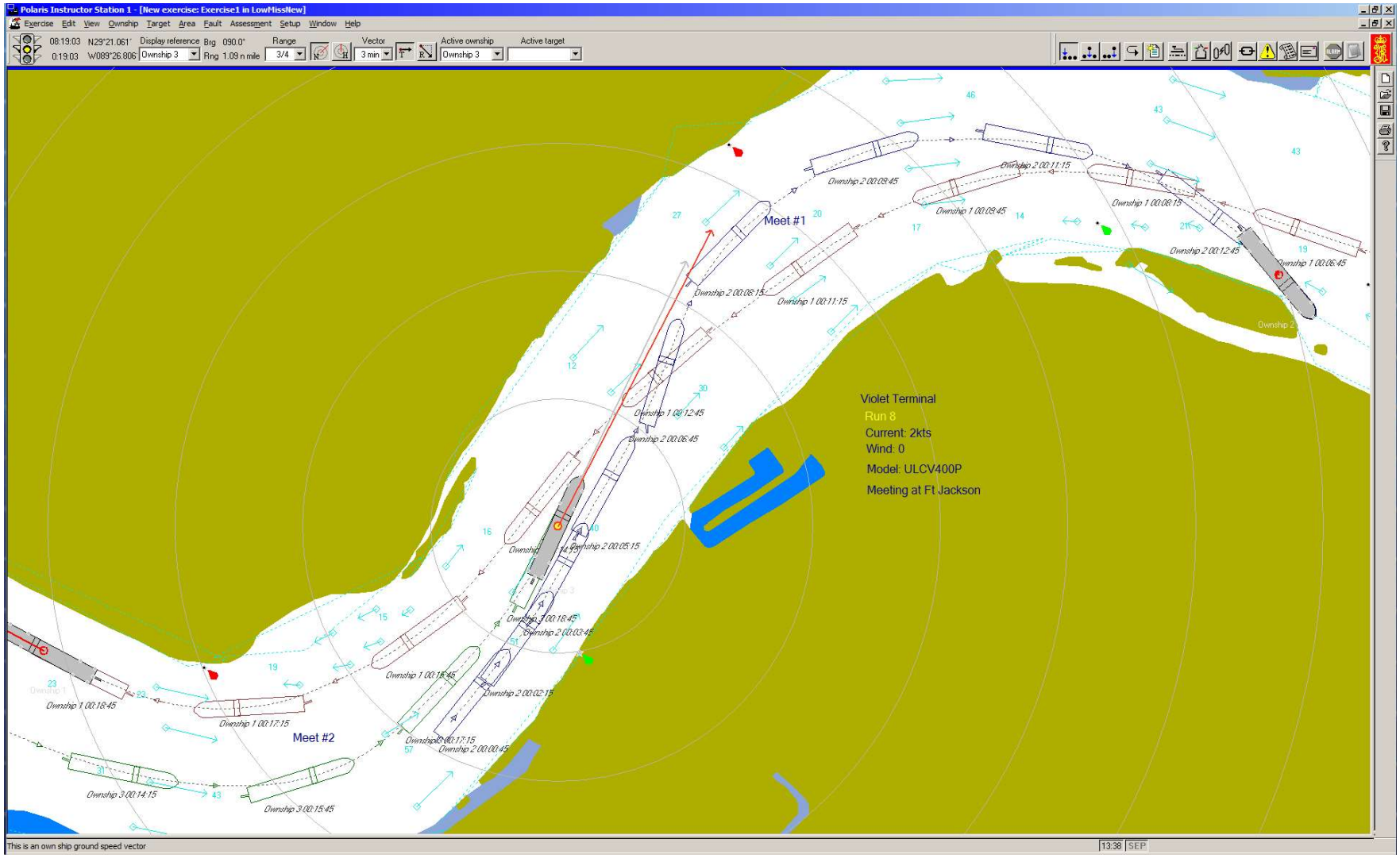
Run 6: Undocking berth 1, No Wind, 3 Kns Current, Day



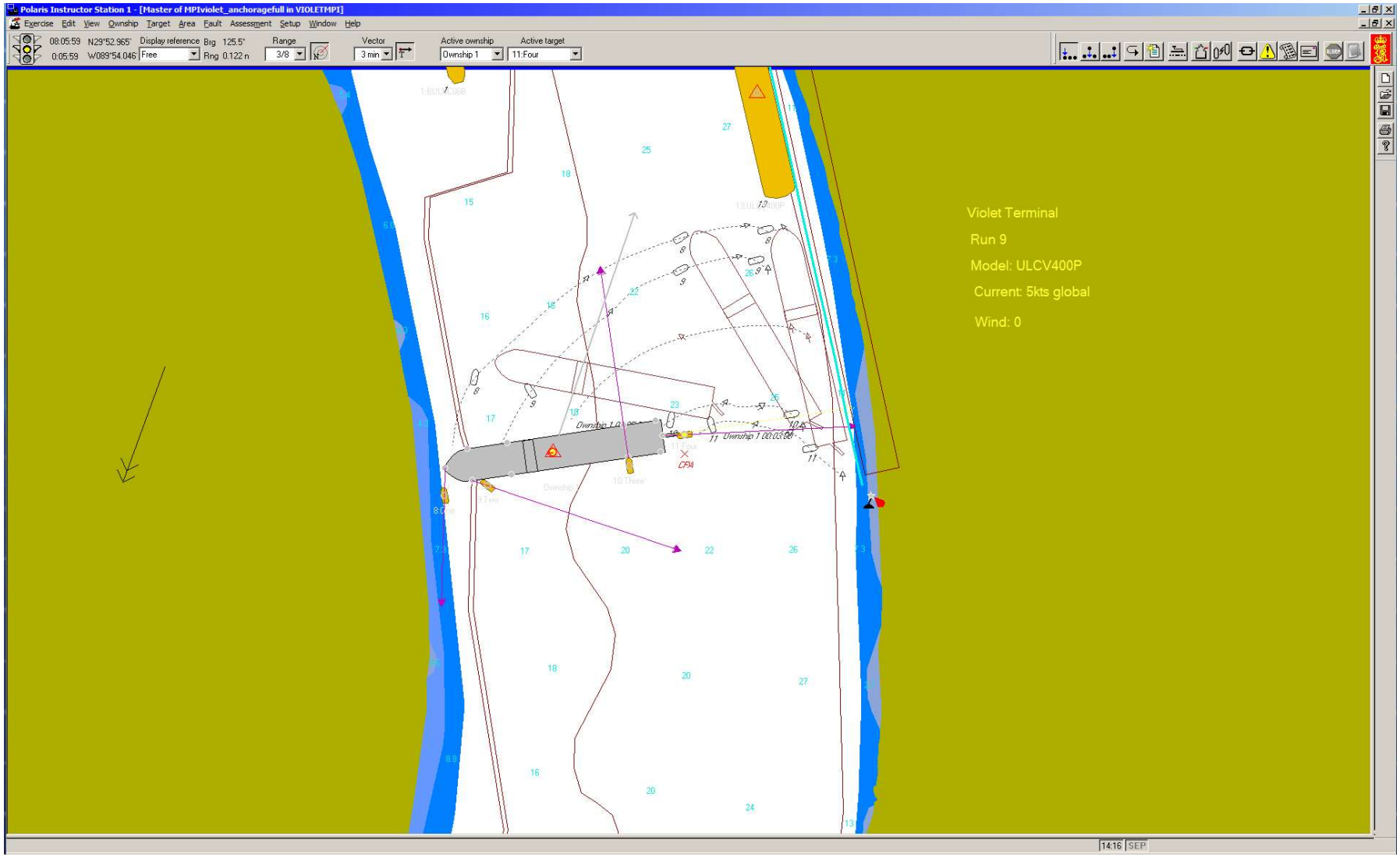
Run 7: Undocking berth 1, No Wind, 3 Kns Current, Day



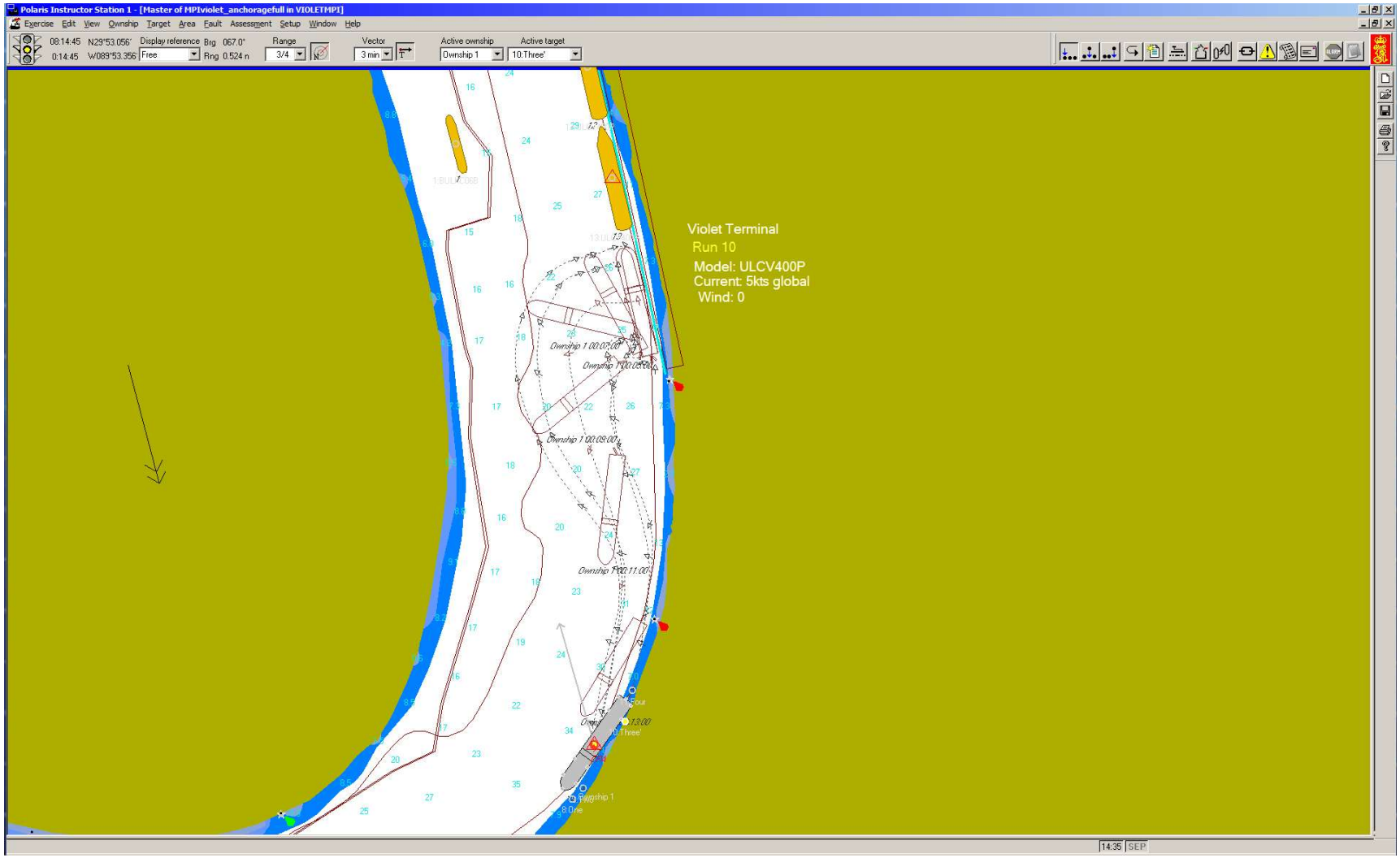
Run 8: Double Encounter, No Wind, 2 Kns Current, Day



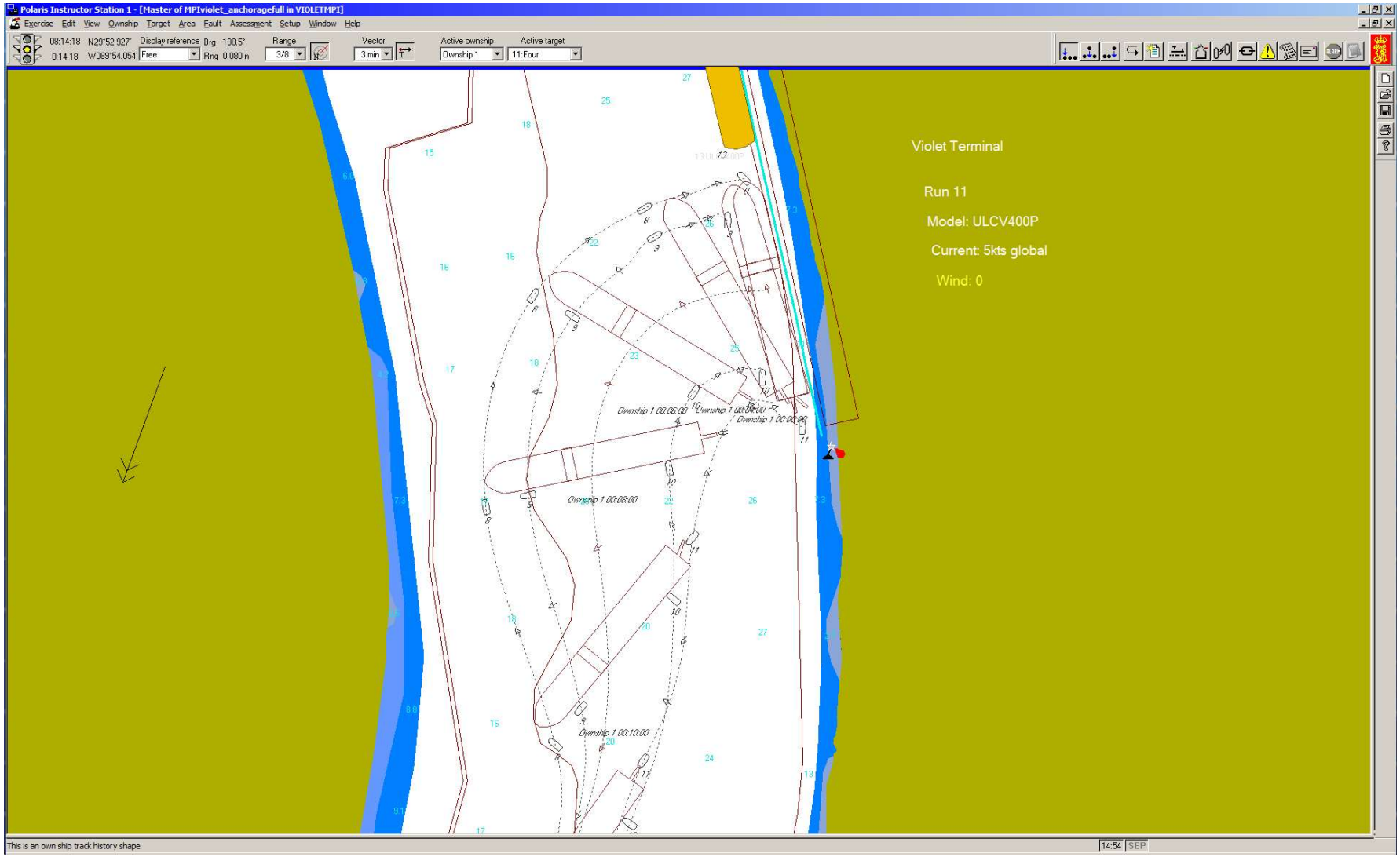
Run 9: Undocking berth 1, No Wind, 5 Kns Current, Day



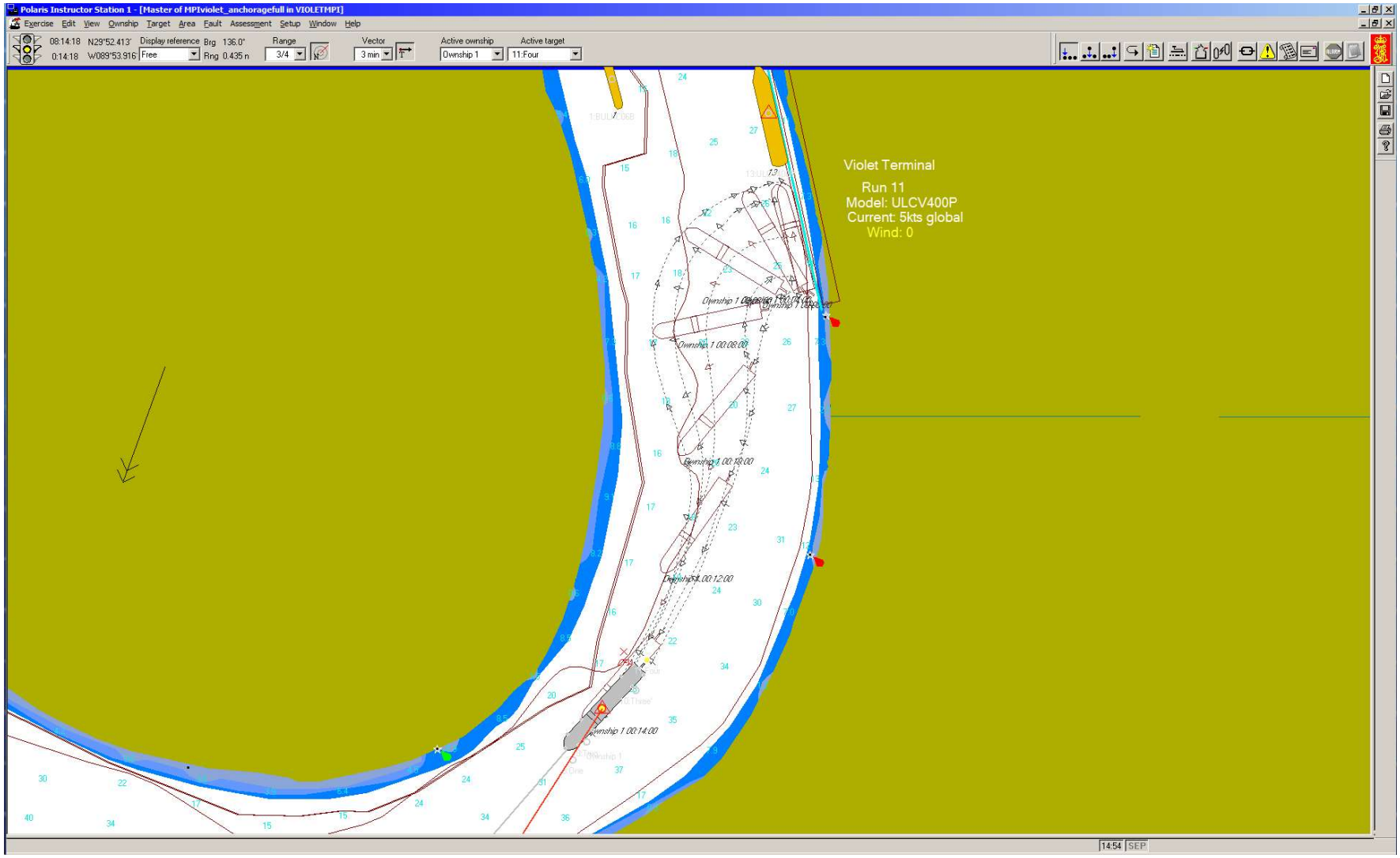
Run 10: Undocking berth 1, No Wind, 5 Kns Current, Day



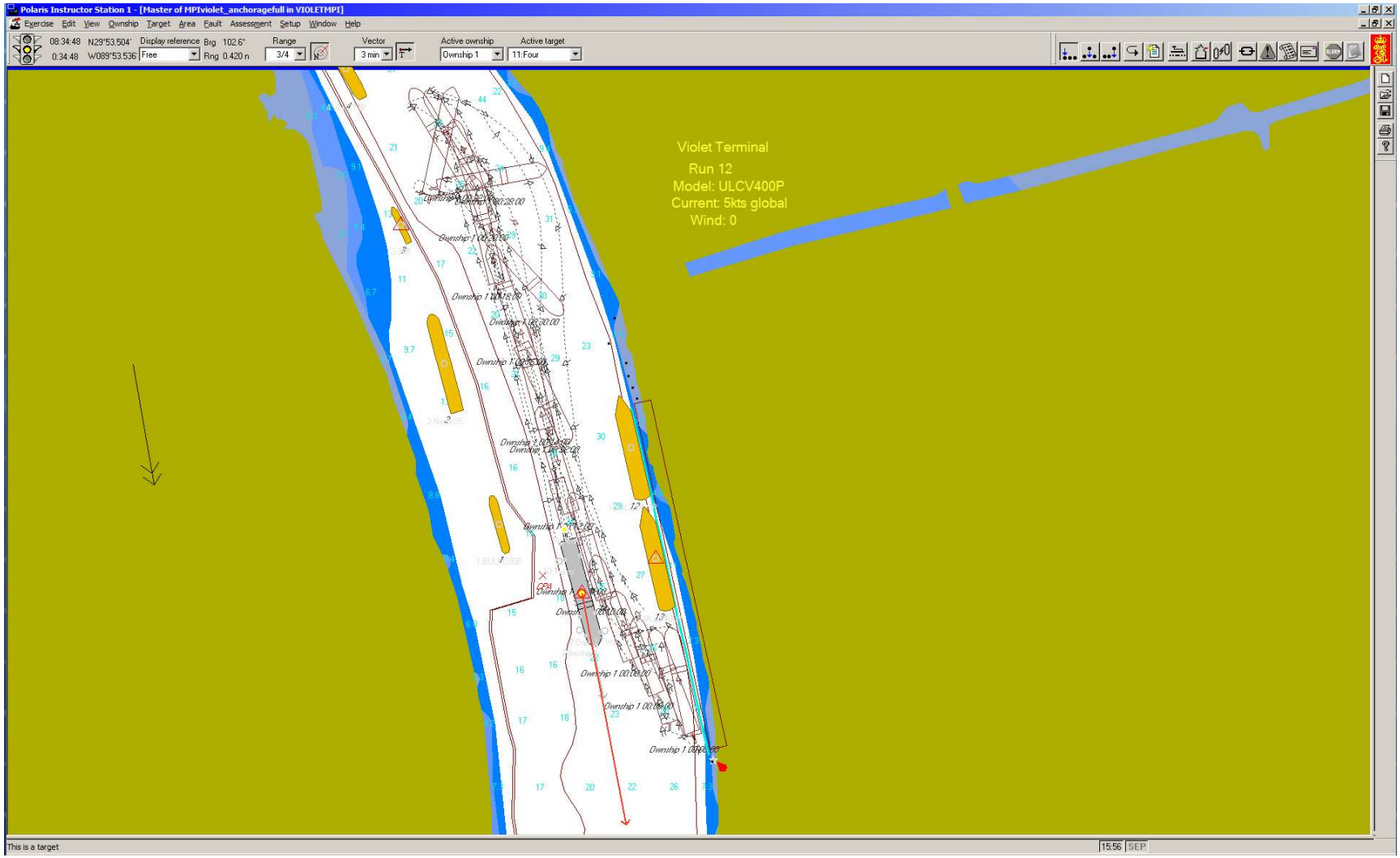
Run 11a: Undocking berth 1, No Wind, 5 Kns Current, Day



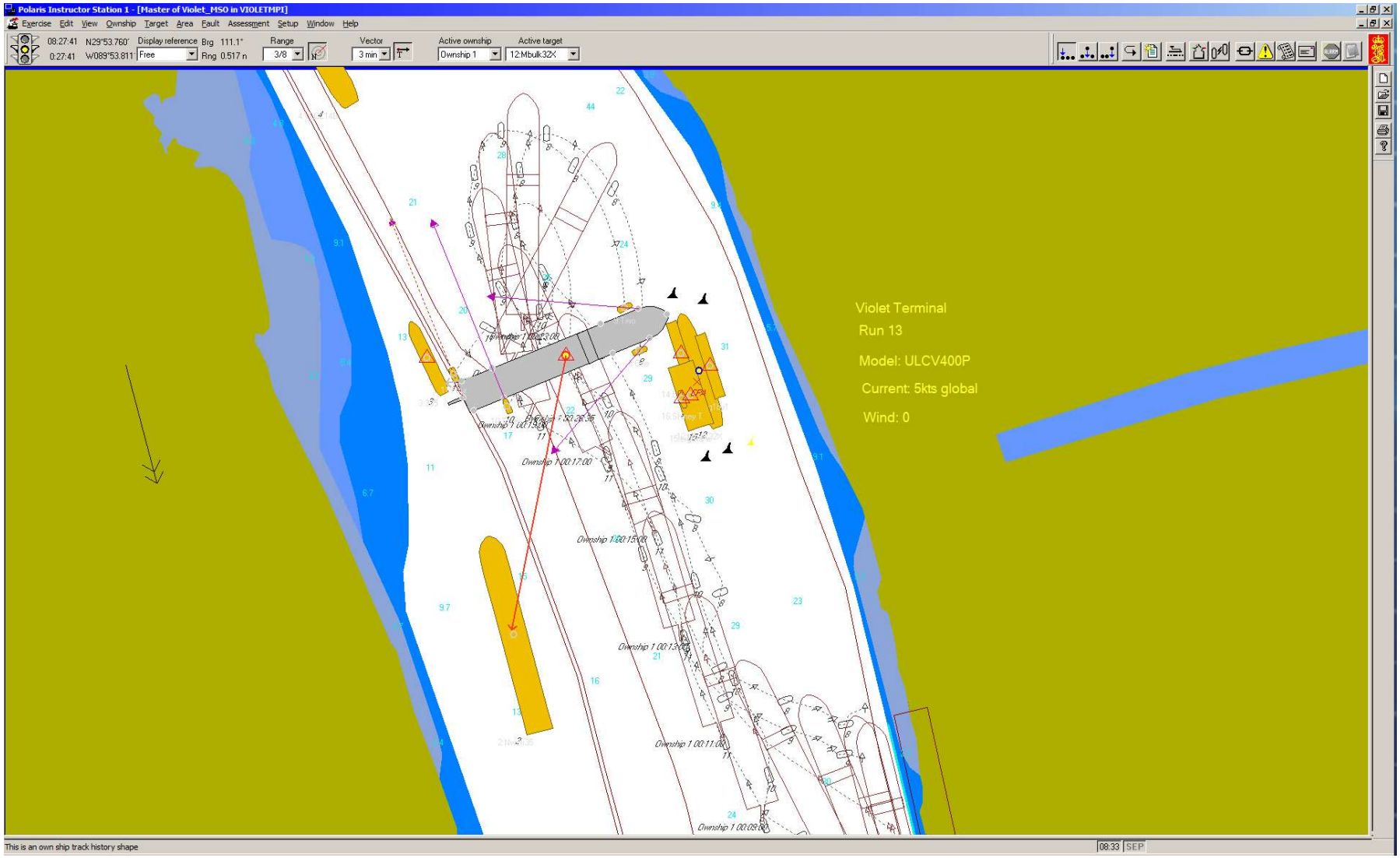
Run 11b: Undocking berth 1, No Wind, 5 Kns Current, Day



Run 12: Undocking berth 1 with turn, No Wind, 5 Kns Current, Day



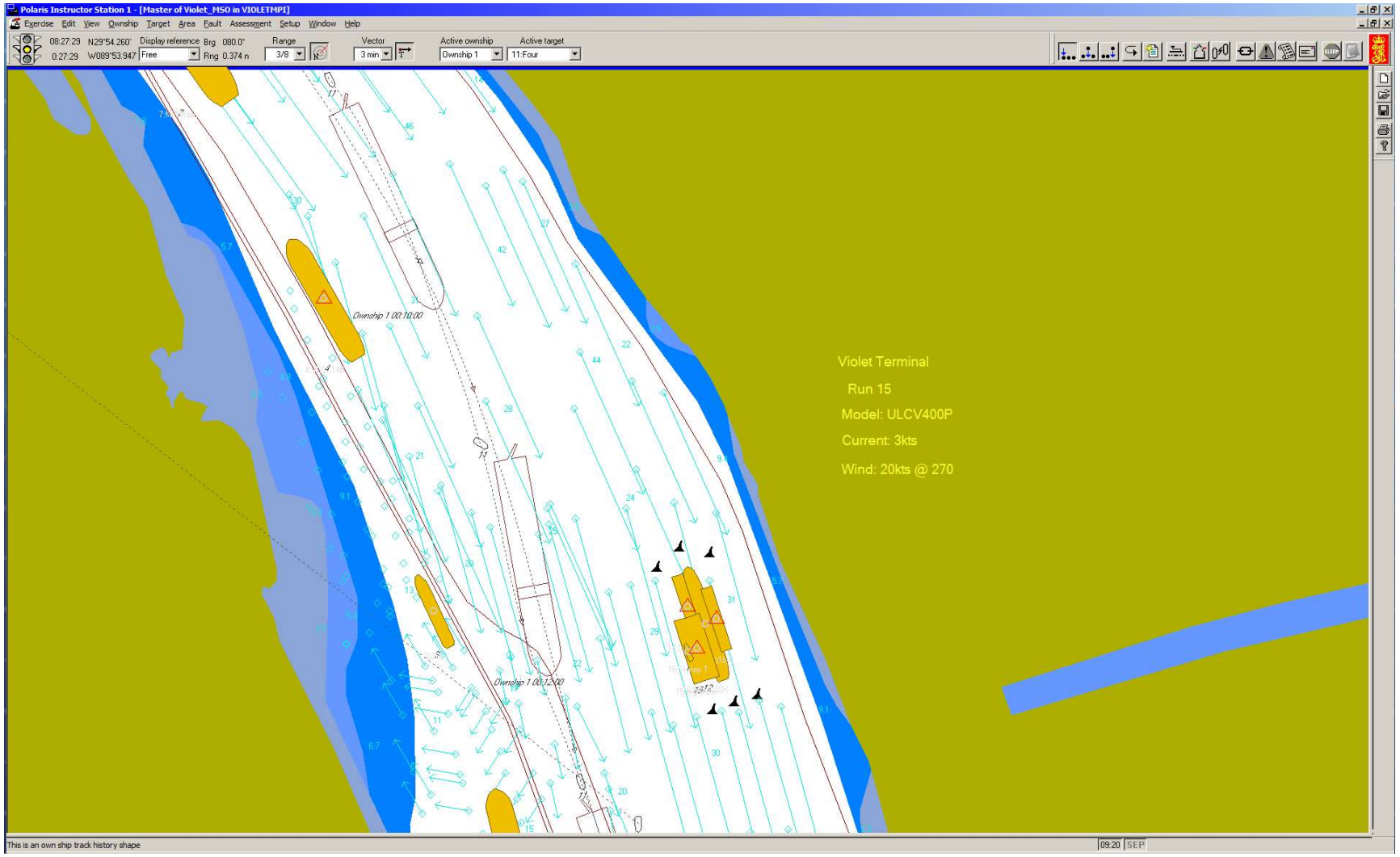
Run 13: Undocking berth 1 with turn, No Wind, 5 Kns Current, Day



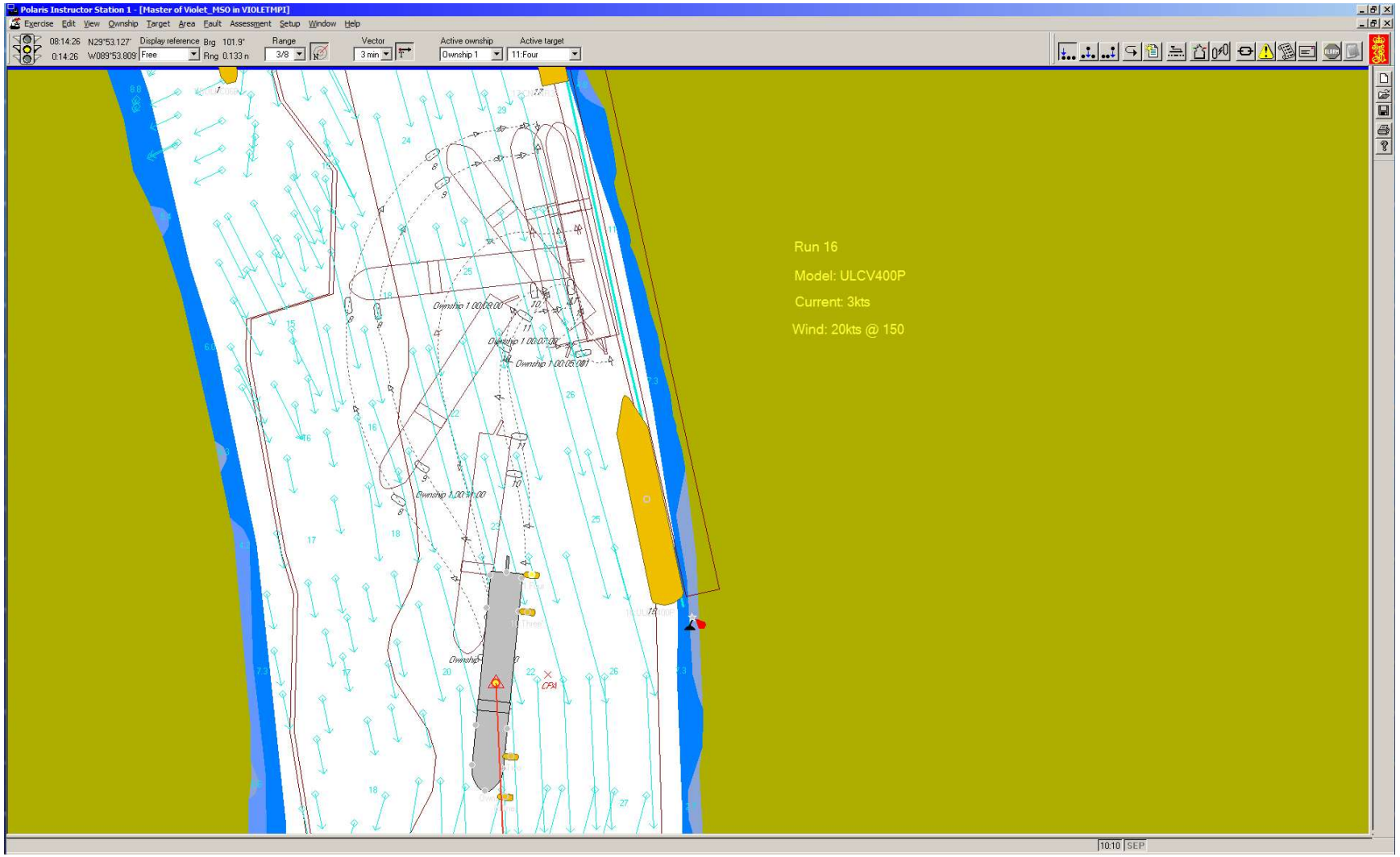
Run 14: Passing Vessel, 270/20 Kns, 3 Kns Current, Day

No image captured on simulator

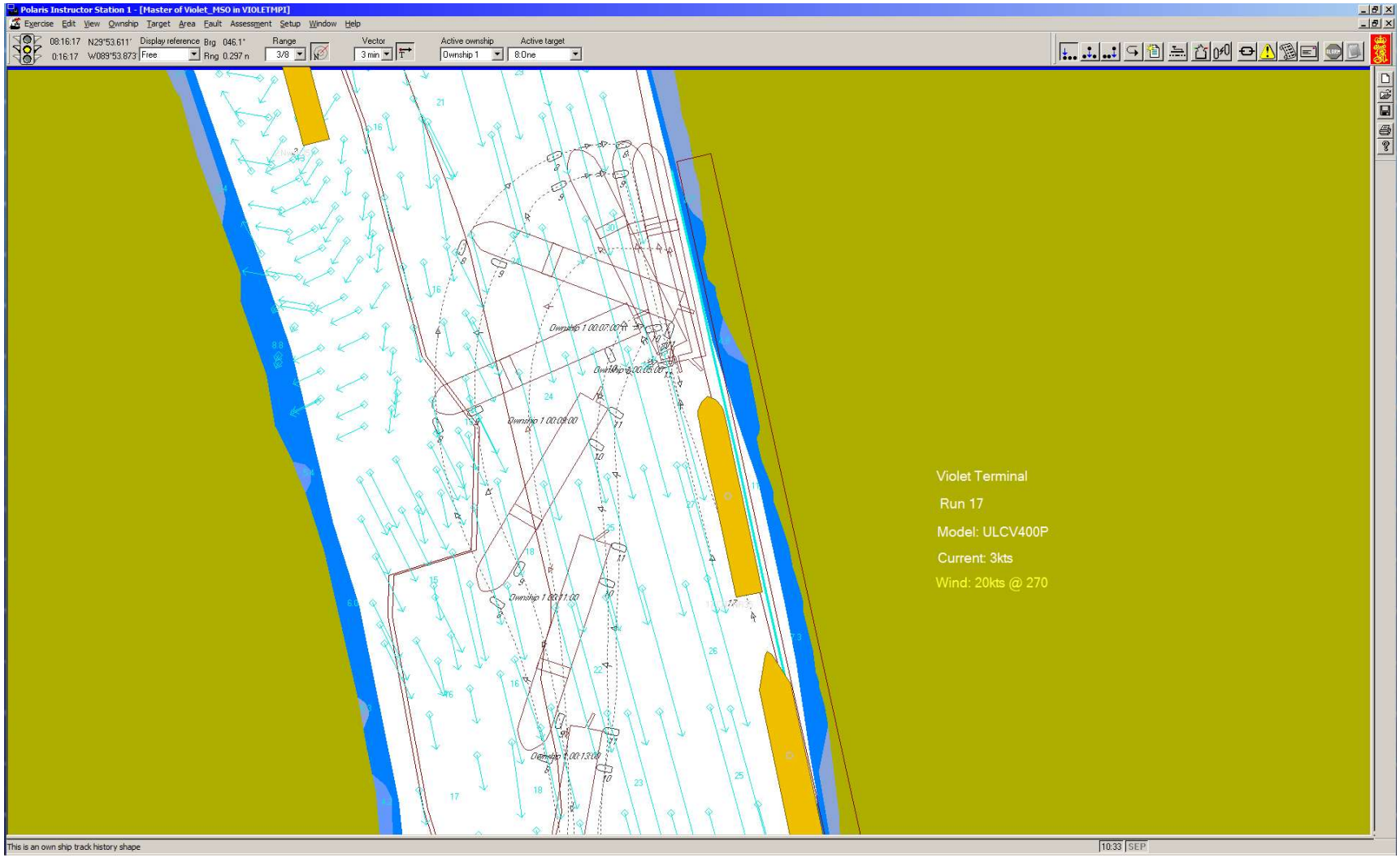
Run 15: Passing Vessel, 270/20 Kns, 3 Kns Current, Day



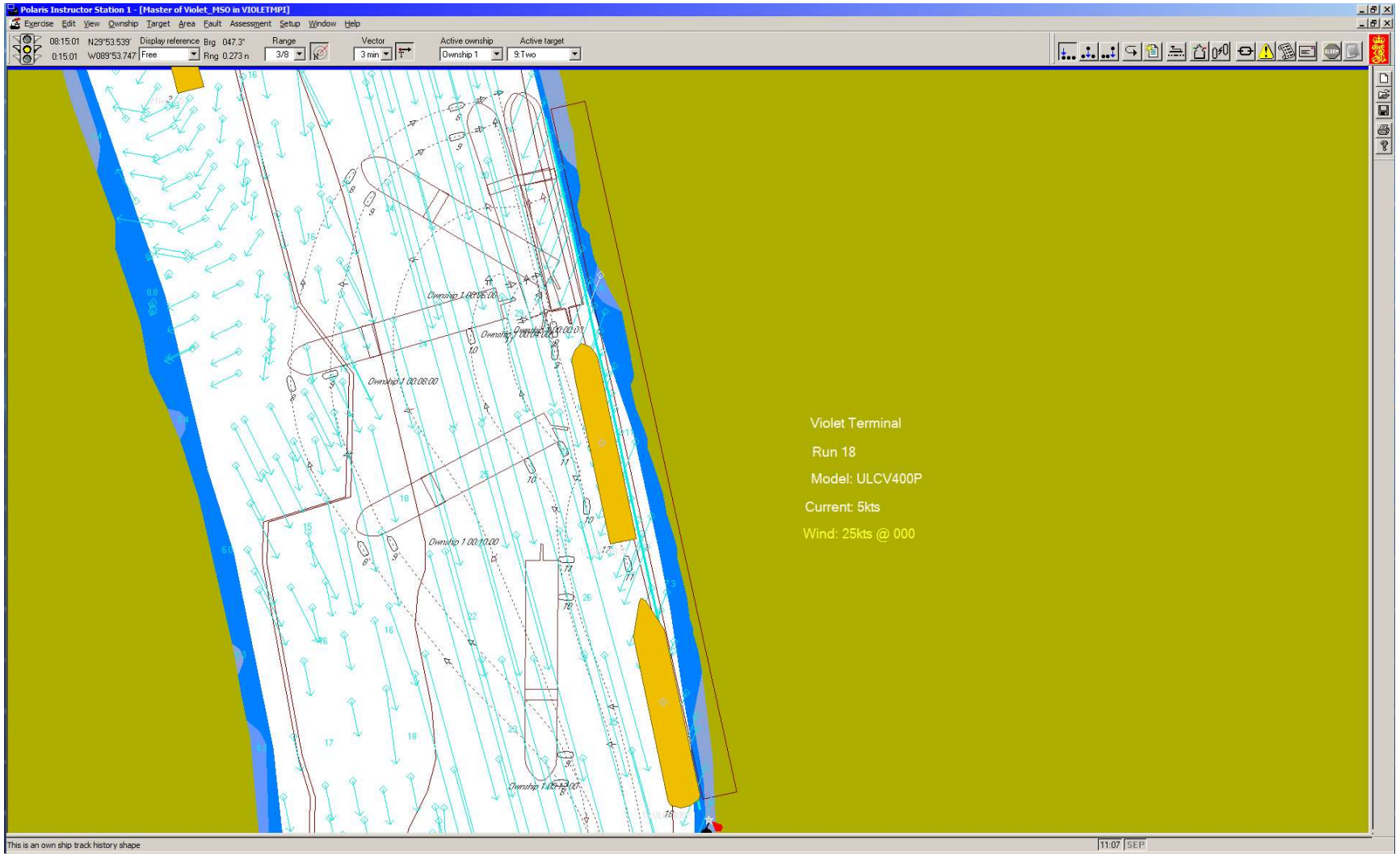
Run 16: Undocking berth 2, 150/20 Kns, 3 Kns Current, Day



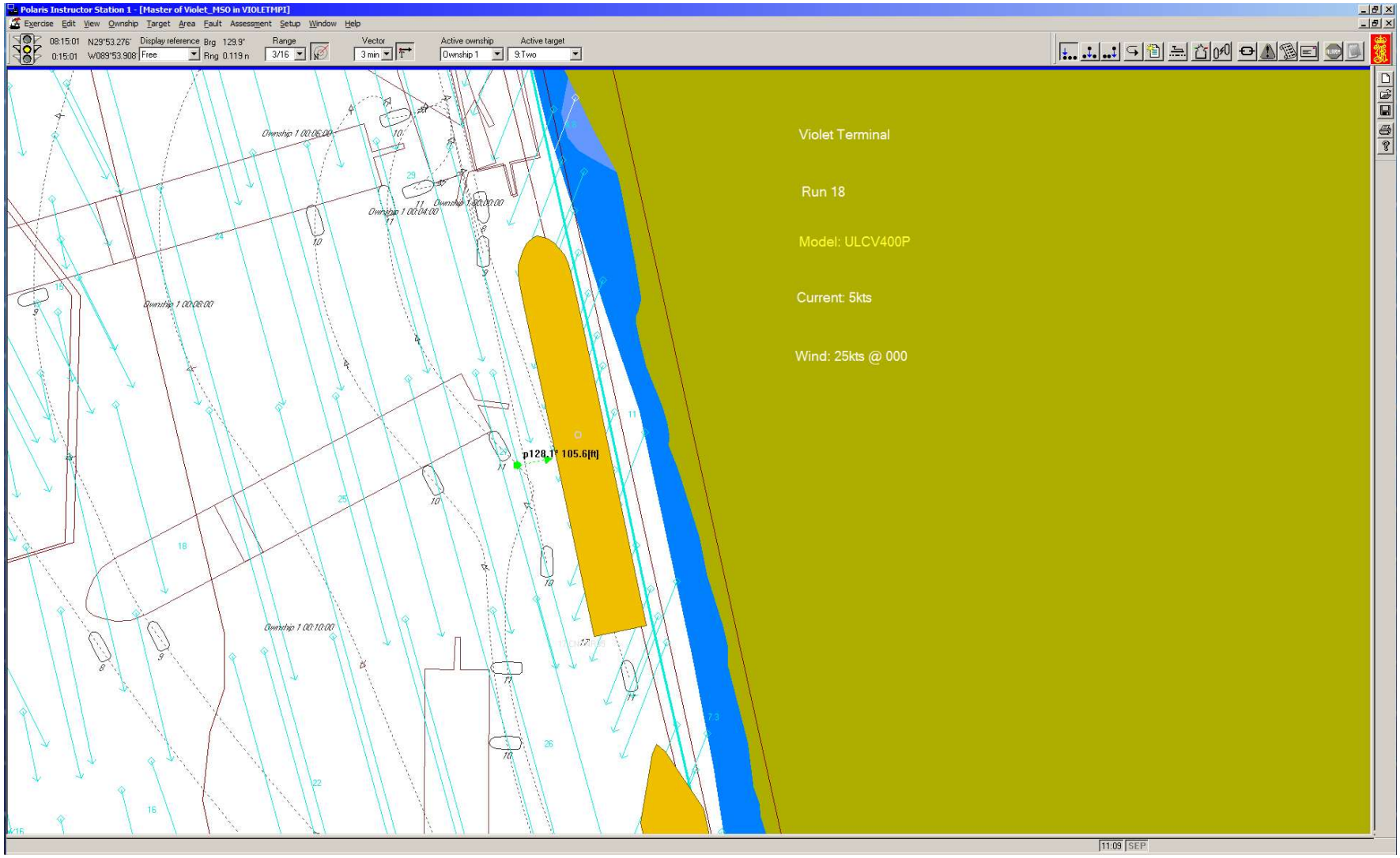
Run 17: Undocking berth 3, 270/20 Kns, 3 Kns Current, Day



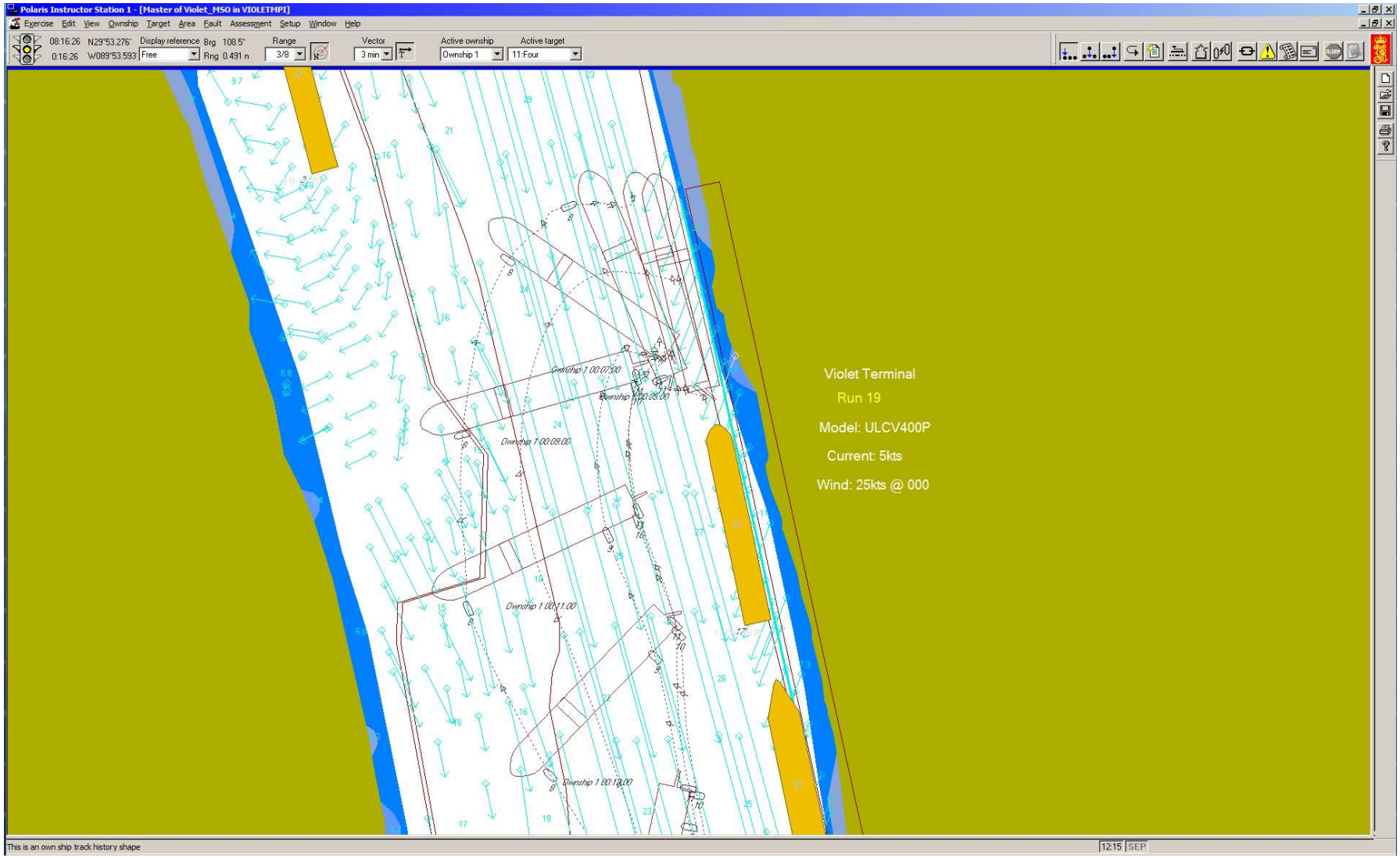
Run 18a: Undocking berth 3, 000/25 Kns, 5 Kns Current, Day



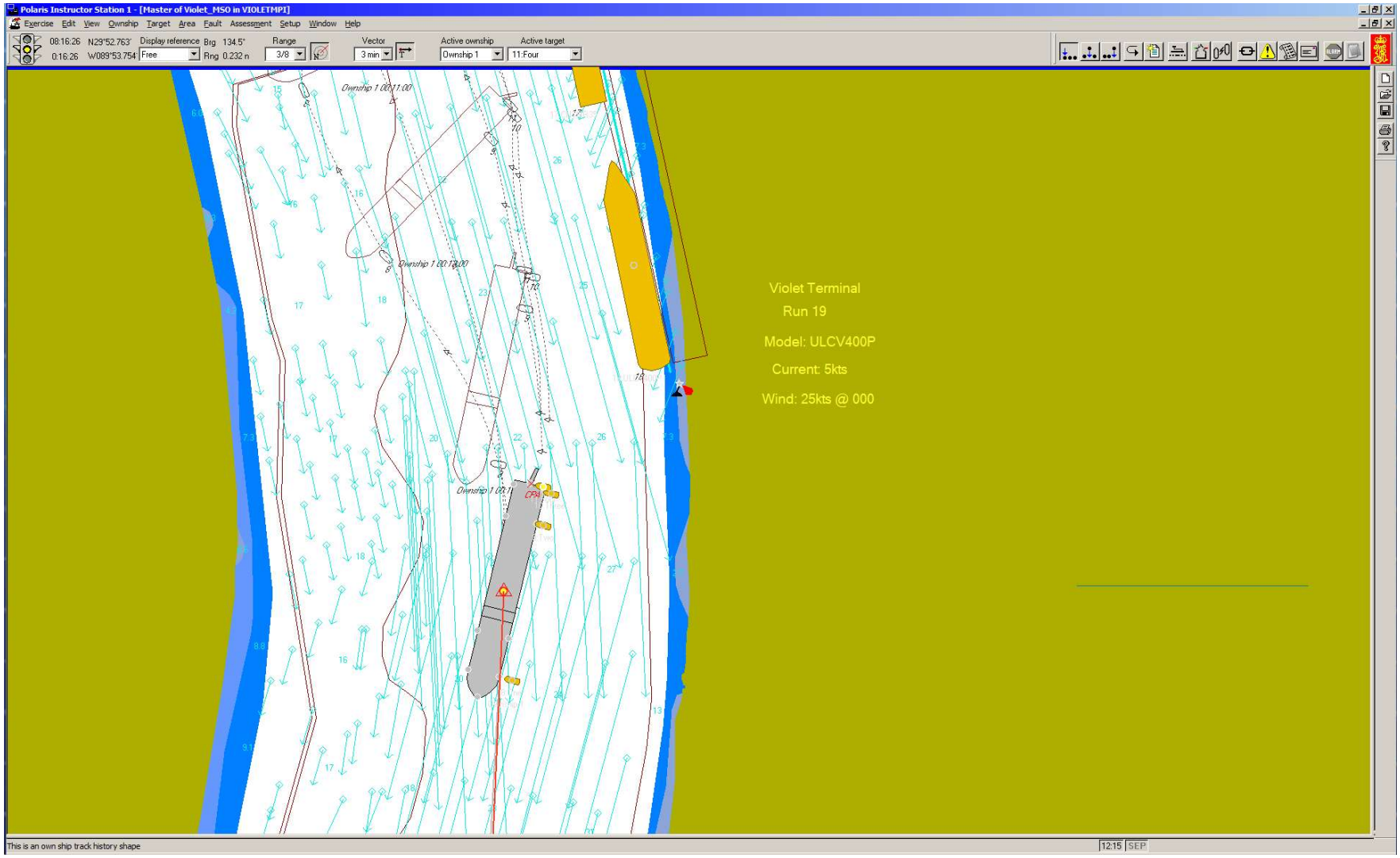
Run 18b: Undocking berth 3, 000/25 Kns, 5 Kns Current, Day



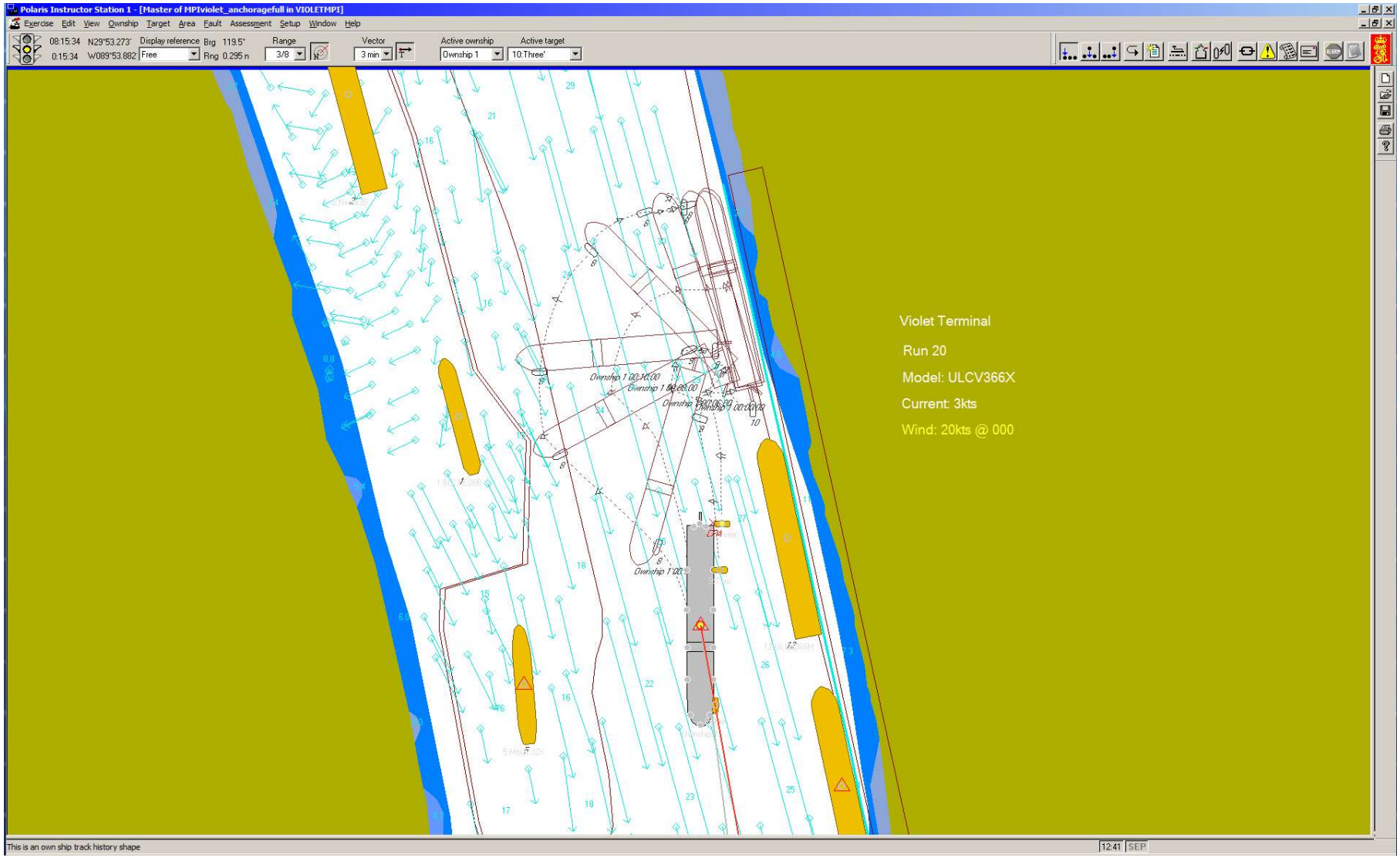
Run 19a: Undocking berth 3, 000/25 Kns, 5 Kns Current, Day



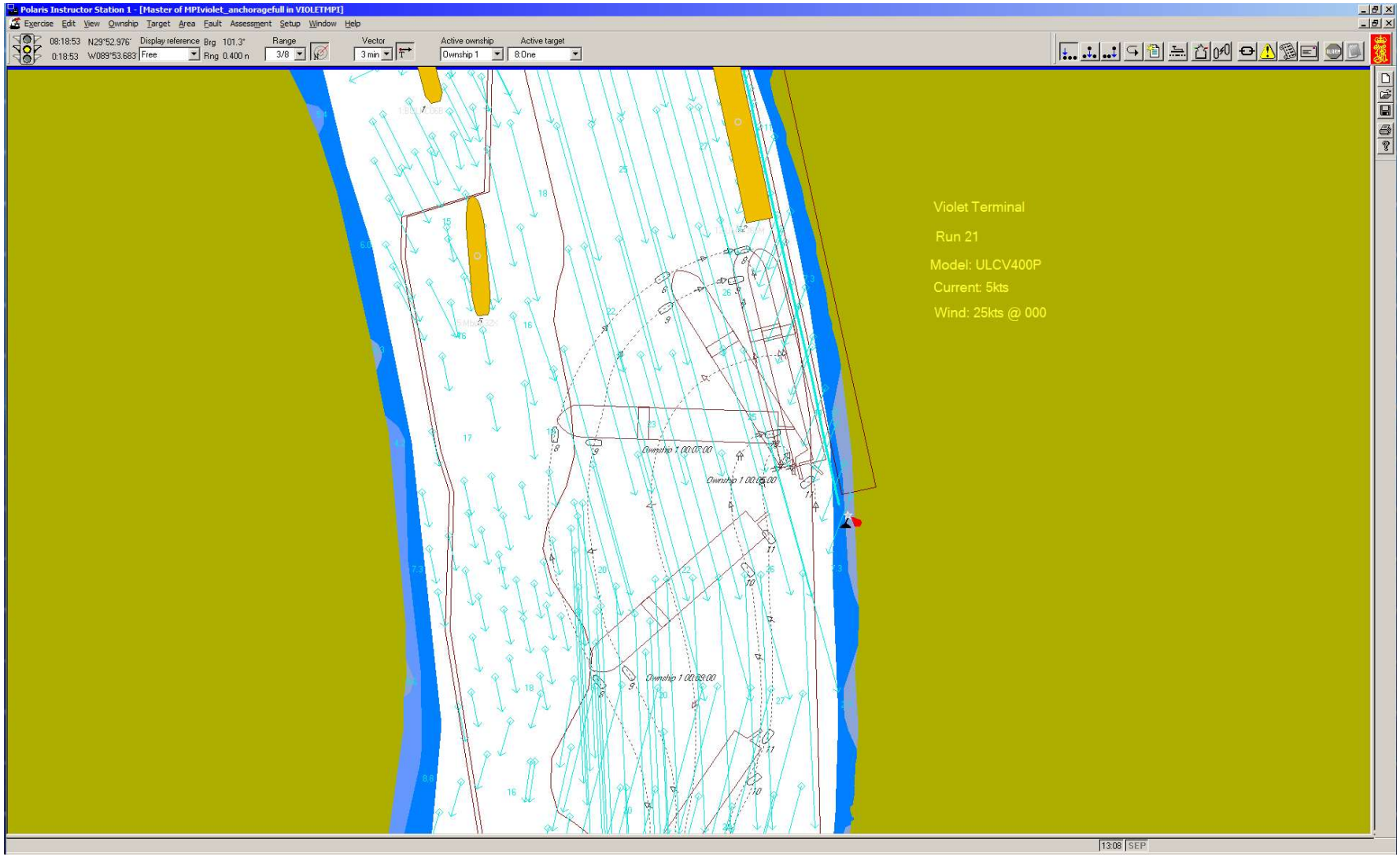
Run 19b: Undocking berth 3, 000/25 Kns, 5 Kns Current, Day



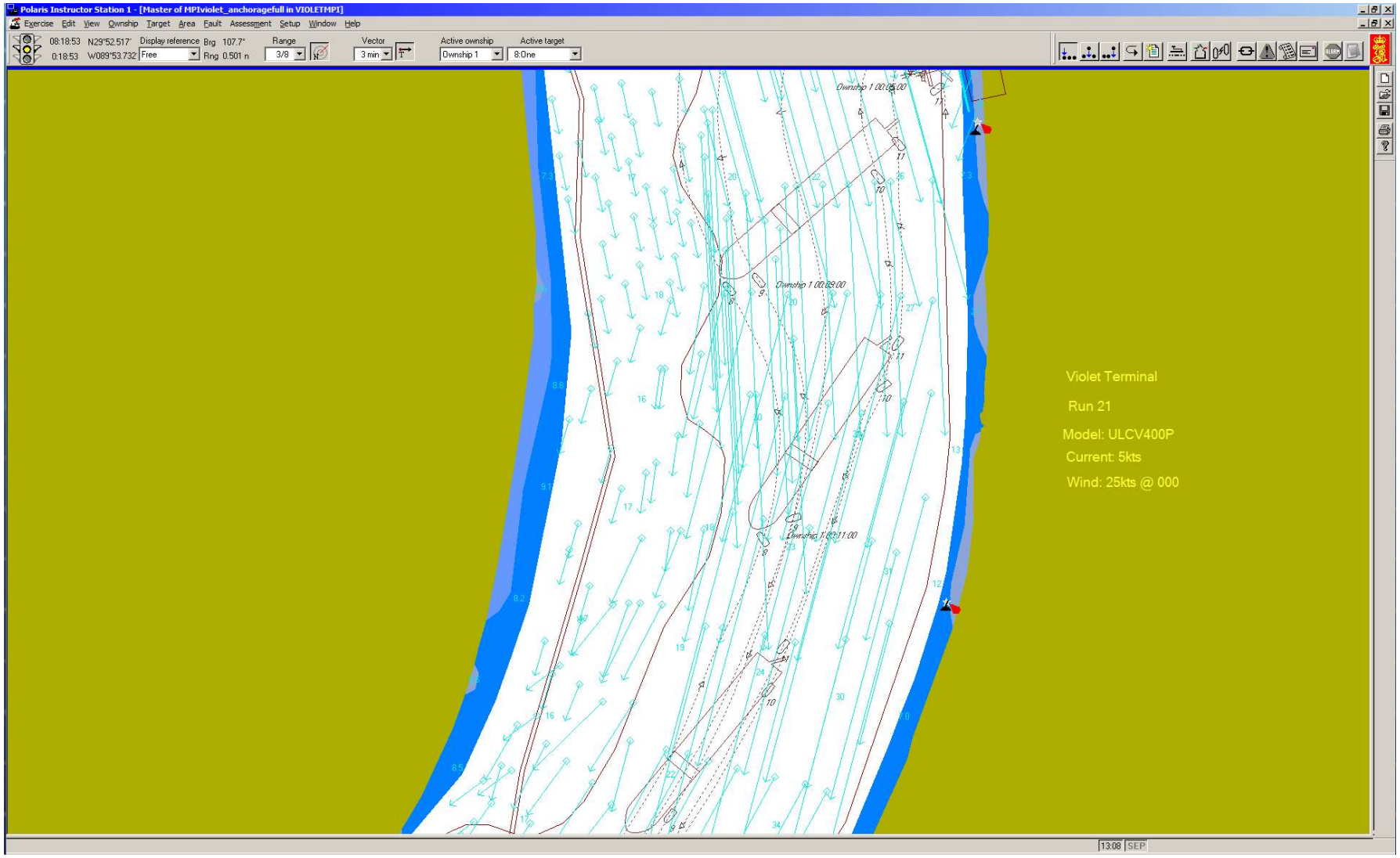
Run 20: Undocking berth 3, 000/20 Kns, 3 Kns Current, Day



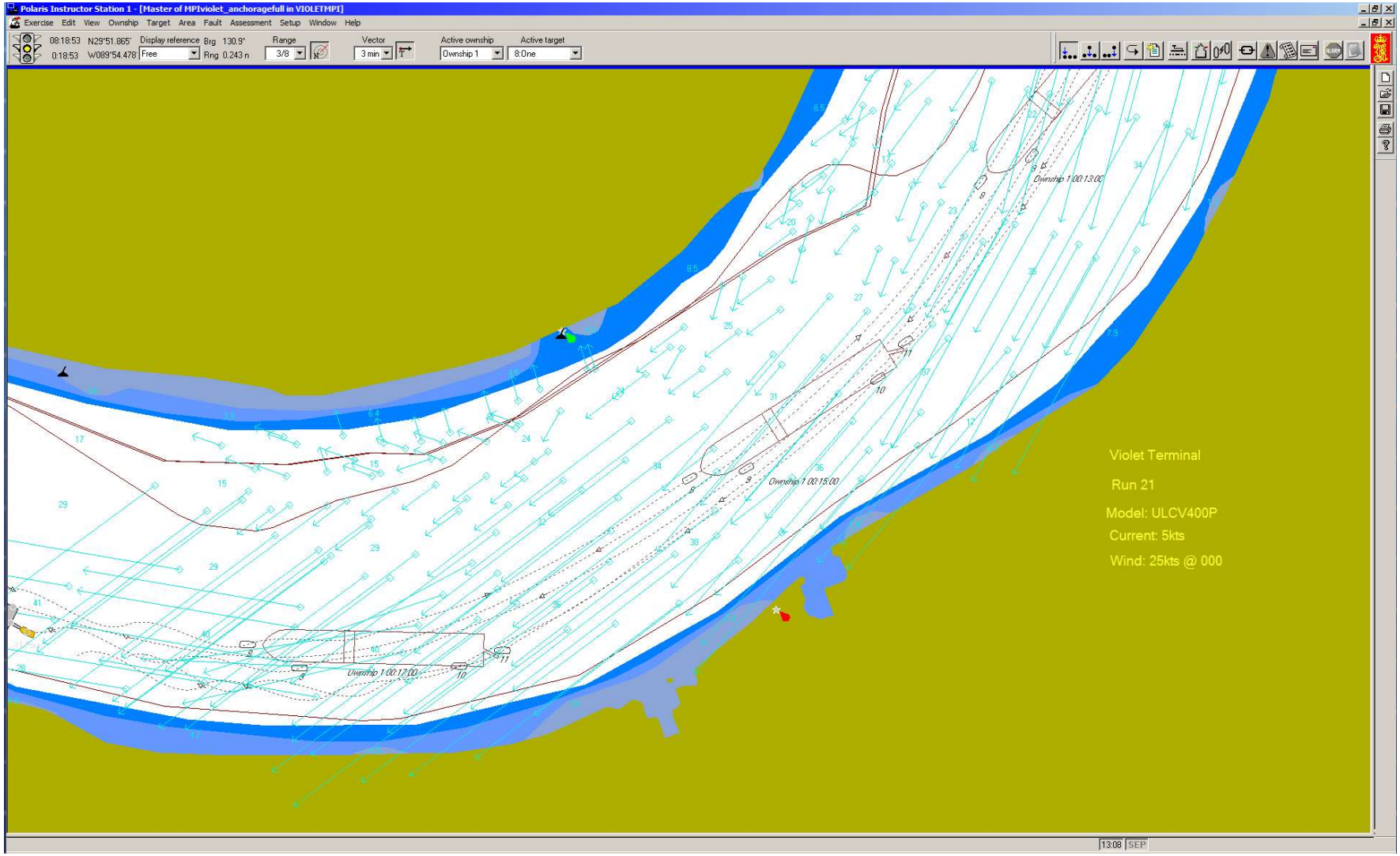
Run 21a: Undocking berth 1, 000/25 Kns, 5 Kns Current, Day



Run 21b: Undocking berth 1, 000/25 Kns, 5 Kns Current, Day



Run 21c: Undocking berth 1, 000/25 Kns, 5 Kns Current, Day


Polaris Instructor Station 1 - [Master of MPIviolet_anchoragefull in VIOLETMPI]
Exercise Edit View Ownship Target Area Fault Assessment Setup Window Help
Violet Terminal
Run 21
Model: ULCV400P
Current: 5kts
Wind: 25kts @ 000

Appendix

A: Vetting Run Summary

On January 15, 2021 simulations were conducted at the Maritime Pilots Institute in Covington, LA to vet the ship models and database for an upcoming research project for a proposed Container Terminal. The vetting process included a CRPPA pilot, two engineers from Port of New Orleans, and employees from the Maritime Pilots Institute.

The project vetting was performed using one ship model at two different drafts, 47.7 feet and 51.8 feet. Eleven runs were completed with undocking and turning around in various locations with currents at 1 knot and 3 knots. The vetting concluded that the vessels did handle as expected within this environment and set the groundwork for geometry require to have an operational dock.

Group Discussion following simulations:

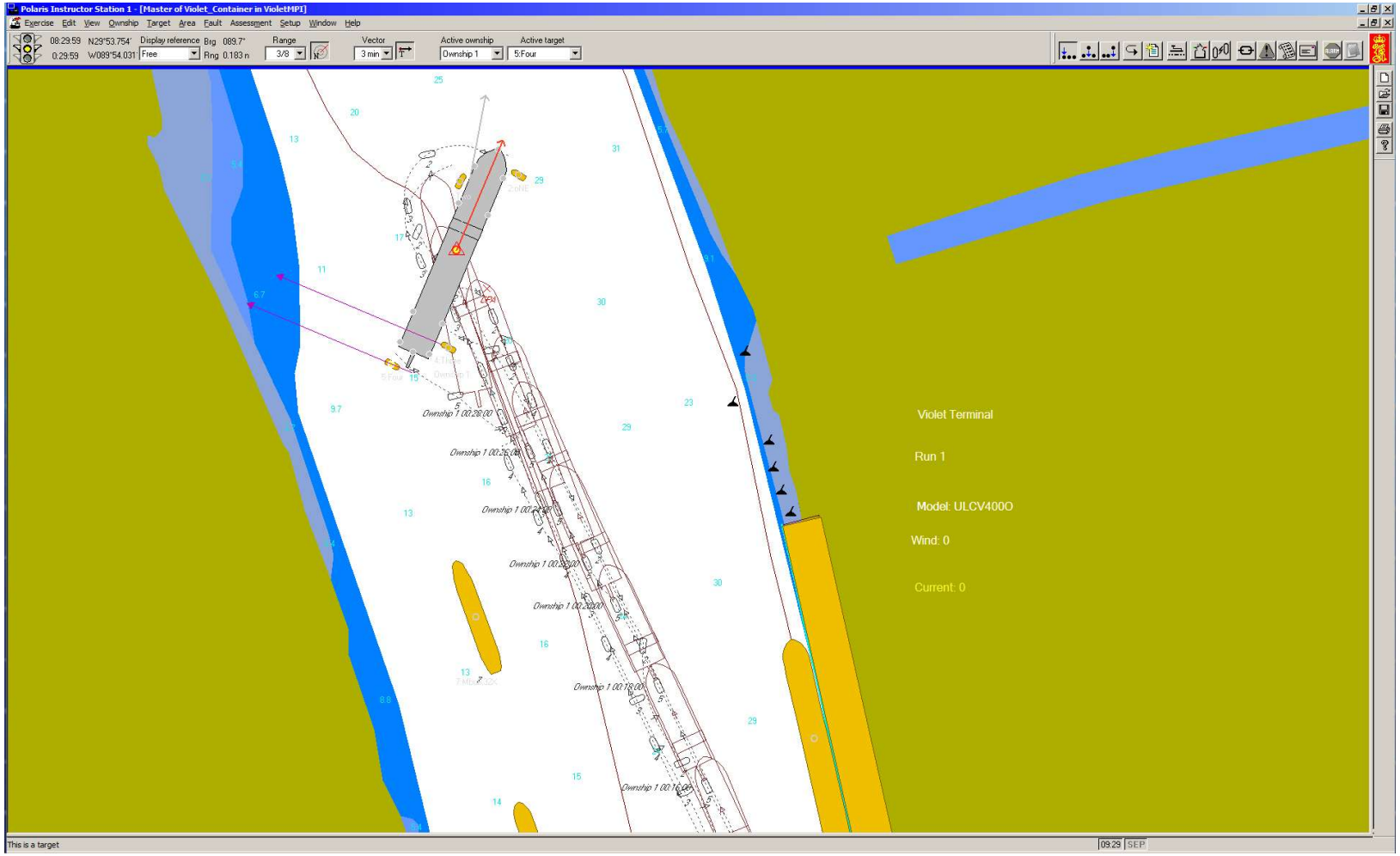
1. Midstream operation
    - There is an additional property for sale north of the terminal that another company is possibly interested in purchasing for midstream operations
    - Would this operation affect the proposed dock?
        - For the research we will add 6 buoys and a ship in the proposed location to simulate any affects this may have on the dock location
2. Additional dredging required on both the dock side and the anchorage area?
3. Where would be the next safest place to turn around if it is not feasible to do off of the dock?
4. Federal anchorage may cause problems for a larger vessel to turn off of the dock.
5. Proposal runs for two-day simulation research
    - Put a ship at Upper anchorage and turn services (8 wide)
    - 1Kn current depart berth, go upriver and turn around
    - 3Kn current depart berth, go upriver and turn around
    - Turn off dock with 1kn and 3kn currents
    - Add wind component
        - SE @ 20-25 Kn
    - Docking at the berths
        - Not top priority as this should be basic ship handling
    - Nighttime undocking

B: Vetting Run Matrix

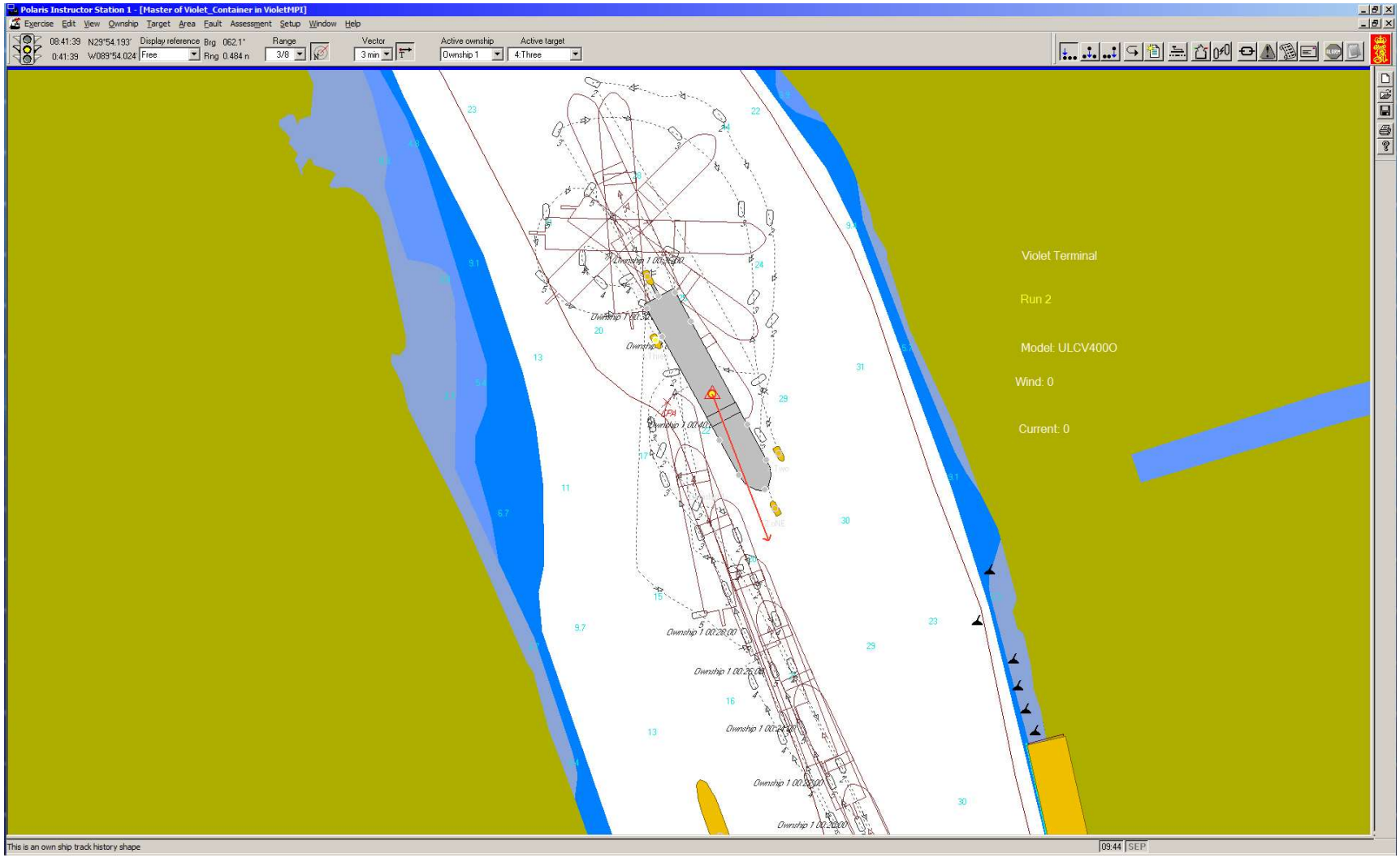
Run#	Run Type / Setup	Ship Model	Tug Models	Current	Wind Dir / kn	Day/Night	Researcher Run Comments
1	Undocking from berth 1 and turning around North of the terminal	ULCV400O	4-MTGMOST1	1 knot	0	Day	Stern grounded due to shallow water on the right side of the waterway while completing turn. Adding a meter of tide for further runs to account for the current.
2	Turning around North of the terminal	ULCV400O	4-MTGMOST1	1 knot	0	Day	Turning manuever to test the water depths. No unusual issues.
3	Turning around North of the terminal	ULCV400P	4-MTGMOST1	1 knot	0	Day	Using loaded model with 51 foot draft. Pilot change to Capt. JA after undocking. Bow grounded during turn.
4	Turning around North of the terminal	ULCV400P	4-MTGMOST1	1 knot	0	Day	Pilot attempting to perform turn with a different strategy by setting up further west in the channel.
5	Undocking from berth 1 and turn around	ULCV400P	4-MTGMOST1	1 knot	0	Day	See screenshot for distance during manuever. Standard turn off dock with no major issues.
6	Undocking from berth 2 and turn around	ULCV400P	4-MTGMOST1	1 knot	0	Day	Capt. JA noted that it is a tight space with the anchorage and the draft of the container vessel however once the vessel starts turning it is a manageable manuever. He did note that he did not have a lot of reserve power because he was using backing full power and tugs almost at 100%.
7	Undocking from berth 3 and turning around North of terminal	ULCV400P	4-MTGMOST1	3 knots	0	Day	Increased to the assumed maximum current (3 knots) in this area of the channel and 1 foot of tide to account for the current. Bow grounded.
8	Turning around North of the terminal	ULCV400P	4-MTGMOST1	3 knots	0	Day	Stern grounded due to shallow water on the right side of the waterway while completing turn. Pilot was trying to get over and use slack water to push the stern for the turn but got to close to the shallow water in the process. Adding dead water in the simulation database on the west side of the channel that is expected to be there.
9	Turning around North of the terminal	ULCV400P	4-MTGMOST1	3 knots	0	Day	Strategy for this run is to stem the river and use the stern tugs more allowing the stern to turn quicker then the bow and straighten back out in the waterway. Stern grounded on right side of waterway while completing turn.
10	Turning around North of the terminal	ULCV400P	4-MTGMOST1	3 knots	0	Day	Repeat of previous run. Testing current and depth files north of the terminal.
11	Undocking from berth 2 and turn around	ULCV400P	4-MTGMOST1	3 knots	0	Day	Turning off of the dock with increased current. Capt. JA noted that he had to use a lot of power to safely perform the manuever.

C. Vetting Run Images

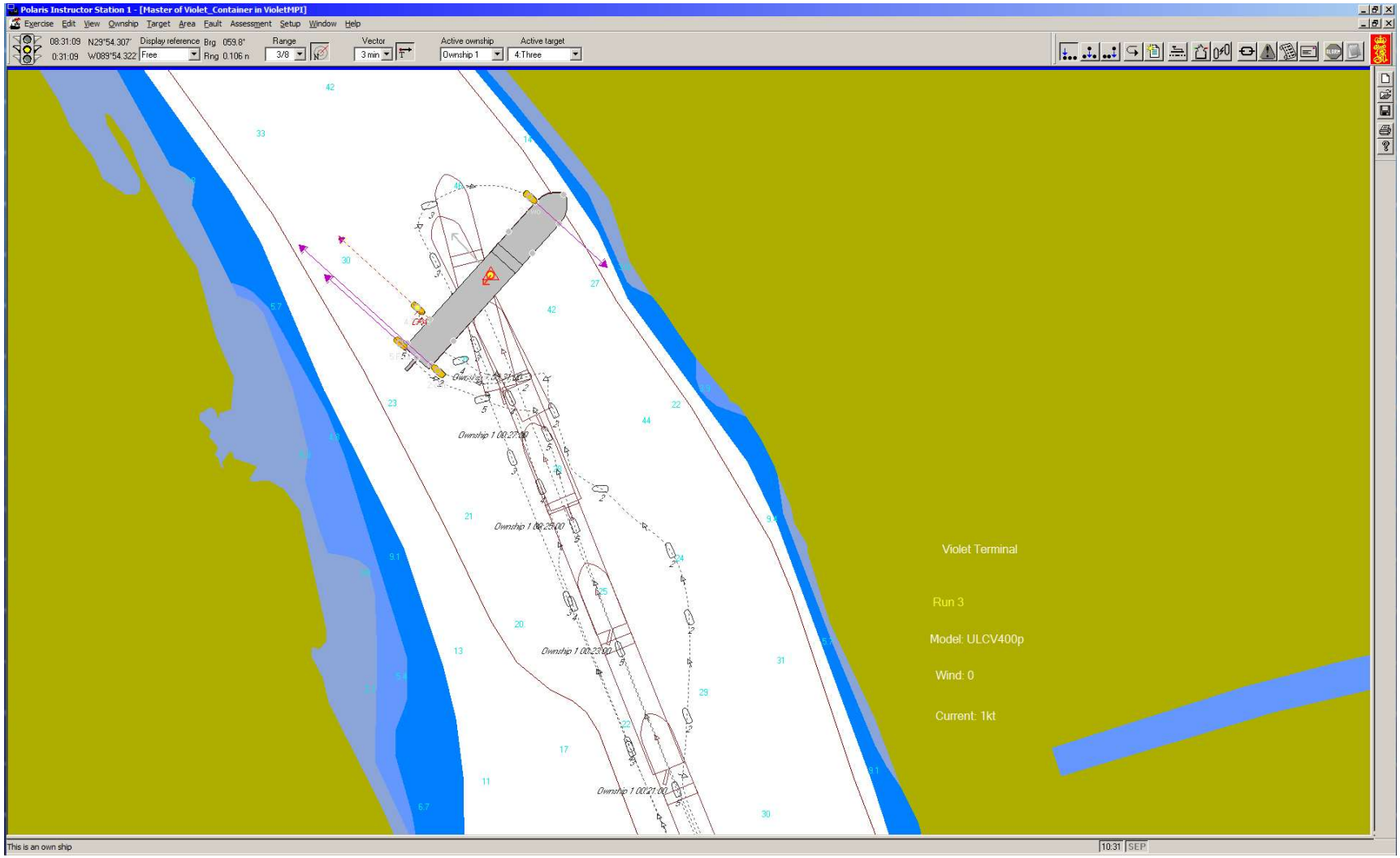
Run 1: Undocking, No wind, 1kn Current



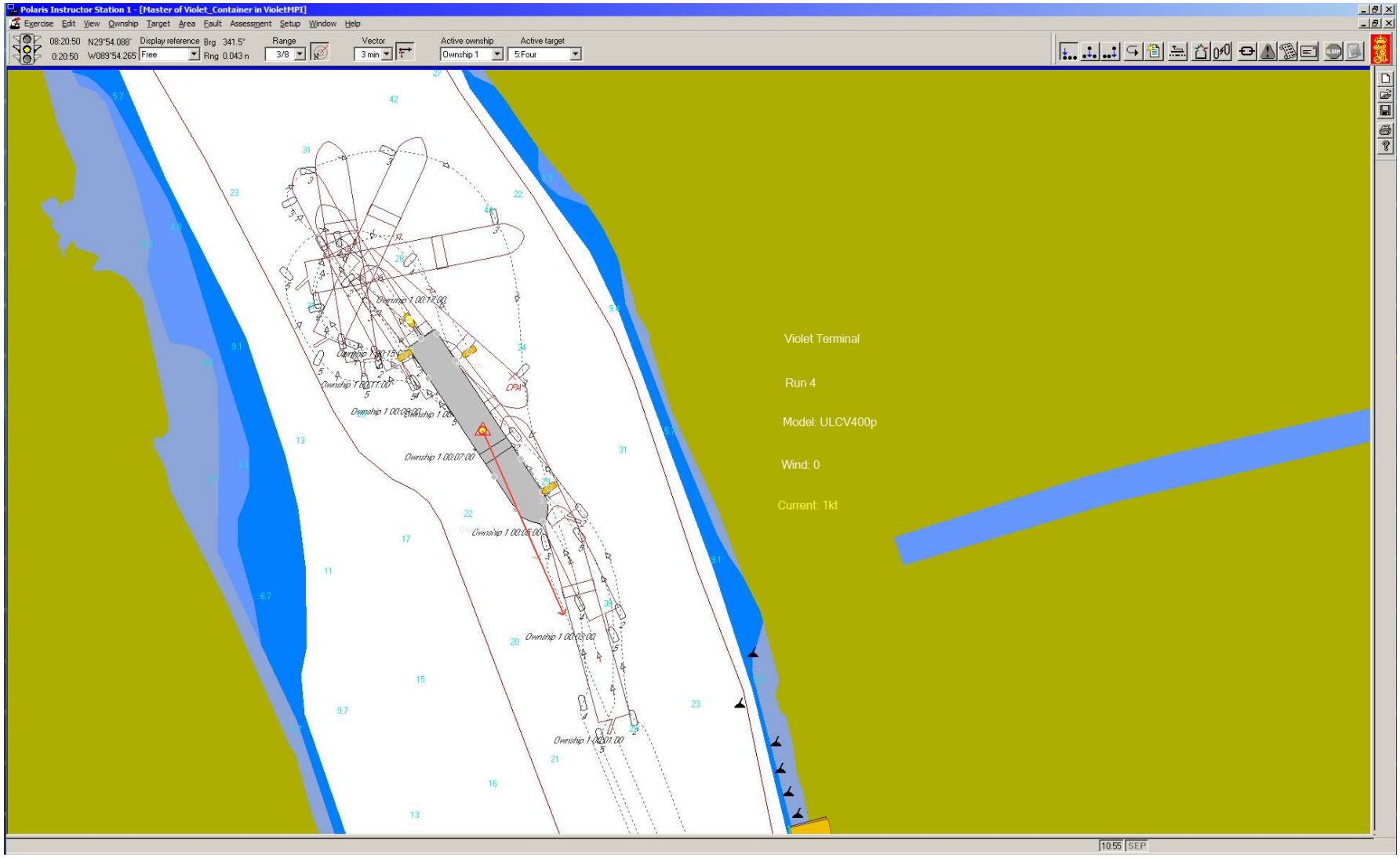
Run 2: Turn Around, No Wind, 1kn Current



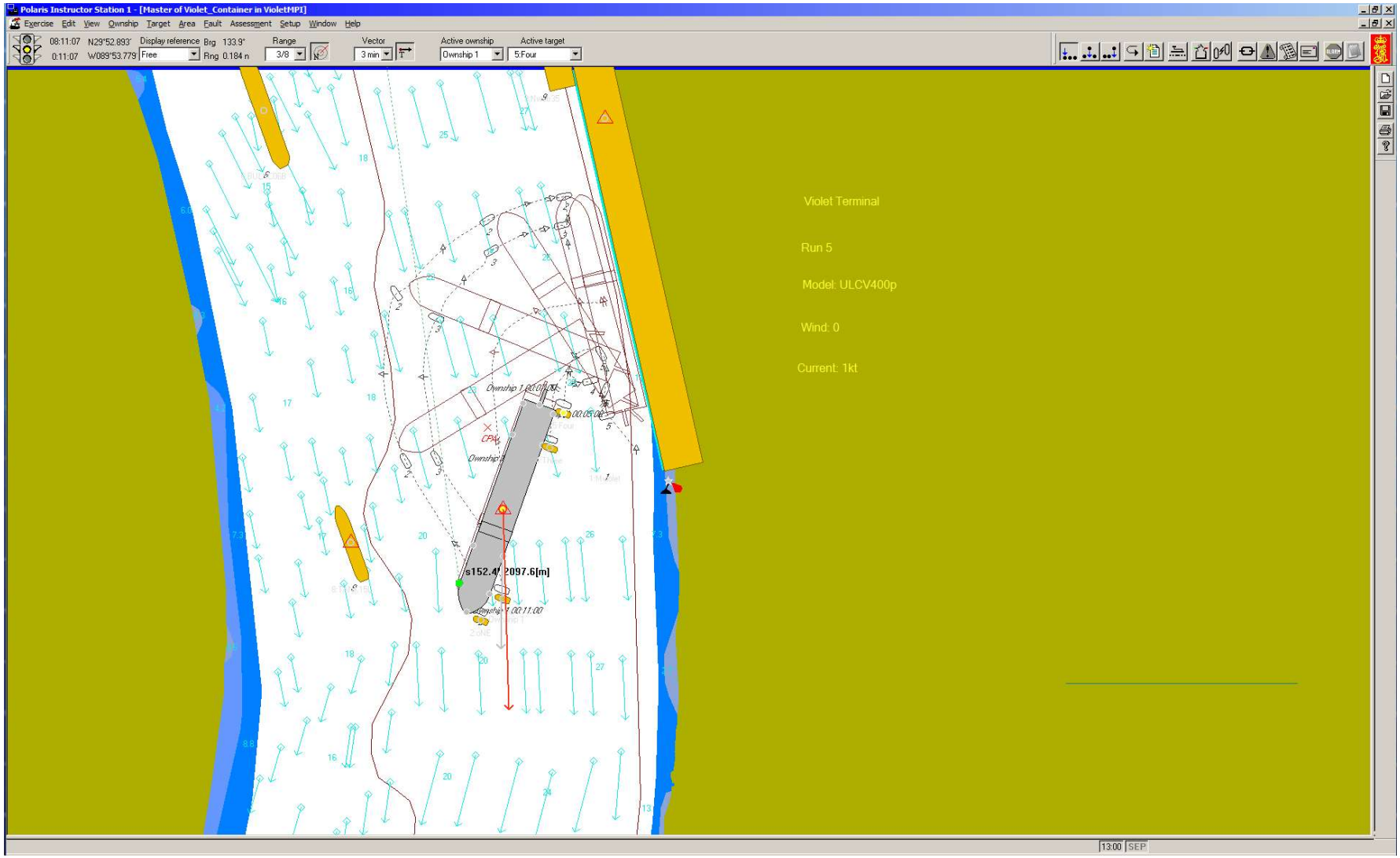
Run 3: Turn Around, No Wind, 1kn Current



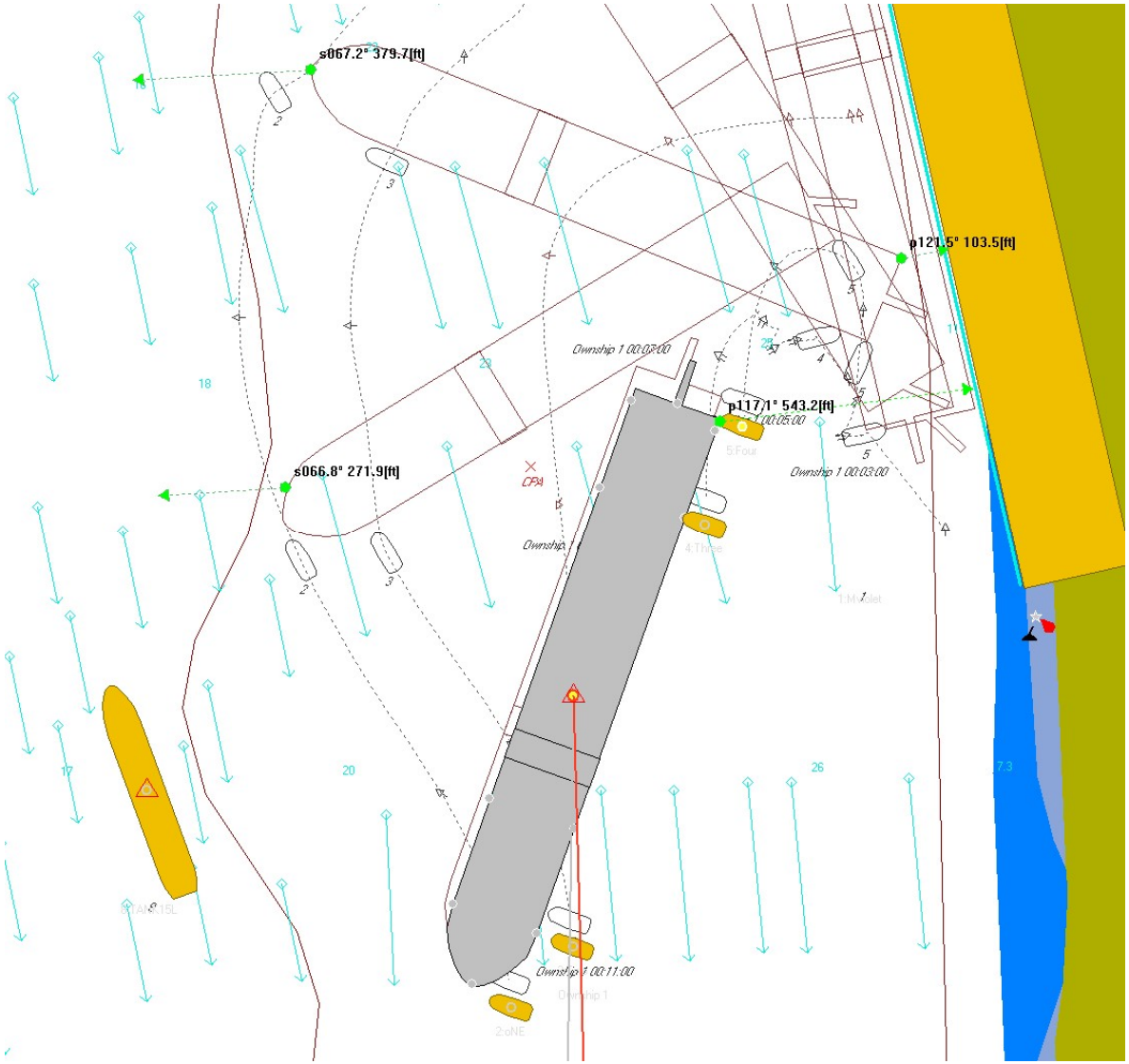
Run 4: Turn around, No Wind, 1kn Current



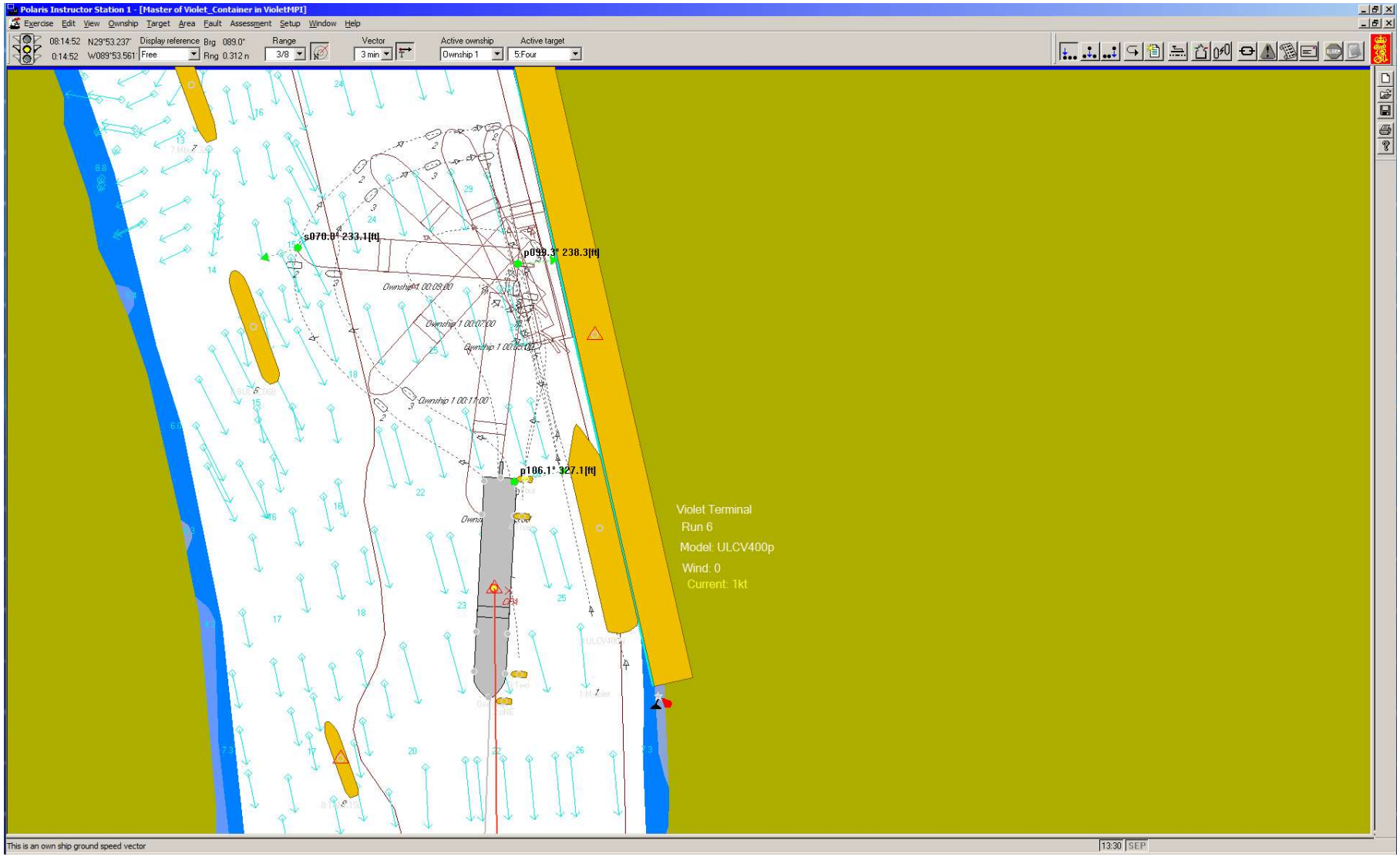
Run 5a: Undocking, No Wind, 1kn Current



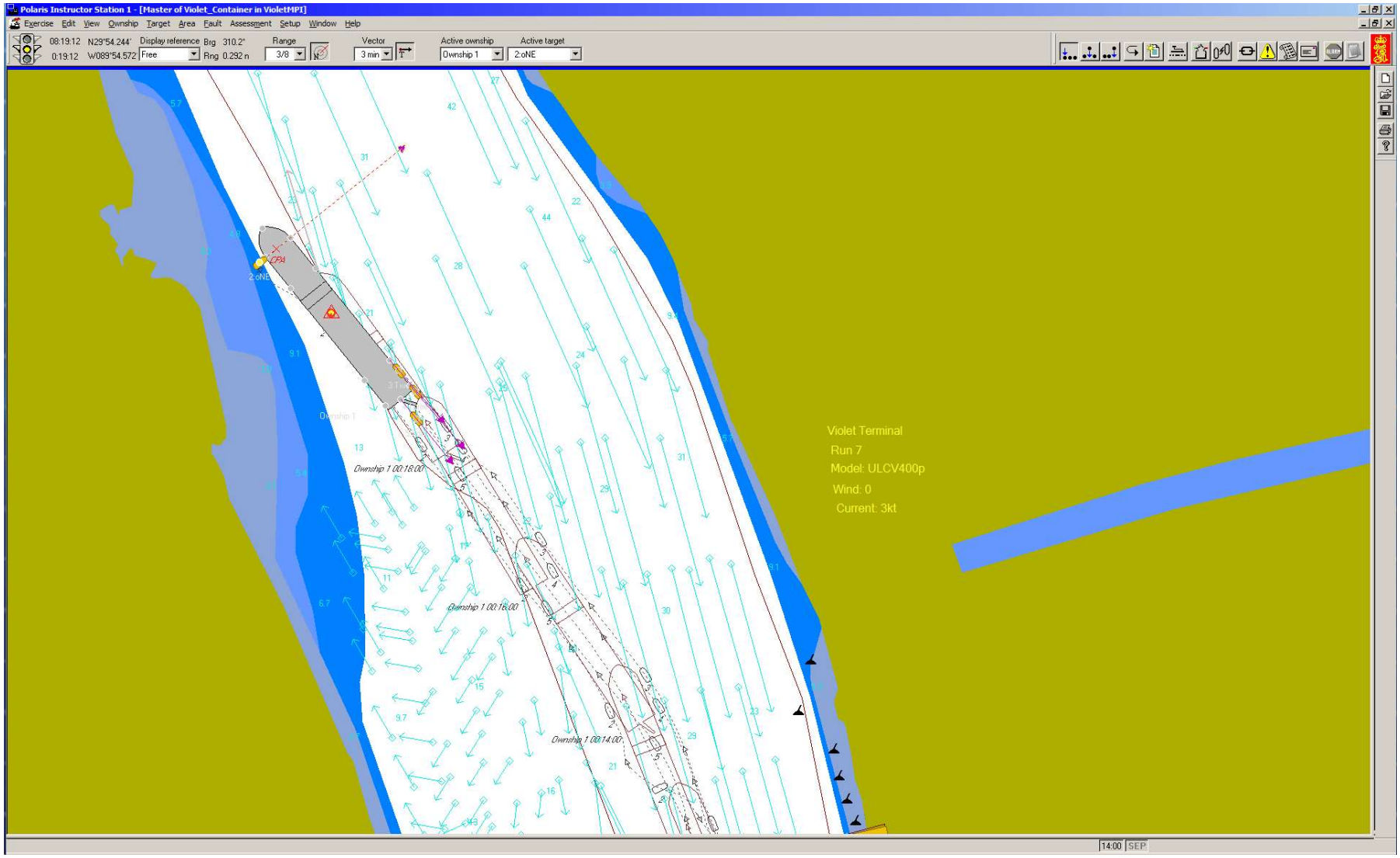
Run 5b: Undocking, No Wind, 1kn Current



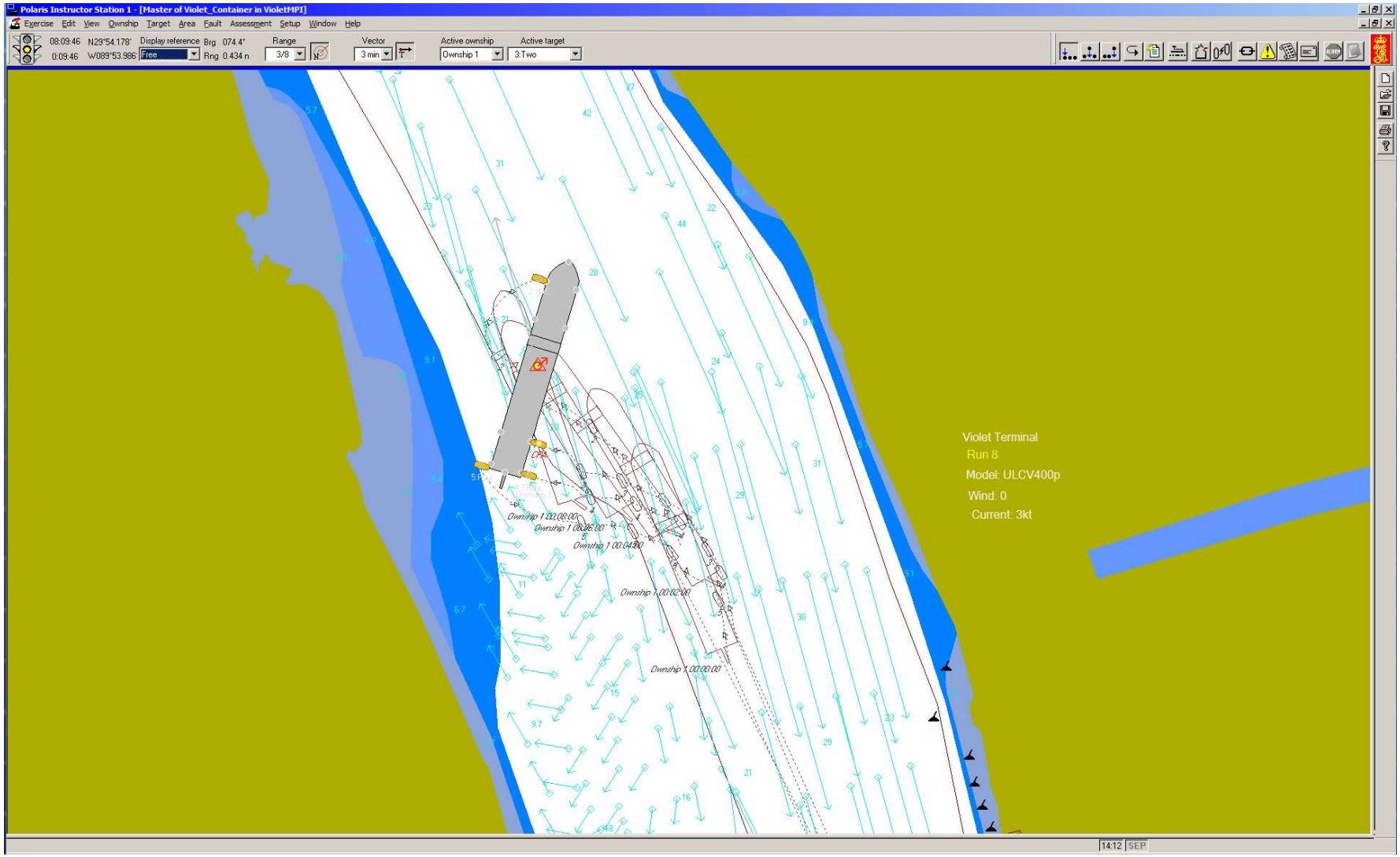
Run 6: Undocking, No Wind, 1kn Current



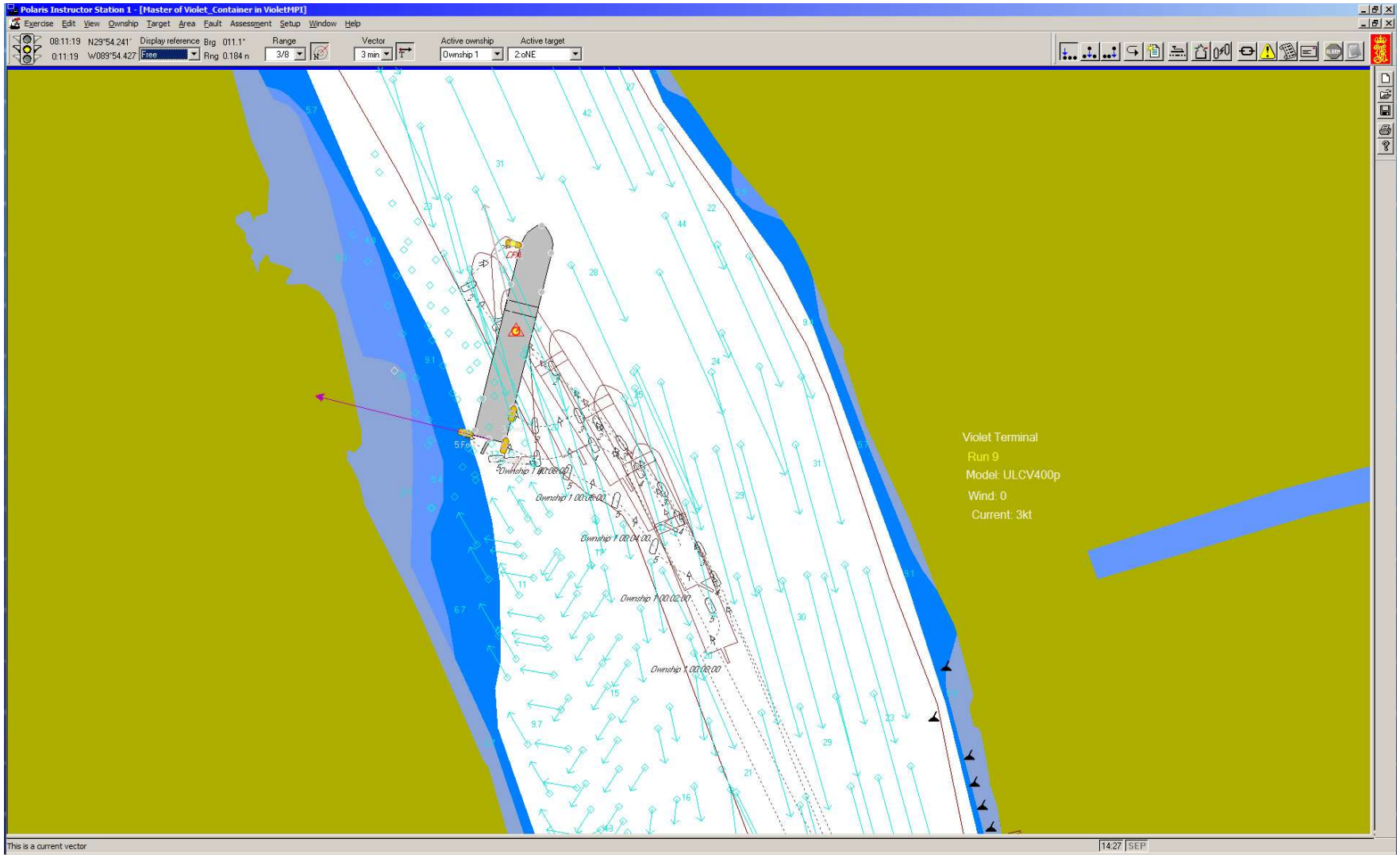
Run 7: Undocking, No Wind, 3kns Current



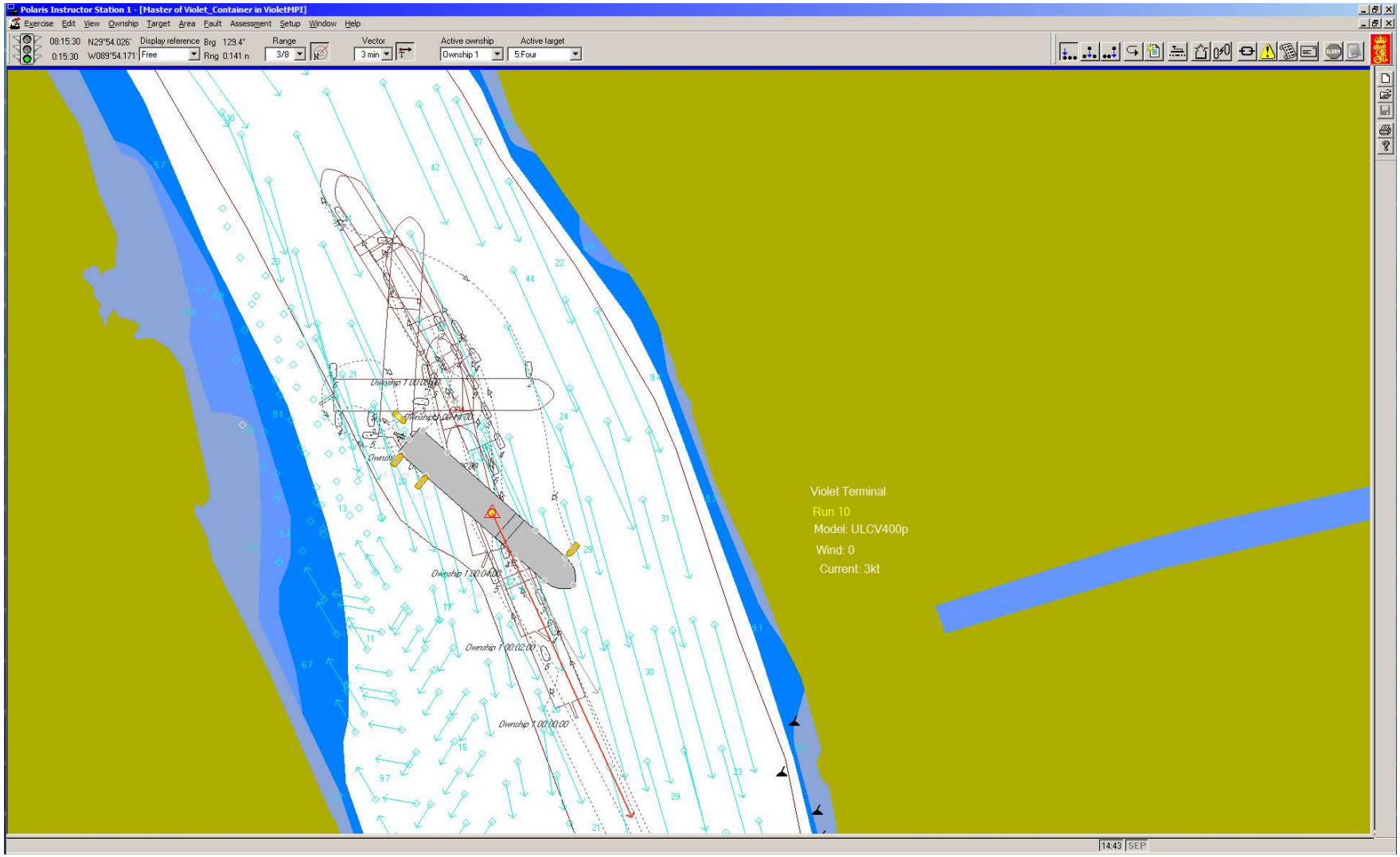
Run 8: Turn Around, No Wind, 3kns Current



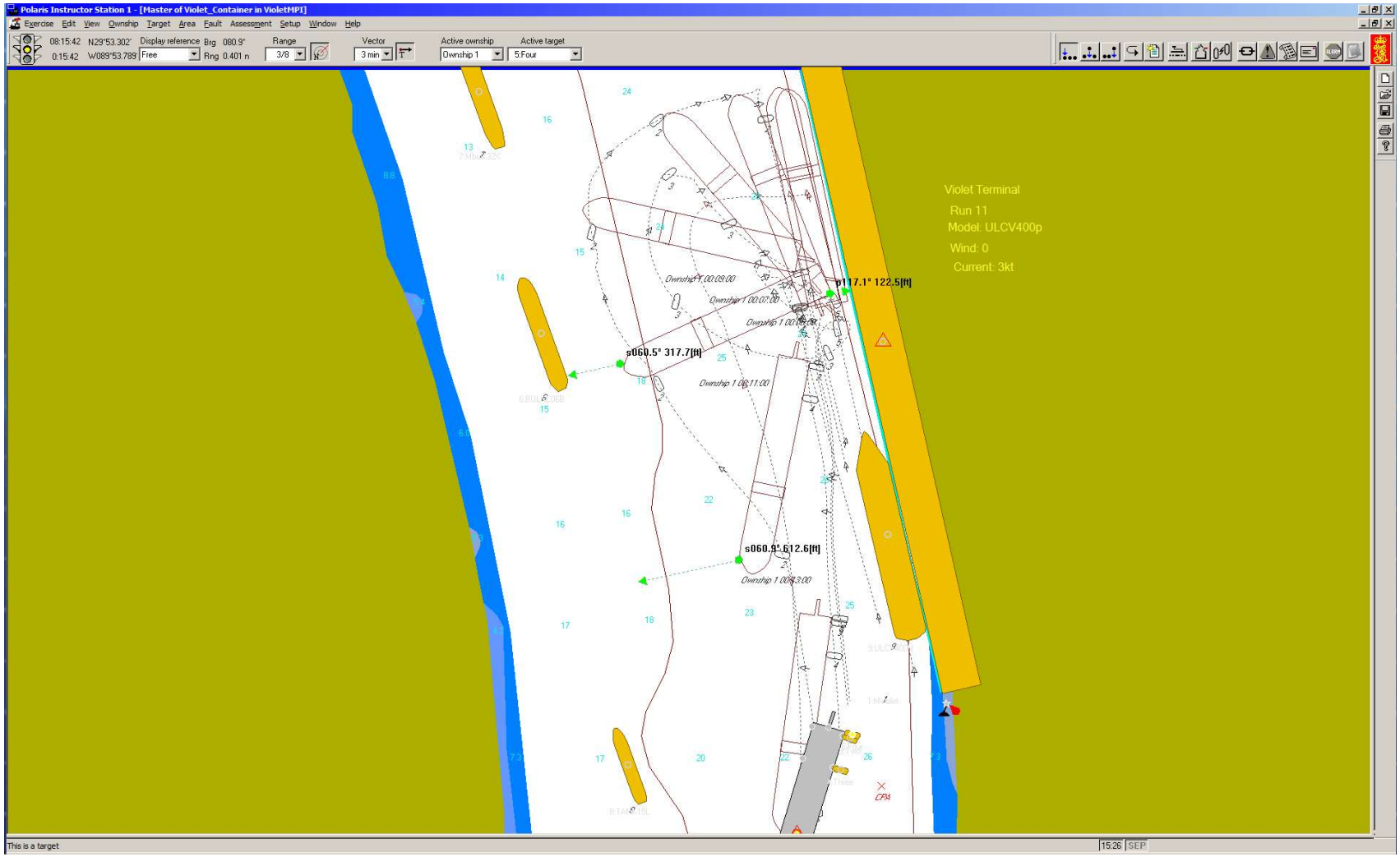
Run 9: Turn Around, No Wind, 3Kns Current



Run 10: Turn Around, No Wind, 3Kns Current



Run 11: Undocking, No Wind, 3kns Current



End of Report