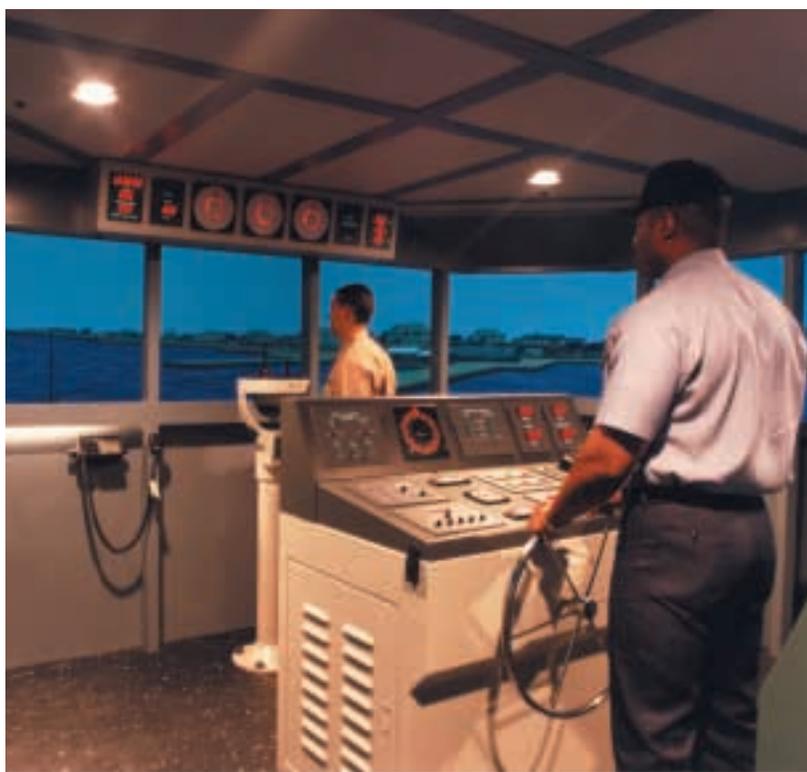


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Then you hear a voice from nowhere call, "Stop! Let's run it again from the top." You might think you're on a movie set and, in a way, you're right.

*By Lt. R. D. Oliver,
Naval Safety Center*

As a conning officer, you order right 30 degrees rudder to put your ship into a hard turn. As you line up on the guide, the visibility begins to go bad. Suddenly, out of the fog, another ship appears close aboard. You try to turn the ship, but it's too late. A collision is imminent.

Then you hear a voice from nowhere call, "Stop! Let's run it again from the top." You might think you're on a movie set and, in a way, you're right. You're in one of the Navy's three high-tech ship-simulator complexes run by MarineSafety International. One is in Norfolk, and the others are in San Diego, and Newport, R.I.

Called a "shiphandling complex," the Norfolk facility opened July 20, 1998. Located just inside gate 5 in building CEP-173, the complex has four full-scale visual simulators, two with a 360-degree horizontal field of view, and two with a 225-degree field of view. All simulators use state-of-the-art image generators and projectors, with visual and radar databases that cover a wide

range of ports and hydrodynamic models (simulating effects of wind, current and other factors) of military and commercial vessels. The Norfolk facility can handle training for a yacht, small coastal minehunter, frigate, aircraft carrier, submarine, or super-tanker.

The two 360-degree simulators are referred to as full-mission bridges. They feature a generic bridge structure, with helm and engine controls, two automatic radar-plotting aids (ARPAs), plotting tables, VHF radios, intra-ship phone systems, and other instruments and displays. The full-mission bridges are designed to be manned with a bridge team that includes a helmsman, navigator and conning officer.

The two 225-degree simulators, or bridge-wing simulators (BWSs) as they're called, are designed for individual training. They are controlled by communicating with a system operator. The BWSs feature a deeper vertical field of view for docking and undocking operations or maneuvering near other ships.

Besides the four visual simulators, each complex includes two radar-navigation bridges. Although they lack a visual presentation, these bridges have two ARPAs, a plotting table, a full communications suite, and ship-control-and-indicator consoles. Each bridge can function independently as a separate ship, or as the radar-navigation-plotting room associated with any one of the visual simulators.

The simulators are laid out symmetrically, with a full-mission bridge, bridge wing and radar-navigation bridge on each side of a central-learning feedback center. Following Navy tradition, one side is called "blue," and the other is "gold." Usually, one side will be assigned to a ship's CO for a 20-hour availability over two-and-a-half days. The CO may use this time for shiphandling, piloting or navigation training.

The staff facilitators (made up mostly of retired Navy captains) help develop proficiency for the various watchstanders, especially conning officers. During the 20 hours of simulator time,

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they can focus on the various shiphandling evolutions, using a high-fidelity model of their own ship in a safe environment. Simulator training gives the Navy a cost-effective alternative to sending ships to sea for similar training.

Before people start simulator training, they attend a one-hour brief to determine their level of expertise and to review precautions while in the simulator. Facilitators also provide a lecture on the nautical rules of the road if it is requested. However, about 90 percent of the 20-hour availability is spent in the simulator.

A typical scenario for the Navy would include a bridge team manning the full-mission bridge, while the ship's radar-navigation team works in the radar-navigation bridge. Together, this team takes the ship from the dock in its homeport and pilots it out the channel to sea. Then, after a debrief of the departure, using the learning feedback center, the team can shift to entering a different port. While this team training takes place in the full-mission and radar-navigation bridges, ship officers can practice their docking skills in the bridge-wing simulator. Other scenarios include anchoring, buoy mooring, coastal piloting, traffic-separation schemes, at-sea refueling and replenishment, and division tactics. These scenarios can be run on any simulator.

Visual simulations include sound effects, and environmental conditions can be introduced, including dusk, night, haze, fog, rain, wind, and any combination of seas and swells. The hydrodynamic models for each ship have six degrees of freedom, which makes users actually feel like they are underway. The movement is so real that even experienced mariners often grab stanchions to steady their balance in heavy seas.



The size and flexibility of the Norfolk complex provide tremendous advantages. The system is designed to allow all six simulators (four visual and two radar-navigation) to be operated in an interactive mode. In this scheme, six ships can operate independently in the same geographic area, with each able to watch visually or on radar the movements of the other ships, as well as other ships included in the scenario. This feature lends itself to formation maneuvers, coordinated port departure and entry, and emergency shiphandling scenarios. The beauty of a facility like the Norfolk shiphandling complex is that when you hit a pier or buoy, nobody gets hurt, you don't have to send a message, and you get to try the operation again.

The Norfolk complex is mainly focused on U.S. Navy training, including docking and undocking training for crews of *Los Angeles*- and

Ohio-class submarines. However, it also provides U.S. Coast Guard-approved courses in bridge-resource management, radar and ARPA, as well as customized courses for individuals, crews or fleets. The facility trains about 50 students a week. At eight million dollars, much of which was spent on the four supercomputers that run the simulators, it's a bargain when you consider how much the simulators boost confidence and teamwork of bridge and radar teams.

To schedule time in a simulator, send a request through your ISIC. Here are the points of contact for the various shiphandling complexes:

Norfolk: Mr. Brian Boyce, (757) 423-2320

Newport: Mr. Jim Connors, (800) 341-1353

San Diego: Mr. Leonard Elder, (619) 231-3333

The author's e-mail address is roliver@safetycenter.navy.mil.