QUEEN MARY 2 VIRTUAL BRIDGE TOUR

By Richard H. Wagner

The bridge on QUEEN MARY 2 is located in the foremost part of the ship's superstructure on Deck 12. (See Photo 1). It spans the entire superstructure running from port to starboard some 56.5 meters or 148 feet. Indeed, the bridge extends beyond the sides of the ship so that the officers can see the entire length of the ship. It was extended further to either side at the end of 2006 in order to improve the view of the side of the ship relative to the pier when docking. With a height of 134 feet, the horizon is 13.5 miles away. (See Photo 2). However, ships and land that project above the horizon line, can be seen much further away.

Consisting of a central navigation area, chart room safety center and two enclosed bridge wings that extend out over the water, the bridge is the navigation and safety hub of the ship. The name can be traced back to the old paddlewheel steamships. So that the captain would have a better view when navigating the ship, a wooden structure was built across the ship linking the tops of the paddlewheel enclosures. These links came to be called the bridge.

On QUEEN MARY 2, the bridge is manned by personnel from the Deck Department. Headed by the Staff Captain, the Deck Department is responsible not only for the navigation of the ship but also for safety, security and maintenance including painting and varnishing. In addition, Deck Department personnel man the ship's tenders, which take passengers to and from shore when the ship is at anchor and guard the gangways when the ship is in port. Officers in the Deck Department can be identified by the black spaces between the gold stripes on their uniforms.

The Chief Officer, who reports to the Staff Captain, is in charge of the bridge team. There are three watches on the bridge: 12 to 4; 4 to 8; and 8 to 12. Normally, a senior officer, a third officer and two helmsmen/lookouts take each watch. Of course, other officers may be present on the bridge as their duties require. At all times, day and night, in port or at sea, the bridge is manned with somebody from the Deck Department.

In physical layout, there are three control consoles on the bridge, each with a similar set of controls. One is on either side of the bridge in the bridge wings and one is in the center. (See Photo 3). This arrangement allows the ship to be maneuvered from the location that offers the best vantage point. For example, when the ship is docking with the starboard side to the pier, the captain will maneuver the ship from the control console on the starboard bridge wing. (See Photos 4 and 5). At sea, the center console is used.

On either side of the center console are consoles with computer screens. (Photo 6). The navigational systems on QM2 are integrated through the Kelvin Mantra System. This system allows the electronic chart systems, the radars, and the safety systems to share information. It also allows officers to select from a number of interchangeable displays on the computer screens located around the bridge. In addition to the radar and chart displays, officers can see displays about the engines, the fire zones, ballast, fuel etc.

QM2's wheel is located on the center console. Like the wheel on QUEEN ELIZABETH 2, it is rather small. (Photo 7). A small wheel has been found to be quicker and more responsive than the large wooden or brass wheels that once were used to steer ships. For the most part, the wheel is only used when approaching ports, in times of heavy traffic and during limited visibility when a quick reaction may be needed. Even then, much of the maneuvering is done using the pod controls (described below).

Most of the time, QM2 is steered by an autopilot. This system takes into account the winds and currents and keeps the ship on the course that is input by the navigator. The officers also input certain parameters to keep the autopilot from turning too quickly thus causing the ship to tilt and making it uncomfortable for
QUEEN MARY 2 is propelled through the water by pods. The pods are structures that hang below the hull of the ship weighing about 260 tons each. Each contains a 21.5 megawatt electric motor which is directly attached by a short motor shaft to a fixed pitch propeller (six meters in diameter) on the front of the pod. The electricity that powers the motors is generated by four diesel generators and two gas turbine engines located within the ship on Decks One and Twelve respectively. They have a total power output of 117.2 MW, which is equivalent to 157,168 horse power.

The propeller is on the front of the pod because the propeller can obtain greater efficiency operating in undisturbed water rather than in water that has been disturbed by the pod preceding it through the water. Thus, QUEEN MARY 2 is actually pulled through the water rather than pushed as in the propeller and shaft arrangement traditionally associated with passenger ships. (It should be noted that positioning the propeller in the front of the pod is just a matter of efficiency and that pods can work with the propeller at the back. Indeed, one of the pods on FREEDOM OF THE SEAS has the propeller on the back).

There are four pods on QM2. Two of them are in fixed position and two can turn 360 degrees. The latter two are called "azipods," which is a contraction for azimuthing pods. These pods turn in order to maneuver the ship. Not only do they take the place of a rudder, they can be set so as to hold the ship in position when tendering and when used in conjunction with the ship's three bow thrusters (see below) to give side thrust. As a result, except in very strong winds or currents, the ship can be docked without the assistance of tug boats.

The fixed pods are located forward and outboard of the two azipods. They are used in propelling the ship forward and in reverse.

QM2's maximum speed is approximately 10 knots. During her sea trials, she was able to go from full speed to a complete halt in 1.69 miles. It is believed with improvements that have been made since then that now she could stop in about a mile. On a ship of her size with a traditional propulsion system it would take approximately 4 miles.

In Photo 8, the controls for the pods are in the center of the bottom line of controls. The controls on either side swivel in order to turn the azipods while the levers mounted on top of them control the speed. The levers in the center control the speed of the fixed pods.

Located next to the pod controls is a joy stick (Photo 9). By pushing this stick in different directions, an officer can maneuver the ship ahead, astern or laterally. This is made possible by the ship's Dynamic Positioning System which combines information from the ship's global positioning system (GPS) (see below) and information derived from sensors as wind and heading to determine what combination of bow
Photo 3. The navigational controls are duplicated on each bridge wing. The computer screens above the console can display charts, radar, closed-circuit television and the ship's "Harbor Approach" display.

Above: (Photo 4) The port bridge wing. The window cut into the floor allows the officers to see the relative position of the ship's side and the pier when the ship is docking. Below: (Photo 5) Looking down the port side from the bridge wing.

Photo 3. The navigational controls are duplicated on each bridge wing. The computer screens above the console can display charts, radar, closed-circuit television and the ship's "Harbor Approach" display.

Above: (Photo 4) The port bridge wing. The window cut into the floor allows the officers to see the relative position of the ship's side and the pier when the ship is docking. Below: (Photo 5) Looking down the port side from the bridge wing.

Photo 3. The navigational controls are duplicated on each bridge wing. The computer screens above the console can display charts, radar, closed-circuit television and the ship's "Harbor Approach" display.

Above: (Photo 4) The port bridge wing. The window cut into the floor allows the officers to see the relative position of the ship's side and the pier when the ship is docking. Below: (Photo 5) Looking down the port side from the bridge wing.

Photo 3. The navigational controls are duplicated on each bridge wing. The computer screens above the console can display charts, radar, closed-circuit television and the ship's "Harbor Approach" display.

Above: (Photo 4) The port bridge wing. The window cut into the floor allows the officers to see the relative position of the ship's side and the pier when the ship is docking. Below: (Photo 5) Looking down the port side from the bridge wing.

Photo 3. The navigational controls are duplicated on each bridge wing. The computer screens above the console can display charts, radar, closed-circuit television and the ship's "Harbor Approach" display.

Above: (Photo 4) The port bridge wing. The window cut into the floor allows the officers to see the relative position of the ship's side and the pier when the ship is docking. Below: (Photo 5) Looking down the port side from the bridge wing.

Photo 3. The navigational controls are duplicated on each bridge wing. The computer screens above the console can display charts, radar, closed-circuit television and the ship's "Harbor Approach" display.

Above: (Photo 4) The port bridge wing. The window cut into the floor allows the officers to see the relative position of the ship's side and the pier when the ship is docking. Below: (Photo 5) Looking down the port side from the bridge wing.

Photo 3. The navigational controls are duplicated on each bridge wing. The computer screens above the console can display charts, radar, closed-circuit television and the ship's "Harbor Approach" display.

Above: (Photo 4) The port bridge wing. The window cut into the floor allows the officers to see the relative position of the ship's side and the pier when the ship is docking. Below: (Photo 5) Looking down the port side from the bridge wing.

Photo 3. The navigational controls are duplicated on each bridge wing. The computer screens above the console can display charts, radar, closed-circuit television and the ship's "Harbor Approach" display.

Above: (Photo 4) The port bridge wing. The window cut into the floor allows the officers to see the relative position of the ship's side and the pier when the ship is docking. Below: (Photo 5) Looking down the port side from the bridge wing.
Above: (Photo 6) The area around the center console.
Below: (Photo 7) QM2's wheel is located on the center control console.

Photo 8. The pod controls. On the left is the control for the port azipod and on the right is the starboard azipod control. The fixed pods are controlled by the center levers.

simultaneously. Radar works by sending out an electronic pulse which is reflected back to the sender when it strikes an object. The system on QM2, however, does not show just a blip on a screen. It also gives the target's course and speed, closest point of approach, the time of closest approach and how far ahead of QM2's bow the target will cross. Among other things, this information tells the officer on QM2 whether the closest point of approach is such that a course alteration is required. Usually, the officers arrange to pass other ships at a distance of at least 1 nautical mile.

Combined with the Automatic Information System (AIS), the officer can also obtain the name of the target (assuming it is a ship and is transmitting AIS data), its registry, its call sign and where it is going. QM2's charted course can also be overlaid on the radar screen and compared against the ship's actual course. This acts as a cross-check to the electronic chart system. In Photo 11, the white area are reflects from the waves around QM2. The green line is the ship's actual course and the red line overlying it is the ship's charted course.

QM2 has both a magnetic compass and two gyro compasses which are electronic compasses that align themselves with true north. A magnetic compass points to magnetic north rather than to true north. The difference between the two can become important in determining position when a ship has to travel for several days in a relatively straight course such as on a transatlantic crossing. The gyro compass is not subject to this problem or to certain other anomalies that may affect a magnetic compass such as differences in the earth's magnetic field and the magnetic influence of ship's steel.

The ship's draft is usually stated as 33 feet 10 inches. However, when a ship is in motion, it is subject to a phenomenon known as "squat" which increases the draft. The bridge uses an echo sounder to determine the depth of the water under the ship's keel. A pulse is sent out and the depth is calculated by how long it takes for that signal to return. QM2 does not have a forward searching sonar. Such sonars are typically only found on warships and certain research vessels.

To minimize rolling, QM2 has four stabilizers (two on each side) that can be extended 15 feet from the sides of the hull. These can be likened to the flap on an airplane wing. As the ship tries to roll toward one side, the angle of the stabilizers will change in order to increase the pressure on the opposite side and bring the ship upright. Because the stabilizers are dependent on the flow of water past them to create the necessary lift, they are less effective at slow speeds. The stabilizers are folded flush with the hull in port and can be extended individually as conditions warrant.

Unlike earlier liners, QM2 has no radio room per se. Instead, communication is controlled from the bridge. Coming in and out of ports, VHF radio trans-
missions are used for communicating with other ships and harbor authorities that are within an approximately 30 mile radius. To talk with someone further away, there are medium and high frequency radios. In addition, there are two INMARSAT-C satellite terminals, which can communicate essentially to points all over the globe. The satellites also receive weather forecasts and navigational information and warnings. These forecasts are noted on weather charts on the bridge and the Commodore informed so that all know what to expect weatherwise.

With the Global Maritime Distress and Safety System, a distress signal containing the ship's name, position and a request for assistance can be sent out within five seconds by pushing a button. This signal will go out over all three of the transmission systems described above and thus be sent to ships in the vicinity and throughout the world. If there is more time, one can send the nature of the distress (e.g., fire, grounding).

The Computer Safety System allows the bridge to monitor all of the safety systems throughout the ship and to have visual displays showing where on the ship a situation is developing. For example, there are fire and smoke detectors throughout the ship. When one of these detects fire or smoke, a signal is sent to the bridge. The watch officer can then dispatch the Assessment Party, consisting of officers from various departments, to the location on the ship from where the alarm signal was sent. They report their findings to the Safety Centre located in the aft of the ship. However, all watertight doors, fire screen doors, ventilation, low level lighting and other safety systems can be operated by either the bridge or the Safety Centre.

Because the navigation and safety systems depend upon electricity, the bridge has a battery back-up system to enable its electrical systems to function even in the event of a power failure. However, the officers are also trained in the traditional methods of navigation such as the use of sextons and plotting a course on a paper chart.

Access to QM2's bridge is restricted. However, passengers can view what is happening on the bridge through a window on Deck 12. The viewing room is normally open during the day when the ship is at sea.