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and conning station) voyage management system (VMS), which integrated the vessel's major navigation components to display data gathered from a variety of sources in a single place.

This system was particularly important in areas of low visibility, and was heavily relied upon by the pilot and crew of the ship as it left San Francisco on a foggy November morning.

The VMS consisted of two ARPA radars (X- and S-band), an electronic chart system, and a conning information display, as well as an AIS (automatic identification system).

The radar displays could also be superimposed onto the electronic chart along with AIS data. The vessel's voyage plan could be superimposed onto the radar screen if entered into the VMS.

Radar tests conducted before and after the accident indicated that the equipment was all functioning correctly, however VDR evidence retrieved after the incident showed the crew to be patently unfamiliar with the operational details of the systems.

A representative of the radar manufacturer noted at a public hearing that the VDR recordings showed that crewmembers had increased the gain on the antenna to a level "really higher than it should be."

He added: "While this [high gain setting] never impacts the [radar's] ability to give a good picture, it does . . . give much more return on the display. What you'd see is things get a little larger, a little more clutter because the gain is up so high."

While this error in the use of the radar was not identified as a direct cause of the accident, it does indicate the potential problems that might arise when gaps exist between the capabilities of the technology onboard and the capabilities of the users.

Electronic chart confusion

More serious than the lack of radar expertise among the crew, in the context of this accident, was the confusion of the pilot and the ship's master over the symbology used by the electronic chart system.

The electronic chart system in use on the Cosco Busan was not a full ECDIS system, as it was operating with unofficial chart data, though the hardware itself was capable of performing as an ECDIS.

However, NTSB does note in its report that the symbols upon which the pilot relied for navigation were "similar, if not identical" to the type of symbols approved in the International Hydrographic Organization's (IHO's) Presentation Library for ECDIS.

Despite this the report says that in post-accident interviews the pilot stated that: "even though he typically saw as many as 10 different ECDIS systems during a work week, he had 'never seen a red triangle on any piece of navigation information, electronic, paper or otherwise'."

"The red triangles to which the pilot referred were the conical buoys on either side of the Bay Bridge Delta tower."

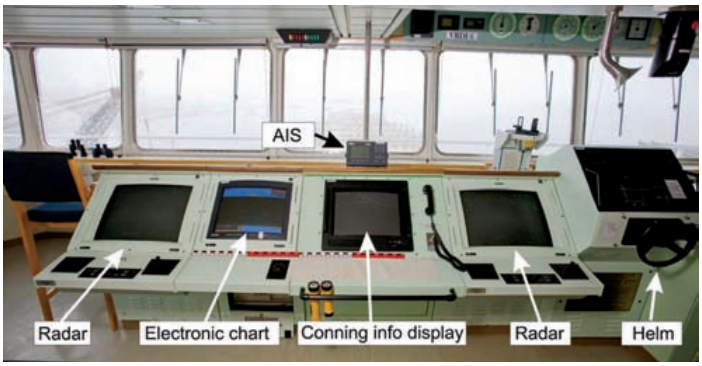
The report continues with details of discussions of these symbols that took place between the master and pilot, recorded by the VDR.

It says: "the pilot asked the master about the 'red triangles' - as he referred to them - on the electronic chart display of the vessel's transit area. When asked about the meaning of the red triangles, the master said, 'this is on bridge'."

"This was far from a precise response and, based on subsequent events, the pilot apparently interpreted this as 'centre of the bridge' or, more significantly, 'centre of the span'."

This confusion and uncertainty in the use of the navigation equipment aboard the Cosco Busan had disastrous consequences, as the containership struck the base of the bridge's Delta tower and leaked approximately 53,500 gallons of fuel oil into San Francisco Bay.

The $10 million fine imposed by the US District Court is only a small fraction of the estimated $70 million spent on the environmental cleanup of the area, but it is hoped, at least, that the spotlight on the facts of the incident will remind ship operators of the importance of cultivating onboard expertise in the use of navigation technology. DS



The Cosco Busan VMS featured a number of high-tech navigation aids. Photo: NTSB

Hellespont tankers take VSAT

www.marlink.com

Marlink reports that it has completed the signing of a new five year agreement with ship management company Hellespont Hammonia of Germany, for the provision of global VSAT services.

The contract includes the delivery and installation of Marlink's Sealink C-band services onboard four newbuild chemical tankers, as well as a range of services including Prepaid Talk for crew telephony and the creation of a VPN for communication between the vessels and Hellespont's headquarters.

The system will be customised to meet Hellespont's particular requirements, with each vessel to get eight simultaneous telephone/fax lines, one dedicated business line and one crew internet line.

Installation onboard the first of the four chemical tankers, the MT *Hellespont Charger,* began at the end of 2009 and other installations will continue over the course of the first quarter of 2010.

"A reliable, always-on connection is critical for us to meet our business needs," said Capt Matthias Imrecke, managing director, Hellespont Hammonia.

"Sealink is a high quality VSAT solution with dedicated, guaranteed bandwidth that offers a range of opportunities for interaction between our vessels and HQ, [and] will enable us to operate our ships more efficiently, via remote access from the shore, as well as provide crew with a range of voice, internet and e-mail services so that they can stay in touch with friends and family at home."

In addition to the four new build chemical tankers, Hellespont owns and operates 17 oil, product and chemical tankers and 5 PSV vessels.

One of its product carriers, the MT Hellespont Progress, is conducting a separate C-band VSAT test using the C-Bird system supplied by Maritime Broadband (see *Digital Ship* March 2010 issue).

The Hellespont Charger is the first of four chemical tankers to be installed under the deal