Exceptional operational performance is an ever-increasing requirement of today's shipowners. Some of the most significant elements of operational performance include risk reduction and navigational safety. Many ship systems in use today tend to overwhelm ship's officers with on-screen information, while only a fraction of the information presented is useful at any given time. This approach tends to degrade operational performance and prolong the learning process unnecessarily. The L-3 Valmarine Integrated Bridge System (IBS) is designed to assist the navigator in selecting information that is deemed relevant to the operational situation by collecting, processing and presenting navigational and/or other relevant data, without cluttering the displays with other information that may not be needed at that moment.

One of the world's largest operators of high-speed container ships expresses:

"The L-3 Valmarine IBS lets the crew focus on the task at hand. They get exactly the information they need in a clear, uncluttered format – reducing the risk of accidents. It is easy to learn because of its intuitive uniform design. The L-3 Valmarine IBS meets our operational requirements. Higher productivity makes it possible to use smaller crews. The easy-to-use system streamlines maintenance and reduces cost."

The L-3 Valmarine approach to navigation and integrated bridges is different than all others, and is based on a solid background of system integration expertise, sea-going experience, and innovative engineering. While the philosophy for the integrated bridges of most suppliers is that of physically integrating numerous different hardware and software systems into one console, the L-3 Valmarine Integrated Bridge takes a completely different approach focussing on functional integration. This approach allows any navigation function to be performed from any workstation. The networked approach that brings the functionality together also allows for easy integration with other ship systems. The L-3 Valmarine IBS is based on the belief that improved man-machine interaction results in increased safety. This is accomplished by:

- Seamless integration of all navigation functions
- Uniform presentation of information
- Uniform principles of operation
- User simplicity to avoid human errors
- Multi Function workstations (MFW)
- Multiple layers of redundancy and graceful degradation
- COTS hardware for ease of maintenance
- Open system design (inter-system links to other systems)

SEAMLESS INTEGRATION

All navigation sensors including radar are integrated into the navigation network, allowing operation, monitoring and alarm identification on any workstation. Distribution of navigation data and exchange of tactical information from a Combat Management System or the Integrated Platform Management System is therefore facilitated. Tactical information can be presented on any bridge workstation as overlay data on ARPA radar and ECDIS (Electronic Chart Display and Information System) or, if desired, displayed in a separate window on the workstation.
UNIFORM PRESENTATION OF INFORMATION
Human-Machine Interface (HMI) for the various applications, such as ECDIS, ARPA radar and Conning Display, have similar design layouts for easy recognition and user-friendliness.

UNIFORM PRINCIPLES OF OPERATION
The applications employ similar layout of the control areas with soft keys. The control keys are operated by a user-friendly control panel and roller-ball cursor control on the armrest of the navigator chairs. Some frequently used functions may be controlled by keys on the armrest panels that provide direct access to these functions.

USER SIMPLICITY
L-3 Valmarine’s IBS is designed to be intuitive in operation, and takes into account that most navigators today have good working knowledge of modern computer systems. L-3 Navigation believes that uniform presentation and operation contribute to safety because they help to reduce the risk of operator errors especially in emergency situations.

MULTI FUNCTION WORKSTATIONS (MFW)
All workstations are completely multifunctional, and may be used for any IBS function at any time. All MFWs provide access to all information, enabling the duty officer(s) to configure the bridge console layout in accordance with the mission being performed, bridge manning or system status (i.e., damage or malfunction), or to suit the personal preference of the navigation officer.

MULTI LEVEL REDUNDANT SYSTEM
- Sensors are connected to two or more Sensor Concentrator (SC) units. In case of duplicate or triplicate sensors, the different sensors are connected to different SCs to provide even greater redundancy.
- Two parallel SCs feed each half of the number of MFWs.
- Fibre optic cabling connects the SCs and allows transfer of data to the other system if one SC should malfunction.
- Because each of the MFWs can display any application, a malfunction of one MFW will not be fatal.
- Two operator’s chairs can control any of the MFWs.
- Additional back-up control capability by dedicated control panels (option) at each MFW or by standard computer keyboard.
- Provision of Uninterruptible Power Supplies (UPS) contribute to fail-safe operation.
ERGONOMICS
L-3 Valmarine has many years of experience with advanced bridge layouts, and the latest innovations in user ergonomics are taken into account. Three-dimensional layout studies are offered to ensure the best possible working environment and compliance with IMO and class rules. Control of all main systems is readily available from the navigator chairs, including optional steering tillers. Visibility analysis will ensure minimal interference of blind angles and ensure optimal visual capability.

OPERATION OF RADARS
Navigation radars are operated and controlled from the navigator’s chairs and radar video is displayed as one of the applications on the MFWs. This integration makes ordinary dedicated radar displays obsolete. Radar information is also presented as overlay on the ECDIS. The IBS can be extended to accommodate up to four navigation radars with full ARPA performance. Presentation of surveillance radar video on MFWs can also be accommodated.

NAVAL NAVIGATION FUNCTIONS
L-3 Valmarine IBS deliveries to the Royal Norwegian Navy and the Royal Swedish Navy include development of special naval navigation functionalities such as:

- WECDIS (Warship ECDIS)
- Semi-automatic positioning with input from the ship’s optical bearing device and laser range and bearing binoculars
- Electro-optical multisensor operation/presentation
- Tactical information: tactical routes, tactical areas, tactical target transfer/correlation, mine/torpedo warnings etc.
- Intercept point calculation and presentation
REMOTE DIAGNOSTICS
Available as an option is a vessel support system that enables software diagnostics and other support services via Inmarsat HSD satellite communication.

“Remote diagnostics and troubleshooting via satellite means that problems can be solved much faster than before.”

INTEGRATION
The L-3 Valmarine IBS is very flexible concerning the interfacing of navigation sensors, combat management systems, Integrated Platform Management System and communication systems. Because of our system integration expertise and open system approach, the L-3 Valmarine IBS can accept sensor inputs from a wide variety of suppliers supporting most common signal transmission methods and protocols, while being able to adapt to special needs.

OTHER FEATURES
Closed Circuit Television (CCTV) operation and presentation, Advance Position Prediction and Voyage Data Recorder (VDR) are available for integration with the L-3 Valmarine IBS. Integration of Automatic Identification Systems (AIS) with ECDIS/ARPA is also offered as required by IMO regulations.

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