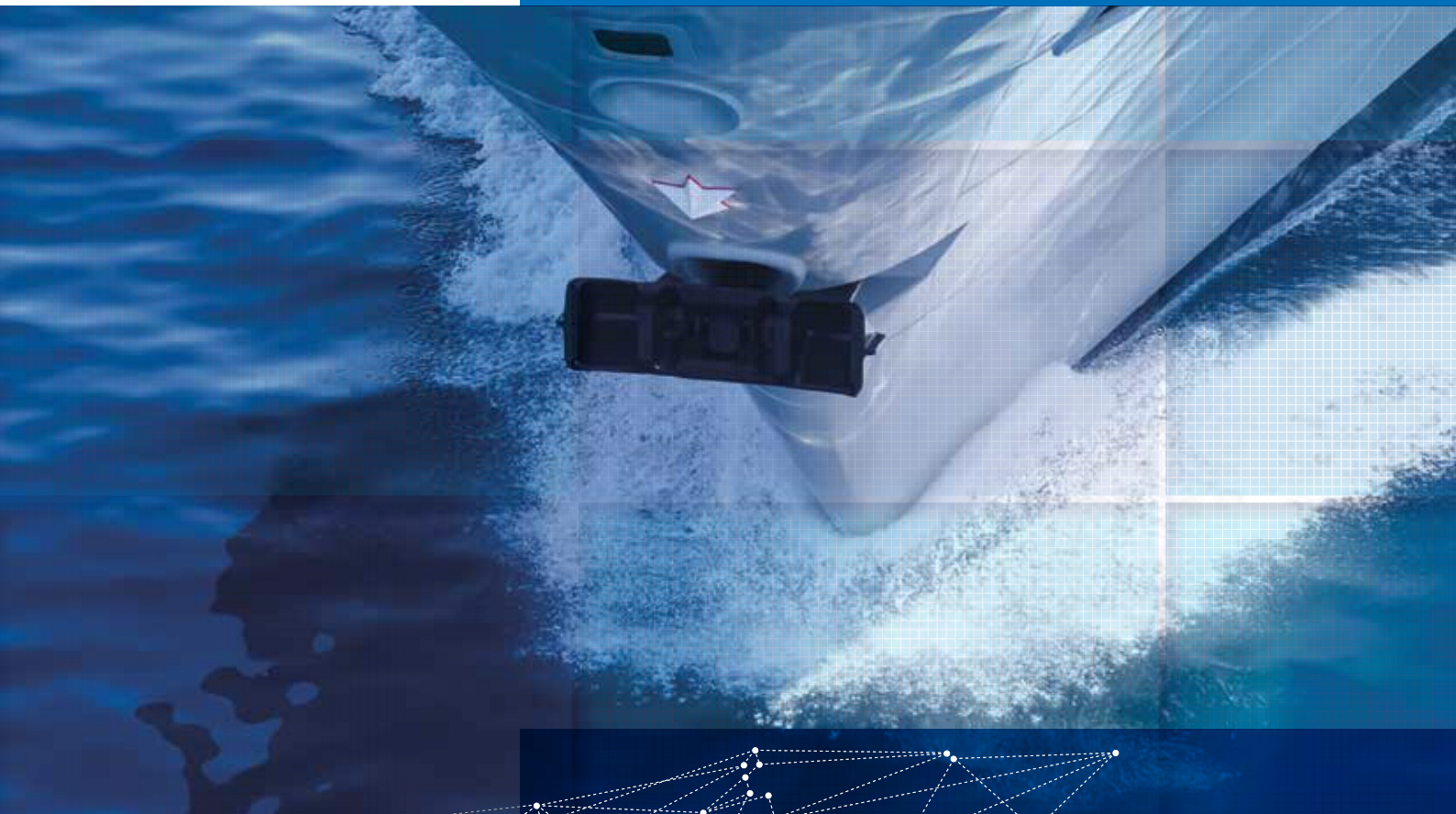


SEASNavy™

INTEGRATED PLATFORM MANAGEMENT SYSTEM.
SHIP OPERABILITY, SAFETY AND DECISION SUPPORT.



MARINE AUTOMATION SOLUTIONS

a **FINCANTIERI** company





The future of Automation is now

— Seastema S.p.A. is a company involved in the design, development and supply of integrated automation systems for different areas of the marine industry, with particular expertise in the naval sector, and in the design, development and supply of entertainment systems. The headquarter is in Genoa (Italy) with branch offices in Lucca and in Trieste.

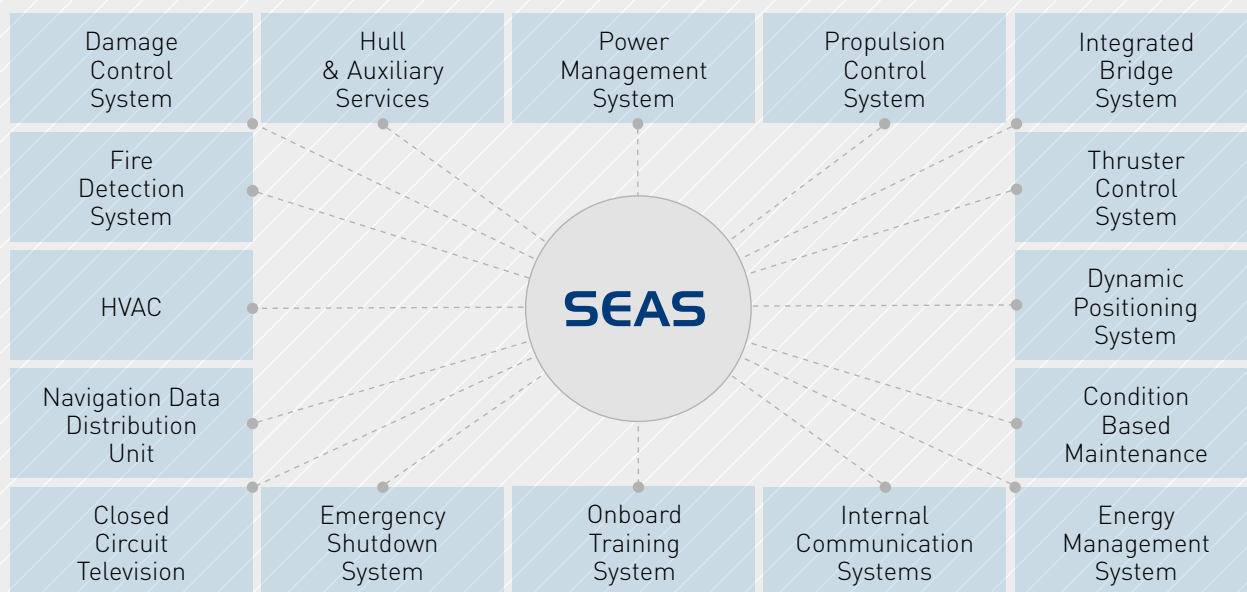
— Seastema continuously cooperates with external Partners and Research Institutions in order to increase the products portfolio with reliable solutions, to maximize innovation and to develop strategic products.

Seastema provides end users with a global after-sales service throughout the entire life cycle of the ship even supported by partners organizations.



SEAS: a global vision

— Seastema's Enhanced Automation System (SEAS) is a single control and supervision system that is able to integrate all single sub-systems on board and to provide a unique interface to the operators by the use of multifunctional operator stations. This high level of integration and the extensive use of automated functions leads toward a reduction of the operating costs and an advance in the ship operability in terms of safer and more efficient operations.



a **FINCANTIERI** company

— Seastema S.p.A. is a Fincantieri Group company. Fincantieri is one of the world's largest shipbuilding groups. It is world leader in cruise ship construction and a reference player in other sectors, from naval vessels to cruise ferries, from mega yachts to special high value-added vessels, ship repairs and conversions and offshore vessels. Headquartered in Trieste, the Group has more than 20,000 employees, of whom 7,700 are in Italy, and 21 shipyards in four continents. Fincantieri is a major western shipbuilder and the biggest in terms of diversification and presence in every high value-added sector.

SEASNavy™

INTEGRATED PLATFORM MANAGEMENT SYSTEM.
SHIP OPERABILITY, SAFETY AND DECISION SUPPORT.

Towards safer and more efficient ship operations

— Seastema SEASNavy™ IPMS is the state of the art of marine automation technology, a reliable system that grants continuous control of onboard safety, operability and equipment efficiency. The high level of integration and the increased number of automated features of the SEASNavy™ IPMS, are the best answer to the new operational requirements of added flexibility in the different missions and reduction of the manning coming from the Navies. Seastema's experience in Naval Platform Automation projects and Seastema's specific solutions for power management, propulsion control, machinery automation, safety management and navigation systems integration applied on Naval Vessels, helps our customers to maximize machinery and bridge operation efficiency improving readiness in operations and safety on board. Life cycle costs are considerably reduced by a more efficient warship management and by the standardization of the electronic equipment on board.

High standard solutions

— Combining cutting-edge technology in process automation with leading expertise in shipbuilding, Seastema offers the state of the art of the Integrated Platform Management Systems. Typical scope of supply includes monitoring and control of machinery equipment, electrical and power generation systems, hull services, ship services and safety systems. All systems are designed to guarantee the highest level of redundancy for the maximum of availability, ship survivability and operability in case of damage or emergency conditions.

— A sophisticated set of specialized libraries, combining full access to all information and subsystems functionality with simplified operating functions that optimize crew intervention, are what make SEASNavy™ IPMS extremely appreciated by the end user customers.

STANDARD SUPPLY:

- _ Power Management System (PMS)
- _ Propulsion Control System
- _ Machinery Auxiliary Monitoring and Control
- _ Hull Services Control and Monitoring
- _ Battle Damage Control System

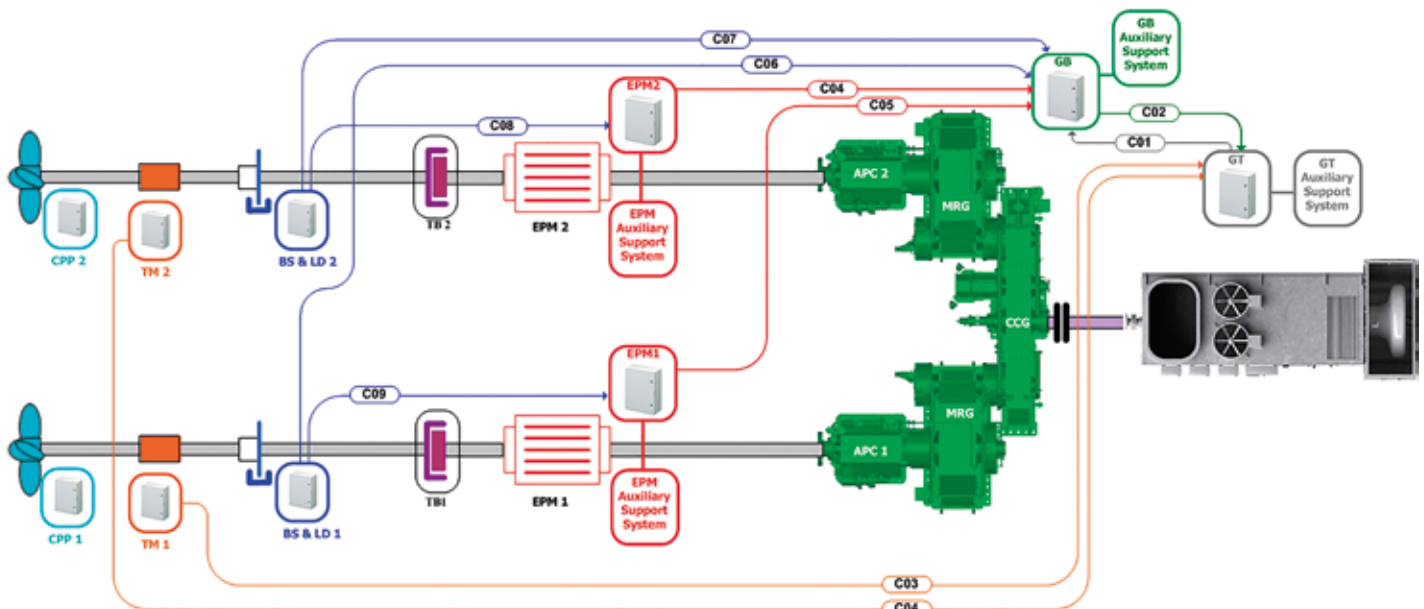
ADDITIONAL FEATURES:

- _ Integrated Condition Assessment System (ICAS)
- _ Propulsion Dynamic Simulation
- _ OnBoard and Ashore Training Systems
- _ Energy Management System
- _ Navigation Data Distribution Unit
- _ Integrated Bridge System



Leader in integrated solutions

— Open systems technology, leading expertise in developing large process automation systems and specific expertise in naval vessels platform management make Seastema the ideal partner in developing the high level of integration needed to improve Platform operation and efficiency. Our basic concept is the ship management operation through a single system with all subsystems managed through IPMS monitors. This vision extends the Integrated Platform Management concept to a Ship Management System that includes the full integration of the onboard electronic systems related to the Platform Management such as Navigation, Communication, CCTV, Safety and Security systems. Seastema solutions include extended packages that, with their high level of functional integration, provide advantages both in terms of smaller need for ship manning and more interoperability from single operator workplaces. A recent development towards the full integration is the Integrated Bridge and Platform Management System SEASNavy™ IBPMS, the integrated automation and navigation system where all electronic devices are connected to the same network and exchange the same information. This system enables the operator to work with the following packages by the same multifunctional operator workplace: Radar, Ecdis, Conning, Safety systems, Security systems and Machinery Automation.



PROPULSION SYSTEM INTEGRATION (PSI) CAPABILITIES:

- Seastema strong capability in Propulsion System Integration acquired through a long term experience in PSI especially for Naval Ships, is another added value that can be offered by Seastema.
- Propulsion Control aspects and all Mechanical and Naval engineering aspects are followed by a team of specialists that have experience in many projects for the Italian Navy and other important Navies.
- Today this competence is available also for the external market as well as the IPMS technology.



System reliability and availability

— System reliability and availability are guaranteed by system design, hardware products and their ability to withstand the toughest naval environments and improved by experience in thousands of applications where customer and classification society requirements were often surpassed. High level ease of use is obtained through fault-tolerant design, multi-level redundancy, on-line configuration, maintenance capability and advanced self-diagnostic tools.



DAMAGE CONTROL MIMIC OVERVIEW

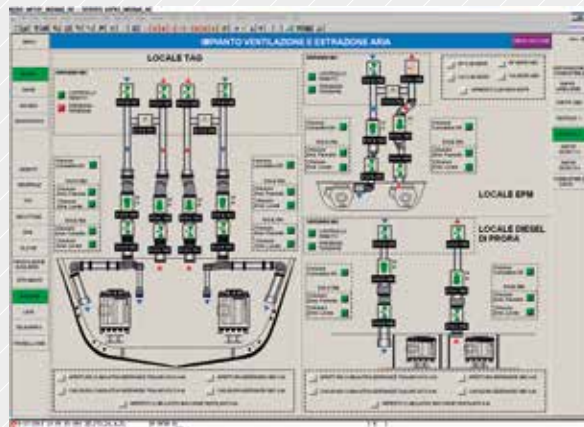


State of the art technology

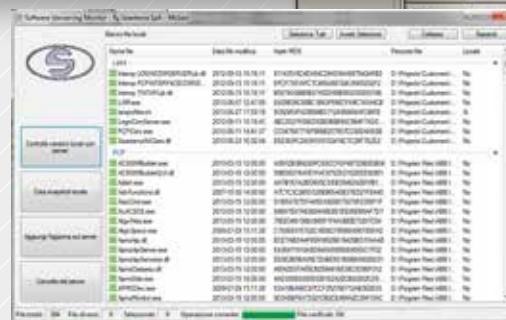
— Easy navigation through ship machinery information, immediate data access, storage and management are all enabled by SEASNav™ Platform, which is at the core of the system. Personalized workplaces, intuitive and flexible navigation for focused and fast information access, integrated data for informed decision-making and comprehensive operator functionality for reliable control are distinctive features of SEASNav™ IPMS. Readiness in obtaining information is vital in case of threat or damage.

— SEASNav™ object oriented technology presents the entire ship equipment information in a simple graphic way. To access information of any object, simply right click on it. The context menu appears with all the relevant information at the user's fingertips: equipment condition, operating manuals, drawings, operator notes, information for repair or maintenance. The application provides an extensive set of trending features and functions. Standard features are: zooming, maximum, minimum and mean value, ruler tool, X/Y plotting, export data to Excel files and a drag and drop function to create a trend function from a mimic display just with a mouse click. Extended archiving is also available with a set of powerful functions including collection and long term storage of data, reporting services, safe and secure storage and personalized data presentation.

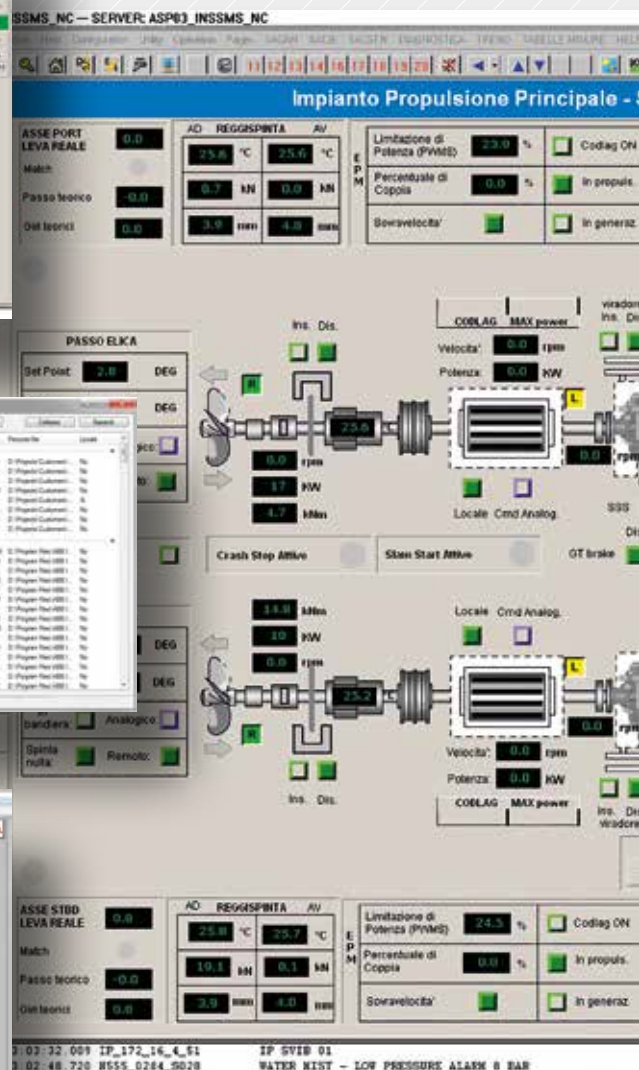
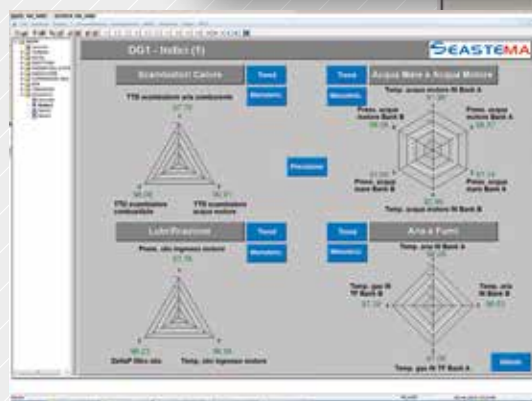
— PLANT
DETAILS PAGE



— ALARM PAGE



— MACHINERY
DIAGNOSTIC PAGE



The image shows a complex ship's bridge display system. The main display is titled "CONNING" and is divided into several sections. On the left, there's a "Sinottico per Large Screen Display" section with buttons for "AUX Prop. OT pronti in mod. Trascialli", "Aux EPM & HVTR Pronti al moto", and "EPM in marcia". The main display area includes a compass, speedometer, pitch and roll indicators, and engine torque/speed gauges. On the right, there's a "RISCS" (Risk) section with various alarm and status indicators. The bottom of the display shows a status bar with various numerical values and units.

Sinottico per Large Screen Display

APC PORT

- AUX Prop. OT pronti in mod. Trascinati
- Aux EPM & HVTR Pronti al moto
- EPM in marcia

TAG

NTC Richieste a TAGC: 1.23

TIC REM: 1.23 % TIC: 1.3

TIC digitale: ☐ TIC rem. allivato: ☐

Coppia su Asse (dNm): 0.0 Riferimento: 41.3

Calc: 1.7 Back: 1.6 Out. Limit: ☐

Potenza (kW): 0.0 Prodotto: 0.0

GRAFICI

Set On Epm Set Off Epm Set Passo Set On Tag

APC STBD

- Inserito
- Disinserito

GPU

- Override
- Ready for Operation
- Remoto

2 M 1

1 AL Alarm

USER_ADMIN ASP03_PSSMS



From requirements to turn-key projects

BASIC DESIGN

— The basic design of the automation system starts with the preliminary stage of close cooperation with the Navy to define the most efficient solution for them while also taking into consideration the warship's characteristics and operational requirements. Our considerable experience demonstrates that this approach results in a ship management system that provides added value to the whole ship.

PROJECT MANAGEMENT

— Meeting project targets is a must for our professional project management team. Shipyards and Navy organizations are supported from the beginning to the end of a project with a single contact point committed to implementing all technical and contractual requirements.

SYSTEM CONFIGURATION AND LAYOUT

— Based on our experience, system configuration, layout and cabinet dimensions can be defined in the early stages in order to help GA definition. Detailed information will follow during the project design phase.

SYSTEM SPECIFICATIONS

— Following functional specification and technical requirements, the project starts with detailed engineering and test specification, which are the basis for each project development, in compliance with our engineering process. Particular requirements, shock and vibrations requirements, fault and damage analysis and redundancies, are carefully analyzed in this phase.

SOFTWARE AND HARDWARE DESIGN

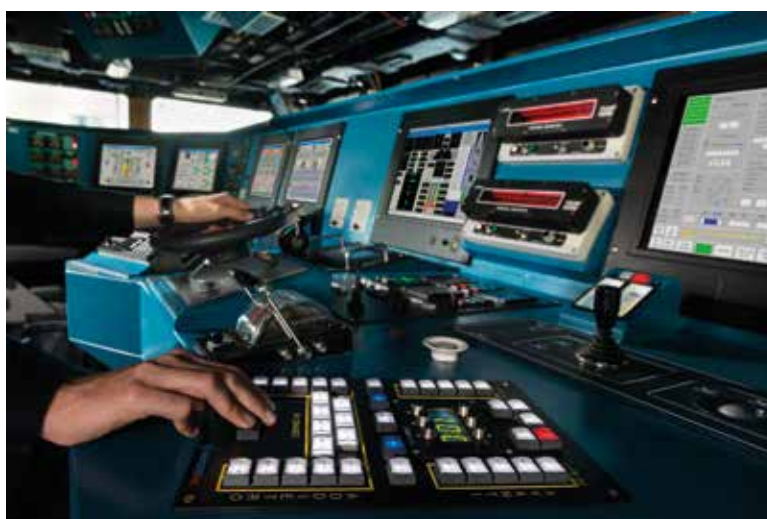
— Application software is the heart of the automation system. By combining our in-depth knowledge of ship processes, high-level programming tools and the SEASNavy™ set of standard libraries for naval vessels, we develop solutions that meet the most important requirements for fast and accurate control and human machine interface. The hardware design is also critical because it must be such as to meet all requirements for temperature, humidity, degree of protection, EMC, noise, shock and vibrations, redundancy, fault tolerance and, in case of damage, survivability.

INSTALLATION ACTIVITIES

— Correct system installation requires engineering, planning and supervision tasks ensuring that all work is punctually and accurately completed in accordance with all requirements. Our expert team ensures added value to projects all over the world, often in partnership with in-country organizations which can provide for local activities in order to ensure a more effective and faster assistance.

TESTING AND COMMISSIONING

— Testing activities are carefully planned; from the factory acceptance test that is carried out on the entire system, to on board tests where our commissioning team verifies that all interfaces are running correctly and make any necessary final adjustments during berthing and seatrials. Shock, vibration, EMC and noise requirements, and even particular demanding temperature requirements sometimes require specific tests that are performed in specialized laboratories.



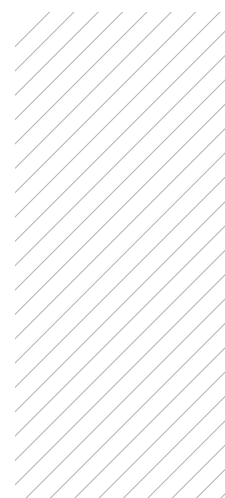
A commitment for the whole life cycle

— Service activities begin with the ship's operation and last for her entire lifetime. Seastema utilizes COTS products that have a very extensive life cycle, and provides 3 stages before obsolescence: Active products, Classic products (new developments are stopped) and Limited products (limited production). Next product generations overlap to existing ones in a way that enables transitions also skipping one generation. This fact allows Navy organizations to plan system upgrades only when necessary, reducing as much as possible the impact on the installed systems and ensuring a very long life time. To assist Navy officers all over the world, Seastema can rely on a worldwide flexible service organization that often involves also technical partners based in the operative area of the ships. The life cycle concept, the large use of COTS products available everywhere and the worldwide service network ensure high system availability during the whole operating life of the ship.



Added value applications

— The most advanced technologies in process automation, leading competences in naval vessels ship automation, and an in-depth knowledge of customers needs provide the ideal mix for the best solutions in a project. Our customer oriented organization ensures projects go smoothly, from project detail definition, together with Navy organizations, to project implementation, commissioning and ship delivery. Seastema's fully integrated solution for platform management is the key to safe and efficient vessel operation. The ship management system, as a single system collecting all single sub-systems and providing a unique plant interface to operators, is the quickest route towards a reduction of operating costs and an advance in ship operability for safer and more efficient warship operation. Seastema's commitment in helping customers improve ship efficiency and ship operations at all levels, together with our high level of customer care, functional knowledge, automation technologies and worldwide service network, result in a genuine added value to the ship.



Selected IPMS References



Project nameFFX-II (in progress)
 Owner Korean Navy
 Type of ships Frigate
 Shipyard DSME
 I/O channels 10 500



Ships's name (3 ships)..... Carlo Bergamini, Virgilio Fasan,
 Carlo Margottini
 Owner Italian Navy
 Type of ships FREMM Frigate
 Shipyard Fincantieri
 I/O channels 17 000



Ships's name Luigi Dattilio
 Owner Italian Coast Guard
 Type of ships MRSS
 Shipyard Fincantieri
 I/O channels 3 000



Ships's name Abu Dhabi
 Owner UAE Navy
 Type of ships Anti Submarine Warfare Corvette
 Shipyard Fincantieri
 I/O channels 3 000



Ships's name (2 ships)..... INS Shakti, INS Deepack
 Owner Indian Navy
 Type of ships Fleet Tanker
 Shipyard Fincantieri
 I/O channels 3 000



Ships's name (4 ships)..... Yasam, Umut, Güven, Dost
 Owner Turkish Coast Guard
 Type of ships Offshore Patrol Vessel
 Shipyard RMK
 I/O channels 3 500



Ships's name Cavour
 Owner Italian Navy
 Type of ships Air Craft Carrier
 Shipyard Fincantieri
 I/O channels 35 000



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SEASTEMA S.p.A.

Viale Brigata Bisagno, 2/41

16129 Genova - Italy

Tel. +39 010 9863600

Fax +39 010 9863678

info@seastema.it

www.seastema.it