OUR LAND IS THE SEA

▪ State of the art technologies
▪ Cutting edge performance
▪ Best value and low risk solutions
▪ Very low life cycle costs
▪ High flexibility for system’s customizations
NAVAL SYSTEMS

We are an international provider of advanced defence systems for surface combatant vessels. The company is able to equip all classes of vessels, each according to their mission requirements.

The company:
- Is customer-driven throughout projects
- Designs turn-key combat systems which integrate the company’s equipment or a combination of these and third party technologies
- Delivers reliable naval systems on-time and in compliance with military standards that meet the most demanding battlespace and environmental conditions at sea
- Runs low-risk projects thanks to a structured planning and design methodology which is applied when designing such mission critical systems
- Has provided equipment for more than 100 naval military units of varying size across 40 different navies.

MAJOR ACHIEVEMENTS

Ghannata Class FAC
Flyvefisken Class OPV
Falaj 2 Class OPV
Baynunah Class Corvette

FREMM Class Frigate
Horizon Class Destroyer
Bâtiment de Débarquement et de Soutien Logistique
Cavour Class Aircraft Carrier Vessel
DELIVERING RELIABLE COMBAT SYSTEM SOLUTIONS

The company runs very low risk integration. This is possible due to the company’s use of a design methodology which uses proven tools and processes to validate a combat system’s architecture before anything is physically installed on-board a vessel.

Modern Naval Combat Systems require new holistic approaches and processes to manage overall complexity. This is why we have developed a number of design methods, tools and processes that come into play at the combat system’s analysis phase.

The Integrated Systems Functional Modeling (ISFM) is the model driven system design method developed by the company to perform a complete analysis across the entire system life-cycle, from the requirements specification to the system integration within a simulated environment, up to the test and validation.

Combat system’s design phase starts with the CONOPS definition and also takes into account factors such as the expected operational scenarios the combatant vessel will face, the number of missions it will sail, target detection performance requirements, physical constraints of the vessel, the operational doctrine for weapon assignments and the desired reaction time and/or range of capabilities in engaging targets.

Once the requirements are defined, a deeper analysis of each is performed in order to design a functional architecture for the system. This architecture in turn ensures that the preliminary components of the combat system meet the overall performance requirements.

If the requirements are met, the architecture is fixed and the software development phase starts. This is followed by a number of phases covering integration and validation, first ashore and finally on-board the vessel in harbor and at sea.
DESIGNING AND TESTING COMBAT SYSTEMS TO EQUIP THE FUTURE SURFACE COMBATANT VESSELS

The company designs and validates the combat system architecture integrating the software of the Combat Management System (CMS) within a simulated environment known as Land-Based Test/Training Site (LBTS). The LBTS includes dedicated simulators of the vessel’s sensors and effectors to test the CMS. Depending on the scenario, the data used in the testing can be either synthetic or based on real environmental data.

The LBTS, in addition to simulating equipment, can integrate the real, physical parts of the combat system, allowing the equipment to be tested working with the CMS software prior to being installed onboard the vessel.

The LBTS itself can also be supplied to a customer alongside the combat system, providing a number of benefits including the ability to:

- Test and validate new equipment, either updates or upgrades software, testing it prior to installation on-board the vessel.
- Maintain and update specific component of the CMS software through dedicated configuration control tools.
- Insert new technologies according to new requirements or the established system growth plan.
- Create an integration site which features physical representations of a vessel’s main assets.
- Run crew training simulations; The LBTS can work seamlessly alongside other vessel’s LBTS centres and the real fleet.

SUPERIOR AWARENESS AND NETWORK ENABLED ASSETS

Combat management systems, command support systems, strategic support solutions and advanced C4I support (including land-based naval C4I) are all key to integrating and distributing information throughout armed forces’ networks.

The capability to process and convey secure information to each specific level of the command chain, according with the operational doctrines, is a tactical and strategic need to meet the requirements of modern armed and security forces, and not just limited to the joint operations.

The company is able to support customer’s naval information requirements at both tactical and strategic levels, ensuring the effective management of intelligence across the fleet.
COMBAT MANAGEMENT SYSTEM “ATHENA®”

The state of the art Combat Management System ATHENA (Architecture & Technologies Handling Electronic Naval Applications) provides officers and operators with the complete situational awareness of the battle-space at sea, above and under the water, in order to plan and quickly execute the reaction.

ATHENA® is modular and scalable, designed by The company to perform a full range of missions according to military standards:

▪ Anti-Air/Surface/Submarine Warfare
▪ Naval Firing Support and Littoral Warfare
▪ Maritime Security Operations and Situation awareness enhancements through Intelligence Library and Jane’s data
▪ Search & Rescue and Patrolling operations
▪ Aviation Support for UAV, helicopters and aircrafts
▪ Interceptor Organic Boats control

ATHENA covers all battle management functions, maximizing the integration of sensors and effectors within a multi-layered application, to comply with the most demanding requirements for Anti-Air Warfare, Anti-Surface Warfare & Naval Firing Support, Littoral Warfare, Anti-Submarine Warfare and Mining Warfare missions and scenarios.

With a range of non-combat data processing functions accessible from the system’s multifunction consoles, ATHENA is also useful in non-combat scenarios. These include law enforcement, maritime security operations, search and rescue missions, disaster relief operations, maritime pollution control, the surveillance and control of sea lanes and navigation routes and government escort duties.

ATHENA performs Threat Evaluation and Weapon Assignment (TEWA) in accordance with operational doctrine as well as Force TEWA (FTEWA) at force level to coordinate hard-kill resources.

ATHENA takes into account the customer’s operational doctrines with regards to sensor management, picture compilation, threat evaluation, engagement assessment and effector management and control.
ATHENA is able to:
- Manage a variety of sensors, collecting and integrating the data gained from each sensor’s unique detection capabilities to provide the best possible threat evaluation
- Control weapon assignment and the management of a vessel’s various effectors to maximize the effectiveness of the combat system in response to any threats
- Provide information integration and data-mining services for intelligence collected by national and allied assets during joint and cooperative missions.

ATHENA can gather, process and provide visualization for all types of sensor data including that from radar, optronic sensors and video (from Interceptor Organic Boats and/or UAVs).

The system has advanced tactical and planning decision support features and can be easily integrated with maritime C4I systems.
COMBAT SYSTEMS INTEGRATOR

Combat Systems Integration is an area in which we have a great deal of experience. The company has executed a number of challenging naval programmes of varying complexity using low-risk approaches that have benefitted from comprehensive design phases.

Able to deliver combat systems that are state-of-the-art whilst remaining reliable, the company can turn ships into combatant surface vessels suitable for a wide range of missions.

We deliver combat systems that integrate: Sensors (active, passive, above water, underwater, etc..) which gather information on the local situation to evaluate the current level of threat; Effectors (active, passive, above water, underwater, etc..) which defend or attack in response to threats.

ATHENA both integrates the data collected from the sensors and controls the effectors, ensuring the combat system delivers the highest possible performance during any operations at sea.

A number of guns were integrated either within our Fire Control Systems or Combat Management Systems.

We are able to provide turn-key Combat Systems solutions through the integration of combat system equipment provided either by OTO Melara (Guns and AAW Decoys supplier), Whitehead Sistemi Subacquei (underwater sensors, decoys and missiles supplier), MBDA (Surface-to-Air Missiles supplier) and Elettronica (Electronic Warfare Systems supplier) or alternative manufacturers.

In addition, we are able to act as a ‘mast integrator’. Here, the company integrates non-rotating sensors and communications systems within a ship’s mast, providing multiple and high reliable lines of sight and compact architecture while avoiding electromagnetic conflicts.

The company can also offer its own solution of integrated mast UNIMAST (UNIque MAST), a scalable architecture (currently comprising UNIMAST 1000, 2000 and 3000) designed to meet the requirements of a wide range of surface combat vessels.
INTEGRATION, NAVIGATION AND COMBAT MANAGEMENT SUPPORT SYSTEMS

The company provides and integrates any navigation systems within the Combat Management System architecture.

We are able to provide turn-key navigation systems solutions based on the company's Navigation Data Distribution Unit (NDDU), navigation radars such as the Low Probability of Intercept radar SPN-730 and its associated multifunction consoles to provide ARPA and WECDIS functions. The NDDU gathers data from a number of navigation sources such as gyros, meteo data, speed log and DGPS and properly distributes this information to the combat system network.

The information can then be used by the combat management and fire control systems to aid with ballistic calculations and support ATHENA with the definition of a vessel’s engagement plan. ATHENA also integrates any W-AIS system to correlate all information and data available.

Additional capabilities can be added to a vessel’s combat system architecture in order to improve a crew’s awareness, especially against asymmetric threats such as fast attack craft or attacks which take place outside of formal conflicts.

The recurring theme in asymmetric warfare scenarios is that attackers will aim to find the most unconventional method (i.e.: jet sky, small and very fast armed boats, etc..) and unexpected time to attack. In response to this, the ATHENA combat management system is ideally suited for handling Communications Intelligence (COMINT) through enhanced integration of Communications-Electronic Support Measures (C-ESM) as part of overt or covert reconnaissance operations and network-centric warfare. With this capability, naval units can exploit the electromagnetic spectrum and intercept their adversaries’ communications to counter conventional, asymmetric, criminal, or terrorist threats against coastlines, national borders, and logistics channels.

We can select and integrate any Remotely Piloted Air Systems (RPAS), Unmanned Underwater Vehicles (UUVs) and/or video data provided by Interceptor Organic Boats within its ATHENA combat management system.

The Automatic Dependent Surveillance-Broadcast (ADS-B) system can be added to the combat system architecture to support an airborne fleet and to complement data processed by the ATHENA combat management system to provide the aviation support capability.

Integrated Platform Management System (IPMS) solutions can also be integrated as well as supplied to provide features such as ship safety and security management and guidance, and navigation management.

The company designs and integrates any type of multifunction console and provides tactical tables solutions.

Our tactical table displays a common operational picture on large multi-touch displays (55”-60”). The tactical table can integrate data from external sources and provide mission planning, mission execution monitoring, mission control and debriefing facilities.

Remote control panels can be provided in order to allow the distribution of essential information to wherever it is needed.
A key part of any naval combat system is the gunfire support capability against air/surface threats. Our family of Gun Fire Control Systems (GFCS) integrate with any vessel’s navigation suite to provide a basic, but already effective, combat system architecture for small combatant vessels.

NA-25X is a GFCS that can control all caliber of guns used in anti-air and anti-surface combat scenarios. Support for close-in weapon systems and ammunition control is built-in and up to three guns of varying caliber can be controlled by the NA-25X’s processing unit.

The NA-30S includes all of the NA-25X’s capabilities and in addition also interfaces with a continuous-wave transmitter. By doing this, the NA-30S supports the successful engagement of airborne and surface threats by illuminating the targets. The latest version, NA-30S Mk2, is designed to operate with a dual-band radar to provide superior tracking performance and special ammunition support.

NA-30S Mk2 combines features of GFCS in X-Band and the ammunition illumination capabilities provided by NA-30K, the GFCS of the STRALES system.

The number of gunfire control systems on a vessel is scaled in accordance with the combat system’s requirements and its need for multiple lines of sight. The gunfire control systems can be combined with either electro-optic sensors or radars within a variety of integrated artillery systems. These systems can autonomously perform effective short and medium-range inner-layer defence.

Each GFCS can be integrated within a vessel’s combat management system architecture in order to perform according to its specific operational doctrine.

We can also provide one of the smallest GFCS available; the Medusa Mk4/B. An EO/IR GFCS based on a multi-sensor pedestal with up to four passive sensors, the Medusa can integrate laser, infrared and TV camera sensors (both black and white and/or colour).
THE MOST COMPREHENSIVE RADAR PORTFOLIO

The company has a comprehensive radar portfolio covering X-band, C-band, S-band and L-band. The wide range means a customer can find a perfect fit for a given application, be it navigation, air and surface surveillance, tracking or over-the-horizon scanning. With multifunction capabilities on offer, the range of radars can meet even the most demanding requirements.

For navigation, we offer the SPN-730 Low Probability of Intercept (LPI) radar. High performance and IMO compliant, the SPN-730 can operate in a ‘silent mission’ mode when required.

For surveillance, the SPS-732 and RAN-30X operate in X-band and offer ranges of more than 180km. 2D multi-role radars, they can be installed onboard small and medium surface combat vessels to fulfill a variety of operational roles.

For those who require an S-band surveillance radar, the RAN-21S provides 2D, dual-mode air and surface scanning up to 120km.

For surface combatant vessels of 400 gross tons and above, the KRONOS® NAVAL can be fitted onboard. Offering Active Electronically Scanned Array (AESA) technology in the C-band, KRONOS NAVAL is the only multi-function radar on the market with an antenna group that weighs less than 1000 kilograms. KRONOS NAVAL High Power is able to provide increased performance in range detection.

Also part of the KRONOS family, the KRONOS GRAND NAVAL is a multi-function AESA radar that acts as main asset of the Principal Anti-Air Missile System for heavy surface combatant vessels.

Applications of the KRONOS GRAND NAVAL include extended self-defence and area protection, air and sea surveillance, multi-target tracking, volumetric search and guidance for multiple active missiles.

For early warning, the L-Band 3D solid state radar RAN-40L provides instrumental range of 400km. The latest generation of the radar, the RAN-40L Mk2 can provide surface combat vessels with enhanced anti-tactical ballistic missile (ATBM) capabilities.

The company also offers a complete line of tracking radars. The ORION RTN-25X/RTN-30X/RTN-Mk2 radars are the primary sensors in the NA-25X/NA-30S/NA-30S Mk2 fire control systems.

The company’s portfolio of secondary surveillance radars is one of the most comprehensive internationally. The SIR-M family of radars range from simpler compact variants to sophisticated architectures that can integrate both rotating or fixed-face / conformal antennas.

All of our dual and tri band AESA radar technologies have been designed with scalability in mind. This means that they can form the core of an integrated mast solution which combines X-band, C-Band and L-band fixed panels with different number of transmitter receiver modules.
The company is a leader in electro-optical (EO) technologies and systems, providing high-performance EO products for the most demanding requirements of customers worldwide. This position is based on the company’s research and manufacturing experience in the core elements of an EO system including its infrared detector, stabilized EO director and image processing algorithms. The company has a great deal of integration expertise installing EO products on naval vessels, land vehicles and avionic platforms.

**MEDUSA MK4/B**
MEDUSA MK4/B is a lightweight Gun Fire Control System (GFCS) for anti-air and surface warfare, based on enhanced and unmanned self-stabilized EOIR pedestal, which is modular and open to a variety of cameras selection.

The GFCS Medusa MK4/B controls medium/small caliber guns, and provides passive surveillance for sea control, search and rescue operations and main asset against surface asymmetric threats.

MEDUSA can be fitted with up to four sensors: B/W TV, Laser, IR; and an optional colour TV. The system can be installed on board small patrol vessels, providing panoramic IRST feature to improve the situational awareness at sea.

The system can be provided with its own console, displaying the data provided by the cameras and laser, and by search or navigation radars. It is open to get target designations from external sources as Target Designation Sights and Command & Control.

MEDUSA MK4/B-LR provides an improved long range night surveillance and detection.

**JANUS**
Janus is an electro-optical, multi-functional, panoramic aiming and anti-aircraft sight. Janus is fitted with passive IR, TVCCD and laser range finder sensors to meet a modern vessel’s day and night surveillance requirements. The sight is ideal for maritime navigation and patrol, search and rescue and harbour surveillance and protection.

**SASS™**
The Silent Acquisition and Surveillance System (SASS) is an InfraRed Search and Track (IRST) system which detects and tracks air and surface targets and offers 360° horizontal coverage. It operates simultaneously in the MWIR and LWIR spectral bands.
COMMUNICATIONS SYSTEMS

The company is uniquely placed to lead the delivery of Network Enabled Capability. We have proven, in-service, modular, scalable, secure systems, designed to function at the heart of modern military operations, enabling interoperability with allies, joint forces and civil authorities for effective exploitation of information. The company is a founder member of EURO MIDS and also provide Information Assurance services, including digital forensics, vulnerability testing and ICT security consultancy.

With experience playing a leading role in several naval communications programmes, we can provide:
- Strategic communications systems and Satcom
- Messaging and information systems
- Cryptographic equipment
- Naval radios
- Maritime networks
- Navy shore stations
- Specialist antennas and Electromagnetic modeling

V/UHF Transceiver
Multi-band and multi-function transceiver to provide reliable voice and data LOS services for ship-to-ship/aircraft military communications. An embedded RF amplifier saves in door space.

UHF Satellite Terminal
Full hemispherical coverage for satellite access is provided through stabilized phased array antennas. The terminal is JITS accredited for US/NATO interoperability, allowing fully-meshed, starred and hybrid connectivity with all terminals served by the network control centre for voice and data services.

LF/MF/HF Transceivers
The company designed a modular and broadband architecture, which enables the highest number of RF channels per antenna, without the need for antenna tuning units. The transceivers are highly adaptable to include V/UHF, L11/L22 and EPM (HQ II and SATURN), satcom and to support all NATO standard voice and data waveforms. They provide synchronous 3rd Generation Automatic Link Establishment over HF, exceeding VSWR RF power performance standards.
NAVAL SYSTEMS

X/Ku Satellite Terminal
This terminal provides two-way communications via military (X-Band) and civilian (Ku-Band) satellite systems. The two antennas share a single modem, therefore only one airtime contract is required. The terminal provides multi-transponder, fully-meshed connectivity with all terminals served by the network control centre for voice, fax, high speed data services. Video services use an asymmetric link (DVB S2 RCS) to allow the use of small antennas.

Voice User Terminal
The terminal is designed to provide military organizations with a VoIP with military extensions such as priority, conference, security and PTT signaling. It provides access to a pool of communications assets and services, such as radio transceivers or warning and order distribution systems. Simultaneous access to up to four audio channels is provided by a single terminal.

The phone eliminates other devices through direct provision of multiple facilities. High system redundancy and layout flexibility is achieved by means of two Ethernet optical interfaces with dual homing connections to the network. Access to services is managed through user profiles and log-on at any terminal. A centralized database is not required.

Military Messaging System
The naval messaging system delivers secure message authoring, transmission, receipt and management in compliance with NATO standards (ACP 127, STANAG4406).

Voice and Data Encryption
The company supplies NATO and worldwide navies with compact and ruggedized encryption solutions for voice, data and IP communications, facilitating highly resilient secure communications at data rates of up to155Mbps.
**Wireless System**
Amongst the other standards supported, the handheld radio system compliant with ETSI TETRA V+D compliant is tailored to vessel size and mission needs.

**Communications Management System**
The system offers secure management and monitoring of all communications equipment enabling seamless links with Command & Control management systems. The software architecture is modular and open to meet future requirements. The Man Machine Interface is user friendly and intuitive.

**HF2000**
HF2000 is the fully automatic High Frequency (HF) network solution to deliver low cost and reliable communications to both military and civilian end users. Beyond Line-of-Sight HF Communications is managed by HF2000.

Third generation automatic link establishment (3G ALE) algorithms are implemented against all factors (i.e: day time, sun spot activity, etc..) that affect the propagation of HF radio waves. HF2000 continuously monitors link quality selecting itself the best transmission frequency.

The HF2000 system is suitable for operation at sea as well as ashore.

**Multi-Data Link Processor M-DLP**
M-DLP enhances a vessel’s combat management capabilities. The M-DLP enables command and control integration in network enabled centric scenarios. A number of tactical data links can be configured according to customer’s requirements. M-DLP is already provides Link11-A/B, Link16, JREAP, Link22, and VMF.
SERVICES AND SUPPORT SOLUTIONS

The company has more than 50 years’ experience in designing supportability programmes and providing in-service support for combat systems delivered worldwide.

We provide services and support solutions as Integrated Logistic Support, In-Service Support and Customer Logistic Support.

Integrated Logistic Support includes:
- Logistic studies as obsolescence management and in-service systems analysis
- Maintenance concept definition
- Technical publications
- Training
- Initial Provisioning and Spare Parts on board and ashore
- Special Tools & Equipments
- Warranty

The maintenance concept and maintenance organization are defined according with MIL-STD-1388. Spare parts are sized according with the ship’s mission profile.

The company can provide through life cycle support solutions based transfer of capability up to third and fourth levels of maintenance

In-service support services includes tailored scope of supply for ILS as well as:
- Naval base support and monitoring
- Dedicated tutorial programmes
- Customized services
- Maintenance and field engineering support
- Service level agreements

Extended services and support solutions can be customized taking into account the following solutions.

Computer Basic Training
To provide the customer with independency in the training at every operational level

T1 Module: Remote Monitoring
The T1 module performs the remote monitor/display of the operating parameters, status and failure messages with the direct link to the related technical documents like IETM manuals.

T2 Module: Remote Control
The T2 Module gives the “maintenance remote control” facilities providing operating and configuration parameters modification, according to the user profile and the equipment status.
**T3 Module: Remote Diagnosis**
The T3 Module performs the equipment data processing and analysis in order to make a deeper diagnosis and anticipate possible failures. It provides failures propagation to next higher assembly using FMEA/FMECA tables, Boolean and fuzzy logic, Bayesian networks and correlation/reciprocal relation algorithms.

**T4 Module: Remote Configuration**
The T4 module carries out the on site system configuration using the RF-Id technology in real-time. It provides an easy way to manage installed assets and to track maintenance activities.

**T5 Module: Remote Collaboration**
The T5 Module performs remote support services through an innovative collaborative environment using the most advanced audio/video streaming facilities. These services are also integrated with Customer Support Service Desk that provide the whole technical assistance services.