WORLD LEADING SUPPLIER AND INTEGRATOR OF NAVAL COMBAT SYSTEMS FOR SURFACE SHIPS

Intelligent Maritime Solutions
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Thales Above Water Systems has been proudly serving the world’s navies for over 85 years. During this period we have made it a lasting habit to listen very closely to our customer’s operational needs. This has resulted in many technological world firsts in our sensors (we have the most extensive radar portfolio in the world) as well as in our combat management systems.

WE CREATE INTELLIGENT MARITIME SOLUTIONS

The closeness to our customers also resulted in moving up the value chain and in taking the logical step from being the trusted integrator of combat systems to becoming the architect of complete maritime solutions. Our services encompass all the mission capabilities of a naval vessel, ranging from anti-air warfare, surface warfare, anti-submarine warfare, to peacekeeping missions and coalition operations.

Our combat management system is the glue that integrates everything. It is the only true Open System Architecture available in the market. Its business model is as open as the system itself through a Global Asset Store (page 7) where the system is produced locally all over the world.

Apart from these combat management systems, integrating all sorts of subsystems into the ship, Thales also developed specific solutions for just one specific integration job such as one surveillance sensor or one fire control sensor to a stand alone system or to be connected to an existing configuration. These compact CSCS and CFCS solutions provide modern operational add-on capabilities to (existing) mission critical systems.

For non-military mission systems Thales has developed the right solutions for sea and shore coastal patrols connected to Maritime Safety & Security assets. Within the field of MSS a special dedicated organization has been established.

NATO projects at the other end of the spectrum have wide attention through our efforts for ACCS and with some navies for Ballistic Missile Defense and Land Attack capability initiatives.

In this brochure you will get top-level information on Thales’ capabilities in the above water systems domain. We offer the most complete product portfolio in the world with respect to radar (page 16), sonar, electronic warfare (page 26), combat management systems (page 6), and communications (page 27). Please feel free to contact us for more in-depth information.
At the heart of a Naval vessel you’ll find the combat management system. This integrates all the ship’s sensors and information of other parties into superb real time situational awareness.

Thales’ answer to the combat management needs of the world’s navies is a CMS family called TACTICOS. The architecture on which the Thales CMS family is based ensures real time reliability up to the last working processor on board. It is an open system, which treats all information equal. It takes care of the indigenous sensors just the same as other platform sensors or information from tactical data links, databases and sources such as AIS or Lloyd’s.

TACTICOS is famous for its reliability and its ability to integrate virtually anything. The massive installed base and the unparalleled track record of integration have ensured a continuous evolution. Due to its solid legacy it has become the world’s finest combat management system in service with well over 50 navies (both Nato and non-Nato) on more than 130 platforms of all types. Thales has got experience in integrating over 90 different sensors and effectors in TACTICOS. On average an upgrade program features around ten sub systems that are to be integrated. Due to its integration experience Thales is superbly positioned to conduct these types of programs low-risk, within schedule and budget.

TACTICOS under its current trade name has been around since the early nineties, earning operational respect all over the world. This success is based on continuous evolution and development. Also processes and business models evolve. The first systems were written and developed in Hengelo, the Netherlands.

Nowadays a Global Asset Store already numbering well over 50 back offices worldwide strive to improve the system and to meet customer requirements, since no navy is the same. In a way this distributed business model reflects the open and distributed architecture of the TACTICOS system itself.

The TACTICOS CMS family is fully scaleable and serves the operational needs from the smallest OPV right up to the largest fleets. However, there are situations and scenarios for which full CMS capability in any size is not necessary.

COMMANDER C3
COMMANDER C3 is Thales’ Marine Command, Control, and Communications System for non-Combatant applications. It provides seamless near real-time sharing of the Common Operating Picture (contact data, messages, and geo-referenced map overlays) between vessels, helicopters, and shore installations. COMMANDER C3 also provides gateway interfaces to achieve interoperability with major naval data link standards. The system is ideal for both civilian and military users who require an effective, affordable solution to address the technical and interoperability challenges associated with co-operation and co-ordination of various maritime agencies.

Compact Sensor & Control System (CSCS)
The Compact Sensor & Control System services the small ship market providing command and control, even AIS. It can be integrated with fire control systems in order to achieve full combat system capabilities. It is based on open-standards and architecture and capitalizes on the use of COTS technology.
It is in the early nineties that Thales started to market its Combat Management System under its current name SEWACO-FD/TACTICOS. At that time the underlying fully distributed architecture was used as real-time and fully distributed core for SPLICE middleware solution upon which TACTICOS was build. With SEWACO-FD at its heart TACTICOS was and is through the adoption of OPEN-SPLICE from Prism tech compliant with the OMG-DDS standard, a truly open architecture. The middleware and the applications have been under continuous evolution in the many programs that the Combat Management System has been part of over the decades. Bottom line in this approach is that the best of the legacy is kept – such as interfaces with effectors – and that new applications are being developed from scratch according to the needs of the new program. This way TACTICOS keeps in its development a perfect balance between completely new components on the one hand and trusted elements on the other. Innovating, while keeping risks low.
Critical combat situations have proven that the optimum use of the complex and complete CMS comes from optimum Human Computer Interface (HCI) and through the optimised lay-out of the Combat Information Centre (CIC) or Ops Room. Thales has extensive experience and supports customers by designing an optimal layout and arrangement of these rooms. Using an interactive Virtual Reality environment and taking into account all possible human and ergonomic effects, the most suitable placement for operators in their operational tasks will guarantee the operational capabilities our Naval customers require.

Multifunction Operator Console
The MOC MK3 (Multifunction Operator Console) is Thales' latest step in the evolution of consoles for naval applications. MOC MK3 can be used to support combat system applications, (integrated) bridge systems, command positions, shore-based centres and training facilities, software development centres, land-based test sites, or brief/debrief facilities. Different types of MOCs are available, depending the space in the Operations Room (or CIC) and the manning/operational requirements.

This includes all aspects related to the optimum functional, technical and physical integration between combat system components themselves (CMS, tactical data link radar, optronics, sonar, weapon control, weapons, ESM, ECM, navigation, communication etc.) and between the combat system and the platform (the ship). Thales has a proven track record in this art of system engineering and system management and has performed numerous programs as Combat System Integrator and Prime Contractor. The main benefit for the customer is the reduction or elimination of risks associated with naval shipbuilding or modernisation projects. Thales in its role as Lead System Integrator accepts responsibility for the administration and execution of all activities required to define, procure, install, test and validate the combat system related items so that the required capabilities are proven to function according to the performance specifications.

Program Management
Operational and technical developments over the last decades have introduced complex combat systems, which require specialised skills and dedicated teams to achieve integrated combat systems with optimum warfare capabilities. Program management encompasses the following:
- Application of solid engineering and management
- Overall program control and co-ordination of activities
- Progress control for all subsystems
- Input to the contractor for overall combat system progress control
- Risk management
- Experience through many years with virtually all sensor and weapons system suppliers
- Knowledgeable in handling TAA with the US DOD and US industries
- Subcontractor management
- Multi site development work management across countries and cultures
- Multi-lingual workforce
- Used to work with firm fixed contracts

The main purpose of Lead System Integration (LSI) is to ensure delivery of new or modernised Combat Systems within budget and schedule and according to the specifications in order to ensure a vessel’s optimum and continued warfare capability throughout its planned life cycle.
Thales offers comprehensive Maritime Safety and Security (MSS) Solutions. Customers can be Navies, Coastguards and civil administrations and agencies such as Transport, Fisheries, Border Guard, and Maritime Police etc.

The Thales MSS systems may range from single coastal radar stations (if required including optronics, Automatic Identification System, communications and a local control center) to full-fledged integrated coastal surveillance networks involving numerous sensor stations, linked through an information system backbone and completed with all required presentation, communication, information and database facilities on local, regional and/or national level as required. This can also include integration with other maritime surveillance sources such as patrol vessels and maritime surveillance aircraft.

Thales can provide own equipment such as radars (COASTWATCHER, SEAKER) optronics, communications, vessel tracking systems, systems network etc. or can use third party equipment, depending on the customers’ requirements. System integration and program management is performed according to the same proven procedures as for the naval combat systems.
On many naval ships it is common practice to switch some systems off before others can be activated, in order to avoid interference problems. Thales has developed an Integrated Sensor & Communication System (ISCS). This Integrated Mast (I-Mast) will accommodate, depending on the customer’s specifications, surveillance radar, tracking radar, an electro-optical short-range surveillance system, and several communication systems.

The benefits of integrating all these systems in one deck structure are huge. First of all, they are designed to operate simultaneously, so that all risk of interference has already been eliminated on the drawing board. I-Masts are made of radar-transparent material and make separate system housings unnecessary. This means that maintenance can be done from the inside.

As the sensors and communication units in the I-Mast structure are positioned close to each other, they do not need their own cooling and power supply systems. Instead, the I-Mast has one central power and cooling capability for all units inside. If the I-Mast is installed on a corvette or patrol ship, it offers a substantial contribution to the reduction of the number of personnel on board, thus reducing the operational costs of the ship. Another advantage for shipyards is the fact that integration risks have been radically decreased due to the fact that integration of the sensors into the structure are done at once at the Thales vicinity. This means time saving in the over-all building time of a naval vessel.

A traditional naval ship, with its many antennas and its rotating radars is easy to detect by any radar for its many irregular surfaces create a large radar cross section. A ship with only Thales’ I-Mast is much more stealthy, making the ship more effective and providing more security to its crew.

I-Masts are a modular concept. Thales has developed surveillance and tracking sensors that are optimised for operating in the I-Mast, but the customer may require the installation of other sensors and for communication antennas. In such an event, Thales will assume the role of system integrator and makes its expertise available to the customer so that the original advantages of an Integrated Sensor and Communication system are maintained. At present the first I-Masts are under contract with the Royal Netherlands Navy as part of their Ocean Patrol Vessel program.

I-Masts are offered in various sizes to fit most ship classes from FPBs (I-Mast 100), to corvettes (I-Mast 400) and frigates (I-Mast 500).

Modern naval vessels are equipped with many sensors and communication systems, each requiring their own antenna. The radiation emitted by all these antennas may give rise to interference problems. Several serious accidents have been recorded that were caused by interference from other radiation sources on the same ship.
MULTIFUNCTION RADARS

**APAR**
APAR is the world’s first operational I-band Active Phased Array Radar providing the multifunction capabilities required for the modern anti-ship missile threat. Capabilities include multiple target detection & tracking and multiple missile control based on mid-course guidance and terminal homing. Continuous Wave generation and Interrupted Continuous Wave Illumination (ICWI) are built-in features of APAR. Providing powerful system architecture with a high level of redundancy, the four fixed antenna faces cover non-stop and simultaneous a 360° detection area. APAR is the result of a tri-national development, in which Thales is the prime contractor, and which involves governments and industries from The Netherlands, Germany and Canada. APAR is now fully operational on the Netherlands Navy “De Zeven Provinciën” class and the German Navy “Sachsen” class and is contracted by the Royal Danish Navy.

**HERAKLES**
HERAKLES is a 3D rotating multifunction radar that is designed to be the sole radar on board of major naval platforms. It concurrently performs all functions involved in the establishment of air and surface pictures. HERAKLES performs target detection and tracking, target classification, weapon assignment and deployment and missile up-link guidance. HERAKLES is optimised to detect and track multiple SSM, ARM, diving missiles, fighters and helicopters in littoral environments. This system has an exceptionally high reliability and operational availability, thanks to its all-solid-state and high-redundancy architecture.

SURVEILLANCE RADARS

**SMART-L/S1850M**
The SMART-L Volume Search Radar is a member of our advanced 3D multi-beam radar family. Operating in D-band, SMART-L provides a very long-range coverage (400 km radius), as well as up to 70° of elevation. State-of-the-art technology, combined with refined signal processing, guarantees excellent performance, especially against stealthy targets in a littoral environment. SMART-L also can be fitted with anti-ballistic missile defence capabilities. The S1850M Volume Search Radar is a SMART-L based radar, designed and produced in co-operation with Alenia Marconi Systems and with specific customer adaptations. The SMART-L/S1850M is the de facto standard of the major European navies for their long-range 3D radar requirements. This system could well be one of the pillars in NATO TBMD.

**SMART-S Mk2**
The latest design in Thales’ proven 3D multi-beam radar family is the SMART-S Mk2. This radar operates in F-band and is optimised for medium-to-long range surveillance, target designation and accurate air and surface target tracking in littoral environments. SMART-S Mk2 matches the full performance envelope of modern surface-to-air missiles such as the Evolved SeaSparrow Missile (ESSM) and is suitable as main air and surface surveillance radar for light frigates, corvettes and LPD/amphibious ships. The radar offers two main modes, up to 250 km range, 70° elevation coverage, a special helicopter mode, surface fire control channels, high reliability and ease of installation and maintenance. SMART-S Mk2 is the optimal sensor for a powerful weapon & sensor suite.

**MRR-3D NG**
MRR-3D NG is a G-band multi-role radar designed for medium-to-long range (180 km) surveillance and self-defence. The radar performs 3D air and 2D surface target detection and tracking, is highly accurate and has short reaction times. The MRR-3D NG also performs automatic helicopter detection and classification, including pop-up and stationary helicopter over ground, and helicopter short-range control. The system controls surface gunfire.

The Thales surveillance systems portfolio consists of a wide range of 2D and 3D active and passive surveillance sensors covering both short- and long-range surveillance and target designation requirements for all naval vessels. The portfolio also includes coastal surveillance radars.
SCOUT Mk2
SCOUT Mk2 is a Low Probability of Intercept (LPI) surface surveillance and tactical navigation radar operating in I-band. This radar operates on the Frequency Modulated Continuous Wave (FMCW) principle and therefore has an extremely low output power. This qualifies SCOUT Mk2 as a “silent radar” whose transmissions cannot be detected by ESM systems or radar warning receivers. SCOUT Mk2 outstandingly detects targets in adverse sea clutter conditions, thanks to its very small range cell size. The system is also very suitable for coastal surveillance.

VARIANT
VARIANT is a multi-role, short-to-medium range (up to 70 km) 2D air and surface surveillance radar which simultaneously operates in I- and G-bands. The fully stabilised VARIANT provides automatic-target detection, initiation and tracking for air targets. For surface targets, three fire control track-while-scan channels are available to support direct target gun engagement. A helicopter control mode is also available. An integrated Low Probability of Intercept (LPI) surface surveillance radar (SCOUT) completes the system.

SIRIUS
SIRIUS is the latest addition in the IRST field. SIRIUS provides continuous passive horizon search against sea-skimming anti-ship missiles. This stabilised and fast rotating IRST system operates simultaneously in two wavelengths (3-5 µm and 8-12 µm) and provides long-range passive surveillance with a high datarate under all atmospheric conditions. Completing the on-board surveillance radar equipment, SIRIUS ensures an effective capability against all threats, especially under restricted Emission Control (EMCON) circumstances.

GATEKEEPER
GATEKEEPER is the latest addition in the passive surveillance product family. Non-rotating (staring) IR/TV cameras provide continuously a 360° panoramic visual overview of the own ship environment. Adequate tracking facilities are provided to track even the smallest surface target. GATEKEEPER has been designed as an automatic own ship close-range security sensor when in harbour, at anchor or sailing close to unfriendly shores. The system is ideally suited as clip-on for existing platforms.
COASTAL SURVEILLANCE RADARS

**COASTWATCHER 100**
COASTWATCHER 100 is a medium-to-long range radar system designed for maritime surveillance. The radar is optimised for long-range detection and accurate localisation of small surface or low altitude air targets in difficult sea conditions, with automatic initiation and tracking of surface and air targets. These features make COASTWATCHER 100 particularly efficient in guiding aircraft or helicopters during search and rescue (SAR) or police/coastguard operations. The solid state technology and automatic reconfiguration ensure very high reliability. The radar can be operated autonomously (locally or remote controlled) or can be integrated in a chain of several other radar stations, which are linked to one or more control centres. COASTWATCHER 100 is designed to operate automatically round the clock on unmanned sites.

**COASTWATCHER 10**
COASTWATCHER 10 is a short-to-medium range radar for coastal surveillance. The radar is optimised for small target detection and tracking in territorial waters. It combines a FURUNO marine radar with THALES high performance processing units. COASTWATCHER 10 is ideal for low altitude site and for upgrade of existing VTS station for security applications. It ensure ultimate ease of maintenance through FURUNO spares depots worldwide. The radar can be operated autonomously (locally or remote controlled) allowing the site to be unmanned.

**SEAKER**
SEAKER is part of the Thales LPI radar family. This lightweight and compact coastal radar combines low output power with portability, good detection ranges on small targets and ease of installation and operational use. SEAKER can be easily integrated in a (wireless) radar and communication network by using Internet IP address protocols. This sector scanning radar is perfectly suited for e.g. harbour and offshore platform security functions. SEAKER cannot be detected.

WEAPON CONTROL SYSTEMS

**STIR**
The STIR is a medium-to-long range tracking and illumination radar. The system has been designed primarily to control point and area defence missile systems such as NATO SeaSparrow, ESSM and Standard Missiles (SM-1 and SM-2). A second application is the direct control of guns of various calibres. The STIR 180 with both I- and K-band facilities provides excellent low-level target tracking for missile and gun control. All STIR configurations have optional TV/IR tracking capabilities. STIR technology stands for high accuracy, excellent performance and extensive ECCM capabilities. STIR is a well-proven system. More than 150 STIRs are operational with eleven navies, including six NATO navies.

**STING-EO Mk2**
STING-EO Mk2 is a highly capable, medium range, lightweight, dual band (I and K) weapon control system, primarily for gun control. STING-EO Mk2 combines a 1.2 m radar director with a full set of electro-optic equipment (TV/IR/laser), including optronic tracking and an automatic ‘best sensor’ selection process. The three data sources (I, K and EO) provide high redundancy, high performance and ECCM resistance. A shell-measuring feature is incorporated to support facilities such as Pre-Action Calibration (PAC) and Miss Distance Indication (MDI). The fully solid state STING-EO Mk2 provides the best weapon control for medium-sized vessels.

Thales is renowned throughout the world for its range of highly accurate weapon control systems. Capabilities range from gun control to full missile guidance.
WAPON CONTROL SYSTEMS

LIROD Mk2
This is the smallest, yet highly capable radar and optronic director for gun control. LIROD Mk2 uses K-band and an elliptical beam for extremely accurate tracking, especially at low elevations. Its capabilities include radar and TV tracking, as well as support facilities such as PAC and MDI (Pre-Action Calibration and Miss Distance Indicator). The stealthy shape and low weight make the LIROD Mk2 very suitable for small ships such as Fast Attack Craft and Fast Patrol Boats.

MIRADOR
MIRADOR is a compact, fully optronic observation and weapon control system. The one-piece stealthy sensor head houses a mix of electro-optical sensors for TV surveillance, TV tracking, IR tracking and laser range finding. Its lightweight design enables ultra-quick responses. An ergonomically designed state-of-the-art Human Machine Interface completes the system in a stand-alone configuration. MIRADOR can be the main weapon control system on board small ships or provide a secondary passive fire control and observation channel on larger ships.

CLOSE-IN WEAPON SYSTEM

GOALKEEPER
GOALKEEPER is the most effective fully autonomous and integrated Close-in Weapon System (CIWS) available today. Its superior search radar leaves no threat undetected. Its highly accurate I- and K-band tracking radar gives pinpoint precision. Its high-performance 30 mm Gatling gun with its special ammunition and firing rate of 4200 rpm, leaves no room for doubt about the outcome of any engagement. No anti-ship missile is able to penetrate GOALKEEPER’s defence.

GUN CONTROL
The gun interface control systems are the consummate proof of Thales’ extensive experience in gun control. Around the world more than 350 Thales fire control systems interface and operate with gun calibres ranging from 25 mm to 127 mm. This includes naval guns from all well-known manufacturers from around the globe.

MISSILE CONTROL
Thales is very experienced in the guidance and control of a wide range of surface-to-air missiles e.g. the NATO SeaSparrow, ESSM and Standard Missiles 1 and 2, as well as the ASTER family of surface-to-air missiles and the Rolling Airframe Missile (RAM). For the ESSM and NATP SeaSparrow close cooperation is maintained with the NATO SeaSparrow user community. Thales also has an excellent track record in the integration of surface-to-surface missiles (SSM). These include the latest versions of the Harpoon, Exocet and RBS15 SSM systems.
Thales offers two state-of-the-art solutions for AAW systems: one designed for the US ESSM and SM-2 air defence missiles, the other designed for the European Aster 15 and Aster 30 air defence missiles. In both cases the AAW system uses a multifunction radar: APAR for the US missiles and HERAKLES for the European Aster missiles.

**AAW System for US Missiles**
Thales’ cost-effective design for a naval Anti-Air Warfare (AAW) system of unrivalled performance is operational on board the latest generation of Air Defence Frigates (“De Zeven Provinciën class”) of the Royal Netherlands Navy and the Federal German Navy (“Sachsen” class) and has been contracted by Denmark. The system outperforms any other AAW system, existing or under development, thanks to its unique combination of sensors and weapons. It captures the best of European and US capabilities and experience in AAW development and is a successful synergy of:
- Long Range Volume Search Radar (SMART-L)
- Multifunction Active Phased Array Radar (APAR)
- Long Range Infrared Surveillance System (SIRIUS)
- Fully Distributed AAW system architecture (SEWACO FD/TACTICOS)
- Vertical Launch Missile System (Mk 41)
- Medium Range/Area Defence Missile (SM-2)
- Close-in Weapon System (GOALKEEPER / RAM)
- Medium Calibre Multi-Purpose Gun.

The system is based on the NATO Anti-Air Warfare (NAAWS) concept combined with the latest developments in Extended Air Defence.

**TBMD capabilities**
These AAW Systems include a possible upgrade path towards Maritime Theatre Ballistic Missile Defence (MTBMD) capabilities by dramatically extending the detection range and capabilities of the SMART-L radar and the functionality of the TACTICOS AAW features.

**Anti Air Warfare System solution for European missiles**
A new design of an AAW system developed for the ASTER missile family is now operational on board the frigates of the Singaporean Navy. This solution uses the HERAKLES 3D multifunction radar optimised for detection of SSMs, ARMs diving missiles, fighters and helicopters in littoral environments. The system is on the French FREMM frigates. This solution can be extended with the SIRIUS IRST for passive surveillance and low-level target tracking.

**Anti Air Warfare System for small platforms**
Apart from the AAWS for high-end platforms such as destroyers and AAW frigates, Thales can also provide an AAWS for smaller vessels. This capable AAW combat suite combines the new SMART-S Mk2 Volume Search Radar with a STIR or STING EO Mk2 weapon control system and the TACTICOS Combat Management System. Associated weapon systems can be the Mk41 missile launcher with ESSM missile, Rolling Airframe Missile (RAM) or the VL-MICA system in combination with medium calibre dual-purpose gun.

**Compact Fire Control Systems**
For FACs, FBPs OPVs and other (patrol) vessels with less demanding sensor and weapon requirements, Thales has introduced the Compact Fire Control Systems (CFCS). Consisting of a weapon control sensor (MIRADOR or LIROD Mk2), gun integration, Multifunction Operator Console (MOC) and integration with radar and navigation systems, these CFCSs provide excellent, integrated and compact weapon control functionality for these types of naval vessels. The CFCS can also be integrated with existing ship systems, e.g. during an upgrade, to enhance the ship’s operational capabilities.
**Underwater Warfare Systems**

Thales offers unparalleled capabilities and a unique range of products to meet the challenges of undersea warfare. We invest actively and consistently in new signal processing techniques, underwater acoustics and undersea warfare concepts. This results in advanced hull-mounted and towed array sonars that give Naval forces the capabilities they need to counter underwater threats. Captas and the Captas nano are good examples of outstanding sonar technology helping secure the environment of our customers.

Thales is leading expert in mine countermeasures with more than 300 mine warfare sonar systems in service world-wide. Our wideband and SAS synthetic aperture sonars can detect and locate even the stealthiest mines.

*For more information go to [www.thalesgroup.com/naval](http://www.thalesgroup.com/naval)*

**Electronic Warfare Systems**

Naval electronic warfare systems are a vital part of a ship's capability to analyse the electronic situation and provide both self and force protection. EW systems provide a first line of defence, interception, analysis and classification of emissions from airborne, land-based, surface and missile radars. Integrated Electronic Counter Measures (ECM) systems also afford the capability to provide self-protection jamming of incoming missiles and to deny an enemy's use of radar to detect or target ships or battle groups. This effectiveness at sea is greatly reinforced by the Electronic Warfare Operational Support which handles the reference classification database on ground, keep it permanently updated and disseminate this data onboard platforms for a better classification of intercepts and a more appropriate counter action against threats.

For surface, submarine and airborne forces, Thales’ new Vigile ESM/ ELINT system provides rapid and reliable threat warning and accurate signals intelligence. Thales offers point or area defence jamming with the Digital Radio Frequency Memory based Scorpion 2 ECM system.

*For more information go to [www.thalesgroup.com/aerospace](http://www.thalesgroup.com/aerospace)*

**Communication Systems**

Thales’ competence in Naval/Maritime, Fixed Station, and Land Mobile High Frequency (HF) communications is borne of a broad HF product offering coupled with extensive experience in tailoring HF system solutions to meet individual platform applications and customer requirements. Capabilities include High Frequency (HF) radio communications systems, software-defined radio technologies, radio room automation, and Fully Integrated Communications Systems (communications control and management, networks, and terminals) for all classes of naval/maritime systems and fixed station platforms.

Thales naval and maritime communications systems embed the best of COTS technologies, specifically tailored to meet unique military applications. The systems are integrated into a cohesive system solution that spans traditional “stove pipes” of technology. The result is increased flexibility.

*For more information go to [www.thalesgroup.com/landjoint](http://www.thalesgroup.com/landjoint)*
Life Cycle Support is more than just an aggregate of the standard logistic elements such as documentation, spares, tools, test equipment and training courses. Life Cycle Support or Integrated Logistic Support is a coherent concept considering all logistic disciplines.

**LIFE CYCLE SUPPORT**

The Thales Naval Services organisation focuses on its specialisations:
- Logistic Services for initial logistics and logistic engineering
- Customer Services for life cycle support/after sales services
- Co-production or licensed production of parts of systems as direct offset.

Thales implements these Life Cycle Support activities, with the general aim of reducing life cycle cost for the customers, tailored to the customers' individual logistic policies and requirements.

Reliability and Maintainability (RAM) analyses on all designs form the basis for a pragmatic Logistic Support Analysis (LSA).

In close co-operation with the customer, Thales will define the cost-effective minimum of Life Cycle Support for a combat system. An advanced Life Cycle Costing (LCC) program allows trade-offs between alternative solutions and concepts.

Customer requirements with respect to e.g. Computer Based Training (CBT), Interactive Electronic Technical Manual (IETM) and web-based data exchange technologies, can also be accommodated. Off-the-shelf products are available and customised solutions can be jointly developed.

All of this will allow our customers to build up an indigenous support capability, in accordance with their national policies. Co-operation with in-country industrial facilities may be part of the support approach.
A dedicated organisation for supplying after sales support is in place. It is staffed with specialists who work in close co-operation with our customers worldwide. The organisation covers all types of support services required after the introduction into service of the systems, beyond the contractual warranty activities.

In-house repair services
- Spare parts supply
- Provision of tools & test equipment
- Field services and on-site technical assistance
- Trial support and analysis
- Training services
- Post-design support services (helpdesk, incident management, support engineering)
- Failure reporting and corrective actions services
- Configuration management services
- Overhaul and refit programs
- Hardware and software modifications and upgrades.

Tailored Service Level Agreements and Basic Ordering Agreements can be developed to satisfy individual customers’ requirements for more structural support. Various service elements may be combined into a comprehensive package.

Above Water Systems is one of the four business lines of Thales’ Naval Division. Thales is a leading international electronics and systems group, addressing defence, aerospace and security markets worldwide. Thales employs 68,000 people in 50 countries with 2007 revenues of 12.3 billion, with the Naval activities accounting for 2 billion euro.*

* including all Thales naval business and the company’s 25% interest in DCNS