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The Terma Business Area Radar Systems is to deliver SCANTER 2001 radar systems complete with antennas and Radar Target Tracking for the upgrade of the Portuguese coastal surveillance system.

With the new radars, Portugal will benefit from an advanced surveillance system that will enhance security on the coast by deploying a seamless network to detect movement of ships, etc.

The contract for the new radar systems is awarded through INDRA with Portugal’s Ministry of State and Internal Administration as customer.

The SCANTER 2001 radar systems will be supplied including Radar Target Tracking.

In an environment like the Portuguese coastline, where the weather can get very harsh with high sea states, dense rain and low visibility, the small target detection capability of the SCANTER 2001 radar will be utilized to its fullest. And with a coastline exceeding 560 miles, efficient surveillance is needed.

The Radar Target Tracking equipment will ensure reliable tracking of the targets detected and facilitate and improve the efforts of the Coast Guard to secure the coastline and borders. The new coastal surveillance system will also improve the response capacity and will back up rescue operations at sea.

Terma will initiate delivery of the SCANTER radar systems at the beginning of 2010, and installation and implementation of the entire system will be completed by the end of 2011.

With the new SCANTER radars, Portugal will benefit from an advanced surveillance system that will enhance security along the 560-mile coastline.
New SCANTER 6000 Naval Surveillance Radar

Terma’s new SCANTER 6000 is a coherent X-band Solid State Radar with advanced processing techniques which fulfill the requirements for situation awareness.

Tailored for the maritime environment, the SCANTER 6000 offers superior performance through intelligent design and advanced processing. The development is founded on more than 60 years of experience of developing radars and surveillance systems for navies, coast guards and other authorities.

The SCANTER 6000 is superior for surface patrolling by detecting and tracking small targets from a very close range and up to the radar horizon. Coherence, frequency diversity, time diversity, and other advanced processing techniques support operation in all weather conditions. Sub-clutter visibility is obtained for targets moving radially and with speeds different to clutter.

Monitoring Low Airspace
The SCANTER 6000 monitors the short range and low level airspace around the vessel. Depending on the antenna selected, it detects and tracks light propeller and jet aircraft up to 10-15 NM and up to 6000 feet altitude.

Helicopter control
The SCANTER 6000 coherent radar techniques in combination with the small target detection capabilities enable the vessel to control a helicopter in its operations within short range, also when hovering.

Search and Rescue
The capability to detect small surface targets in combination with helicopter control makes the radar extremely well-suited for search and rescue operations.

Self-protection
The SCANTER 6000 provides timely detection of approaching threats as part of the situational awareness improvements, the small target, surface, and air detection capabilities. Moreover, it offers a variety of techniques to protect itself (ECCM) e.g. frequency diversity, reduced power in sectors, pulse repetition frequency (PRF) stagger, and (optional) frequency agility.

Navigation
The SCANTER 6000 surpasses high-end navigation radars in all areas. Simultaneous detection at short, medium, and long range ensures performance according to International Maritime Organization (IMO) standards.

Terma has been pre-qualified with the SCANTER 6000 for the Royal Navy (UK) fleet wide Navigation And Situation Awareness Radar project (NASAR).
As subcontractor to Thales Air Systems S.A., France, Terma will supply an Automated Terminal Information Service System (ATIS) for the NATO supply of an air traffic capability to Kandahar Airfield in Afghanistan.

The ATIS system is based on the Terma ATIS Plus platform which is a tailored solution for regional and domestic civil and military airports and airfields. The user-friendly Human-Machine Interface (HMI) and excellent reliability have served many airports to the full satisfaction of the Civil Aviation Authorities and air traffic controllers.

The system provides combined ATIS broadcast in either single or main/hot standby configuration. The Terma ATIS Plus generates high quality voice broadcasts from METAR data (Aviation Routine Weather Reports), and generates an error alert if values fall outside user defined limits, or if data do not comply with The World Meteorological Organization (WMO) standards.

The computer-generated speech synthesis module allows for advanced voice and pronunciation adjustments in order to optimize speech clarity. Supplementary data may also be entered into the system through a text editor. Terma ATIS Plus also supports pre-recorded human spoken vocabulary. The system complies with ICAO – The International Civil Aviation Organization and WMO standards and may at a later stage be extended with DataLink for D-ATIS.

As a global supplier of Air Traffic Management solutions, Terma specializes in developing applications for information display for the controllers and for communication between the controllers and pilots. Our core product lines include ATIS/ VOLMET, Departure Clearance/

Pre-Departure Clearance (all of which are available via DataLink and voice), Integrated Information Support and Display System for airport control centers and towers, and Radar Data Processing System for small to medium-sized airports.
C-Flex and SCANTER Radar for Romanian Border Police OPV

In June 2009, Terma signed a contract with Alphatron Marine of The Netherlands for the supply of a SCANTER 2001 surface surveillance radar and a C-Flex Tactical Situation Display (TSD) system for the Romanian Border Police.

The main purpose of the OPV will be to control the Romanian border along the Black Sea and prevent illegal immigrants and smugglers from entering Schengen.

The SCANTER 2001 surface surveillance radar system is equipped with a 12” antenna, frequency diversity, and automatic detection and tracking (ADT). It provides a second-to-none capability for detection and tracking of small units, such as wooden boats and RHIBs.

The C-Flex TSD is a minor but highly efficient C2 system providing a functionality for the control of all parameters and modes of the SCANTER 2001 radar including display of tracks and radar video and a suite of basic C2 functionalities such as area monitoring with alerts, a library of patterns, e.g. for Search and Rescue (SAR) operations, and various tactical tools for assisting the navigation.

Additionally, the C-Flex TSD integrates the ship’s EO surveillance system, which allows the operator to control the EO Director to focus on a certain radar track. Further control of the EO Director and display of the video streams is available to the C-Flex operator by means of a joystick and one of the two 21” console displays.

C-Flex TSD is a one-console mini-C2 solution with all electronics and software built into the console. It is suitable for vessels with limited space, typically with a combined bridge for navigation, communication, surveillance, as well as command and control.

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If C-Flex TSD is connected to a sensor, such as a SCANTER surveillance radar, a navigation radar, AIS, or an EO surveillance system, the C-Flex TSD fuses the different sensor tracks. This provides a superior overview of the tactical situation for Inshore and Offshore Patrol Vessels (IPV and OPV) for coast guards, border police and similar governmental, regional, or municipal authorities.

The Romanian OPV shows what a wide range of marine vessels can benefit from using the Terma C-Series solutions. The tactical system for the Romanian OPV is Terma’s smallest C-Flex solution, which is typically used by OPVs to patrol borders in Exclusive Economic Zones (EEZ). However, C-Flex can easily be adapted to accommodate the needs of larger vessels that are sometimes located in conflict zones where a short reaction time and the ability to defend the ship, if necessary, are crucial.
Landing Platform Dock for the Royal Thai Navy

Terma signs contract with Singapore Technologies Marine (ST Marine) for the delivery of a C-Series combat system for the Royal Thai Navy.

In 2008, Singapore Technologies Marine (ST Marine) was contracted to build a Landing Platform Dock (LPD) vessel for the Royal Thai Navy (RTN). The LPD is a Multi-Role and Multi-Purpose ship specifically designed to provide the RTN with a strengthened capability in situations of natural disasters such as floods and tsunamis. The vessel will thus provide support to naval missions such as sea transportation, support operations, civil search and rescue missions, and disaster relief programs.

Terma has been contracted to supply a combat system and a combat management system for this LPD.

The combat system provides excellent surveillance and identification capabilities (both air and surface) as well as control of the guns on the ship for self-protection, and the combat management system ties the system together in a fully integrated solution. The delivery includes the C-Flex, C-Search and C-Fire modules.

These three modules are all part of Terma’s C-Series naval combat system portfolio. C-Flex is the combat management system and the natural nucleus of C-Series. It will provide the RTN with full command and control capability in terms of situational awareness, multiple sensor management, monitoring features, threat evaluation operated from the multi function consoles on board. The LPD will be equipped with three multi function consoles. The consoles are identical and provide full redundancy for operation of the system, including any of the three guns. Thus, if one of the consoles should break down, the operator can move on to another console and continue his/her work.

C-Search is a radar and sensor suite. On Thailand’s new amphibious vessel, the system will consist of a SCANTER 4100 air and surface surveillance radar combined with an IFF system that provides identification to the air tracks of the radar.

C-Fire is the fire control system. Although the main purpose of the vessel is to provide aid and assistance to people who need it, it is essential that the LPD has the capability to defend itself. The Thai LPD will have three guns installed – one 76 mm and two 30 mm – controlled by C-Fire from the C-Flex multi function consoles.

Terma will supply C-Flex, C-Fire, and Scanter 4100 radar for Thailand’s new Landing Platform Dock.
The C-Fire Electro Optical (EO) Director has an inbuilt thermal imager, a TV camera, and an eye-safe laser range finder, and it is easily trained to a track from the situation display or manually by a joystick in the console. The EO Director can then be used for surveillance and identification of certain tracks. Upon hostile actions encountered by any surface or air target, C-Fire can go into engagement mode, and the operator can fire any of the ship’s three guns at the target. In case of hostile actions from both a surface and an air target, the system can engage both targets using the SCANTER 4100 radar for tracking the surface target and the EO Director for tracking the air target.

The combination of C-Flex, C-Search, and C-Fire makes up a 100 % integrated solution, which means that all sub-systems can be operated from any one of the three consoles on the ship.

Three combat system modules have been put together to form a complete combat system for the Thai LPD. A Terma C-Series combat system can be designed to suit the needs of any client. In this case, the modules have been put together to create a system providing excellent surveillance and self-protection in addition to having a full set of command and control functionalities even for a small solution with three multi function consoles. Additionally, the contracted configuration allows for easy future expansions of the combat system.

The contract was awarded as a system package together with Terma’s combat management system C-Flex.

The SCANTER 4100 radar system will be installed on ST Marine’s Landing Platform Dock (LPD) ship for Royal Thai Navy as the ship’s main radar.

Situational Awareness and Helicopter Support
The SCANTER 4100 concept is a versatile, effective radar, designed as a 2-D, coherent radar with pulse compression and MTI-processing. It is designed for detection, automatic track initiation and tracking of all kinds of air or sea targets. The radar is optimized for signal processing and tracking of surface targets and helicopters, as well as optimized for signal processing and tracking of air targets.

The system offers superior situational awareness in all weather conditions with very high reliability, and the system performs undisturbedly in harsh conditions, such as high sea states and heavy rain showers.

The SCANTER 4100 integrates with several antenna types, one being the dual-beam surveillance antenna mounted on a stabilizing platform.

The SCANTER 4100 is the optimum solution for littoral sea surface and 2-D air surveillance.
The Royal Danish Navy is currently undergoing a major fleet renewal, and Terma plays an important role in the process by supplying the renowned C-Flex command and control system.

The Royal Danish Navy is expanding its capacity with three new frigates of the IVAR HUITFELDT class. The frigates will replace the corvettes of the NIELS JUEL class and will make further involvement in international operations a possibility.

Communication and situational awareness are essential to all modern vessels, and Terma has been contracted to supply its high quality command and control system C-Flex for each of the Danish frigates.

C-Flex is a truly scalable state-of-the-art naval command and control system. The system is proven configurable to a single user system on a mobile platform as well as a full blown 25 operator frigate OPS room. C-Flex provides the operator with full situational awareness and platform control based on platform sensors, effectors and data links.

C-Flex fulfills the requirements of the entire modern Navy fleet from single user systems, e.g. RHIB’s and maritime helicopters, to multiple user systems of frigates and destroyers, and it ensures interoperability nationally and internationally.

C-Flex features a modern open architecture based on COTS software (e.g. Windows) and COTS hardware, which facilitates the introduction and use of the system for new operators as the look and feel is similar to familiar Windows-based programs.

This means that all communication, transferring and gathering of information, as well as weapon control are managed via C-Flex and all commands can be executed from the same location.

Furthermore, Terma is also responsible for the integration of the frigates’ advanced Anti Air Warfare (AAW) into C-Flex. The integration process has lead to a further development and improvement of C-Flex. The combination of the two systems now makes it possible for IVAR HUITFELDT to control and defend an area within a 400 kilometer radius.

The contract with the Royal Danish Navy marks Terma as a leading provider in the defense market. It has also ensured a continued development of C-Flex and, finally, it has laid the foundation for successful export of Terma products in the future.
Detection of Pirates with Terma SCANTER Radar

Piracy is becoming an increasingly major problem, especially in the waters surrounding the Horn of Africa. Pirates in small boats approach large merchant vessels by sneaking up from behind. From the side of the ship, boarding and taking the unarmed crew hostage is relatively easy.

In 2008-09, the Royal Danish Navy’s support ship ABSALON led the Combined Task Force 150 while carrying several pieces of Terma equipment. The main purpose of Task Force 150 was Maritime Interdiction Operations (MIO), which is control of goods transported in the operation area. The mission tasks also included Maritime Security Operations (MSO), which is protection of ships and installations in the operation area, Theatre Security Cooperation (TSC), which is support to weak nations in the region, and Search and Rescue missions (SAR).

You do not know what you do not see, but experience has proven that the high quality SCANTER radars that ABSALON carries enable the crew to detect and track all small vessels in the area around own ship, including those very small vessels used by pirates.

In addition to the traditional marine radar capabilities, the SCANTER provides much higher sensitivity, better resolution and advanced clutter processing techniques.

This enables detection of very small targets in virtually any weather condition, from very short distances and to the radar horizon. Furthermore, adaptation to the weather and to changes in propagation, including the very special Middle East conditions, is fully automatic in range and azimuth.

Terma takes pride in the fact that our equipment makes it difficult for the pirates to operate in areas where our radars are part of the joined international effort. The SCANTER radar is proven to increase situational awareness onboard naval vessels. There is a potential for use of the technology onboard trade vessels to provide early warning to the crew and increase the time available for help to arrive from naval forces.

The sooner a potential threat is discovered, the easier it is to respond to that threat rapidly and efficiently.
C-Link and C-Flex for Naval Helicopters

In today’s battlefield, communication and information sharing is critical to mission success. Terma has a long history of supplying mission critical and reliable data link solutions.

C-Link and C-Flex systems for naval helicopters in operational use will provide expanded field of view and a Network Centric Warfare (NCW) capability to naval forces. It proves Terma’s ability to continuously expand the current defense product range to include airborne C4ISR solutions (AIR-Flex).

C-Link provides Tactical Data Link by use of the platform’s own radio (HF, VHF, UHF or optionally SATCOM) and expands the user’s operating picture and offers enhanced interoperability in combined and joint operations.

Through the link system, the operator can share a local picture from own sensors and track identification with other units.

Terma offers Link-11, Link-16 and future Link-22 solutions as well as a proprietary non NATO link system which can be customized to meet customer requirements.

Terma can offer an affordable link solution to maritime, land-based and airborne platforms.

Expanding the Field of View at Sea

With C-Raid for Rigid-Hulled Inflatable Boats (RHIB) and Inshore Patrol Vessels (IPV), nodes in the network are able to look beyond the horizon.

Search and Rescue, Coastal Patrolling, Direct Action, Special Reconnaissance, Maritime Insertion and Extraction and Boarding Operations. Along with asymmetric threats and access-denial missions, these are some of the challenges maritime forces deal with on a daily basis.

Expanding the recognized maritime picture, precision, and situational awareness are crucial when it comes to executing this type of operations successfully.

C-Raid is a scalable command and control system designed to make the process of carrying out these operations faster and more precise. The system presents a joint overview of all units in a particular area, and it provides the operator with detailed information on the position, speed, and course of any given unit.

The C-Raid system consists of a C-Raid console which is installed on the RHIB, FAC or IPV and linked to a C-Raid workstation on a mothership. Via the link system, the mothership and smaller units are able to exchange and incorporate a vast amount of information such as threat evaluation, route management, intel overlays, free text messages and video images. Through C-Raid, the operator is able to look beyond his actual field of view. The features in C-Raid assist the decision making process and allow the operator to reach people in need faster, preplan a defense against an approaching threat, and maximize efforts to confront those engaged in criminal activity such as illegal fishing, smuggling, and terrorism.
C-Guard in use by Royal Australian Navy and U.S. Navy

Terma’s Soft Kill Weapon System (SKWS) can be found in some of the world’s largest navies.

Patrolling the waters in the world’s most dangerous conflict zones is a task that requires an efficient and carefully designed self-protection system.

In conflict zones, a naval vessel is constantly exposed, and it needs to be able to take immediate action, should it be exposed to an attack.

C-Guard is the self-protection system that makes this possible – also known as Terma’s field proven Soft Kill Weapon System (SKWS).

About C-Guard
The secret to the C-Guard success has been a combination of fixed and reliable hardware controlled by high-tech software, allowing customer programmed algorithms.

Installation and maintenance costs are low adding to an overall affordable and competitive life cycle cost.

Future “standard” 130 mm decoys have options for variable range and velocity, giving same coverage and protection compared to trainable launchers.

C-Guard can be offered in three different configurations depending on the ships design, type and size.

Australia and USA
Recently, Indonesia and Morocco have decided to purchase the Terma technology, and this has resulted in the signing of C-Guard contracts with the navies in both countries.

The Royal Australian Navy also decided on C-Guard as their future self-protection capability, which is why the system is presently installed on both Australian Adelaide Class Frigates (FFGs) and Hobart Class Air Warfare Destroyers (AWDs).

C-Guard has been contracted for the U.S. Navy’s new Littoral Combat Ship, USS Freedom (LCS1) – the prototype of a naval vessel designed to operate in the littoral and able to counter asymmetric threats designed and built by a Lockheed Martin led industry team.

USS Freedom was delivered to the U.S. Navy in only six years from initial concept, half the time of traditional shipbuilding programs. In May, it successfully conducted its second and final round of U.S. Navy acceptance trials off the Virginia coast. The trials – which were a coordinated effort between the Navy and the Lockheed Martin team – included operational testing of the vessel’s propulsion, communications, navigation and mission systems, as well as all related support systems. Freedom recently completed successful structural test firings; the 57-mm gun was fired 70 times; Rolling Airframe Missile (RAM) fired two rounds; Terma Soft Kill Weapons System (decoys) and 50-cal machine guns.

U.S. Navy’s new Littoral Combat Ship, USS Freedom
We Provide **Mission Customized** Solutions

Terma develops and markets high-tech solutions, systems, and products for civilian and military applications.

Terma's high-tech solutions and products are developed and designed for use in extreme mission critical environments and situations, where human lives and valuable material assets are at stake.

In Denmark, Terma facilities are located at Aarhus, Copenhagen, and Grenaa.

Terma’s international locations include Leiden, the Netherlands; Darmstadt near Frankfurt, Germany; Washington, DC, Warner Robins, GA, Fort Worth, TX, and Norfolk, VA, USA; and Singapore.

Terma A/S was established in 1949. For years, Terma has worked closely with defense forces, public authorities, and international organizations around the world. Through these relationships, Terma has gained in-depth knowledge of and insight into our customers’ working environment and an equally deep understanding of their situations and needs.

Terma is fully owned by the Thomas B. Thrige Foundation.

**Terma’s Business Areas cover:**

- Aerostructures for aircraft
- Airborne Systems, including
  - self-protection systems for aircraft
  - audio systems solutions
  - reconnaissance systems for fighter aircraft
- Integrated Systems, including
  - self-protection systems for naval vessels
  - command and control systems for navy, army, and air force applications
  - air traffic management systems
  - Public Safety & Emergency
- Radar surveillance systems
- Solutions, services, and products for space applications
- Production of electronics utilizing advanced manufacturing technologies

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**Financial Highlights USD million**

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Number of full-time employees
- Average for the year 1,183 1,020 965 1,014 1,034