

ARCHIVED REPORT

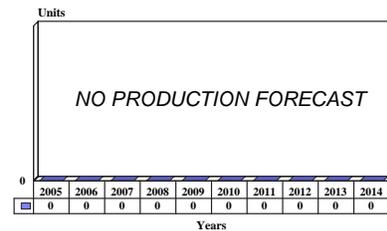
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Manta - Archived 7/2005

Outlook

- Production expected to draw to a close after 2005
- No new orders have been placed in several years

10 Year Unit Production Forecast
2005 - 2014



Orientation

Description. Manta is a modular, naval electronic support measures system designed for submarines.

Status. In service.

Total Produced. An estimated 56 Manta systems had been manufactured through 2003.

Application. The main function of Manta is to provide prior warning of hostile radar emissions and to supply targeting data based on such intercepts.

Platform. Manta is suitable for deployment on nuclear and conventional submarines.

Price Range. Contract averaging suggests a probable unit cost between \$1.5 million and \$2.5 million (FY03 dollars).

Contractors

Thales, HQ, <http://www.thalesgroup.com>, 45, rue de Villiers, Paris, 92526 France, Tel: + 33 1 57 77 80 00, Fax: + 33 1 57 77 86 59, Prime

Technical Data

Characteristics

Frequency range	D- to J-band (2-18 GHz)
Dynamic range	60 dB
Azimuth coverage	360 degrees
Elevation coverage	-10 to 30 degrees
Signal polarization	Horizontal, vertical, and LH/RH circular
Bearing accuracy	6 degrees RMS
PRF range	100 Hz-300 KHz
Pulse width range	50 ns to 100 us
Mission library	2,000 emitter modes
Threat warner	24 emitters @ 6 modes
Operator library	100 emitter modes

Design Features. Manta and its related system, Sceptre, are two separate families of advanced electronic support measures (ESM) systems. They are tasked with protecting surface ships and submarines operating at periscope depth by intercepting, analyzing, classifying, and identifying hostile radar emissions of all types.

For historical reasons, both systems have been discussed in previous years in the same report. They have grown in slightly different directions over the years, however, each evolving into distinct entities. These programs are therefore being discussed separately, allowing for more in-depth coverage of each system's individual characteristics. (See separate "Sceptre" report in Tab B.)

Manta is a modular system, enabling Racal-Thorn Defence Systems (now Thales) to match the configuration of the equipment to the operational requirements and technical specifications of any submarine class. Manta works on the principle of a central management computer surrounded by subsystems, each containing advanced processors carrying out local functions. This approach means that subunits and units can be assembled into a cohesive system that meets operational requirements while matching available space and power constraints.

Different antenna modules provide options for extended frequency coverage and accurate bearing measurement. Digital processing modules can extend pulse-density capacity and library capacity, output data to tape or hard

copy, and interface with central data-handling and action information systems.

Operational Characteristics. The Manta antenna can be installed on a special ESM mast or fitted to the submarine periscope. The ESM mast configuration provides 360-degree instantaneous coverage. Hostile radar emissions are analyzed and simultaneously displayed on the operational consoles with the radar type and threat significance. Radars used by anti-submarine warfare (ASW) aircraft and helicopters are regarded as the prime threats. Their characteristics can be loaded into a number of prime threat channels prior to patrol. While carrying out covert electronic intelligence (ELINT) missions, or in the event of open hostilities, the detection of any prime threat radars causes the ESM displays to immediately warn of a threat.

Simultaneously, the threat data are transmitted to the submarine's central data-handling system. This gives the submarine commander maximum time to initiate evasive maneuvers and defensive measures. In addition to its automatic operation, Manta can also be operated manually using a keyboard and tracker ball to obtain detailed information on any radar detected.

A unique feature of the Manta system is that its warning capability can be configured to predict the radar detectability of a submarine, depending on the frequency of the radar, the sea state, and the ESM mast/periscope configuration.



Gotland Class Submarine, Sweden

Source: Kockums Submarine Systems

Variants/Upgrades

Because of the modular nature of the Manta system, it can be easily upgraded to match changes in the

electromagnetic environment. Such upgrades have presumably been aimed at improving Manta's

directional and range resolution of contacts and the system's ability to detect stealthy and low probability of intercept (LPI) radars.

Manta O. The submarine ESM system for smaller submarines without a dedicated ESM mast.

Manta X. The high-performance submarine ESM system for larger boats or those with comprehensive ESM capabilities.

Setter. Land-based derivative of Manta X. Setter is deployed in a truck-mounted shelter.

Corvus. Land-based derivative of the Manta O system; it is installed on a trailer.

Program Review

MEL (acquired by Thorn-EMI, now Thales Defence Ltd) originally developed the Manta ESM system in the early 1980s as part of the Signaal-designed RAPIDS project.

At that time, both Hollandse Signaalapparaten and MEL were divisions of the Swedish Philips group. The system was first announced in 1983, and was shown in public for the first time two years later. Success was almost immediate, with the U.K. Royal Navy calling for retrofit installation in nine conventionally powered Oberon class submarines, and five nuclear-powered Churchill class hunter-killers. Subsequently, the system was selected by the Swedish Navy to equip two new A-19 class boats. Spain also selected the system to refit its Galerna/Agosta boats.

A surface ship derivative of Manta/Sceptre was introduced in 1986. This derivative is now available in three versions: Sceptre O, for fast attack craft and offshore patrol vessels; Sceptre X, to provide long-range ESM capability for frigates, destroyers, and major surface combatants; and Sceptre XL, which has enhanced capabilities.

MEL used the 1988 British Army Equipment Exhibition to launch a land-based derivative of Manta XL, called Setter. This was sold to at least one known client in the Middle East, reportedly from Saudi Arabia or Jordan. Setter was partnered by a lightweight equivalent derived from Manta O, called Corvus. This latter system subsequently passed through a number of development phases.

In 1989, Philips decided to withdraw from the defense market and sell off those divisions operating in that sector. As a result, Signaal was sold to the French Thomson-CSF group, and MEL was sold to Thorn-EMI

(now Thales) to become part of the Thorn-EMI Sensors group.

This merger was followed in 1991 by reports of orders for Manta X systems to equip the Collins class submarines in place of the Argo system already specified. As part of this order, at least some of the existing Oberon boats reportedly were to be retrofitted with the Manta as well. Since the Oberon class was being withdrawn from service, however, and the Collins class appeared to have its Argo equipment installed on completion, these reports were probably incorrect.

In 1993, GEC-Marconi (now BAE Systems) supposedly put in a bid to buy the defense interests of Thorn-EMI. These negotiations broke down in 1994, when irreconcilable differences arose over the financial aspects of the acquisition. Thorn-EMI then entered into negotiations with Racal Defence Systems. These ended in May 1995 with Racal's purchase of the Thorn-EMI Sensors Division for US\$26 million. Racal-Thorn Defence Systems, which consolidated the electronic warfare expertise of the two groups, was then formed.

With another big turn of the defense merger wheel, Thomson-CSF (now Thales) acquired Racal Defence Electronics in June 2000. Perhaps because of these seemingly endless mergers and acquisitions, new information regarding the Manta then became scarce. It can be assumed, however, that work on all previously awarded contracts would proceed as scheduled.

By June 2001, Manta variants were in service with the Swedish Gotland and Spanish Daphne and Agosta submarine programs. The Swedish program, Submarine 2000, will keep the system in production through at least 2005.

Funding

Manta and related systems were developed by Thorn-EMI Sensors (now Thales Defense Ltd) as a corporate venture. Modifications to U.K. Royal Navy requirements were funded under a U.K. Ministry of Defence contract.

Recent Contracts

No recent contracts have been identified.

Timetable

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
	1985	Manta first revealed to public
	1986	Sceptre first revealed
	1987	MEL begins work to expand coverage
	1989	MEL sold to Thorn-EMI
Jan	1990	Manta ordered by Sweden for Gotland submarines
Feb	1990	Manta ordered by Spain for Agosta submarines
	1990	Sceptre XL ordered for ANZAC frigates
	1991	Manta X reportedly ordered for Australian Oberon and Collins submarines
Dec	1993	Sceptre specified for the Swedish YSM-2000 and YSB programs
	1995	Racal purchases Thorn-EMI
Jun	2000	Thomson-CSF (now Thales) acquires Racal
	2005	Manta production for Swedish submarine program expected to end

Worldwide Distribution

Manta is reportedly in service in **Australia, Spain and Sweden**.

Forecast Rationale

After a relatively long and healthy production cycle, the Manta modular, naval electronic support measures (ESM) system has apparently run out of potential new platforms. The last known orders for the system were placed several years ago. Also, the last known working contract is due to draw to a close in 2005. Still, the system, something of a workhorse in the Spanish and Swedish navies, is still very much in service.

Under the Swedish submarine upgrade program, 2000 SSK, one last installation is set for 2005. No significant work is scheduled beyond that year. As it appears that Manta has indeed run its course, no additional production can reasonably be forecast.

Ten-Year Outlook

New production has apparently ceased for this system.