

**THOMSON MARCONI  
SONAR**



*A COMPLETE RANGE OF SYSTEMS*

**THOMSON MARCONI SONAR LTD**

[www.rochesteravionicarchives.co.uk](http://www.rochesteravionicarchives.co.uk)



In 1996, Thomson-CSF of France and GEC-Marconi of the UK merged their sonar activities in a Joint Venture company, forming Thomson Marconi Sonar (TMS), the world leader in sonar systems.

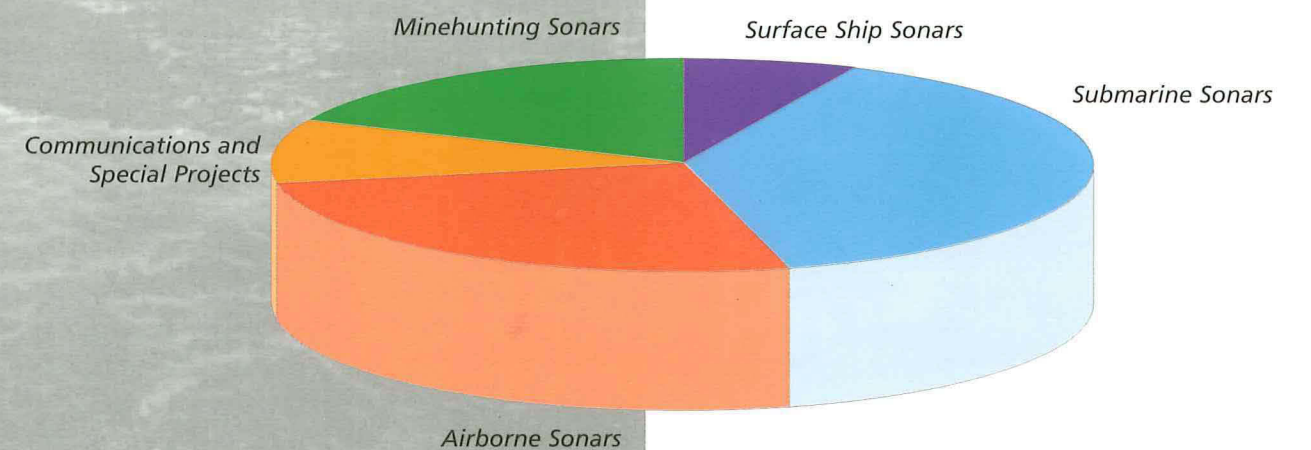
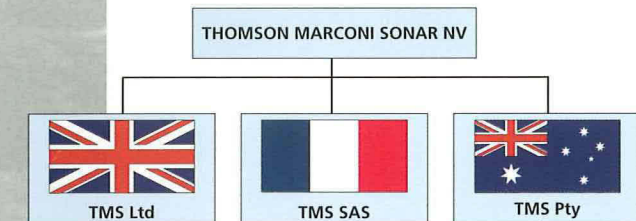
This new group, managed by an international executive team based mainly in Sophia Antipolis (France), co-ordinates the activities of its three national companies: Thomson Marconi Sonar SAS (TMS SAS) of France, Thomson Marconi Sonar Ltd (TMSL) in the UK and Thomson Marconi Sonar Pty Ltd (TMS Pty) in Australia.

As part of this new company and as the largest British sonar company, TMSL has established a comprehensive and world class range of sonar products and services backed up by nearly 40 years experience of sonar system research, design, manufacturing and in-service support.

There are over 1,500 complete TMSL sonar systems in use across 30 nations. The company is also prime contractor and system design authority for nine Royal Navy and three RAF sonar system projects.

Being part of Thomson Marconi Sonar means that high levels of investment in research and product development are maintained. Activities range from feasibility studies and project definition through to commissioning, acceptance and logistic support.

All TMSL facilities conform to ISO 9001 and ISO 9000-3 (TickIT) quality requirements.



TMSL Breakdown of Turnover

**TMSL Products**



*Sonar 2046*



*Sonar 2074*



*SUBTASS*



*SPUD Acoustic Processor*



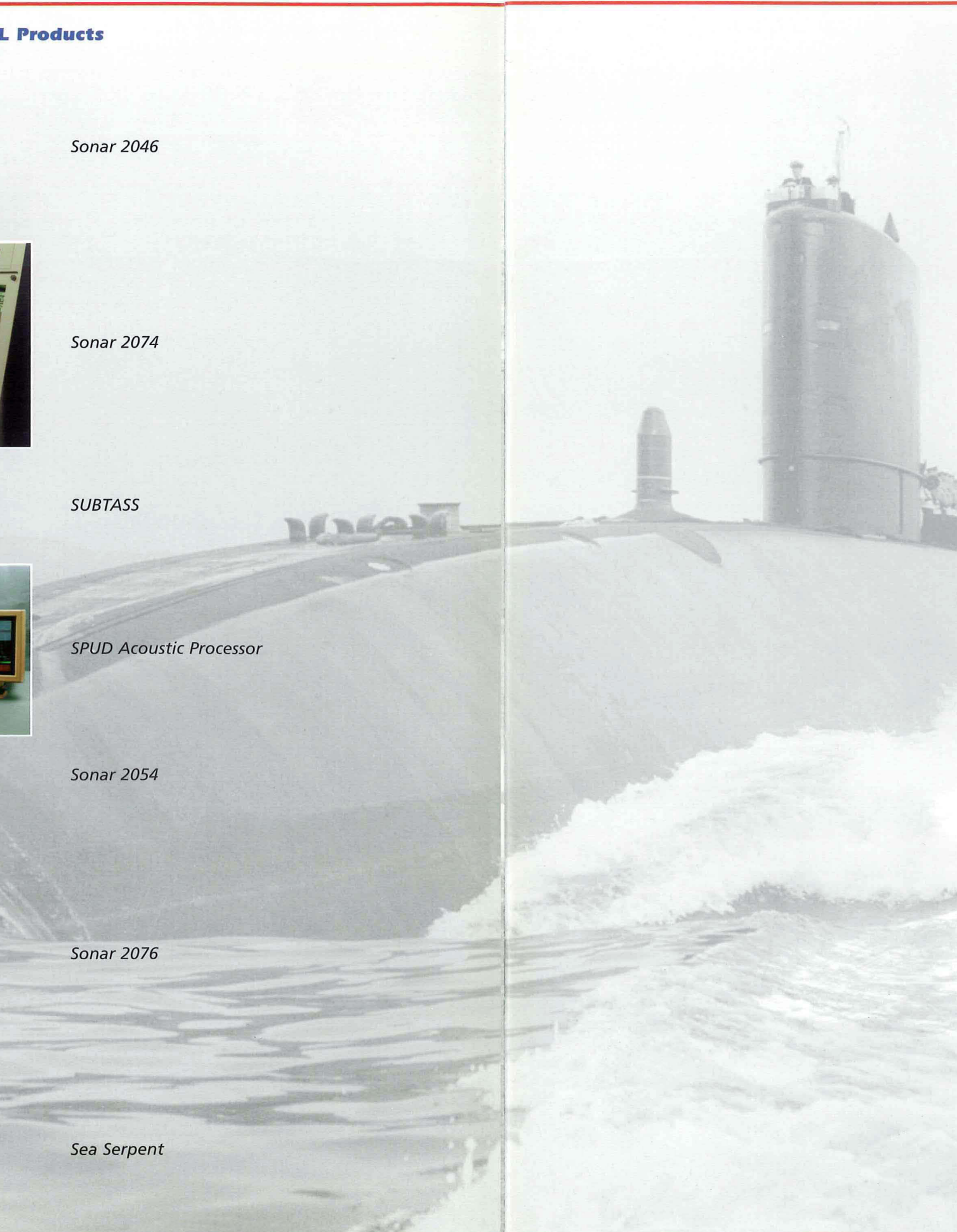
*Sonar 2054*



*Sonar 2076*



*Sea Serpent*



Thomson Marconi Sonar has developed and manufactured most of the sonar systems in service onboard Royal Navy, French Navy and Royal Australian Navy submarines and a significant percentage of sonar systems supplied to many overseas navies. The company has a unique understanding of the submarine's complex role and the ever-increasing threat from more sophisticated, faster and quieter submarines. It understands the operational constraints and the environmental conditions in which submarines operate.

Common modular architecture ensures that systems can be readily configured to a customer's specification. Development and production costs are minimised and technology updates are accommodated without major disruption of operational availability.

Digital signal processing and computer-aiding have vastly improved detection, classification and surveillance along with the presentation of data to the operator. Interactive consoles employ high-resolution colour displays and simplified controls, further improving operator performance. Automatic fault monitoring and a high degree of system redundancy ensure high availability.

These advances allow more complex array shapes, the ultimate factor determining performance, to be accommodated in new GRP, carbon fibre and polymer domes, and offer greatly improved acoustic and hydrodynamic performance.

Three generations of sonar supplied by TMSL are in service with the Royal Navy. The following TMSL sonars are either in service onboard Royal Navy submarines, or are in development.

**Sonar 2046**

Complementary to the submarine's primary sonar suite, Sonar 2046 provides passive 360° coverage with broadband surveillance and high resolution narrowband analysis. The primary sonar sensor is a towed array.

**Sonar 2054**

Developed as the main sonar for the new Vanguard class submarines, Sonar 2054 incorporates passive, active, intercept and towed array systems and is the largest Royal Navy sonar system.

**Sonar 2074**

Now entering service in Trafalgar class submarines, Sonar 2074 is the main passive and active hull-mounted sonar suite. Using the existing Sonar 2020 sensors, Sonar 2074 provides improved performance and is smaller (by a ratio of 5:1) than Sonar 2020.

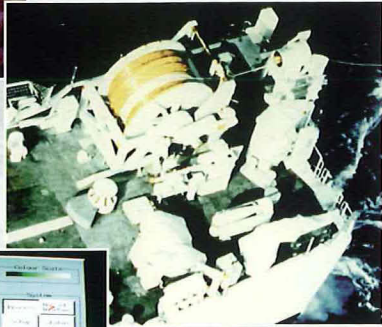
**Sonar 2076**

A fully integrated passive/active search and attack sonar suite, Sonar 2076 is scheduled for the mid-life update of Royal Navy Trafalgar class submarines. The system incorporates a comprehensive set of new arrays and associated inboard processing.

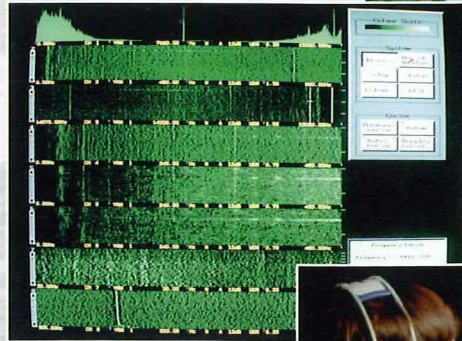
**TMSL Products**



Sonar 2016



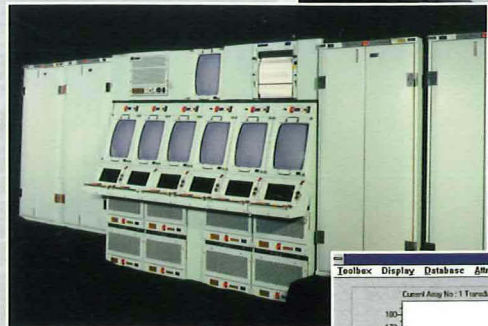
Sonar 2031



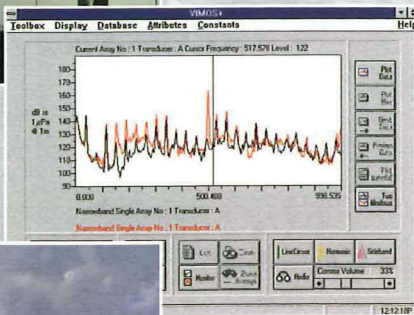
CRISP



COMTASS



FMS 15



VIMOSplus



Sonar 2050

Anti-submarine warfare is among the most important of the many roles of the modern warship. Increasing emphasis on the submarine threat and the efforts being made to make submarines harder to detect have to be met by advances in sonar performance.

While performance is ultimately determined by sensor array characteristics plus efficient data analysis and presentation, the choice of sonar and deployment method also depends on ship's role, operating environment, nature of the threat, constraints of platform self generated noise and, not least, cost.

Thomson Marconi Sonar's new generation solutions feature cost-effective modular architecture offering vastly improved performance with greatly reduced space requirements. Systems are configured to satisfy the varied operational needs of navies around the world.

The three TMS national companies add technological capabilities that represent an unrivalled base from which to provide modular solutions tailored to the specific requirements of individual customers.

TMSL products include:

**Sonar 2050**

The Royal Navy's current major fleet escort sonar, the hull-mounted Type 2050 provides greatly improved detection, classification and torpedo warning capabilities, higher performance in shallow water and multiple target automatic tracking. The system also features automatic data transfer, computer-aided displays and computer-controlled monitoring.

Together with TMS SAS, TMSL is developing the successor to Sonar 2050, the MFS, a high performance hull mounted sonar.

**New generation towed array sonars**

Towed arrays are the most important surface ship ASW development in a generation. Systems now in service with the Royal Navy have achieved consistently better long-range detection than is possible with any other type of sonar.

Systems are designed for high towing speeds and winching stresses. Modular construction allows a much larger acoustic aperture than with a ship-mounted array. High-strength tow cables permit the sensitive hydrophone modules to be towed well clear of vessel noise.

Processing and single operator display systems provide long-range detection of surface and submarine targets. Systems can be easily enhanced with additional modules and optional equipment to operate in both passive and low frequency active domains. TMSL is now involved with TMS SAS in the Project Definition phase of Sonar 2087, a high performance, very low frequency, active and passive towed array sonar for the Royal Navy.

**Vibration monitoring systems**

To maximise detection probability, it is essential to minimise the obscuring properties of the ship's self-generated noise. VIMOSplus provides command with the ability to continuously monitor structure-borne, cavitation, machinery and hydrodynamic noise to allow assessment and rectification.

**TMSL Products**



*Minehunting Performance & Prediction System*



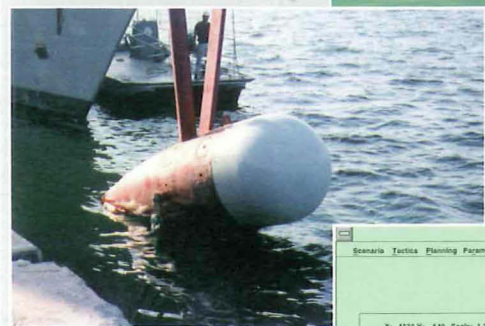
*Sonar 193M Mod 1*



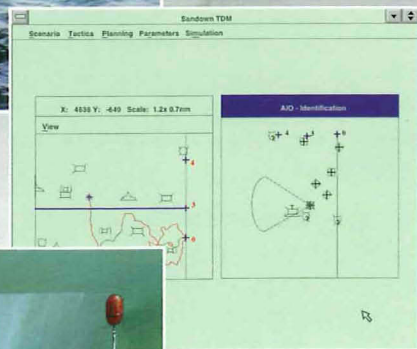
*Sea Scout*



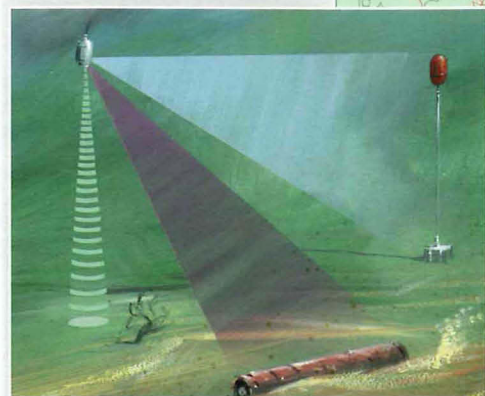
*Sea Probe*



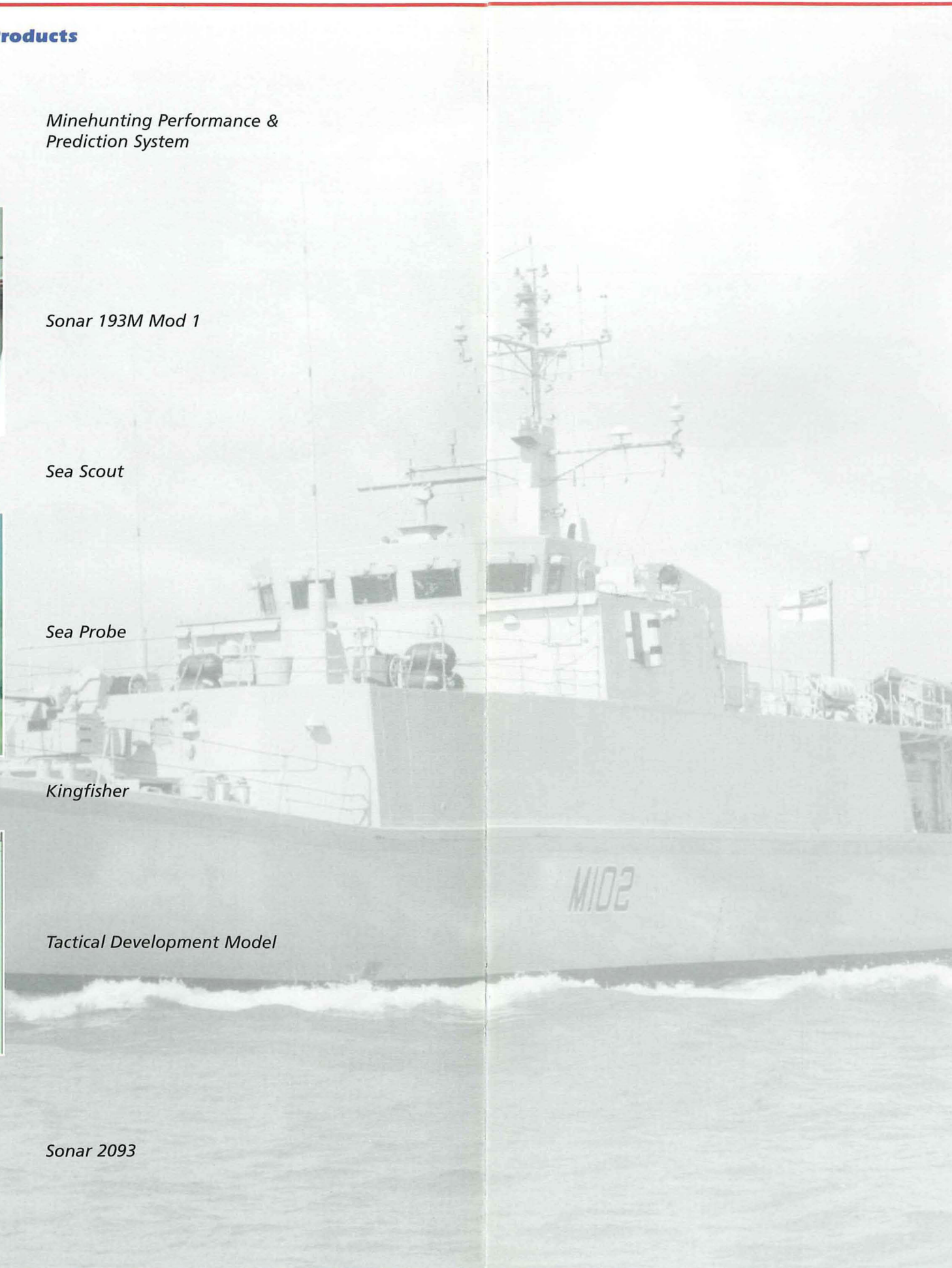
*Kingfisher*



*Tactical Development Model*



*Sonar 2093*



Thomson Marconi Sonar has been the major contractor for research, development and production of minehunting sonar systems since the concept of 'hunting' mines was introduced in the 1960s in France and the UK. The company has an unrivalled range of mine warfare systems able to fulfil any requirement. Products include hull mounted, variable depth, sidescan, mine avoidance and PVDS sonars, plus mine sweeping equipment.

Minehunting sonar technology has been dictated by the complexity of modern mines and the consequent diminished effectiveness of traditional sweeping methods, the damage these mines are able to inflict and the ease with which they can be laid.

Through many years of close co-operation with the Royal Navy and the French Navy the company has acquired a wide experience and understanding of minehunting requirements and has developed a range of products capable of combating current and future threats.

Current Royal Navy and French Navy minehunting sonars have proved their effectiveness against hostile mining. Successes include mine clearance operations in the Falklands, the Suez Canal, the Red Sea and the Gulf.

TMSL minehunting products include:

**Sonar 193M Mod 1**

Sonar 193M Mod 1, acknowledged as one of the world's leading hull-mounted minehunting sonars, is in service with the Royal Navy and many overseas navies.

**Sonar 2093**

Foremost in the product range is Sonar 2093, the world's most successful variable depth minehunting sonar. In addition to the Royal Navy Sandown class installations, Sonar 2093 has also been selected by four export customers.

Sonar 2093 has demonstrated its superior performance in successive NATO and multi-national exercises where it has performed extremely well in demanding shallow and deep water environments.

**Minehunting Performance Prediction System (MPPS)**

Installed with all Royal Navy minehunting sonars and many export systems, the MPPS enables the minehunter to predict sonar performance for the prevailing environmental conditions.

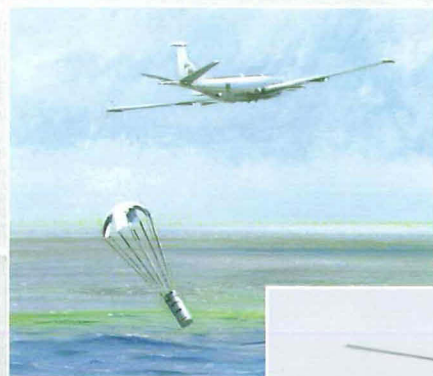
**Sea Scout**

Sea Scout, one of the Thomson Marconi Sonar family of high frequency mirror sonars, is a lightweight, robust, portable sonar for deployment from very small craft of opportunity. It provides a mine countermeasure capability in shallow water areas inaccessible to conventional MCM vessels.

**Sea Probe**

With high resolution in range and bearing, the Sea Probe remote minehunting sonar provides good mine detection and classification performance, even in adverse conditions. Its portability and compact size enable deployment from a remotely operated vehicle and also make it suitable for installation on a variety of platforms, from small craft to large ships.

**TMSL Products**



*Sonobuoys*



*Sonar 2069*



*AQS 901*



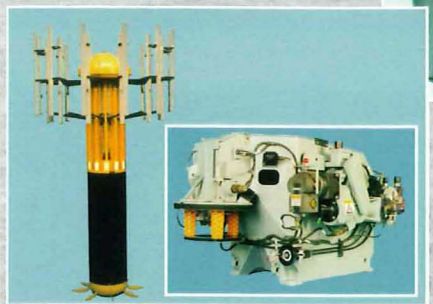
*AQS 902*



*AQS 903*



*CRISP Mission Support System*



*Sonar 2089*

The most rapid, effective, safest and economical method of turning a vague long distance contact into a definitive localised target, is by means of airborne sonar. Systems can be installed on maritime patrol aircraft and shipborne ASW helicopters.

Thomson Marconi Sonar is the world leader in the design and manufacture of acoustic processors, dipping sonars and sonobuoys, and has supplied more than 1000 onboard systems to 15 nations.

TMSL airborne sonar products include:

**Airborne acoustic processors**

The AQS 900 series of acoustic processors, designed for both maritime patrol aircraft and ASW helicopters, analyse and classify the many complex inputs from a wide variety of sonobuoy types and, in helicopters, also from the dipping sonar. Identified targets are automatically tracked and co-ordinates passed to onboard weapon systems for calculation of fire control solutions.

AQS 901 and 902 are currently in service with the RAF and the Royal Navy respectively and export variants of both systems are in service with overseas customers. AQS 903 is an advanced distributed architecture system currently being supplied for the Royal Navy's new Merlin ASW helicopter.

The next generation acoustic processor, TMS 2000, is currently undergoing joint development by the UK and French companies. TMS 2000 is able to process up to 64 sonobuoys and employs state-of-the-art man machine interface techniques.

**Dipping sonars**

Sonar 2069 is the latest upgrade for the 250 Type 195M sonars supplied to the Royal Navy ASW Sea King helicopters and to three export customers. Sonar 2069 is now integrated with the AQS 902 acoustic processor and gives an increased operational depth capability to 195M equipped helicopters.

Sonar 2089, the advanced dipping sonar for the Royal Navy Merlin ASW helicopter, is one of the configurations of the TMS family of low frequency FLASH dipping sonars. It interfaces through the tactical management system with the AQS 903 acoustic processor. FLASH has been selected and successfully qualified by the US Navy.

**ASW crew training**

A cost-effective ASW crew trainer has been developed to eliminate the need for consort submarine or deployment of sonobuoys during training exercises, by realistic simulation of targets, sensors and the environment. The trainer can be provided in many forms including a portable stand-alone system for use with any acoustic processor.

**Sonobuoys**

TMSL develops and supplies a full range of sonobuoys for the Royal Air Force and the Royal Navy. Products include DIFAR, LOFAR and bathythermal buoys.

**TMSL Products**



*Expendable Communications Buoy*



*Submarine Periscope Antennas*



*Land-mobile SATCOM Antenna*



*Surface Ship SATCOM Antenna*



*MSK Communications Decoder*



*Submarine Composite Mast Module*



*Integrated Communications Mast*

Reliable communications between submarine, surface, land and air forces are key to the maintenance of effective tactical control.

Due to the severe attenuation of radio signals in water, it is essential that submarine communications sensors operate very near to, or above the surface. When these sensors are exposed, the parent submarine becomes vulnerable to radar detection and attack by hostile forces.

Thomson Marconi Sonar Ltd is the only TMS national company involved in this activity and has developed a range of communications sensors that minimise the possibility of detection, thus maintaining the submarine's inherent tactical advantage.

All Royal Navy submarines are equipped with TMSL communications sensors. Different sensor deployment options are available to a submarine commander, their use depending upon the tactical situation. Complementary communications antennas have also been developed for surface ships and mobile land forces.

**Integrated communications masts**

In service with the Royal Navy and the Royal Australian Navy, these unique multi-function non-hull penetrating GRP masts feature a radar absorbent coating plus a hydrodynamic profile to minimise the possibility of plume detection when raised. A full range of RF services ensures that only this single sensor is exposed above the surface, its hydrodynamic profile permitting the submarine to maintain submerged speed with the mast raised.

**Expendable communications buoy**

Supplied to the Royal Navy and four other navies, the ECB 680 provides submarine-to-surface covert tactical communications. One-way, delayed pre-recorded messages can be transmitted long after the parent submarine has left the vicinity thus maintaining its tactical advantage. The buoy also serves as an emergency communications buoy in the event of a submarine being unable to surface.

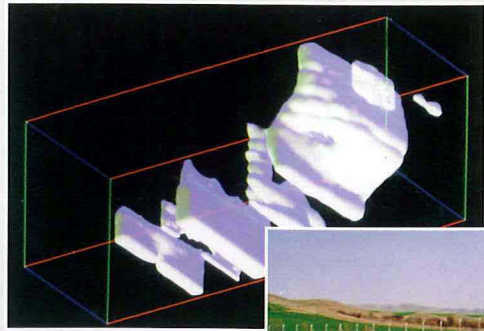
**Periscope antenna outfits**

A range of antennas has been developed for installation on search and attack periscopes. These provide capabilities ranging from VLF/HF reception only, to broadband antennas capable of receiving from VLF to UHF and transmitting UHF SATCOM signals. Others have been optimised for specific purposes, such as the reception of GPS signals.

**Surface ship and land mobile antenna outfits**

CLSS(D) and CLSM antenna outfits respectively provide a SATCOM capability for surface ships and land mobile forces, and have been designed to be compatible with the modern DAMA systems.

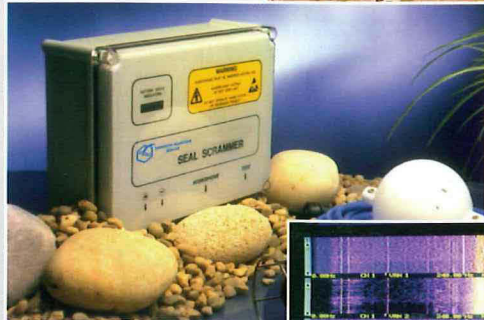
**TMSL Products**



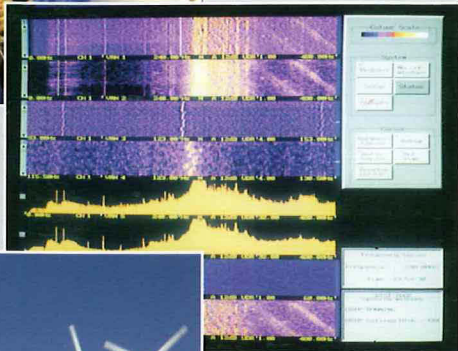
*Sea Witness Customs Sonar*



*Fibre-Optic Intruder Detection*



*Aquaculture Predator Deterrent*



*Real Time Acoustic Data Analysis*



*Acoustic Baffles for Wind Turbine Noise Reduction*



*Mission Replay Systems*



*Acoustic Survey for Oil Exploration*



Exploitation of acoustic and associated technology has yielded a range of commercial products to benefit expanding markets in aquaculture, contraband detection, environmental (noise) pollution, large area security surveillance, seismic survey, and the detailed analysis of recorded acoustic data.

**Acoustic predator deterrent**

The system employs instantaneous, high source level, active sonar transmissions to deter marine predators and forms part of the Aquaculture Industry's defensive measures against the threat to cultivated fish stocks from marine predators.

**Contraband detection sonar**

Sea Witness is a high definition mirror technology short range hull inspection sonar. Particularly effective where underwater visibility is poor, this portable unit can be installed on small inshore customs launches for detection and classification of hull profile anomalies.

**Wind turbine noise reduction blocks**

As wind turbines become more efficient and encroach on domestic areas, greater emphasis is being placed on the reduction of the noise generated by them. TMSL auxiliary mass damping blocks are a simple and cost-effective way of modifying wind turbine towers to achieve major reductions in the self-generated noise levels.

**Large area security surveillance systems**

The long distance transmission characteristics of optical fibres have led to the development of low cost, low maintenance, intruder detection systems. These systems use a buried pressure-sensitive fibre optic cable, requiring no remote power source, for the surveillance of long boundaries extending many kilometres.

**Seismic survey**

In support of oil exploration activities, the company has developed a re-usable noise source for examination of rock strata.



**TMSL Products**



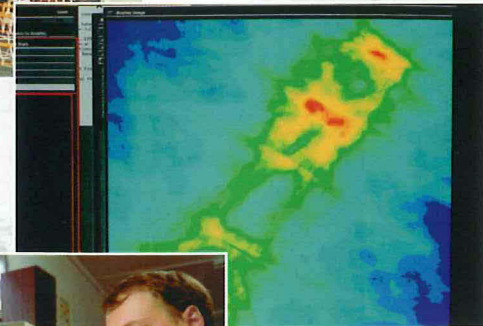
*AS 2107 Sonar Simulator*



*Towed Array Onboard Trainer*



*Portable Tracking Range*



*Modelling and Assessment*



*Acoustic Signature Management*



*Installation and Commissioning*



*Trials and Acceptance*

Through-life sonar services range from pre-design modelling and assessment of acoustic parameters (in specific geographical and environmental circumstances) to platform signature management.

Supporting equipments include shore-based reference and training systems, portable trainers, simulators and stimulators plus noise ranges and post mission analysers.

Human Factors Integration expertise is available to undertake complex workload analysis, develop man machine interfaces, define skill levels and perform training needs analysis at all appropriate stages of product development. A Human Factors Laboratory is available to undertake this work, to trial systems and to carry out acceptance.

In support of platform installation, commissioning trials, and other in-service support requirements, field engineers are available to work onboard and at the customer's premises.

**Integrated Logistic Support**

Through all the phases of the procurement life-cycle, Integrated Logistics Support management is undertaken to ensure that supportability issues influence the product design, and that the required product support is made available to meet the customer's timescale.

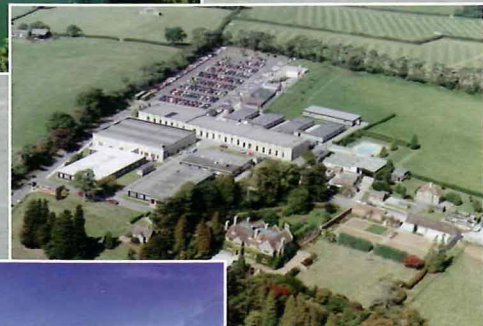
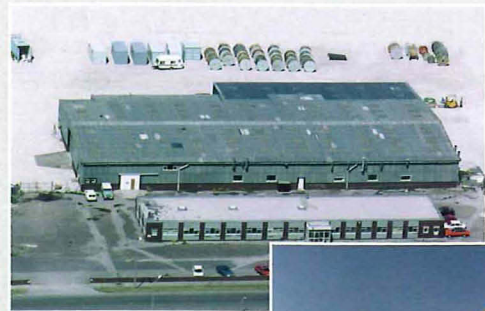
Commercial software tools are used to model through-life costs and, in conjunction with Availability, Reliability and Maintainability data, to define spares requirements to meet mission profiles.

From the Integrated Logistics Support management activities, a comprehensive range of support services are provided from initial product delivery through to disposal:

- Spares manufacture and repair
- Software maintenance and upgrades
- System modifications and enhancements
- On-site defect analysis and fault rectification
- Remote defect analysis
- Performance trials and analysis
- Obsolescence management
- Automatic test equipment
- Documentation preparation and maintenance
- Technical diving team for underwater investigations

**Design support facilities**

Design support facilities include purpose-built acoustic test tanks, the Vobster in-water test site with its unique low ambient noise characteristics, specialised materials research, and environmental test laboratories.



**Bridlington**

- Towed Array and Transducer Manufacture
- Materials Technology
- Penetrators and Connectors

**Cheadle Heath**

- Prime Contract Management
- Submarine Sonars
- Surface Ship Sonars
- Airborne Sonars
- Ship's Tactical Data Highway

**Rochester**

- Airborne Acoustic Processors
- Mission Support Equipment
- ASW Training Systems

**Church Crookham**

- Towed and Flank Arrays
- Acoustic Transducers
- Special Projects
- Sonar Countermeasures

**Vobster**

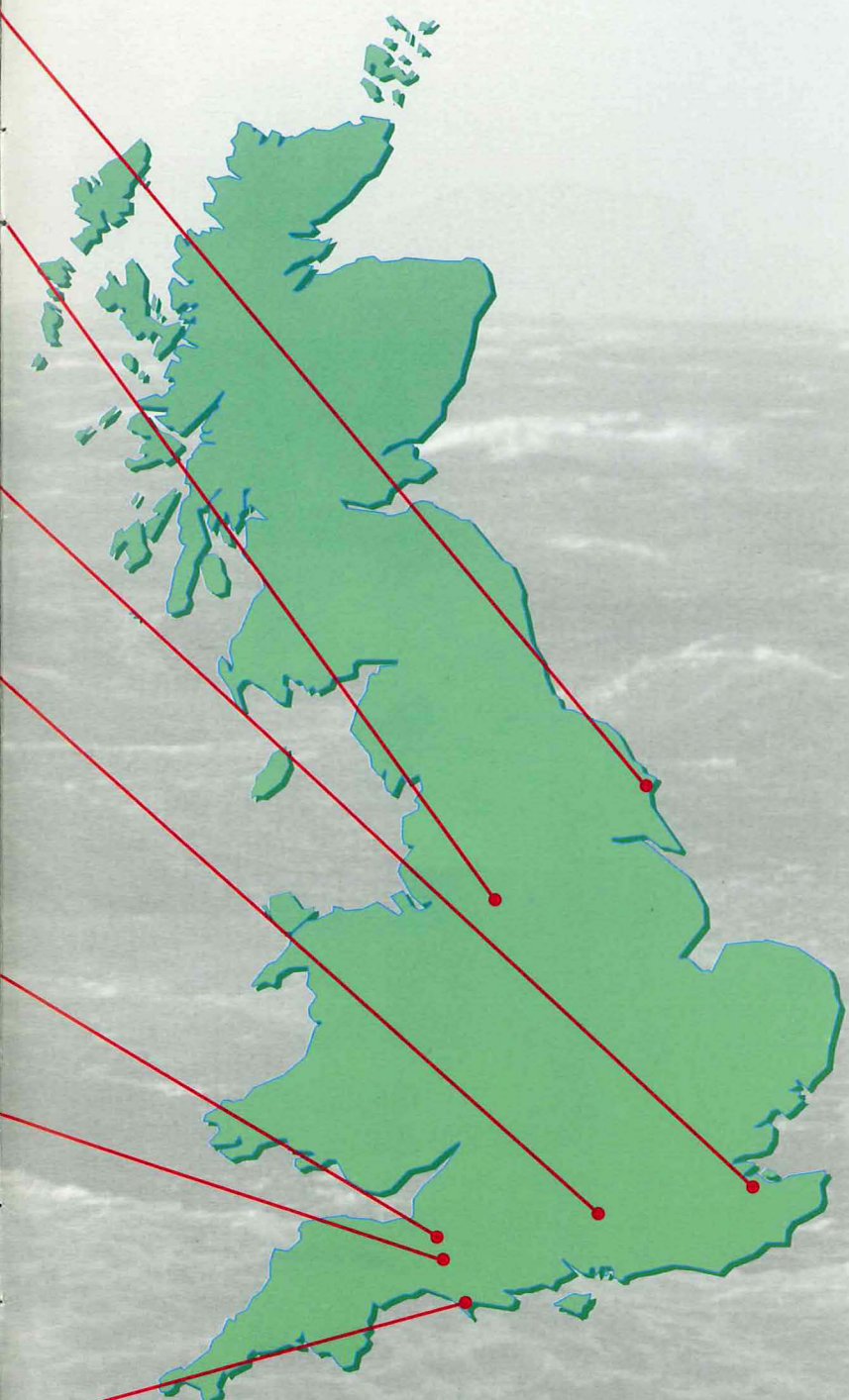
- In-water Test Facility

**Templecombe**

- Company Headquarters
- Prime Contract Management
- Submarine Sonars
- Minehunting Sonars
- Communications
- Special Projects

**Weymouth**

- Civil Projects (including Aquaculture)
- Trainers



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Submarine Sonar Systems

Mine Warfare Systems

Airborne Acoustic Systems

Surface Ship Sonar Systems

Anti Torpedo Warfare

Torpedo Homing Heads

Sonar Support Systems

Masts and Communications

Civil Systems



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SONAR**

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