

# ARCHIVED REPORT

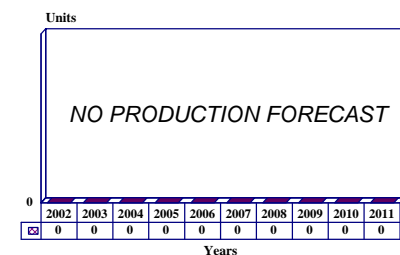
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## Active Towed Array Sonar (ATAS) - Archived 03/2003

### Outlook

- Known production completed
- ATAS likely to be replaced with CAPTAS VDS
- Faces market competition from Russian Vinyetka-EM sonar system
- This report will be archived next year, May 2003

10 Year Unit Production Forecast  
2002 - 2011



### Orientation

**Description.** High-power, low-frequency active/passive towed array sonar tasked with the long-range detection and monitoring of submarines.

#### Sponsor

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United Kingdom  
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Fax: +44 (0) 208 420 3940  
Web site: <http://www.baesystems.com>

US Naval Sea Systems Command  
Crystal City, Virginia (VA)  
USA  
(US Navy tests and trials)

#### Contractors

BAE Systems  
The Grove  
Warren Lane  
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Middlesex HA7 4LY  
United Kingdom

Tel: +44 (0) 208 954 2311  
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(Joint Prime Contractor)

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(Digital processing and display equipment)

MacTaggart Scott & Co Ltd  
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 Tel: +44 131 440 0311  
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 (Deployment/handling gear)

**Licensee.** No known production licenses have been granted.

**Status.** Last known production round completed. System in operational service.

**Total Produced.** An estimated 22 ATAS systems produced and delivered.

**Application.** The BAE Systems Active Towed Array Sonar (ATAS) system was designed to provide active/passive submarine detection for the complete range of warships. ATAS is suitable for installation on any warship with a displacement greater than 250 tons.

**Price Range.** It is believed that the ATAS system as originally conceived had a unit cost of around US\$1 million; however, the cost of the BAE Systems/Thales ATAS system is likely to be higher. Unfortunately, the cost could not be determined or confirmed.

## Technical Data

<b>Characteristics</b>	<b><u>Metric</u></b>	<b><u>US</u></b>
Handling system weight	7,000 kg	14,400 lb
Display/processor weight	280 kg	615 lb
Transmitter weight	200 kg	440 lb
Cable weight	1,500 kg	3,300 lb
Cable length	900 m	1,000 yd
Transmitter peak power	25 kW	
Transmitter frequency	3 kHz	
Operational speed	5-20 kt	

**Design Features.** The Active Towed Array Sonar (ATAS) transmitter consists of a vertical stave of low-frequency flextensional transducers housed in a glass fiber towed body. A flextensional transducer consists of a piezo-ceramic stack, operating in a piston mode, enclosed in an elliptical shell. The shell flexure's mechanical advantage produces the large-volume displacements needed to generate low frequencies. British Aerospace's flextensional transducer weighs less than 3 kilograms and can be assembled in arrays or staves to provide beam patterns for particular applications. A vertical two-transducer stave is used for ATAS. The acoustic transmission is omnidirectional in the horizontal plane with a vertical beamwidth of 25 degrees.

The electronics and display element of the ATAS system was supplied by Ferranti Computer Systems Ltd. It has one electronics cabinet and an operator's console. The electronics cabinet contains the transmitter power amplifier and power supplies for the towed array. The console unit houses the signal and data processing electronics and the sonar display. A high-resolution, full-color display presents the sonar signals in range/bearing or PPI format together with target track

information and equipment status. The operator gains control of the display and equipment by a small keyboard and roller ball. Stabilization is available to compensate for ship movement. Following the merger of programs with Thomson-CSF (now Thales), ATAS was repackaged to use a modified TSM-26 Spherion signal processor and display console.

The receiver array includes a line of hydrophones and associated electronics housed in a 20-meter-long flexible tube. This provides full azimuth cover and a bearing resolution of 0.5 degrees in the broadside beam. The port/starboard ambiguity normally experienced by line arrays is automatically resolved, eliminating the need for ship maneuvers. Hydroplane signals are transmitted to the shipborne electronics as a single serial data stream, thereby minimizing cable dimensions.

**Operational Characteristics.** The Active Towed Array Sonar can be installed or retrofitted to nonspecialized vessels and a variety of warships. No hull penetration is required. The handling system can be supplied as a self-contained unit for permanent fitting on the stern or supplied in containerized form for deployment with auxiliary vessels or merchant shipping.

## Variants/Upgrades

ATAS is produced in three distinct versions:

ATAS(V)1 is a purely active system using a 30 meter array (of which 10 meters is the active component).

ATAS(V)2 adds a Thomson Marconi Lamproie processor and a 120 meter passive array to the basic ATAS(V)1.

ATAS(V)3 has an additional processing cabinet which allows it to simultaneously operate in active and passive mode at 3.5 kHz in tandem with the towed array and a Spherion bow sonar.

Following the merger of the ATAS project with Thomson Marconi Sonar's program, an integrated hull sonar/active towed array/passive towed array system

has been proposed. This is believed to be the ATAS(V)3.

CAPTAS VDS is a Combined Active/Passive Towed Array Sonar (CAPTAS) Variable Depth Sonar (VDS) for ASW in shallow waters and has been reported as a next generation of ATAS technology. It comprises a towed array body trailing a linear array that provides real-time discrimination that can be used for torpedo detection.

Vinyetka-EM is a Russian towed array active/passive sonar system being sold on the market as a competitor to ATAS. The Vinyetka-EM has a flexible trailing antenna and a towed emitter that is expected to outperform ATAS.

## Program Review

**Background.** The flextensional transducer technology used in ATAS was developed by the UK Royal Navy and made available for licensing in 1983. At the time, Marconi Underwater Systems was initially offered the technology but declined to adopt it, since its evaluations showed that it offered no advantages over its own developments. Eventually, the license was taken up by British Aerospace (now known as BAE Systems) as part of its attempt to diversify into new areas of military technology.

The ATAS system was developed during the 1980s to exploit that technology. The British Aerospace plc Naval Weapons Division was then the program's prime contractor, with Ferranti Computer Systems Ltd having a major input into the dry-end development, and MacTaggart Scott taking responsibility for the design and development of drum, winch, and handling control systems.

The US Navy ordered a limited quantity of the transducers used in the ATAS system in November 1987. BAe announced that the US Navy wanted them for evaluation purposes in the development of new active sonar systems. The transducers were to be towed behind T-AGOS-1 Stalwart class ocean surveillance ships that normally deploy the Surveillance Towed Array Sensor System (SURTASS). The US Navy undertook tests of the ATAS system in a variety of environments.

Around July 1990, it was announced that British Aerospace Dynamics and then-Thomson-Sintra ASM (which became Thomson Marconi Sonars and is now a part of Thales) would be merging their activities in the

active towed array area. The ultimate aim would be to develop a fully integrated system that included a Thales hull-mounted sonar, very low frequency passive array, and the ATAS system. The ATAS system currently uses a modified Spherion signal processor and operator console.

In 1992, the responsibility for the ATAS system was transferred from BAe to the joint venture Dowty-SEMA. This was an interim stage while the merger-formed BAeSEMA (now BAE Systems) negotiated the purchase of the 50 percent interest in Dowty-SEMA held by the Dowty Group. This was completed in late 1992, and the ATAS program fell under the authority of the BAeSEMA venture.

One of the first reported sales of ATAS was to Taiwan in 1992. The contract was for six ATAS(V)2 systems to equip that country's six Kang Ding (La Fayette) class frigates. Using the commission date for this class, two ATAS systems were delivered in 1996, two in 1997, and two in 1998. An additional five ATAS systems were also procured for five Cheng Kung class frigates.

Pakistan was reported to have ordered six systems in September 1993 for installation on six Tariq (Type 21) class frigates. Two were installed in 1993, and the remaining four in 1994.

In December 1994, Oman was reported to have ordered three ATAS systems for the Al Bushra class (OPV) patrol ships. In 1996, Oman took delivery of two new corvettes dubbed the Qahir class. These have also been equipped with ATAS. (All of the above are based on commission dates.)

There were also reports during 1994 that the United Arab Emirates (UAE) was seriously interested in procuring ATAS for its new frigates; however, there was no further evidence to support this claim at the time

of this publishing. If the UAE does obtain the ATAS, it would likely be only two systems, which would probably not be delivered until around 2005.

## Funding

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ATAS is a private venture program funded jointly by BAE Systems (formerly BAeSEMA), Thales (which acquired Thomson Marconi Sonar), Ferranti Computer Systems Ltd, and MacTaggart Scott.

## Recent Contracts

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No recent contracts have been publicly identified.

## Timetable

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<u>Month</u>	<u>Year</u>	<u>Major Development</u>
	1983	Transducer technology license offered
Sep	1985	ATAS announced by BAe
Nov	1987	US Navy orders ATAS transducers for testing
	1988	ATAS sea trials in conditions up to Sea State 6
	1989	ATAS sea trials in shallow waters of Baltic Sea
	1990	USN contract for USCG evaluation of ATAS
Nov	1992	Taiwanese order for ATAS
Sep	1993	Pakistani order for ATAS
Dec	1994	Omani order for ATAS
	1999	Last known production order believed completed

## Worldwide Distribution

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The following countries are known users of ATAS:

**Oman.** Three systems for Al Bushra class (OPV) patrol ships; two systems for Qahir class corvettes.

**Pakistan.** Six systems for Tariq (Type 21) class. An additional three systems for the Agosta B class submarines could be ordered.

**Taiwan.** Six systems for the Kang Ding (La Fayette) class frigates; four on Cheng Kung class frigates. A fifth Cheng Kung frigate was believed equipped with ATAS in 1999.

## Forecast Rationale

Long-range passive detection has become very important to combat today's ultra quiet non-nuclear submarines, whose noise levels have apparently been lowered faster than their antagonists' sonar technology can be developed. Yet, despite such sonar needs, the market for the Active Towed Array Sonar (ATAS), developed by BAE Systems and Thales, appears to have run aground. The mass market that was anticipated has apparently stalled at an estimated 22 units produced and

placed into active service with the navies of Oman, Pakistan, and Taiwan.

Production for Taiwan was reportedly completed by the end of 1999. No additional orders are known to have been placed since then. There was a rumor within the industry that the United Arab Emirates was interested in the system, but nothing further has been heard on the subject. Some international sales may be possible in the future, but it is highly doubtful at this time, given the

more technically advanced systems now on the market and in development.

Another more advanced system, the Combined Active/Passive Towed Array Sonar (CAPTAS) Variable Depth Sonar (VDS), also by Thales, is more likely to be sought as a next-generation replacement to ATAS. Some lesser navies may seek out a sale or two in the hopes of getting a bargain, but ATAS also faces

competition from the Russian Vinyetka-EM sonar, which has a flexible trailing antenna and a towed emitter that is expected to outperform ATAS.

No further ATAS production is being forecast at this time. Barring any surge in sales activity, the market report for this system will be archived next year in May 2003.

## Ten-Year Outlook

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The forecast chart has been omitted. This report will be archived next year in May 2003.

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