

# ARCHIVED REPORT

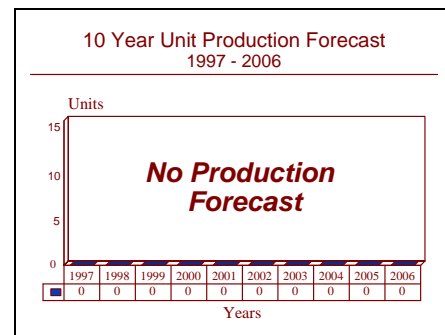
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## Siemens-Plessey AWS-6- ARCHIVED 7/98

### Outlook

- 32 systems produced through 1996
- Failed to fend off competition from Signaal and Telefunken
- Denmark single largest user
- This report will be dropped next year



### Orientation

**Description.** G-band 2-D traveling wave tube (TWT) radar tasked with medium-/short-range multipurpose naval surveillance.

**Sponsor**

Siemens-Plessey Defense Systems Limited  
Oakcroft Road  
Chessington  
Surrey KT9 1QZ  
United Kingdom  
Tel: +44 181 397 5171  
Telex: 929755

**Contraves Italiana SpA**

Via Affile 102  
I-00131 Rome  
Italy  
Tel: +396 43611  
Telex: 610166

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Italy  
Tel: +396 43611  
Telex: 610166

Terma Elektronik AS  
Hovmarken 4  
DK-8520 Lystrup  
Denmark  
Tel: +45 622 2000  
Telex: 68109

Siemens-Plessey Radar is the prime contractor, while Contraves Italiana is responsible for the integration of Dolphin and Seaguard. Terma Elektronik is responsible for integration with Danish warships.

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

**Status.** In service.

**Total Produced.** A total of 32 systems had been produced through 1996.

**Application.** The AWS-6 is suitable for fitting in ships of 400 tons displacement and over. Dolphin is configured for deployment with Seaguard CIWS.

**Price Range.** It is believed that the AWS-6 costs approximately US\$2.0 million.

## Technical Data

Characteristics	<u>Metric</u>	<u>US</u>
Antenna weight:	520 kg	1,144 lb
Frequency band:	G-band	
Peak power:	49 kW	
Scan rate:	10-60 rpm	

**Design Features.** Some of the characteristics of AWS-4 are retained. The systems are of modular design with a smaller and lighter antenna than earlier systems. Below decks equipment is compact and lightweight. Installations can be specified with single or dual beam antenna systems. Optional features include integrated IFF, antenna stabilization, rotation/data rates and signal processing packages.

The TR/RX is equipped with a logarithmic mode for navigation. The AWS-6 features pulse compression within pulse coding. In its Dolphin configuration, AWS-6 is a stabilized dual-beam high data rate radar for missile detection and target indication. It has near hemispherical

coverage and good ECCM performance. Dolphin will also operate as a surface/air search radar in the event of a prime sensor failure. In its general surface/air search configuration, AWS-6 features a single beam antenna.

**Operational Characteristics.** AWS-6 and Dolphin are short-/medium-range naval surveillance radars. The system can be configured to meet the needs of a wide range of surface ships, as a single multifunction radar or as part of an integrated multiradar fit. AWS-6 will carry out air and surface surveillance and long-range air warning. It serves as a navigation set and has the target indication performance required for integration with a point defense or Close In Weapon System (CIWS) system.

## Variants/Upgrades

**Seaguard** Contraves has extended the capabilities of the Seaguard CIWS into a more comprehensive naval weapons control system designated Cosys-200. This expanded system was originally adopted as the command system on the second batch of Turkish MEKO class frigates but subsequently replaced by the Dutch SEWACO system. It is not revealed whether Siemens-Plessey of the UK has a role in the AIS side of this system.

**AWS-6D** is a 3-D stacked beam on receive only derivative of the original AWS-6. In long-range mode, it

concentrates all its energy into the lower beam; at short ranges the beam coverage reaches up to 70 degrees. It was introduced in 1991.

**AWS-6E** is a simplified two-beam version of AWS-6D introduced in 1993. Between four and 30 degrees it measures elevation to within one degree by measuring difference in returns from the two beams. Above 30 degrees and below four degrees it functions as a 2-D radar. The AWS-6 variants are available in containerized form, and a coastal surveillance version is available.

## Program Review

**Background.** Siemens-Plessey designed the AWS-6 with flexibility foremost in the equation. The system has been selected by two clients in AWS configuration. In the early 1980s, Plessey began collaboration with Contraves of Switzerland in the development of the Seaguard CIWS. The AWS-6 was modified to meet the requirement, the resultant system being designated Dolphin. Turkey ordered four Dolphin systems in October 1983 for operation with Seaguard. In 1984, Seaguard was proposed to Egypt for its Chinese-built Jianghu frigates. There have been no published developments with regard to those ships.

Oman was the next customer with an order for three AWS-6 radars to equip the remaining three FAC of the four ship Dhofar class. The name ship of the class received the older AWS-4 radar while the later three operated without a main search radar until the AWS-6 sets were delivered.

Seaguard was tested at the NATO range in San Lorenzo, Sardinia, in 1985. F-104 aircraft simulated sea skimmer missiles by towing targets on 2,000-m runs within the prosecution envelope of the system. Dolphin acquired the targets and passed them on to the associated tracking radar as required. In July 1986 Contraves Italiana revealed that

Seaguard was in full production with a delivery schedule of one complete system every six months.

*Yavuz* was handed over to the Turkish Navy on July 17, 1987. In September 1987, it was announced that the Seaguard system had satisfactorily completed its Sea Acceptance Test (SAT) sea trials. Reaction times, accuracy and compatibility with other ship systems were established. However, the Turkish Navy has subsequently reported serious deficiencies with the gun mountings of the Seaguard system. These do not involve the radars. These problems did not prevent the Turkish Navy from specifying the Seaguard system for the two Track IIA and two Track IIB MEKO-200 frigates. A continued development program applied to Seaguard led to the emergence of the Cosys-200 command system. This system was ordered for the second batch of Turkish MEKO-200 frigates, but a change in policy led to the selection of the Dutch SEWACO system.

The Cosys command system was one of the two finalists to provide the combat system for the Korean KDX destroyers, the rival being BAeSEMA's SSCS. A total of 18 such destroyers are projected, with the first delivered in 1996 and the rest at a rate of two per year thereafter. However, in February 1992, the Korean Navy selected the Goalkeeper CIWS system for these ships and ordered the first pair of guns for the lead destroyer. Since the losing Seaguard CIWS is inextricably linked with Cosys-200, it was presumed that the decision to adopt the BAeSEMA system has been made.

In late 1993, this situation led to a major internal dispute within South Korea. In spite of being preferred by the Korean Navy, Treasury, Foreign Office and Ministry of Industry, and being rated as superior on fourteen out of fifteen grounds, the selection of the BAeSEMA system was countermanded by the Korean Procurement Committee which substituted the German Cosys system in its place. The result was a major procurement corruption investigation by the Korean secret police. This revealed that documents that would have resulted in the BAeSEMA bid winning on the 15th and final grounds had been buried by the committee.

The findings of the police investigation led to the arrest of a number of leading figures. After the procurements for the KDX program had been suspended and the project delayed for some time, the decisions made by the KPC were reversed and the contracts awarded to the BAeSEMA consortium. This features Signaal radars and the AWS-6 was, therefore, dropped from this program. The AWS-6 was, however, bid as part of the equipment fit for the UAE frigate program. The published short list for this project did not include the radar.

During 1995 and early 1996, a number of existing users started to replace the AWS-6 systems on their ships with other radars. Most significantly, this included Denmark, which had previously provided the backbone of AWS-6 use.

## Funding

The AWS-6 was developed as a private venture using corporate funding.

## Recent Contracts

No contractual information has been made publicly available.

## Timetable

Oct	1983	Turkey announced Seaguard procurement
Dec	1986	Denmark ordered AWS-6 for Hvidbjornen class
	1985	Seaguard in live firing trials
Jan	1986	Denmark ordered AWS-6 for Danish STANFLEX
Apr		AWS-6 ordered by Oman for Mussandam FAC
Sep	1987	Seaguard sea trials completed
Dec	1989	Second batch Turkish MEKO-200 frigates ordered
	1991	AWS-6D announced
	1993	Procurement scandal over KDX program
		AWS-6E announced

## Worldwide Distribution

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**Denmark** (5 on corvettes, 16 on Flyvefisken patrol vessels)

**Oman** (3 on Dhofer class FAC)

**Turkey** (8 on Yavuz and Barbaros class)

## Forecast Rationale

The replacement of existing AWS-6 radars with other solutions has signaled a shift away from this unit to other more modern radars. During 1995 and early 1996, a number of existing users started to replace the AWS-6 systems on their ships with other radars.

The Telefunken System Technik TRS-3D radar appears to be one of the leading replacements, and was purchased in 1995 by Denmark over the AWS-6. This was quite a blow to the program, as Denmark had been the most significant customer of the system.

AWS-6 is designed to exploit the one radar ship concept with its tactical data rates being optimized to fulfill a range of functions. These include everything from CIWS (60 rpm) to medium-range surveillance (10 rpm to 20 rpm).

Doubts must be raised as to the wisdom of the concept in an environment where a single anti-radar missile could destroy the radar, and soft-kill the complete ship. This may be part of the reason for the shift away from AWS-6. Forecast International is not anticipating any more large orders for this equipment.

## Ten-Year Outlook

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No production is forecast. This report will be dropped next year.

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