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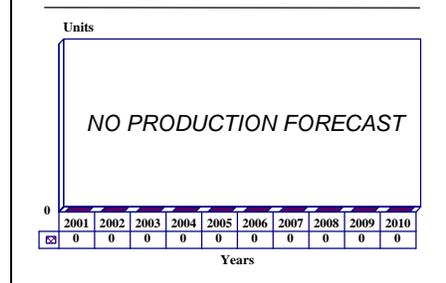
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Seaguard – Archived 08/2002

Outlook

- Last known sale detected in 1999
- No additional procurement anticipated
- Barring any new activity, this report will be archived in the near future

10 Year Unit Production Forecast
2001 - 2010



Orientation

Description. Modular naval fire control system including a close-in weapons system (CIWS) which has been optimized to provide protection against surface-to-surface and air-to-surface guided-missile systems.

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Licensees. No licenses are known to have been issued.

Status. In production and operational service.

Total Produced. An estimated 21 systems have been produced.

Application. Seaguard is an integrated shipboard point defense system intended to provide, 24 hours a day, hemispheric, all-weather, and over-the-horizon defense against anti-ship missiles. Seaguard is equipped with

capabilities verging on those of a full-scale CIWS. It can be combined with a number of different gun solutions, including: the Contraves 25 mm quadruple cannon Sea Zenith, the Russian 30 mm/65 mm guns and the Emerlec 30 mm gun.

Price Range. The modular design of Seaguard makes it difficult to assess an accurate unit cost. Analysis indicates that the various Seaguard configurations probably cost US\$6 million.

Technical Data

	<u>Metric</u>	<u>US</u>
Dimensions - Tracker Mount (X-Band)		
Width:	2,240 mm	88 in
Height:	2,100 mm	83 in
Depth:	1,920 mm	76 in
Weight:	1,200 kg	2640 lb
Operating frequency:	8.6-9.5 GHz	
Peak power output:	4 kW	
Pulse length:	0.53-4 ms	
Antenna beam width:	31 mrad	
Tracking range:	0.3-70 km	0.2-44 mi

Design Features. Seaguard is a modular, digital naval fire control system that consists of components that can be configured to provide an integrated close-range anti-missile defense/close-in weapon system. Seaguard is specifically designed for maximum flexibility in optimizing the defense system arrangements to specific classes of warships. The system centers on one or more multisensor tracking modules, each with their Engagement Control Consoles.

The system has its own command console when operating as a stand-alone unit, consisting of a 24-inch CRT for threat evaluation and weapon assignment. The system is fed by a Plessey AWS-6 surveillance radar and/or the ship's command system. It can be configured to be controlled by the independent modules of the system.

Depending on customer preference, the system can be used for controlling a variety of different weapons. Alternative trackers and designation radars can be also used, thanks to the system's highly modular composition.

Operational Characteristics. The system's operational center can be used for operating one or more Sea Zenith 25 mm point defense gun systems, and operates in concert with a sea-to-air missile as well as a medium-caliber gun, if so desired. All the components are linked through proprietary local-area network (LAN) databuses. Each module has its own 16-bit CORA computer that is proprietary to Contraves. The central processor of this bits-slice computer is characterized as being comparable to the Motorola 68000 series chip.

The modules include a Siemens-Plessey Dolphin/AWS-6 target acquisition radar, a tracker module operating in three axis (TM), weapon modules and a common support module. Each weapon has its own weapons-control module and each tracker has its own control console. Each weapons-control module can produce its own ballistics data. On the Turkish Barbaros class frigates specifically, a separate surface engagement console has been built for controlling the 5-inch gun and the Sea Sparrow missiles. The bus architecture can be expanded into a full-fledged weapons control system/centralized data system (WCS/CDS).

Variants/Upgrades

The Seaguard system can be configured in basically four different orientations.

Variant 1. This consists of a single Weapons Control Monitor (WCM) controlling, in the X-band mode, a vertical launch SAM battery, and in the Ku-band mode, a Seaguard 25 mm Gun Module (GM25). The GM25-

based weapons system is driven by data from the search and target indication radar module (SRM), whereas the SAM-based system interfaces with the ship's combat system.

Variant 2. The X-band version has a single Seaguard tracker radar and associated control console (TMX-

CW) interfacing with the ship's combat system on the one hand, with two WCM units on the other. One of the WCMs controls a medium-caliber gun, the other a VLS SAM unit. The medium-to-short distance, Ku-band version of the system usually employs two tracking module units (TMKs) connected to an SRM and/or the ship's command system. This configuration typically drives a mix of three gun modules (TM25) directly, without weapon control modules.

Variant 3. For long-distance defense applications, this version has two Seaguard TMX-CW tracker units, both of which interface with the ship's combat system independently. Both tracker units control either a vertical launch SAM system and/or a medium-caliber gun. The gun control is done through a WCM unit. The medium/short-distance Ku-band configuration can use one single channel of fire CIWS feed from the ship's command system and operate either a GM25 gun directly or a medium-caliber gun through a WCM.

Variant 4. This is the only one currently in production. It comprises a Siemens-Plessey AWS-6 Dolphin surveillance-lance radar in combination with the ship's combat system, and two Seaguard tracker radars, cross-fed by both. There are two WCM units, one controlling a medium-caliber gun, the other a VLS SAM installation. One of these feeds into a weapons control system optimized for point defense (designated a TMK) which controls four Sea Zenith 25 mm AA guns. The other runs a WCM, which controls the medium-caliber gun and VLS SAM installation. This version is believed to be in license production by Bharat Electronics in India, under the name Shikari.

Sea Zenith. The quadruple-barrel 25 mm gun of Contraves is offered as the default gun in the Seaguard fire control system package.

TMEO/TMK/TMX. Designations for the different tracker units that are available as modules of the Seaguard system.

Program Review

Background. Seaguard can be essentially considered a successor to Contraves' Sea Hunter fire control system. Development of Seaguard began in late 1977 and the system was announced at the beginning of 1980. It was designed as a modular above-water warfare system, the idea being that users could pick and choose what elements they need depending on the platform and its intended mission. The Seaguard system can be fitted on ships ranging in size from fast attack craft to frigates. It can be configured to include one or several tracking radars, a surveillance radar, and a wide range of weapons including small- and medium-caliber guns and a surface-to-air missile battery, all of which operate in concert driven by the data provided by the radar.

The launch order for the system came from the Turkish Navy in 1985. After that, there were rumors that China had also bought the Seaguard, but instead it had selected the Italian DARDO system for its Jianghu class frigates.

Seaguard was, however, ordered for the Turkish Barbaros (MEKO-200) class frigates. These are near-sisters to the earlier in-service Yavuz class, but have the vertical-launch Sea Sparrow instead of the octuple launcher that was on the earlier ships. Original plans had even called for replacing the SEWACO command system on the earlier ships with COSYS-200. However,

the finalized design kept the proven SEWACO command system with the existing Seaguard CIWS. This configuration was also retained for the second pair of ships that were ordered in 1992.

In 1991, Contraves introduced a new gun for Seaguard. The quadruple-mount of single-barreled 25 mm cannons was replaced with a twin 25 mm Gatling mount. Although the major promotional point was that this would increase the rate of fire from 3,400 to the very high 10,000 rounds/minute, the real reason is believed to have been to address the engineering shortcomings of the original quad set-up. It should be noted, however, that none of these mechanical problems had anything to do with the radar system itself, which apparently works very well.

Since the Turkish MEKO 200 order, there have not been any new contracts detected for the Seaguard system. In 1997, Contraves was awarded a contract to supply the LSEOS Mk III (a successor to Seaguard) to direct the 40 mm guns of 11 offshore patrol vessels of a Far Eastern nation. In September 1999, Rheinmetall purchased Switzerland's Oerlikon Contraves Defense for an undisclosed sum from parent holding company Oerlikon-Bührle.

Funding

Development of the Seaguard systems was undertaken as a private venture by Contraves.

Recent Contracts

No recent contract information has been made publicly available.

Timetable

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
Oct	1983	Turkey orders Seaguard
Apr	1988	First Seaguard system delivered to Turkish Navy
May	1988	Second batch ordered by Turkey
Nov	1992	Seaguard ordered for remaining Turkish MEKO-200

World Wide Distribution

India, Saudi Arabia, Turkey, and the **US** have variants of Seaguard on one or more of their sea craft.

Forecast Rationale

The Orlikon-Contraves' Seaguard is a fully automatic, modular shipboard Close-In Weapon System (CIWS) which primarily defends against sea-skimming, surface-to-surface and air-to-surface guided missiles. This CIWS is comprised of a search and target indication radar, one or more Ku-band tracking radars and one or more Sea Zenith quadruple-25mm gun modules. Seaguard can also be fitted with a range of optional FLIR or TV systems which allows operations in an ECM environment.

Seaguard has not fared well on the international market. Its largest known customer is Turkey, which has purchased eight systems for its MEKO class frigates. Since Turkey's last purchase in 1999, no other contracts involving Seaguard or its components have been detected. While the global need for CIWS has not dissipated, the market is saturated with a number of proficient CIWSs. The lack of reported sales indicates that Seaguard does not have what it takes to compete with its rivals. No future procurement of Seaguard is anticipated. Barring any new activity, this report will be archived in the near future.

Ten-Year Outlook

ESTIMATED CALENDAR YEAR PRODUCTION

<u>Designation</u>	<u>Application</u>	Thru	<u>High Confidence Level</u>				<u>Good Confidence Level</u>				<u>Speculative</u>		<u>Total 01-10</u>
			00	01	02	03	04	05	06	07	08	09	
SEAGUARD	Prior Prod'n:	21	0	0	0	0	0	0	0	0	0	0	0