MW08

Outlook

- The final MW08 units were delivered to customers in 2012
- Thales no longer actively markets the MW08 radar. The company is now offering the SMART S Mk 2 radar to new customers
- This report will be archived in May 2013

Orientation

Description. The MW08 is a G-band, 3-D, medium-range naval radar.

Sponsor
Ministry of Defense
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Licensee. No production licenses are known to have been granted.

Status. Out of production and in service.

Application. MW08 is used for surveillance, target acquisition, and tracking. The radar also provides additional channels for gun control against surface targets.

Platform. The MW08 is suitable for smaller frigates, corvettes, and fast attack craft.

Price Range. There is no published information on pricing for any members of the SMART radar family. Forecast International can therefore provide only a speculative range. Taking this caveat into consideration, the MW08 radar is believed to cost $6-$8 million.

Contractors

Prime

Thales Nederland BV	http://www.thalesgroup.com/netherlands, Haaksbergerstraat 49, Hengelo, 7554 PA Netherlands, Tel: + 31 74 2488111, Fax: + 31 74 2425936, Email: info@nl.thalesgroup.com, Prime

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Technical Data

	Metric	U.S.
Specifications		
Frequency band	G-band	
Maximum tracking range – air targets	80 km	49.7 mi
Maximum tracking range – surface targets	40 km	24.85 mi
Tracking capacity – air targets	20 (data handling accuracy)	
Tracking capacity – surface targets	8 (data handling accuracy) 2 (fire control accuracy)	
Antenna size	2.27 m x .84 m	7.45 ft x 2.76 ft
Antenna rotation speed	27 rpm	
Vertical beamwidth (receiving antennas)	Up to 70°	
Horizontal beamwidth	2°	
Antenna system and bearing drive weight	390 kg	860 lb
Transmitter cabinet weight	500 kg	1,102 lb
Processing cabinet weight	450 kg	992 lb
Hydraulic power unit weight	350 kg	772 lb
Heat exchanger	48 kg	106 lb
Waveguide drier weight	83 kg	183 lb

Design Features. The MW08 is designed for the automatic detection, initiation, and tracking of air targets. It also allows the automatic tracking of surface targets and features highly accurate surface tracking channels for direct weapon deployment. The prompt delivery of target tracking data at a high refresh rate enables the fast lock-on of associated weapon control tracking radars. The MW08 features 0°-70° simultaneous gapless elevation coverage.

The antenna has a combined transmitting and receiving stripline array. The array consists of eight elements.

Operational Characteristics. The MW08 is capable of tracking up to 30 targets simultaneously. The air target tracking can be initiated automatically by means of the FFT Doppler processor and the SMR-4 computer. Up to 10 surface target tracks can be initiated manually. The fire control surface processor can accurately track two surface targets.

The radar is controlled from a general-purpose console. Track data is transferred to the command and control system and, if required, to the weapon deployment console for direct surface-target engagement via the databus system or inter-computer interfaces.

Variants/Upgrades

SMART-S. SMART-S is the F-band, medium- to long-range SMART radar variant. It is capable of automatic detection of targets, followed by automatic track initiation and accurate tracking of the targets. It has a unique multi-target tracking capability, and deals simultaneously with high-priority targets such as small, fast low-flying or high incoming anti-ship missiles, as well as all other types of air and surface targets.

Fundamentally, the MW08 is a G/H-band version of the SMART-S radar system.

SMART-S Mk 2. This newest design operates in the E/F-band and is optimized for medium- to long-range surveillance and target designation in littoral environments. SMART-S Mk 2 is designed to match the full performance range of surface-to-air missiles (SAMs) such as the Evolved SeaSparrow Missile (ESSM). It has two main modes: medium range up to 150 kilometers at 27 rpm and long range up to 250 kilometers at 13.5 rpm. It also has a special helicopter mode and surface fire channels. The system features a smaller below-deck footprint than the earlier version, with just two small cabinets. The solid-state transmit modules are integrated into the antenna, meaning no separate transmitter cabinet and waveguide are required.

Thales is marketing SMART-S Mk 2 to new customers who in previous years would have purchased the MW08 radar.

MW08 Platform: The Republic of Korea's KDX-2 Frigate

Source: Republic of Korea Navy

Program Review

Background. The SMART radars have been given a high priority by the Dutch Ministry of Defense since the development program was announced in 1981. The system was in continued development through 1985.

MW08 for Corvettes and Fast Attack Craft

The MW08 is a short- to medium-range 3-D radar for installation on smaller frigates, corvettes, and fast attack craft. Essentially, the MW08 is a G/H-band version of SMART-S. The MW08 was selected for the Portuguese Vasco da Gama class (MEKO 200) in 1987 and the Greek Hydra class (also a MEKO 200 version) in 1989.

Oman. In 1992, Oman ordered two MW08 systems to equip its Vosper 83-meter corvettes. The decision to mount a powerful 3-D radar and the Crotale-NG missile system on these relatively small ships resulted from Omani insistence on acquiring a capable defense against missile-firing helicopters. The project was completed in just over four years.

Greece. Three MW08 radars were ordered for the Greek Super Vita Roussen class guided missile patrol craft. The first of these entered service by 2003. At the launching ceremony of the second-in-class, Greece announced it would exercise its option to procure two more Super Vita vessels (Ships 4 and 5). Thales received two contracts from the Hellenic Navy in 2003. The first contract was for radar and fire control equipment, including the MW08 radar, for two additional Super Vita fast attack craft. The third, HS *Kristallidis* (P69), was launched in April 2004 and delivered in late 2006. The fourth, HS *Grigoropoulos*, was scheduled to be delivered by year-end 2006, but was not delivered until October 2010. The fifth-in-class, HS *Ritsos*, was launched in October 2006.

The second contract was for the midlife modernization of four Combattante III fast attack ships. New radar and fire control systems will be provided under this contract. Although a SMART radar has not been specified for this platform, it is possible that a variant of the SMART radar will be included.

The latest contract, for an additional two vessels, was placed in September 2008, bringing the total number ordered to seven. In March 2009, Thales signed a contract with BVT Surface Fleet to provide a suite of sensors, including the MW08 radar, for these Super Vitas (Roussen class).

The first ship of the latest contract will be handed over to the Hellenic Navy by the end of 2012, and the second ship – the seventh Super Vita overall – will be handed over about a year later.

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Turkey. The Kiliç class is one of Turkey's fast attack craft classes. The first batch of three ships is designated the Kiliç, and the second batch of six ships is designated Kiliç II. Turkey's Kiliç class fast attack craft are equipped with the MW08 radar. The first-in-class, *Kiliç* (P-330), was commissioned in 1998. The second and third vessels were commissioned in 1999-2000.

In 2000, Thomson-CSF Signal was awarded a contract from Fr. Lürssen shipyard for combat systems for four new fast patrol boats of the Kiliç II class. This order included the MW08 radar, the LIROD Mk 2, Scout, and the TACTICOS combat management system. The *Tufan* and *Meltem* were commissioned in 2004-2005. The third ship, *Imbat*, was commissioned between 2005 and 2007 (sources differ). The fourth, the *Zipkin*, was launched in 2005 and was commissioned in 2007.

Two additional fast patrol boats followed. The *Atak* was launched in 2006 and was scheduled for commissioning in 2008. The *Bora* (P-338) was launched in 2007 and was expected to be commissioned in 2009. Although the commissioning dates of the *Atak* and *Bora* have not been confirmed, it is assumed that Thales provided the MW08 for those two vessels.

South Korea Orders Radars

The MW08 radar is being produced for the Republic of Korea Navy (ROKN) KDX-2 destroyers. The first KDX-2 class destroyer, the *Chungmugong Yi Sun-shin*, was launched in May 2002 and conducted its first live-fire tests with the SM2 Block III missiles in the fall of 2004. During the tests, the ship's MW08 radar detected the threat and handed it off to the STIR long-range fire control radar system. The two missiles were fired during the test; both scored direct hits.

The ROKN launched the second KDX-2 destroyer in April 2003 and the third in November 2003. The fourth-in-class was launched in 2005, the fifth in 2006, and the last in January 2007. The sixth and final destroyer was commissioned in October 2008.

In the fall of 2003, Thales signed a contract with the ROKN under which the new Landing Platform Helicopter (LPH) amphibious ship would reportedly be equipped with the MW08 radar system, although this has not been confirmed. (The LPH is known to be equipped with the SMART-L.) The LPH *Dokdo* was launched in July 2005 and commissioned in July 2007.

According to the Korean Overseas Information Service, the ROKN plans to build a second LPH ship. However, no order for a radar for the second ship in the class, the ROKS *Marado*, has been publicly announced. The platforms are being built at the shipyard of Hanjin Heavy Industries & Construction (HHIC) in Busan. This class could have up to four ships.

Indonesia Gets MW08

Indonesia became a customer in January 2004 when it ordered two new 90-meter corvettes from the Royal Schelde Shipyard in the Netherlands. Both of the ships will be equipped with several Thales systems, including the MW08. The two ships were commissioned in 2007. In June 2005, Indonesia exercised a contract option for two more 90-meter corvettes. Thales Nederland is the combat systems integrator and will supply several systems, including the MW08 surveillance radar. The last of the four corvettes was handed over to the Indonesian Navy in March 2009.

Morocco Launches Sigma Frigates

The Royal Moroccan Navy ordered three Sigma class multimission frigates from Damen Schelde Shipbuilding in 2008. The frigates will be equipped with Thales combat systems, including, most likely, the MW08 radar. The first ship was launched in July 2010 and commissioned in December 2011. The second ship was launched in February 2011 and the third frigate in late 2011.

Funding

The MW08 radar export variant was financed with Thales corporate resources.

Contracts/Orders & Options

Contractor	Award ($ Millions)	Date/Description
Signaal	N/A	Jan 2000 – Contract to provide one MW08 radar plus hardware for three KDX-2 destroyers for South Korea.
Thomson-CSF Signal	N/A	Oct 2000 – Contract from Fr. Lürssen shipyard for the delivery of combat systems for four new fast patrol boats of the Kiliç II class. This order includes the MW08 radar, LIROD Mk 2, Scout, Vesta, and TACTICOS combat management system.
Thales Nederland	N/A	Jan 2003 – Contract to supply Thales systems for South Korea's second batch of three KDX-2 destroyers and the LPX (Landing Platform). Note: MW08 not specifically mentioned in contract.
Thales Nederland	N/A	Oct 2003 – Contract to provide radar and fire control equipment, including MW08, for two additional Super Vita fast attack craft for Hellenic Navy.
Thales Nederland	72.4	Jan 2004 – Indonesia orders two corvettes from the Royal Schelde Shipyard in the Netherlands equipped with several Thales systems, including the MW08. The two ships were commissioned in 2007.
Thales Nederland	N/A	May 2005 – Indonesia exercises contract option for two additional corvettes from the Royal Schelde Shipyard equipped with several Thales systems, including the MW08. The first was commissioned in late 2008 and the second in mid-2009.
Thales Nederland	N/A	Mar 2008 – Contract from the Moroccan Defense Ministry to Damen Schelde Shipyard for three Sigma class corvettes (two SNP-9223 and one SNP-10145). The ships will be equipped with several Thales systems.
Thales Nederland	N/A	Mar 2009 – Contract from BVT Surface Fleet for sensors (including MW08 radar) to support two Hellenic Navy Super Vita fast attack missile craft.

N/A = Not Available

Timetable

Month	Year	Major Development
	1981-1985	SMART development program
	1987-1989	MW08 radars purchased by Portugal and Greece for MEKO class frigates
	1992	Oman orders two MW08-equipped Vosper 83-meter corvettes
	1995	Three MW08 systems for the Turkish Navy's Kiliç class fast patrol boats
Jan	2000	Three MW08 radars for South Korea's three KDX-2 destroyers
May	2000	Hellenic Navy orders three MW08 Super Vita guided missile patrol craft
Oct	2000	Contract for four Thales suites for Turkey's Kiliç II class patrol vessels
Jan	2003	South Korea orders additional Thales systems for three more KDX-2 destroyers
	2003	Thales introduces the SMART-S Mk 2
Oct	2003	Hellenic Navy contract to provide radar and fire control equipment, including MW08, for two additional Super Vita fast attack craft
Jan	2004	Indonesia orders two corvettes equipped with MW08 radar systems
May	2005	Indonesia exercises contract option for two corvettes equipped with MW08
Jul	2005	South Korea's first LPX landing ship with SMART-L radar launched
	2007	Thales decides to no longer actively market the MW08 radar
Mar	2008	Morocco orders Sigma class vessels
Sep	2008	Greece orders sixth and seventh Super Vita missile craft
	2012	Thales delivered sensors for Greece's seventh and final Super Vita

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Worldwide Distribution/Inventories

Greece	Four MW08 systems on MEKO 200 Mk 3 frigates; seven MW08 systems on Super Vita fast attack missile craft
Indonesia	Four MW08 systems installed on four new corvettes
Morocco	Three MW08 systems on Sigma class multimission frigates
Oman	Two MW08 systems on Vigilance corvettes
Portugal	Three MW08 systems on MEKO 200 frigates
South Korea	Three MW08 radars on KDX-1 frigates; six more MW08 systems installed on KDX-2 frigates; MW08 believed to be a part of the new Landing Platform X (LPX) amphibious ship class
Turkey	Three MW08 systems on Kiliç fast attack class, six MW08 radars on Kiliç II fast attack class

Forecast Rationale

Thales no longer markets the SMART-S-derived MW08 radar. Instead, the company is promoting its SMART-S Mk 2 second-generation system.

Production of the MW08 has now ended, with the final units delivered to customers in 2012. Since Thales has said it will no longer sell the system, it is not expected that any more will be built. The MW08 program has reached the end of its life cycle, so this report will be archived in May 2013.

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