

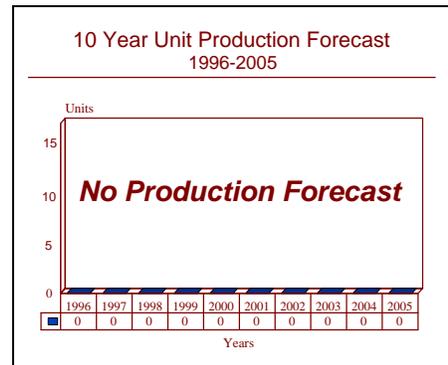
# ARCHIVED REPORT

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## Signaal ZW.06 - Archived 7/97

### Outlook

- In service, with a total of 72 systems installed still in existence
- Production ended in the Netherlands but license production in India continues
- No future orders anticipated



### Orientation

**Description.** I/J-band surface search and navigation radar with limited facilities for air surveillance and helicopter control.

#### Sponsor

Hollandse Signaalapparaten B.V.  
Zuidelijke  
Havenweg 40  
NL-7550 GD Hengelo  
The Netherlands  
Tel: +31 74 488111  
Telex: 44310

#### Contractors

Hollandse Signaalapparaten B.V.  
Zuidelijke  
Havenweg 40  
NL-7550 GD Hengelo  
The Netherlands  
Tel: +31 74 488111  
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#### Licensee

Bharat Electronics Ltd (BEL)  
Trade Center  
116/2 Race Course Road  
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**Status.** In service.

**Total Produced.** A total of 72 ZW.06 and ZW.06/2 and eight ZW.07 systems were produced. This does not include systems installed on a number of ships which have been lost or scrapped.

**Application.** Surface ships from fast attack craft to light aircraft carriers.

**Price Range.** An estimated unit cost of US\$0.5 million.

## Technical Data

### Characteristics

Vertical beamwidth:	19 degrees
Horizontal beamwidth:	0.9 degrees
Sidelobe level:	-25 dB
Gain:	31 dB
Rotation speed:	24 rpm
Frequency band: I/J-band	8600-9500 MHz

### Dimensions

#### Metric

Antenna dimensions:	2.7 x 1.2 m
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**Design Features.** ZW.06 is an I-band radar of compact and lightweight construction, rendering it suitable for installation in small vessels down to 500 tons displacement. It is usually found in corvettes and frigates, although it has been installed on a light fleet carrier of the Indian Navy. The transmitter/receiver is of solid state design and the stainless steel antenna permits siting in adverse environments.

Operationally, the radar gives surface coverage limited only by the horizon and the inherent benefits of maximum mast height mounting. The radar has high resolution for navigational purposes and sufficient air coverage for helicopter operational requirements. Provision for integration of helicopter transponder systems and a digital video processor are incorporated. Anti-clutter measures and ECCM characteristics include circular polarization, logarithmic receiver with pulse length discrimination,

sensitivity time control, suppression of non-correlated pulses and a tunable transmitter. The ZW.06 radar can be selected to scan individual sectors of 10 to 160 degrees. The range of the radar is to the radar horizon for surface targets, with a 12-nm range for helicopters and a 9-nm range for fast moving fixed-wing aircraft, at a maximum elevation of 19 degrees. The range discrimination is 10-20 m in the short pulse mode and 100 m in the long pulse mode, with an angular discrimination of 0.9 degrees. The entire system weighs less than 300 kg (600 lb). The antenna, which is particularly light, withstands windspeeds in excess of 170 km/h.

**Operational Characteristics.** The requirement was for a naval surface search and navigation radar providing surveillance, navigation, helicopter control and limited air surveillance facilities. The radar was designed in accordance with DEF 133, classes N1 and N2.

## Variants/Upgrades

**ZW.07** A submarine-deployed derivative of the ZW.06, ZW.07, has been developed. This has been installed upon the Taiwanese Hai Lung class and Dutch Walrus class submarines.

**ZW.12** A lightweight derivative of the ZW.06 intended for deployment on patrol boats and other small craft. The ZW.12 comes in two sub-variants, the ZW.12/1 with an unstabilized antenna and the ZW.12S with a level stabilized antenna.

Rashmi Bharat Electronics have produced an "upgraded" version of the ZW.06 radar under the designation Rashmi. It features a 2 m slotted array, a solid-state transmit/receive unit, a sector control unit and a 50 cm or 65 cm raster display.

Rani Bharat Electronics builds a navigation radar designated the Rani and/or Type 1245. This may be ZW.06 (or even ZW.02), the old British Type 975 or the Decca 1226 set built under license.

## Program Review

**Background.** The radar was developed during the late 1960s and first entered production to fulfill export orders from Thailand (one set) and Brazil (six sets) in the early 1970s. A string of export orders then ensued. The first domestic order was to equip the 12 Kortenaer class frigates in 1975. Two of these were sold to Greece during construction and replaced by the Jacob van Heemskerck

class. The ZW.06 radar was also specified for the Karel Doorman class of frigates ordered in 1985. ZW.06 was extensively installed in ships of the Indian Navy and specified for the three "repeat Godavari" class frigates scheduled for construction during the latter part of the 1980s. These ships were continuously delayed and are reported to have been finally canceled. The ZW.06 was

installed upon the first five members of the South Korean Ulsan class frigates completed in 1988/89.

The ZW.06 has been replaced by Scout as the navigational radar on the Dutch Navy frigates of the Karel Doorman class. There are no further contracts presently outstanding

for this system although a number of potential clients remain. In a number of recent cases, the ZW.06 installations on existing warships have been removed in favor of later navigational radars, most notably the Type 1007.

## Funding

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The development was carried out as a private venture by Signaal.

## Recent Contracts

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No contractual information has been made publicly available.

## Timetable

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1970	Developed during the late 1960s
1972	Supplied to Thai Navy for <i>HTMS Makut Rajakumarn</i> Supplied to Brazil in Niteroi frigates
1974	Ordered for Spanish Descubierta frigates
1975	Fitted in 5 of 6 Indian Nilgiri frigates Variant ZW.06/2 announced by Signaal
1978	Ordered for Moroccan Lazaga FAC Ordered for Dutch Kortenaer frigates
1979	Ordered for Moroccan Descubierta frigate Ordered for Indian light carrier Vikrant Supplied to Greece in Kortenaer frigates Supplied to Egypt in Descubierta frigates
1980	Ordered for South Korean Ulsan frigates Ordered for Argentine MEKO-360 frigates Ordered for Peruvian Halland destroyers
1981	Ordered for Portuguese Descubierta frigate
1982	Ordered for Indian Godavari frigates
1983	Refitted to Indian Talwar frigates Ordered for Thai Sukothai corvettes
1984	Ordered for Thai Chonburi FAC
1985	Ordered for Dutch Jacob Van Heemskerck frigates
1987	Ordered for Indian repeat Godavari frigates
1988	Ordered for Dutch Karel Doorman class frigates
1989	Indian repeat Godavari frigates abandoned
1992	Replaced by Scout on Karel Doorman class

## Worldwide Distribution

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Argentina (4 on MEKO-360 FF)

Brazil (6 on Niteroi FF)

Egypt (2 on Descubierta FF)

Greece (5 on Kortenaer FF)

India (1 on Vikrant CVL, 3 on Improved Godavari FF [may have been canceled], 3 on Godavari FF, 5 on Nilgiri FF, 2 on Trishul FF)

South Korea (5 on Ulsan FF)

Morocco (1 on Descubierta FF, 4 on Lazaga FAC)

Netherlands (4 ZW.07 on Walrus SSK, 2 ZW.07 on Zwaardvis SSK, 7 ZW.06 on Kortenaer FF and 2 ZW.06 on Heemskerck DD)

Peru (4 on Halland FF - now laid up and stripped)

Spain (6 on Descubierta FF)

Taiwan (2 ZW.07 on Hai Lung SSK)

Thailand (1 on Makut Rajakumarn FF, 2 on Rattanakosin FFL, 3 on Chonburi FAC-G)

## Forecast Rationale

In the past, ZW.06 has been a very successful program for Signaal. Although the success of the ZW.06 is undoubted, its technology dates from the late 1960s, limiting overall capability in comparison with more recent competitors. Versatility and its operational effectiveness have won ZW.06 a thoroughly sound reputation. Sadly, the decision to replace the ZW.06 by Scout on the Karel Doorman frigates has ended its career.

Signaal is now strongly marketing the Scout FMCW radar which has substantial cost and operational advantages over the old ZW.06. With the strong acceptance of Scout registered over the last year by the Netherlands and Germany, the future prospects for the ZW.06 are now bleak indeed. In common with many European systems that have reached the end of their lives in the domestic environment, the ZW.06 has now been licensed out for production abroad. BEL produces the radar for service

with the Indian Navy and is likely to attempt to sell the system in other parts of the Far East.

The abandonment of the Thai Jianghu retrofits and the elimination of ZW.06 in favor of the Signaal Scout for the Karel Doorman class has eliminated domestic production of this radar. However, it is now being produced in India where it will equip the Delhi class destroyers and the Improved Godavari class frigates. While production of the Delhi class is proceeding at a discernible rate, there is no indication that work is actually taking place on the Improved Godavari class ships - however the shipyard responsible is widely reputed to have taken 27 years to build a civilian oil tanker so they may not have been formally canceled. We do not, therefore, predict further production of the ZW.06 at this time. This report will be maintained in the short term against the possibility of unanticipated orders being won. Failing such orders it will be dropped in a future supplement.

## Ten-Year Outlook

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No production is forecast

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