



APAR



What is APAR?

APAR is an Active Phased Array Multifunction radar for naval Area Defence based on Evolved SeaSparrow Missile and Standard Missile 2. It automatically and simultaneously performs search, track and weapon control tasks.

What is its mission?

APAR is the multifunction radar in the Anti-Air Warfare system (AAW) on board of the Royal Netherlands Navy LCF and German Navy F124 class Air Defence and Command frigates. The AAW system combines APAR, the SMART-L long range surveillance radar and the SIRIUS infrared search and track system, to form a world class AAW suite with proven performance. APAR and the AAW system fully support the Evolved SeaSparrow Missile (ESSM) and Standard Missile 2 in the innovative ICWI guidance mode, as proven by a long series of live firings.

APAR's search function is optimised to detect very small targets at the horizon, also in a littoral environment. By realizing a short time between initial detection and fire control quality track, APAR creates maximum battle space against seaskimming missiles. APAR can simultaneously support many AAW and ASuW engagements, creating unsurpassed fire power to protect the own ship and a fleet unit from saturation attacks.

What are the main benefits?

APAR provides 360 x 85 degrees 3D search, track and fire control coverage, with many different radar tasks taking place simultaneously, in one radar mode. APAR's tasks are performed automatically and are self-adaptive to target and environment. APAR uses the I/J-band and high resolution Doppler processing for optimal horizon search performance, with high robustness in the littoral environment.

The system supports many ESSM and SM-2 engagements at the same time, also during the illumination phase.

Thanks to its modular design without single points of failure and rotating parts, APAR offers high availability and 'graceful degradation'. It also allows easy repair, because all equipment is below deck and readily accessible.

The system offers large functional flexibility, making it fully 'future-proof'. It can readily be adapted to evolving requirements, thanks to flexible software design.



By courtesy of the Royal Netherlands Navy



Features

Situational awareness

- I/J (X) band active phased array for low elevation detection out to 75 km
- 360 degree x 85 degree 3D coverage out to 150 km
- Integrated search and track for high accuracy and short reaction time
- High robustness in cluttered environments due to high resolution Doppler processing
- High robustness against jamming, using innovative ECCM

Multi-engagement

- Many simultaneous ESSM and SM-2 engagements by supporting the ICWI guidance mode
- Continuous hemispherical fire control coverage without blind arcs
- Supports any type of AAW engagement, including against super-sonic high-divers, super-sonic sea skimmers and stealth targets
- Supports ASuW engagements via gun and ESSM / SM-2 surface modes

Environmental specification

- All weather operation
- Shock and vibration qualified

In service

APAR has demonstrated excellent performance during operational testing of the LCF and F124, including several series of live firings. Almost all operational sensor testing has taken place in littoral environments, with APAR covering coastlines, windmill parks, and land areas.

Installation

APAR is fully integrated in the ship's mast structure. Equipment installation in the mast structure takes place at the factory, allowing rapid on-board integration at the shipyard. APAR's 4 active phased array antennas are fixed in a non-rotating set-up to realize 360 degrees by 85 degrees 3D coverage. Each antenna is connected with its own signal and data processing, waveform generation, power and cooling supply. Track and system management connects the 4 "faces". All APAR equipment is mounted below deck.

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