



## **KRONOS®**

### **MULTIFUNCTIONAL NAVAL RADAR FOR TOTAL SURVEILLANCE**

KRONOS® is the multifunctional radar based on the advanced AESA (Active Electronically Scanned Array) technology, used on board naval vessels of 400 gross tonnage and above. KRONOS applications range from point defence, air and sea surveillance, radar tracking, littoral warfare to missile defence. Already provided to several Navies all over the world, the system belongs to the renowned KRONOS Multifunctional radar family.

#### **THE SOLUTION**

KRONOS is conceived for small and medium warship like corvettes, light frigates, patrol vessels performing the following naval missions:

- Escort
- Point defence
- Patrolling
- Land forces assistance.

In blue water and littoral environment under harsh meteorological and electromagnetic conditions KRONOS uses its multifunctional architecture to simultaneously

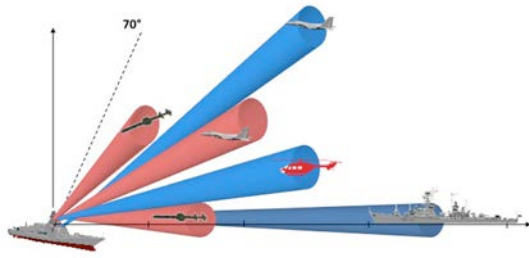
and independently perform the surveillance and tracking functions by electronically scanning the beam both in azimuth and elevation as well as mechanical rotation.

#### **THE SYSTEM**

Suitable for different types of vessels, the KRONOS radar performs the following main tasks:

- Air and Surface Surveillance, with elevation coverage up to 70° to face High Diving Missile threats
- Threat evaluation on priority base • Air and surface dedicated tracking (refresh rate 1 sec, 4 sec) and Track While Scan
- Dedicated tracking for active missile guide (i.e. VL-MICA, ASTER)
- Dedicated tracking against small and low visible target or Pop-Up target, i.e. Sea Skimmer
- Target designation to weapon systems
- Target classification
- Over The Horizon (OTH) Detection Capability
- Bi-dimensional mono-pulse measurement ( $\Delta AZ$ ) ( $\Delta EL$ ) beams

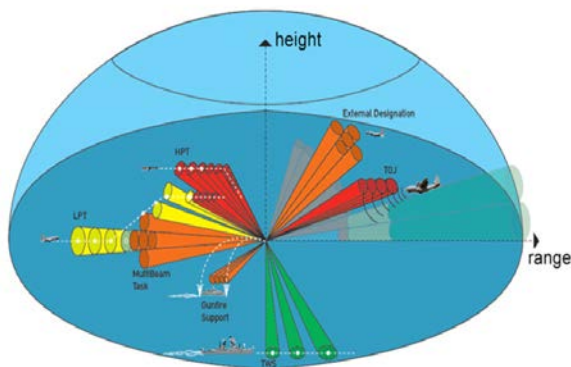
- Gunfire Support/Splash Spotting
- Side Lobe Blanking (SLB) and side lobes lower than 40dB
- Emission CONTROL (EMCON)
- Jam strobe detection and tracking.



Unlike traditional 3D radars, KRONOS automatically schedules and performs any activity classified as a priority within the relevant tactical scenario by scanning the beam both in azimuth and elevation while mechanically rotating in azimuth at 60 round per minute (rpm).

It also features stealth configuration with reduced RCS. KRONOS can be easily integrated in a multi-layered defence system like a ship Combat System providing the following operational advantages:

- **Shortest reaction time for track initialization** (up to 1 sec after first detection): after the first detection of a new threat KRONOS confirms the threat in the same scan, scanning the beam in azimuth and then initializes it in the next mechanical scan. This capability is fundamental against pop-up target (ex. Sea Skimmer)
- **Shortest reaction time for track cueing and engagement:** KRONOS performs a dedicated tracking with an update period of 1 sec for threats classified as HPT (High Priority Tracking) reaching the FCS required tracking accuracy in a short time. This capability provides a time gain in the Combat System engagement chain.



## TECHNICAL FEATURES

Operating Band	C
Antenna Technology	Active Full Phased Array, TX/RX solid state modules
Antenna Rotation Speed	60 rpm
Electronic Scanning Capability	$\pm 45^\circ$ Az, $\pm 60^\circ$ El
Surveillance Range	250 Km in Extended Range Mode
Tracking Update Rate	Up to 1 second
Elevation Coverage	Up to $85^\circ$ in tracking Up to $70^\circ$ in surveillance
Number of Tracks	300 (maximum)
Weight above deck	970 Kg
Integrated IFF and SLB antennas	4 channels for primary radar and 2 channels for secondary radar
MTBCF	>2000h
MTRR	<45 min (TRM plug in)
BITE	Fault identification and location
EMI/EMC	Qualified MIL-STD-461E
Climatic Environment	Qualified MIL-STD-810F
Mechanical	Qualified MIL-STD-167-1A

## KEY POINTS

KRONOS results from a consolidate company experience in the development of multifunctional radar systems, which started more than 20 years ago with the shipborne EMPAR installed on the Italian aircraft Carrier (Cavour) and French/Italian Destroyers (Horizon) with the main mission of point/area defence and active missile guide (ASTER15/30).

EMPAR, on board since 1985, successfully performed more than 10 formal ASTER missile firing and more than 100 formal trials with cooperative targets (missiles, Helicopters, aircraft, ships,...). Supplied to the Italian, UAE, Peruvian, Algerian and Thai Navies, the KRONOS radar stands out for:

- High flexibility in the market
- Configurable operative modes
- Configurable antenna illumination distribution
- AESA based on the GaAs technology, developed within the in-house foundry
- Extremely fast reaction times towards a wide spectrum of present and future threats
- Dynamic and adaptive beam forming
- Dedicated tracking for active missile guidance
- Gunfire Support (i.e. Splash Spotting)
- High reliability and graceful degradation
- Maintainability through TRMs plug in.