



KRONOS - 3D MULTI ROLE RADAR

KRONOS is a 3D multi-role C-Band radar with a full solid state active phased array antenna.

It is designed by SELEX Sistemi Integrati on the basis of its experience in advanced Multifunctional radar systems, such as the shipborne EMPAR provided to the Italian Navy and other Foreign Customers.

It is available both in land based (KRONOS 3D LND) and shipborne (KRONOS 3D NV) configurations.

KRONOS 3D is a medium range Radar, which counters new generation threats in every kind of environment: ECM (Electronic Counter Measures) environments, severe clutter environments, such as open sea (Blue Water) and extreme littorals (Brown Water) scenarios for the naval version.

3D air surveillance extends to 180km and up to 70° in elevation. The radar coverage is obtained by phase scanning both in azimuth and elevation, while mechanically rotating in azimuth at 60rpm.

The capability of electronic scanning in azimuth and elevation and the use of a scheduler for a real time allocation of the time/energy budget to the different activities (search, tracking, auxiliary,...) provides the maximum flexibility in terms of coverage, renewal time and tracking, allowing the system to perform contemporary:

- Surveillance of its operational area up to 180 Km with high detection capability

- Short reaction time against Pop-Up target
- Dedicated tracking with an update rate up to 1 sec

The tracker manages a huge number of tracks with automatic and manual initiation.

A threat evaluation is realized for each track on the basis of its cinematic and detection characteristics.

According to the Threat Evaluation, a priority and a tracking with a different refresh rate is assigned to each threat fully exploiting the Multifunctional architecture (azimuth and elevation beam scanning):

- Dedicated tracking for High Priority Tracks (HPT) with an update period of 1 sec
- Dedicated tracking for Low Priority Tracks (LPT) with an update period of 4 sec
- Track While Scan (TWS) with the surveillance update period

The dedicated tracking and the implementation of azimuth and elevation monopulse techniques provides improved tracking performance especially for manoeuvring targets.

A pencil beam is used in transmission and four contemporary receiving beams (Σ , Δ_{az} , Δ_{el} , SLB) with four dedicated channels with high dynamic range are provided in reception, to obtain high resolution and accuracy performances both in azimuth and elevation.

KRONOS 3D uses modular and adaptive Signal Processing architecture with various coherent integrations

processes. Different clutter maps are used for the selection of the most suitable MTD/MTI doppler filtering and thresholding. Different CFAR techniques are used to reject false alarms caused by clutter and/or jamming. Excellent ECCMs (Electronic Counter Counter Measures) are ensured through:

- Wide-band high frequency agility (pulse-to-pulse or burst-to-burst),
- Automatic Least Jammed Frequency Selection
- Track on Jammer
- Ultra low side-lobe antenna pattern
- Side Lobe Blanking function through a dedicated channel.

Moreover, the very low peak power ensures a minimum chance of intercept.

The Tracker Unit manages more than 300 3D tracks with automatic and manual initiation, each containing high update rates for the best tracking accuracy, specifically for manoeuvring targets.

KRONOS 3D is designed with full compliance to modern international military standards and guarantees high reliability with low life-cycle costs, due to:

- high availability of the system
- few types of different LRUs
- interchangeable LRUs between positions
- few need for spare part investment.

The naval version of the KRONOS system is easily integrated in every Combat Management System and is completely remote controlled.

Advantages for a Combat System:

- Short time for track initialization
- Short time to reach the FCS required tracking accuracy

MAIN OPERATIONAL ROLES

KRONOS 3D LND performs the following main roles:

- Point Defence Mode, to designate the associated firing sections.
- Gap filler

KRONOS 3D NV performs the following roles:

- Point Defence as Standard Mode to counter every kind of threats, as supersonic missiles, high diving and sea-skimming missiles, as well as small manoeuvring crafts
- Long Range Surveillance by means of dedicated Operative Modes
- Littoral Warfare using dedicated waveforms
- Gunfire Support

TECHNICAL CHARACTERISTICS

MTBCF	≥ 2000h
MTRR	≤ 45 min (TRMs plug in)
BITE	fault identification and location

Antenna Group

Frequency:	C-band
Antenna	
Rotation speed:	60 rpm
Elevation:	0° - 70° (Point Defence Mode)
Transmitter	Distributed Solid State modules (TRMs in antenna based on power p-HEMT HPA technology)
Antenna Stabilization:	Electronic Stabilization both in azimuth and elevation
IFF Antenna:	Optional
Dimensions:	Antenna (w d h): m (2050 x 850 x 760)

Receiver

Tracking method:	Dedicated tracking (azimuth and elevation scan-off) and/or Track While Scan
IF Dynamic Range:	High Linear Range
Signal processing:	Adaptive CFAR and MTD/MTI Advanced frequency selection Enhanced ECCM functions

