Naval & Air Defence Systems

# SHIPBORNE MULTIMODE SURVEILLANCE RADAR

The RAN-30X surveillance radar represents the state-of-the-art of 2D X-Band surveillance radars. It can operate as a primary sensor for combined surface and air surveillance on board patrol vessels or as a specialized anti-seaskimmer sensor on board major Surface Combatant Vessels.

RAN-30X features up to 4 operational roles:

- Surface and air surveillance mode (detection and tracking of small air/surface targets)
- Navigation and helicopter control (high antenna rotation speed for navigation close to the coastline)
- Over-the-horizon (OTH) detection (low antenna rotation speed and long range detection capability)
- Anti-seaskimmer missile detection. This mode has an high antenna rotation rate to ensure the detection and tracking of very small targets manoeuvring in clutter environment and featuring very low Radar Cross Section (RCS).

Each mode is designed with a proper set of transmitted waveforms.

The reflector antenna performs two different beams (in linear and circular polarisation) to cope with different applications:

- The first beam is a cosecant square one (up to 25°- beam width of elevation coverage) used in Surveillance and Heli modes
- The second beam (providing a higher gain ) is a pencil beam one, applied for anti-missile detection and Over-the-Horizon mode.

The antenna is designed to house the IFF antenna in a back-to-back configuration.

RAN-30X receiver is designed to provide a very high linearity and sophisticated processing. It employs triple conversion with a carrier sample technique. An automatic and adaptive STC algorithm is implemented against the returns from clutters and wide target radar cross sections.

# RAN-30X

A different detection and data extraction logic is used to extract surface and air target at plot level. Target identification is confirmed by means of automatic tracker algorithm (at track level).

A set of tracking filter parameters and logics is used in each mode, for Air and Surface Targets.

The RAN-30X command control and extended bite is fully remoteable. The new architecture provides the RAN-30X with a higher flexibility in comparison to the normal radar equipment. It can be fully integrated with different ship platforms and Command and Control Systems (point-to-point serial link, FDDI or Ethernet ship data).

## STATUS

RAN-30X is in service on board more than 10 Surface Combatant Vessels.

## TECHNICAL CHARACTERISTICS

| INSTRUMENTAL RANGE | |
|---|---|
| Mode 1 (15rpm) | >100km air/surface surveillance |
| Mode 2 (30rpm) | >40km navigation and heli control |
| Mode 3 (3rpm) | >200km over-the-horizon surface |
| Mode 4 (30rpm) | >25km anti-missile |

| OUTPUT |
|---|
| Video (raw and processed video). They can be mixed and displayed in range by means of an operational command. |
| Air and surface plot |
| Air and surface tracks (up to 255 system tracks) Serial/Ethernet or FDDI bus |

| ANTENNA GROUP |
|---|
| Mechanical Roll and Pitch stabilised platform |
| Reflector antenna with two different beams |

| BEAM 1 WIDTH (AT -3DB) | |
|---|---|
| Vertical | Cosecant square up to 25° |
| Horizontal | 1.2° |

| BEAM 2 WIDTH (AT -3DB) | |
|---|---|
| Vertical | Pencil up to 4° |
| Horizontal | 1.2° |

| VERY LOW AZIMUTH SIDE-LOBE LEVEL |
|---|
| Polarization (circular and linear for both beams) |
| Direct axis azimuth brushiess pancake motor |
| Three operative rotation speeds |
| Provision for IFF-ISLS integration antenna (back-to-back) |

| ANTENNA SERVO UNIT |
|---|
| Managing of the stabilisation platform |
| Speed and space control loop for platform motors |
| Separate power and control managing for each stabilised axis |
| Azimuth motor loop correction management (true reference) |
| Extended bite for each axis |
| 4 separate output azimuth data in synchro and digital |
| Air cooled |

### Receiver

- Linear type
- Coherent triple conversion
- Frequency synthesiser
- Digital pulse compression
- Programmable waveform and digital expander
- Adaptive STC
- Carrier sampling technique
- Coherent integration with MTD technique
- Non-coherent integration
- Automatic frequency selection
- Automatic air and surface plot extractor
- Automatic air and surface tracking
- COTS boards.

### Transmitter

- X-band
- Type of transmission frequency
  - Full band frequency agility
  - Fixed frequency
  - Diversity (batch-to-batch agility) - coded waveforms
  - PRF stagger.

## INSTALLATION DATA

| ANTENNA AND PLATFORM | |
|---|---|
| Total height | 2300mm |
| Swing circle | 2400mm |
| Weight | 600kg |

| TRANSMITTER | |
|---|---|
| Dimensions (h d w) | 1815 x 700 x 694mm |
| Weight | 294kg air cooled |

| RECEIVER CABINET | |
|---|---|
| Dimensions (h d w) | 1815 x 700 x 694mm |
| Weight | 294kg air cooied |

| ANTENNA SERVO UNIT | |
|---|---|
| Dimensions (h d w) | 1815 x 700 x 694mm |
| Weight | 294kg air cooled |

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