



THE UNIQUE AND MODERN DESIGN OF ANTENNA GROUP WITH SOLID STATE TRANSMITTER-RECEIVER ENSURES A HIGH RELIABILITY AND EXCELLENT PERFORMANCES



X-S BAND FULLY SOLID STATE

MARINE RADAR

***LEONARDO* SSR**



Universal Mounting

MULTIFUNCTION RADAR DISPLAY

X/S BAND SUITABLE FOR USE ON SHIPS OF ANY SIZE AND TYPE

BULK CARRIER

CARGO SHIPS

TANKER SHIPS

CRUISE BOATS

SUPPLY VESSEL



Leonardo SSR is a marine navigation CHART RADAR of modern design based on Solid State Power Amplifier (SSPA) and Digital Technology. The radar provides high performance with a high level of targets detection and tracking, with a high resolution and discrimination capacity, using a compact and very light antenna.

Transmission is available immediately after power up.

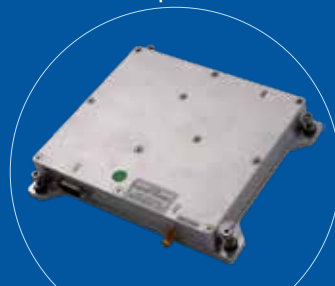
- **Solid State Amplifier (SSPA) designed in house;**
- Radar features are fully configurable and reprogrammable by software (Software Defined Radar);
- Automatic detection of small and large naval targets with Extraction of plot and tracking with automatic start of Track While Scan (TWS);
- Performance of detection and tracking fully complies with the IMO Performance Standards MSC.192(79) and IEC 62923-1/2;
- Extensive multifunctional capacity of the display with: ARPA (250 targets), electronic charts (optional) and data overlay support; AIS, 2000 targets, fusion and information;
- Digital interface, Asterix protocol for both radar video and radar controls;
- Innovative Human Machine Interface (HMI) with modern user-friendly windows based operation;
- Compact, silent, light weight and low power consumption;
- Antenna rotation speed: 22 rpm (standard version), 42 rpm (HSC version);
- Embedded performance monitor;
- High reliability with extensive automatic BITE;
- De-icing optional provision (to extend operating temperature down to -40°C);

Solid State Radar (SSR)

GEM Laboratory Research & Development



Solid State transceiver



Power Amplifier Module

With GEM Solid State Radar, clear echo images are generated, the operator tries to have a very clear image of the area surrounding the ship.

With Solid State technology there are very short times and costs for maintenance because it will not be necessary to replace the magnetron.

- **Antenna lengths: 6', 7.5', 9' (X-Band) and 12' (S-Band);**
- **Up-mast or down-mast transceiver configuration;**
- Simple installation and maintenance procedures;
- Temperature: compliant with IEC 60945 ed.4 par. 8.2/8.4;
- Umidity: compliant with IEC 60945 ed.4 par. 8.3;
- Vibration: compliant with IEC 60945 ed.4 par. 8.7;
- Wind resistance: compliant with IEC 62388 ed.2 par. 15.5;
- EMC: compliant with IEC 60945 ed.4 chapters 9 and 10;
- Shock: compliant with IEC 62388 ed.2 par. 17.3.2;
- Acoustic noise: compliant with IEC 60945 ed.4 par. 11.1;
- Safety: compliant with IEC 60945 ed.4 par. 12;
- Brushless motor (maintenance free)

Extensive multifunctional capacity of the display with electronic charts and data overlay support: AIS targets fusion and information. Embedded display ensure maximum flexibility in bridge design and in general for customer requirements best satisfaction.

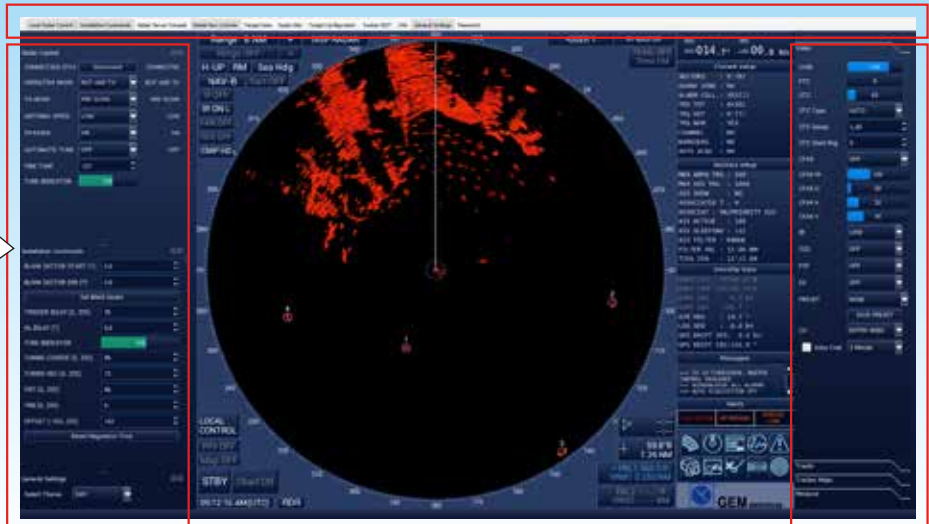


Leonardo SSR X/S Band radars are compliant to the latest IMO performance standards with marine equipment directive (med) certification. Both X/S band radar transmit on the frequencies allocated to maritime radars, satisfying the relative requirements the occupation of the electromagnetic spectrum described in the ITU-R recommendations.

GEM software with exclusive interfaces for immediate and efficient operations

GEM Radar has menus that offer simple and efficient information with which the operator can perform tasks quickly.

The user interface is equipped with intuitive control panels that allow quick access to the main radar functions.



Radar keyboard

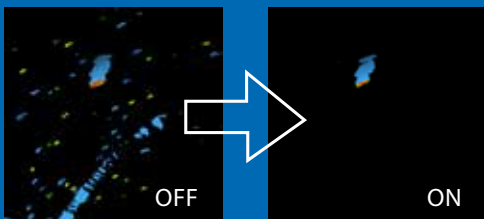
GEM Research & Development Lab designs proprietary software

In the Research and Development laboratory Qualified engineers develop hardware and software to design products that you will use for your work with safety and reliability.

Compatible with current regulations
 RADAR ECDIS
 ·IEC 62388 Ed. 2.0 ·IEC 61174 Ed. 4.0
 ·IEC 62288 Ed. 2.0
 ·IEC 61162 Series
 ·IEC 62923-1/2

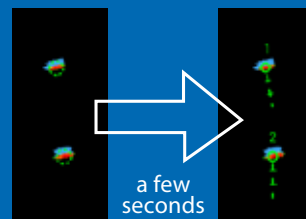


Adaptive Clutter Rejection



Adaptive clutter rejection algorithms perform better radar image adjustment and improved false echoes suppression.

Advanced Target Tracking



Advanced Target Tracking performs faster acquisition and stable tracking even for highly manoeuvring targets in dense traffic waters.

Advanced technologies navigation softwares

GEM Software enables the very latest technologies for Navigation, Sensors Integration and Data Fusion.

Radar Chart



ECDIS

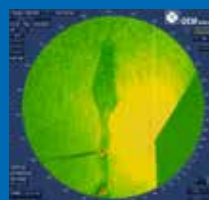


CONNING

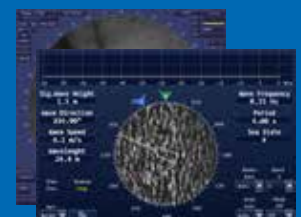


Optional

Oil Spill



Wave Elaboration



Wave elaboration studies the radar back-scatter from the sea to extract the wave information

X/S BAND ANTENNA GROUP

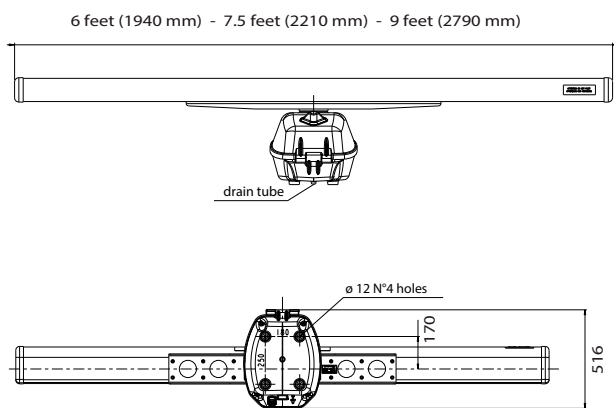
Array Length	X-BAND			S-BAND
	6 feet	7.5 feet	9 feet	12 feet
Type	Slotted waveguide array			
Frequency band	X band, $\lambda = 3.2$ cm, frequency range 9410 ± 60 MHz			2900÷3100 MHz
Polarization	Horizontal			
VSWR	$\leq 1.2:1$			
Horizontal beamwidth to -3dB	$\leq 1.25^\circ$	$\leq 1.05^\circ$	$\leq 0.85^\circ$	$1.9^\circ \pm 0.1^\circ$
Vertical beamwidth to -3dB	$\sim 23^\circ$			$25^\circ \pm 10\%$
Sidelobes within 10°	≤ -27 dB			≤ 26 dB
Sidelobes outside 10°	≤ -30 dB			≤ 30 dB
Gain	≥ 29 dBi	≥ 30 dBi	≥ 31 dBi	≥ 27 dBi
Bearing discrimination with e-DAR [®] processing optional				

TRANSCEIVER UNIT PERFORMANCE

Solid State Power Amplifier (SSPA) / Coherent two-channel receiver Superheterodyne / Digital configuration with functions defined by the software (Software Defined Radar) / Pulse compression techniques

Scanner unit	X-BAND			S-BAND
Transmission output	100 watt	200 watt	400 watt	400 watt
Transmission frequency	X/S Band, 3 channels			
	CH1 SP: F1, LP: F2	F1...F6		
	CH2 SP: F3, LP: F4	X-Band: selectable within $9.300 \div 9.500$ MHz		
	CH3 SP: F5, LP: F6	S-Band: selectable within $2.950 \div 3.150$ MHz		
Pulse Repetition rate (PRR)	from 500 to 2000 Hz			
Pulse Width	from $0.05 \mu\text{s}$ up to $25 \mu\text{s}$			
Sector blanking	Available			
Receiver	Coherent, two channel 16 bits sampling			
Dynamic range	≥ 130 dB			
Built-In Test Equipment (BITE)	Fully integrated in all modules, covering also PRF parts.			
Interface	Gbit Ethernet. Asterix protocol for both radar video and radar controls			

X-BAND OUTLINE



ROTATION UNIT PERFORMANCE

Rotation speed	24 or 42 rpm (for HSC requirement)
Wind load	Operational: 100 knots Survival: 120 knots
Performance monitor	Embedded in Antenna group

ENVIRONMENTAL CONDITIONS

Models SSR are designed to operate in a reliable and continuous mode, with full operative performances, in the environmental conditions specified in the following table:

	Operating Temperature
Antenna Group	From -25°C to 55°C (storage from -28°C to $+70^\circ\text{C}$) with optional anti-icing device (de-icer) extended temperature from: -40°C to $+55^\circ\text{C}$
Protection grade	IP66
Relative humidity	Up to 95% at $+40\%$
Vibrations	In accordance with IEC-60945
Shocks	In accordance with IEC -62388 (17.3.2)

POWER SUPPLY

Antenna Supply Unit (powering Antenna Group and Transceiver)	single phase 88 - 264 VAC, 47-63 Hz, 800 W max
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COLORS

White RAL9003 (Standard)
Navy Gray FED-STD 595 - 26373 (on request)

WEIGHTS

- Scanner Unit	X-BAND: 30 Kg.	S-BAND: 111 Kg.
- 6' Antenna:	5.8 Kg.	
- 7.5' Antenna:	9 Kg.	
- 9' Antenna:	11 Kg.	
- 12' Antenna		77 Kg.

S-BAND OUTLINE

