

Sentinel Series

COASTAL SURVEILLANCE RADAR



X BAND FULL SOLID STATE



Upmast Version



Downmast Version

INNOVATION IN RADAR TECHNOLOGY

Sentinel Series

MAIN CHARACTERISTICS

- Full Solid-State Radar Transmitter and Receiver (TRX)
- 365/24 operation
- Optimum detection of small surface targets
- Dual LAN interface
- High azimuth and range resolutions
- Comprehensive Built-In-Test (BIT)
- Can be remotely accessed and controlled
- Sensor MTBF well beyond 30,000 HRS
- Optional LPI mode



Order Code	Configuration U=Upmast RTX D=Downmast RTX	Transmitter Peak Power (W)	Max Transmitter Average Power (W)	Antenna Length (feet)	Antenna Polarization
Sentinel-50/12	U	50	7.5	12'	Horizontal
Sentinel-50/19	U			19'	Horizontal
Sentinel-50/19/C	U			19'	Circular
Sentinel-50/21	D			21'	Horizontal
Sentinel-50/21/C	D			21'	Circular
Sentinel-100/12	U	100	15	12'	Horizontal
Sentinel-100/19	U			19'	Horizontal
Sentinel-100/19/C	U			19'	Circular
Sentinel-100/21	D			21'	Horizontal
Sentinel-100/21/C	D			21'	Circular
Sentinel-200/12	U	200	30	12'	Horizontal
Sentinel-200/19	U			19'	Horizontal
Sentinel-200/19/C	U			19'	Circular
Sentinel-200/21	D			21'	Horizontal
Sentinel-200/21/C	D			21'	Circular
Sentinel-400/19	D	400	60	19'	Horizontal
Sentinel-400/19/C	D			19'	Circular
Sentinel-400/21	D			21'	Horizontal
Sentinel-400/21/C	D			21'	Circular

in case of dual redundant configuration, add /D to the order code

OPTIONS

- IALA GUIDELINE 1111 Top performances-compliant Tracker module
- Depending on installation requirements, cable lengths are delivered in accordance with Buyer's instructions
- Sentinel-100, Sentinel-50, 19' Antennas: Upmast version available on request for special applications
- Downmast transceiver: dual redundant configuration available on request

ANTENNA UNIT

Length:	12'	19'	21'
Type:	slotted waveguide array		
Frequency:	9225 ÷ 9500 MHz		
Polarization:	horizontal or circular		
Rotation speed:	11 / 22 r.p.m. , depending on transmission mode selected	16 / 22 r.p.m.	6 / 11/ 16 / 22 r.p.m.
Tolerable relative wind speed:	100 knots (operative) - 120 knots (non operative)		
Gain:	32.5 dB typical	35 dB typical	38 dB typical
H-BW:	0.65° typical	0.42° typical	0.35° typical
V-BW:	22° typical	18° typical	11° typical

MAIN FEATURES

Instrumented Range	Up to 96 nmi, depending on the chosen profile
Minimum Detection Range	30 m from the antenna location
Target separation	Better than 12 m (3 m cell size) or 18 m (6 m cell size)
Tracker:	Compliant to IALA Guideline 1111, 2015 top performances, more than 1000 tracks
BITE measurements	Fully integrated BITE facility covering also RF sections
Interface	1 GB LAN Ethernet (digitized video and controls), Analog raw video signals and radar controls
Management	Remote management during operation. Local management for local assistance

TECHNICAL SOLUTIONS

- Main features
- Fully coherent , fully solid state pulse compression radar
 - Fully digital configuration available through software-defined functionalities
 - Time and frequency diversity techniques with automatic adaptation to the real scenario
 - Operator- selectable transmitted power level for each transmitting sector, more than 31 sectors programmable by the user

MAIN FEATURE OF THE TRACKER

Role	Radar Server with embedded plot extraction and radar tracking software
Compliance of the tracker	IALA advanced performances, top performances as stated by IALA Guideline 1111, 2015
Number of surface tracks	At least 1000
Output track data	<ul style="list-style-type: none"> → Track time stamp (UTC) → Track label → Track status → Track position (range, true Nord bearing) → WGS 84 track latitude → WGS84 track longitude → Track speed → Track route → Track quality as per STANAG 5516 → Associated plot
Tracking performances	Automatic clutter map building for automatic filtering thresholds to maximize true tracks and reducing probability of fake tracks
Interface	1 GB LAN Ethernet
Radar presentation	PPI radar available on the screen connected to the server/tracker



FREQUENCIES

Frequency band	9.25 to 9.5 GHz.
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MAIN FEATURES OF THE TRANSMITTER

True transmitted power to the antenna	At least 200W 50, 100, 400 W available on request
Modulation:	Pulsed FM
Minimum Detection Range	30 m from the antenna location
Stagger function	available

MAIN FEATURES OF THE RECEIVER

Demodulation	Fully coherent
Noise figure	<2.5 dB, overall less than 4.5 dB excluded low loss elliptical waveguide
Receiver sensitivity	-131 dBm (dynamic range more than 110 dB)
Receiver IF bandwidth (adequate to mode of operation)	45 MHz maximum
Compression gain	At least 32dB
STC (programmable versus antenna height)	Automatic digitally programmable with user definable multiple sectors of 0.9° resolution and programmable width

RELIABILITY

Description (single RTX)	MTBF (in hours)	LRI / MTTR in Hours	Availability %
Overall radar sensor	25263	-	-
Antenna Group Unit:	104348	2	99,99808
Single Fully solid state Bulkhead Radar transceiver (LAN interface)	40000	1	99,99750
Antenna supply	250000	1	99,99960
Safety switch	1000000	1	99,99990

Description (Dual redundant RTX)	MTBF (in hours)	LRI / MTTR in Hours	Availability %
Overall radar sensor	40667	-	-
Antenna Group Unit: composed by:	104348	2	99,99808
Dual redundant radar transceiver including RF Interswitch Unit	99938	2	99,99800
Antenna supply	250000	1	99,99960
Safety switch	1000000	1	99,99990

EMI

The equipment has been designed and manufactured to operate in full compliance with the international IEC 60945 standard (ed. 4, 2002-8), chapters 9 (Electromagnetic emission) and 10 (Immunity to electromagnetic environment).

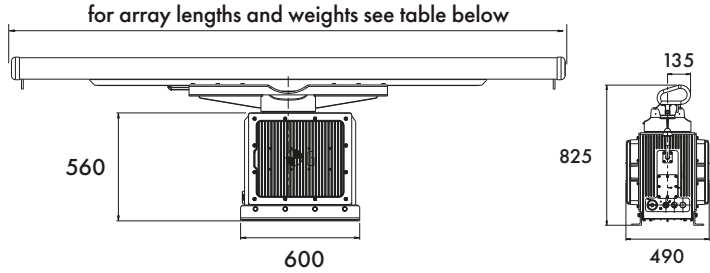
ENVIRONMENTAL CONDITIONS

The equipment has been designed and manufactured to operate in the environmental conditions specified by the international IEC 60945 standard (ed. 4, 2002-8) as follows:

- Temperature range:
 - o Internal units: from -15°C to +55°C;
 - o External units: from -25°C to +55°C;
 - o Storage: from -30°C to +70°C;
 - o Note: Inclusion of optional heating unit lowers range to -40°C;
- Humidity: 95% at 40°C non-condensing (up to 100% at +40°C with de-hydrator);
- Vibrations:
 - o Sweep 2 Hz – 13.2 Hz at ± 1 mm,
 - o 13.2 Hz – 100 Hz at 7 m/s² and for 2 h on each resonance, otherwise 2 h at 30 Hz in all three axes;
- Shock: 6 drops from 1 m.

CONFIGURATION UPMAST

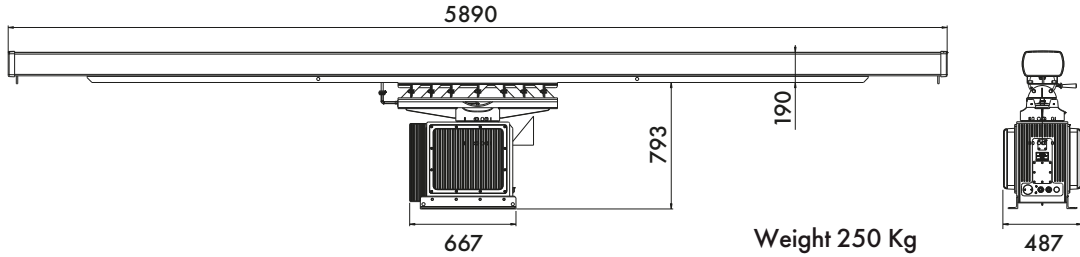
12'



Scanner Unit Weight: 170 Kg (w/o array)

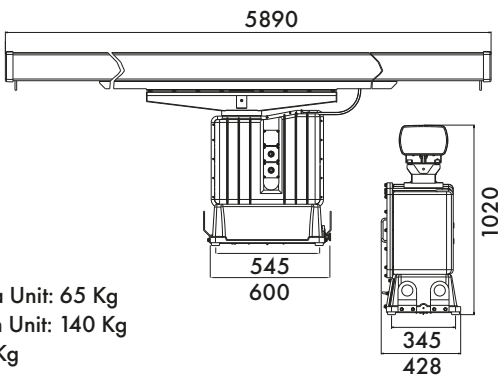
Model	Array Size	Length	Weight
AU11-12	12 feet	3830 mm	24 Kg
AU12-19	19 feet	5890 mm	65 Kg
AU12-21	21 feet	6510 mm	178 Kg

19'



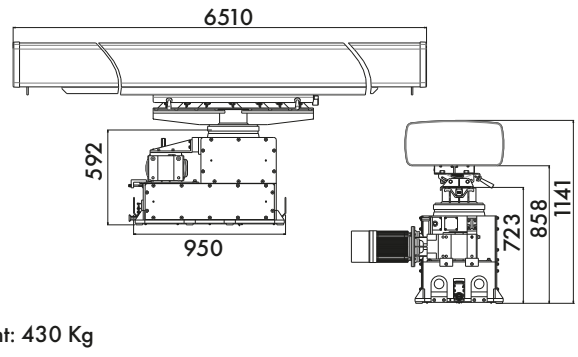
CONFIGURATION DOWNMAST

19'



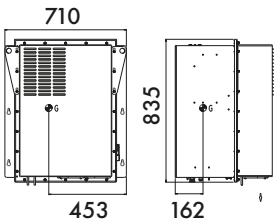
Weight
Antenna Unit: 65 Kg
Rotation Unit: 140 Kg
Tilt: 28 Kg

21'



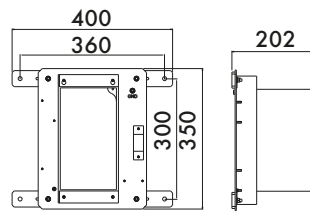
Weight: 430 Kg

DOWNMAST TRANSCIEVER



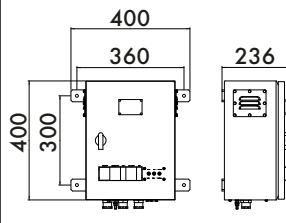
Weight: 55 Kg

ANTENNA SUPPLY UNIT ASU-50001



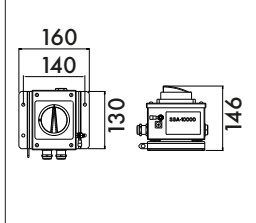
Weight: 10 Kg

ASU-30000



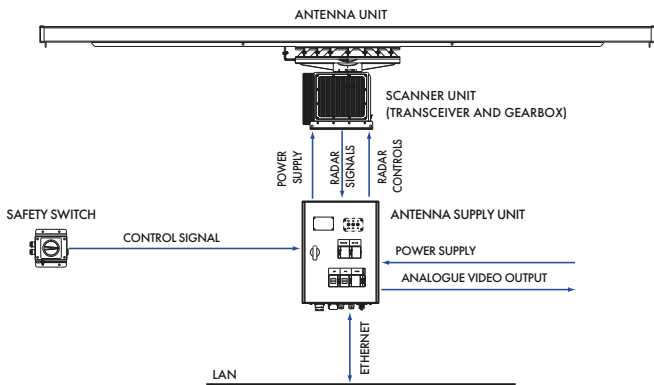
Weight: 10 Kg

SAFETY SWITCH

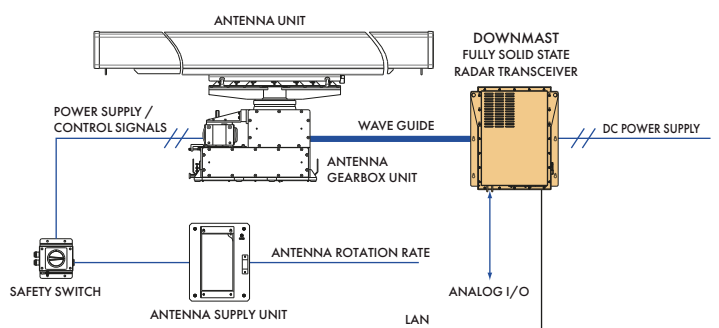


Weight: 2 Kg

VERSION UPMAST RTX



VERSION DOWNMAST RTX



Surveillance & Security

Guidance, Navigation & Positioning

Military & Defence

Marine Electronics

This brochure should not be considered a contractual offer to sell. The specifications given herein may be changed by the manufacturer, GEM elettronica S.r.l., without notice.



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