



LEONARDO ELECTRONICS

Surveillance Radars **MULTI-MODE MULTI MISSION RADAR**



MULTI-MODE MULTI MISSION RADAR

As a global leader in the Surveillance Radar sector, we employ some of the most talented people in the business worldwide. Our expertise delivers cutting-edge technology developed over 45 years in the surveillance radar market. This gives our customers reassurance and maximum capability for a wide range of platforms and all surveillance mission types.

With more than 3,000 radar systems supplied in ISR, fire control and ground attack roles we are able to deliver proven products and the latest technological advances. Integrated on over 42 different platforms, from next generation fighters to fixed and rotary wing aircraft, from large transport aircrafts to UAVs, our radars are in service in more than 34 countries over the world.

We provide a complete spectrum of surveillance solutions to match the operational needs of end users, from armed forces, government agencies and civilian organisations. Leonardo Surveillance Radars enable Aircraft OEMS, modifiers and mission system integrators that select to offer their customers a differentiated capability.

Leonardo surveillance radars can provide stand-alone solutions or complement EO/IR/EW sensors to form part of an overall ISR capability providing a costeffective force-multiplier solution offering flexible multi-mission capability.



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OUR HERITAGE

Leonardo AESA Surveillance Radar Systems - It's our way of seeing maritime, littoral and land environments. It's the driving force behind our history of innovation and customer support that continues into the 21st century.

Our original technologies, designed around 50 years ago, have been continually developed to ensure the most innovative, world-leading surveillance radar systems available.

When our first surveillance radars were introduced to our customers in 1971 they were met with immediate and huge acclaim. Through the eyes of experts, Seaspray quickly became the most respected maritime search and targeting radar of its time. In the forty five years since, our worldleading surveillance radars have been proven in peacetime, crises and conflict.



Seaspray Mk3





DANGER
E.H.T.

DANGER
E.H.T.

ROYAL NAVY

SANDER XX 50

SHEFFIELD

50

24
23
22
21

SURVEILLANCE TARGETS

Leonardo AESA Surveillance Radars provide a complete spectrum of solutions to match operational needs within your budget. Optimum target detection in all domains, Air, Land and Sea, has positioned Leonardo as one of the world's leading radar specialists and providers.

In the maritime theatre, surveillance radars can effectively contribute to:

- Maritime surveillance and EEZ patrol by providing long range detection and tracking of vessels
- Search & Rescue operations, enhancing location capabilities, supporting navigation and providing situation awareness even in adverse weather conditions
- Environmental surveillance (e.g. detection of oil and hazardous material spills)

In air-to-ground ISTAR applications, radars provide persistent, stand-off surveillance of wide areas through high resolution SAR imaging and Ground Moving Target Indication (GMTI).





WHATEVER YOUR NEEDS

Our customers have a right to great radar systems and exceptional service.

Our mission is to help you select and benefit from the best solution for your specific surveillance radar requirements.

We understand that each customer needs specific capabilities to optimise missions in complex co-ordinated maritime, littoral and land environments.

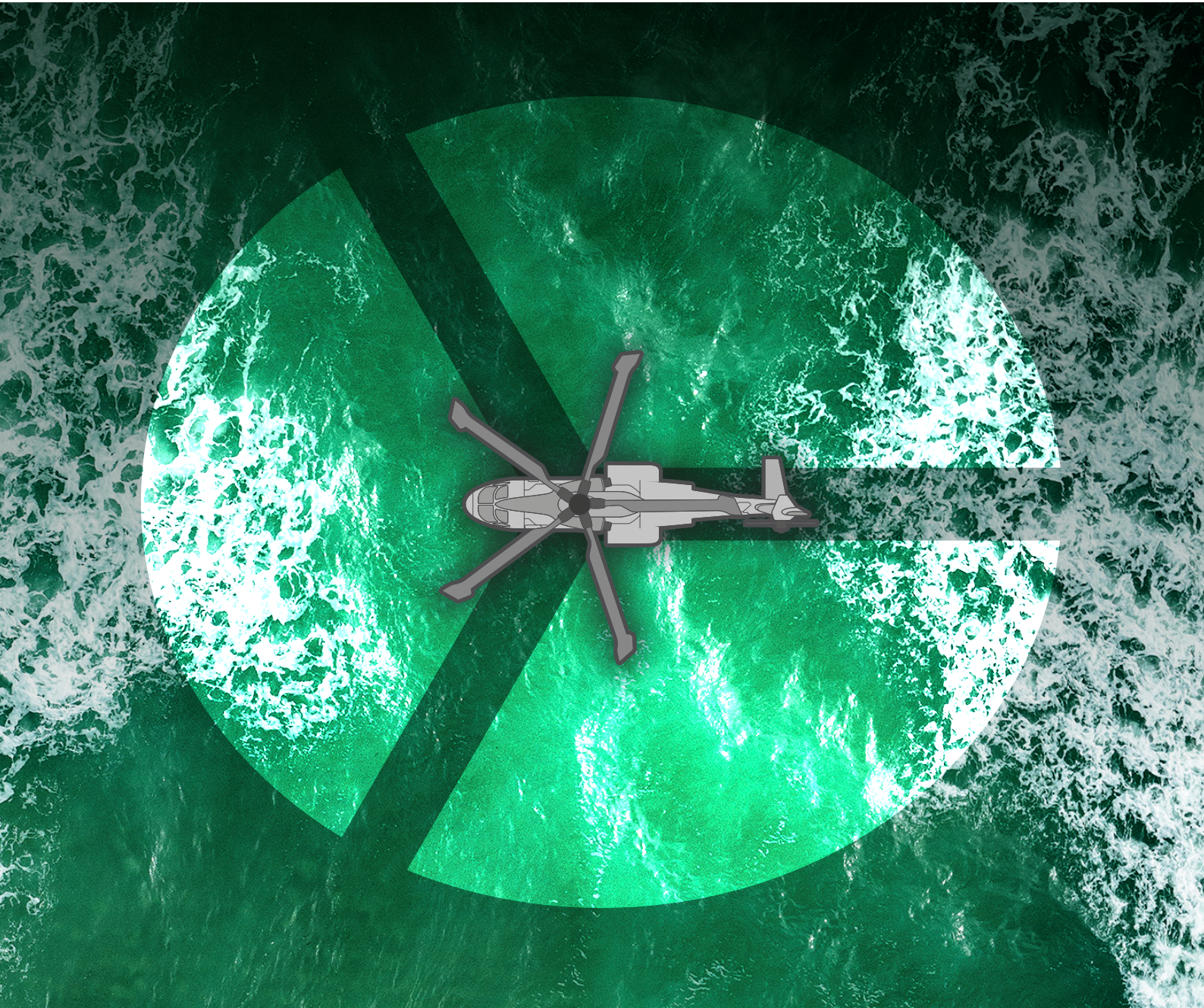
We invest a great deal of time with customers to establish the most effective and cost efficient radar solutions. And when we supply a radar solution, we stay with you to make sure that you optimise the technology through close business relationships with our dedicated customer support staff.

That's why we're passionate about working in partnership to ensure that everyone receives the highest value solution from our family of surveillance radars - whatever the requirement and budget.



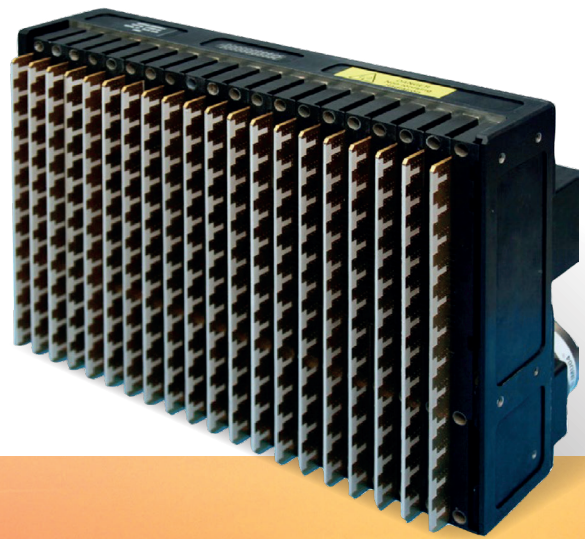
Gabbiano





PICOSAR

PicoSAR delivers a high resolution Synthetic Aperture Radar (SAR) imaging and Ground Moving Target Indication (GMTI) capability that permits new and existing platforms to easily acquire a true, all-weather ground mapping and surveillance capability. Its compact size, low weight and low power consumption, enable installation in parallel with electro-optical/infrared sensors even on platforms with limited payloads.



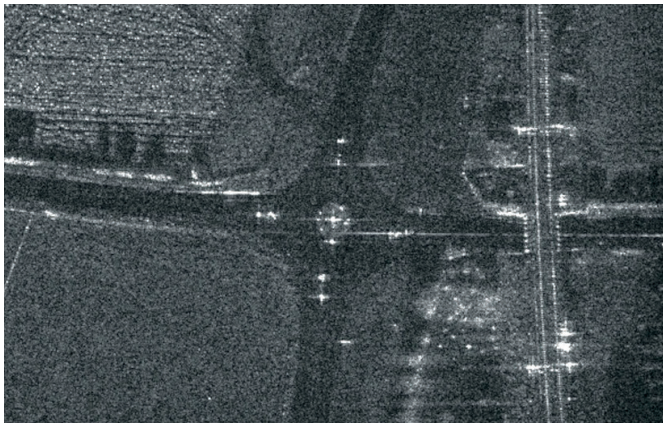
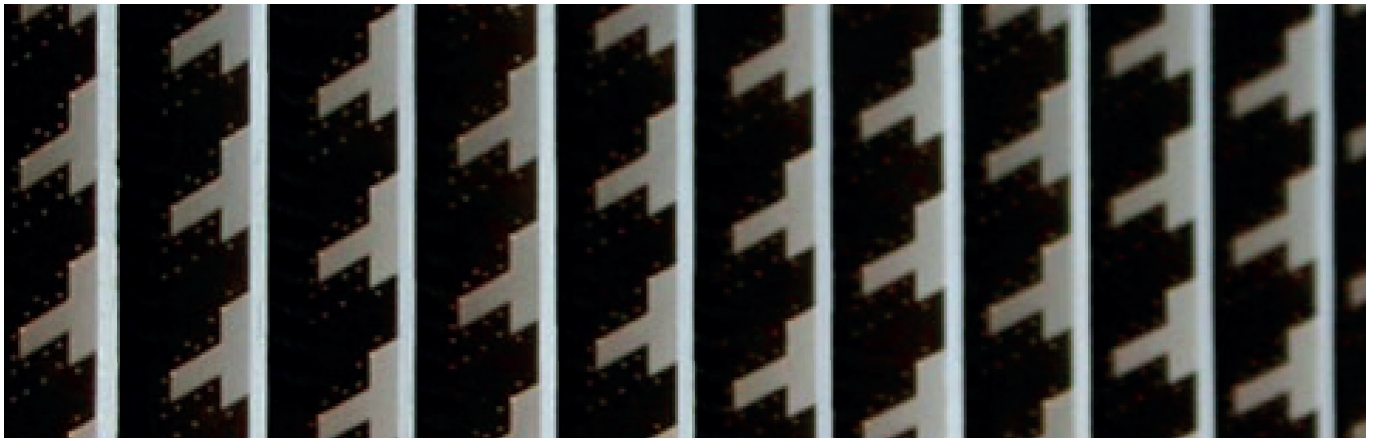
KEY FEATURES

Key to PicoSAR is the use of AESA technology in a small, compact configuration. Ideal for the most compact of installations, PicoSAR can be fixed directly onto the platform with minimal interface requirements and the beam steered electronically.

If necessary, it can be mounted on a gimbal for an even greater field-of-regard. PicoSAR comes as a single Line Replaceable Unit (LRU) which, by detaching the antenna from the processor, can be reconfigured to further ease installation.

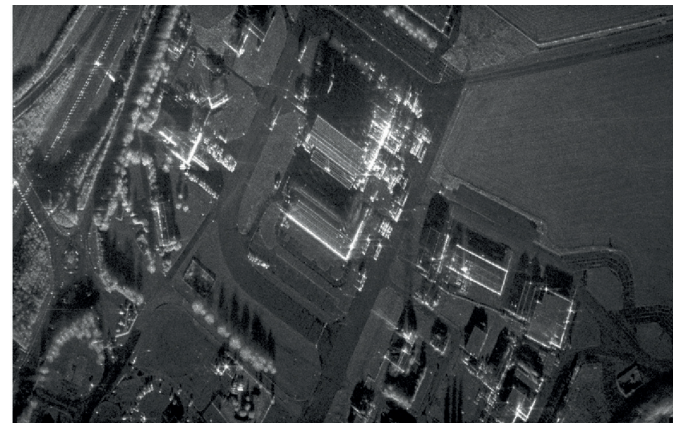
Using several low power, solid state Transmit/Receive Modules (TRMs), PicoSAR is much more reliable than conventional radar systems which means fleet airtime is maximised. Loss of individual TRMs result in a gradual performance degradation rather than complete system failure, always delivering the highest levels of operational availability.





KEY BENEFITS

- Excellent performance
- High resolution ground mapping
- Wide area coverage
- High performance GMTI
- Low cost of ownership
- Reconfigurable radar system
- Lightweight
- Compact
- Very high reliability
- Easy to install and use



Radar and Advanced Targeting

CHARACTERISTICS

- Frequency: X band
- Scan Coverage: $\pm 45^\circ$
- Maximum Range: 20km (resolution dependant)
- Map Resolution: <1m
- Cooling: Unconditioned Air (existing internal fans)
- Weight: 10 kgs
- Input Power: <300W 28V DC

DIMENSIONS

	Antenna	Processor
• Height	220 mm	200 mm
• Width	310 mm	200 mm
• Depth	85 mm	125 mm (140 mm max)

ELECTRICAL INTERFACE CONNECTORS

- Global Positioning System (GPS) antenna feed 28V DC power and Ethernet

CAPABILITIES

- Ground Mapping: Strip SAR
- Spotlight: SAR
- Moving Target Detection: GMTI

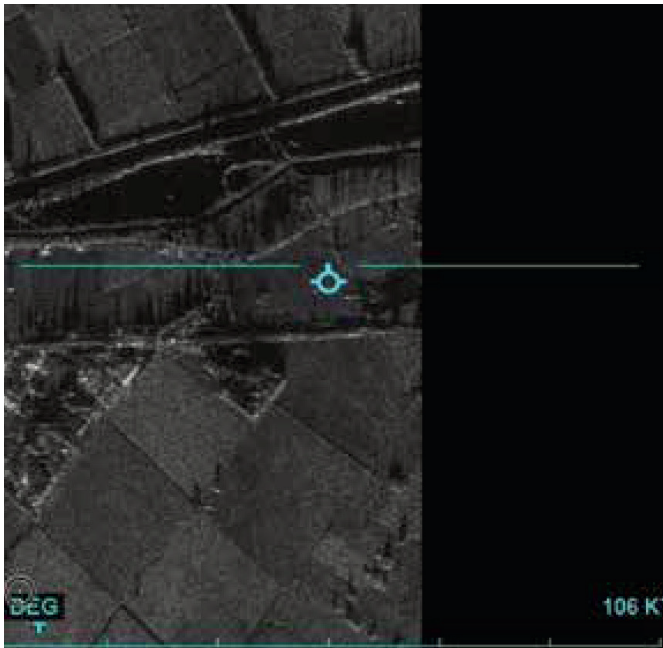
GABBIANO

The Gabbiano radar product portfolio is the result of a decade of continuous development pivoted on a single strategic task: providing our customers with the most affordable and performing solution tailored on their platform constraints and mission needs.

The answer to this challenge is the Gabbiano product family, a line of airborne radars designed around a common processing unit featuring state-of-the-art digital processing boards to achieve the most advanced operative modes for surface and air surveillance.

The processing unit can interface several wideband flat-plate arrays, of different sizes and shapes, to adapt installation to any kind of platform, including those with demanding size, weight, power and cooling constraints.





Sub-metric SPOT SAR

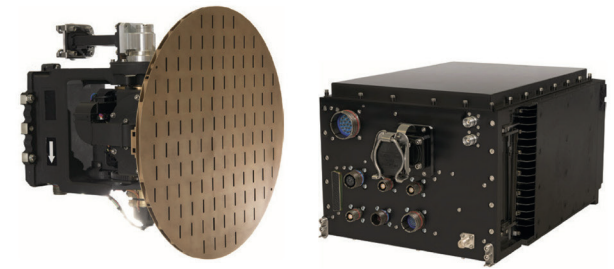
The system can be easily integrated with any platform mission system using standard industry interfaces.

Gabbiano radar systems are operating worldwide on different types of aircraft including UAVs, MALE UAVs, Search & Rescue helicopters, tactical transport aircrafts, medium and large Maritime Patrol Aircrafts.

GABBIANO ULTRA-LIGHT

The ultra-light version of the system (24 kg) is specifically designed to meet the demanding installation requirements related to small platforms, either manned or unmanned. The wide set of advanced operative modes makes this the ideal choice when performance and installation constraints cannot be compromised.

The use of the latest GaN technology for the transmitter enables Gabbiano to deliver peak performance with a reduced power consumption, guaranteeing at the same time a high system reliability.



GABBIANO TS

When radar is the key mission factor, Gabbiano TS offers the greatest flexibility in terms of performance and capability customisation.



KEY FEATURES

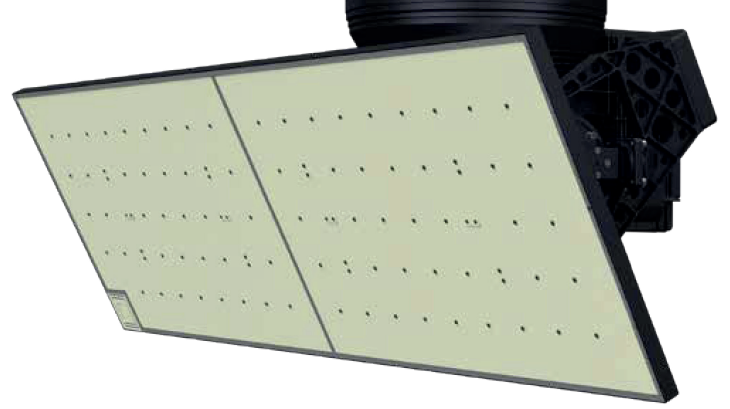
High efficiency transmitter and flexible antenna configurations enable Gabbiano TS to deliver high performance surveillance modes to any kind of platform.

KEY BENEFITS

- Low power consumption
- Cost-effective solution
- True multi-mode operation
- Software driven
- Highly flexible
- Easy to install
- Easy to use
- Peak Power Management

GABBIANO TT

Gabbiano TT version, based on a TWT high power transmitter and a large flat plate antenna array, provides high performance 360° surveillance over large areas. This radar configuration is targeted to MALE UAVs, MPAs and aerostats.



Results List

TUI	CLASS	ID	TARGET	NATION	CONFIDENCE
52	General cargo	52	S01L180M5A1T00	Liberta	67.45
49	Bulkier Carrier	49	S01L177M4A1T00	Malta	63.31
48	Products Tanker/	48	S01L169M3A1T0	Penu'	63.10

Frame Target Features

Input Tgt	Library Tgt
Length: 159.5 [m]	177.0 [m]
Aspect angle: -157.7°	5
Grazing angle: 3.38°	5
Compensated length: 171.3 [m]	53.1 [m]
Number of masts: 5	6.1 [m]
Masts pos: 44.1 [m]	
Structure pos: 18.5 [m]	
Structure type:	

Video Controls

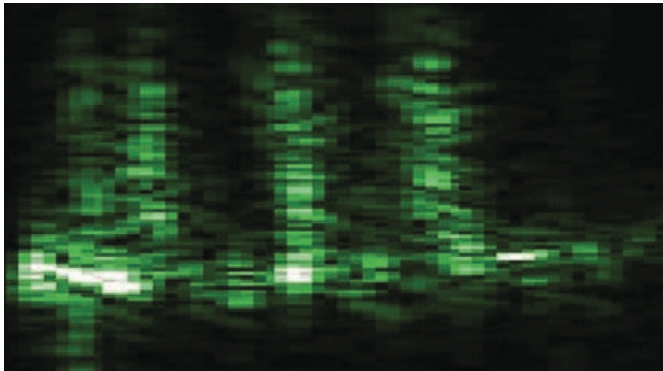
Frame: 1

Stop Play >

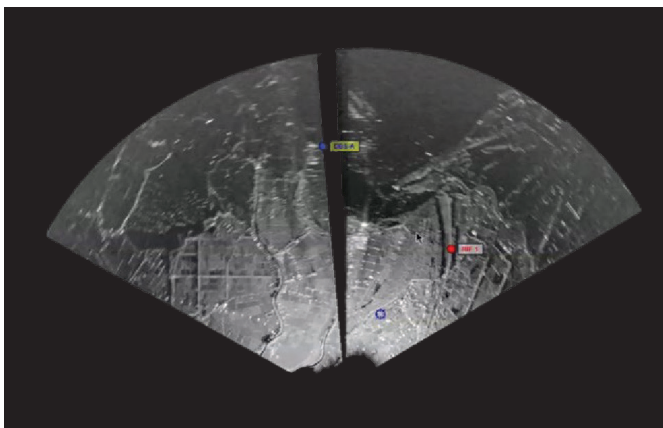
Selected Input ISAR image

Library Target Class Type image

Sea Target Classifier



ISAR Imaging



Doppler beam sharpening



Large patch spot SAR



CHARACTERISTICS (GABBIANO TS & GABBIANO TT)

Frequency	X Band
Scan coverage	360° or ±90° Azimuth scan
Maximum range	220NM
Power consumption	Gabbiano TS from 450W to 1.100W @28VDC Gabbiano TT 305W (+28VDC) & 1200VA (115V400 Hz)
Cooling	Unconditioned air
Weight	28kg up to 62kg, depending on the Antenna

DIMENSIONS

Processor	390 x 310 x 200mm
Antenna	> 360° Az. Scan - Several sizes available from 29" to 70" > ±90° Az. Scan - Several sizes available from 12" to 25"
Transmitter	> TX/FE 20W (solid state) - 340x257x130mm > TX/FE 80W (solid state) - 340x257x150mm > TX 200W (TWT) & RX-FE - 280x315x338mm & 342x256x133mm

INTERFACES

Data & commands	Ethernet plus Mil Std 1553B, ARINC 429, RS422, RS232 and USB
Outputs	Ethernet, STANAG 4607, STANAG 7023, ARINC 708

FUNCTIONS

Track While Scan	Automatic
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CAPABILITIES

Surface surveillance	Long Range Search High Sea State Detection
Navigation	Real Beam Ground Map Doppler Beam Sharpenin Terrain Avoidance Weather Detection Turbulence Detection
Beacon Detection	Search and Rescue Transponder (SART)
Target Imag./Classific	ISAR, Range Profiling Image Classification

GROUND MAPPING

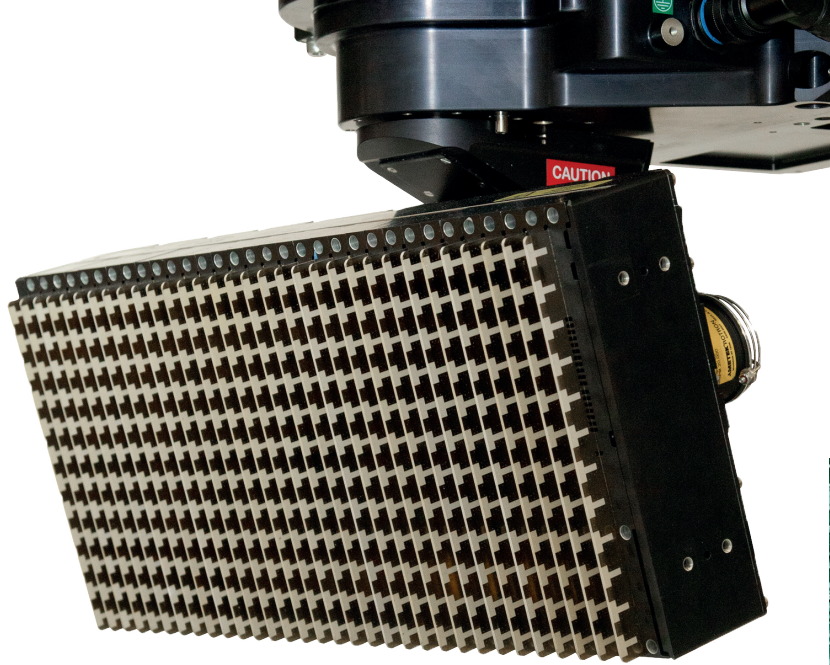
Spot SAR	High resolution ground mapping
Strip SAR	Medium resolution wide area ground mapping Oil Slick detection Iceberg detection
Moving Target Detection	GMTI Air-to-Air MTI

SEASPRAY

Seaspray Active Electronically Scanned Antenna (AESA) multi-mode surveillance radars provide unrivalled surveillance capability as the primary airborne sensor to meet the existing and emerging challenges of the 21st century.

Seaspray employs a common processor coupled with a state-of-the-art AESA antenna to deliver a 360° field-of-regard leading edge capability covering air-to-surface and air-to-air environments and has a proven track record with many users since deliveries began in 2005.

Comprising just two air cooled Line Replaceable Units (LRU), which can be remotely located to ease installation issues and without the need for waveguides, Seaspray is a highly reliable surveillance radar that has been easily installed and integrated on to a wide variety of platforms, whether rotary or fixed wing.





Superior performance in detecting small targets is achieved through use of composite mechanical and electronic scanning. Interleaved modes offer simultaneous surface surveillance and weather detection providing the benefit of two radars in one system.

AESA technology and flexible waveform generation capability is what enables Seaspray to deliver peak performance in all modes. Use of multiple low power, solid state Transmit/Receive Modules (TRMs) make the radar more reliable than conventional systems resulting in a significant cost benefit over the life of the system.

Seaspray can be provided as a turnkey solution with its own Human Machine Interface (HMI) and embedded navigation sensors or as a sensor solution to integrate with a platform mission system using industry standard interfaces.

SEASPRAY 5000E

The smallest of the variants, is primarily aimed at the small to medium aircraft market.

SEASPRAY 7000E

The mid-range Seaspray radar system, is the direct successor to the many hundreds of previous generation M-Scan Seaspray radar systems that are in service world-wide fitted to medium sized naval helicopters and MPA.

SEASPRAY 7500E

Seaspray 7500E provides optimum radar performance across a wide range of platforms from Large Naval Helicopters to LRMPA, Medium Altitude Long Endurance UAVs and High Altitude Long Endurance UAVs.

Customers tell us that their current and evolving requirements are consistently met through effective utilisation of the AESA technology that guarantees exceptional performance.

SEASPRAY 7500E

KEY FEATURES

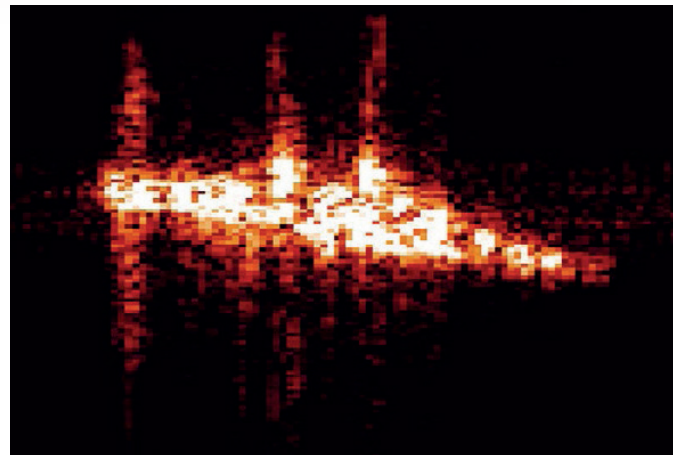
AESA technology and flexible waveform generation capability enables Seaspray 7500E to deliver peak performance in all modes.

KEY BENEFITS

- Excellent performance
- Low cost of ownership
- True multi-mode operation
- Software driven
- Highly reliable
- Easy to install
- Easy to use
- Mode interleaving

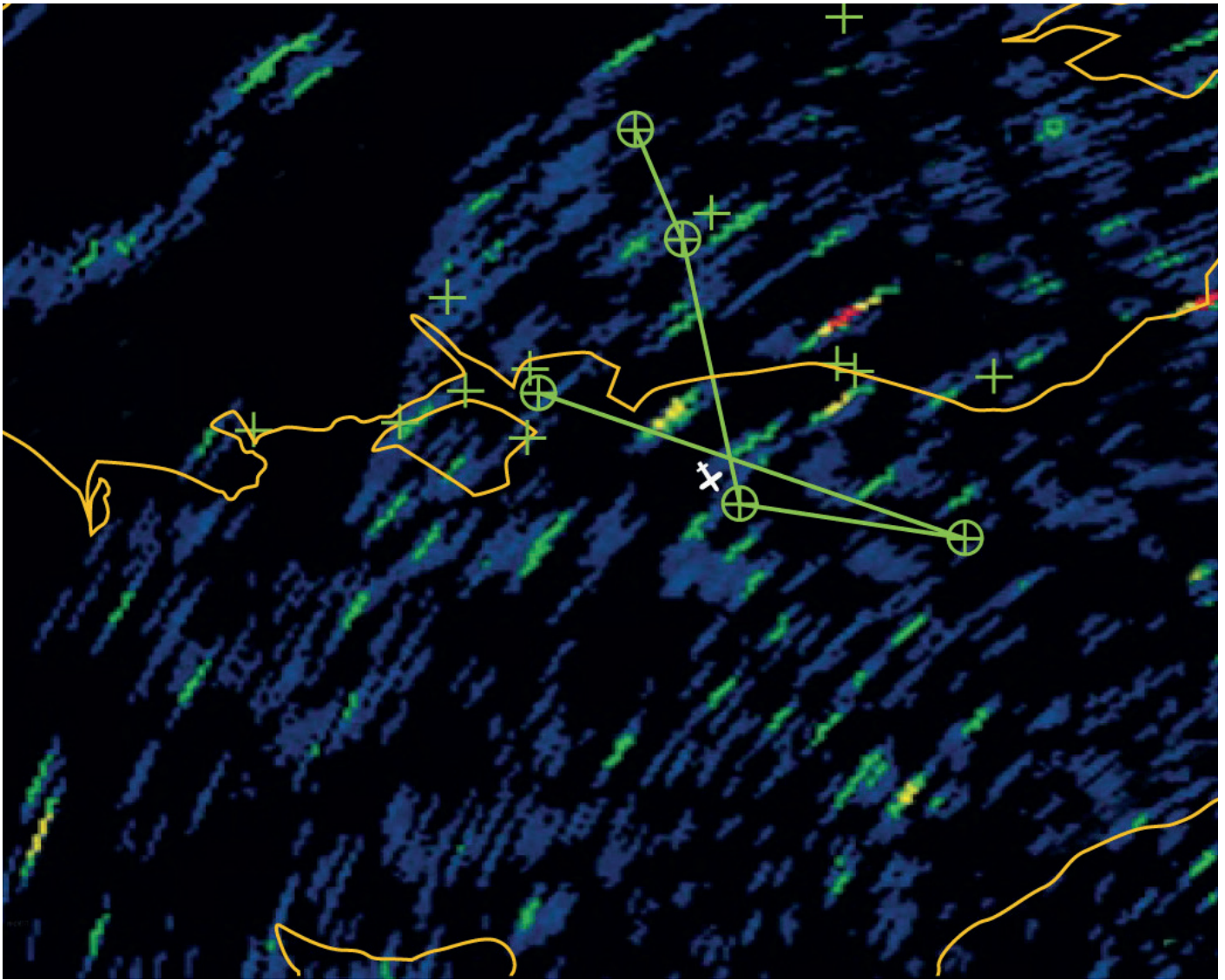


High Resolution SAR Ground Map



ISAR Target Image





CHARACTERISTICS

- Frequency: X Band
- Scan coverage: 360°
- Maximum range: 320NM
- Mean Time Between Failure (MTBF): 2,000 hours
- Cooling: Unconditioned air
- Weight: 110kg

DIMENSIONS

- Scanner: 565 mm height
- Swept volume: 1154 mm diameter, 306 mm height

INTERFACES

- Data & commands: Ethernet plus Mil Std, 1553B, ARINC 419, RS422, RS232, USB and Synchro
- Video outputs: RGB Stanag 3350, VGA, Digital Video

FUNCTIONS

- Track While Scan: Automatic
- Track Identification: AIS integration
- Mode Interleaving: Simultaneous dual-mode operation

CAPABILITIES

- Surface surveillance: Long Range Search, Priority Track, Small Target Mode
- Navigation: Real Beam Ground Map, Weather Detection, Turbulence Detection
- Beacon Detection: Search and Rescue Transponder (SART)
- Target Imaging/Classification: ISAR, Range Profiling

GROUND MAPPING

- Spot SAR: High resolution ground mapping
- Strip SAR: Medium resolution wide area ground mapping, Oil Slick detection, Iceberg detection
- Moving Target Detection: GMTI, Air-to-Air MTI

OSPREY

Osprey multi-mode multi-mission surveillance radar provides the ultimate second generation Active Electronically Scanned Antenna (AESA) surveillance capability.

Selected for the US Navy MQ-8C Fire Scout and by Norway Ministry of Justice for their Norway All Weather Search And Rescue Helicopter (NAWSARH).

Osprey brings together wide azimuth and elevation electronically scanned fixed antennae with a compact, state-of-the-art processor and multichannel receiver.

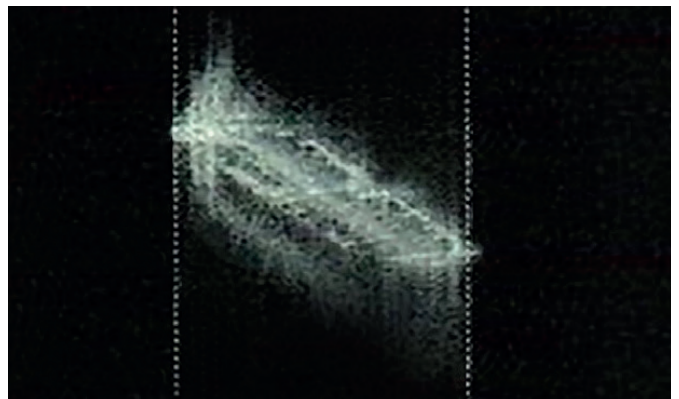
Genuine multi-domain capability, with high performance sea surveillance, against the most 'difficult targets', land surveillance with wide swath, very high resolution ground mapping, small and low speed ground target indication, high performance air-to-air surveillance, tracking and intercept add up to a total surveillance radar solution.



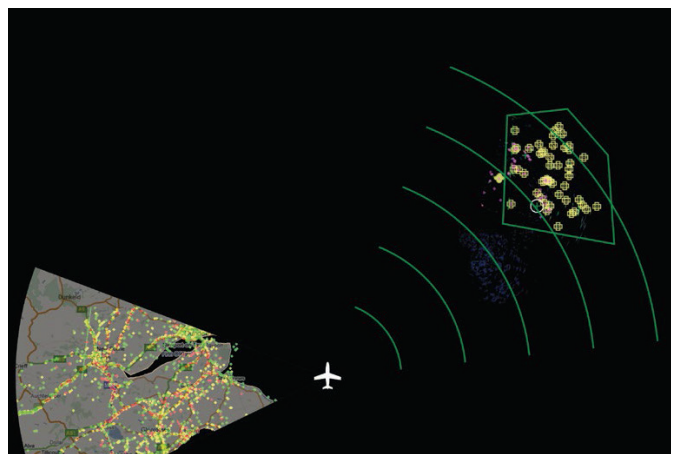
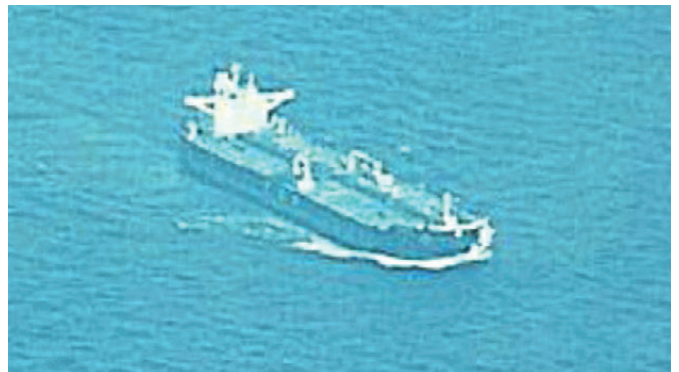
These capabilities, combined with the radar's ability to rapidly interleave modes and provide scan-independent beam steering, make Osprey ideally suited to mixed environment operations.

Osprey is an optimum low size, weight and power (SWaP) radar system, offered with a range of antenna sizes and numbers that may include up to four fixed antennae, depending on the azimuth coverage requirement and installation obscuration factors.

The prime real estate of the aircraft belly is left vacant for other sensors or weapon systems and in extreme circumstances for effective operation on unprepared surfaces.



Inverse SAR



Independent modes per sector

OSPREY

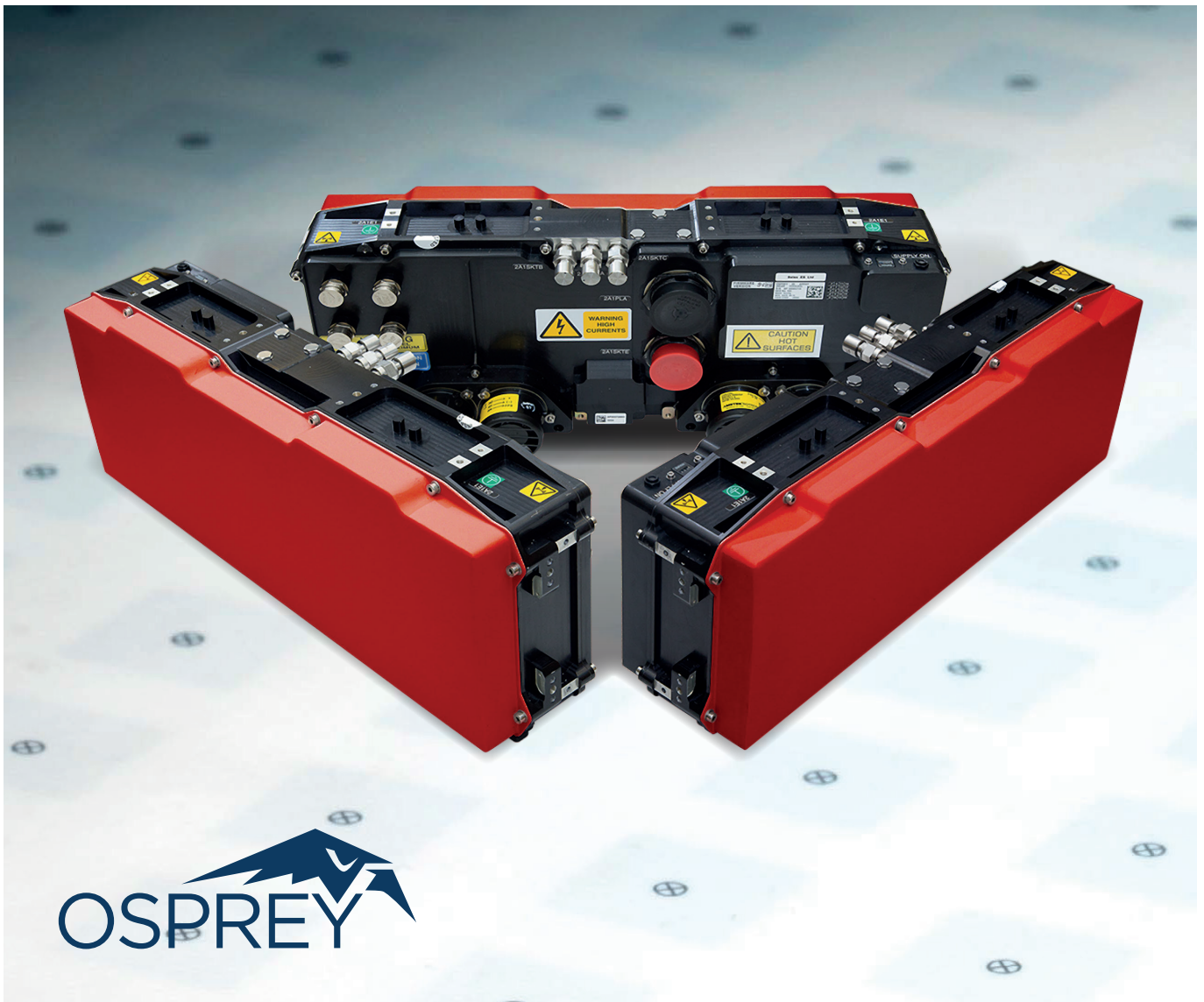
Osprey is our most advanced, future proof surveillance radar solution. Almost 50 years of research, development and proven operational effectiveness has resulted in the optimum combination of size weight and power.

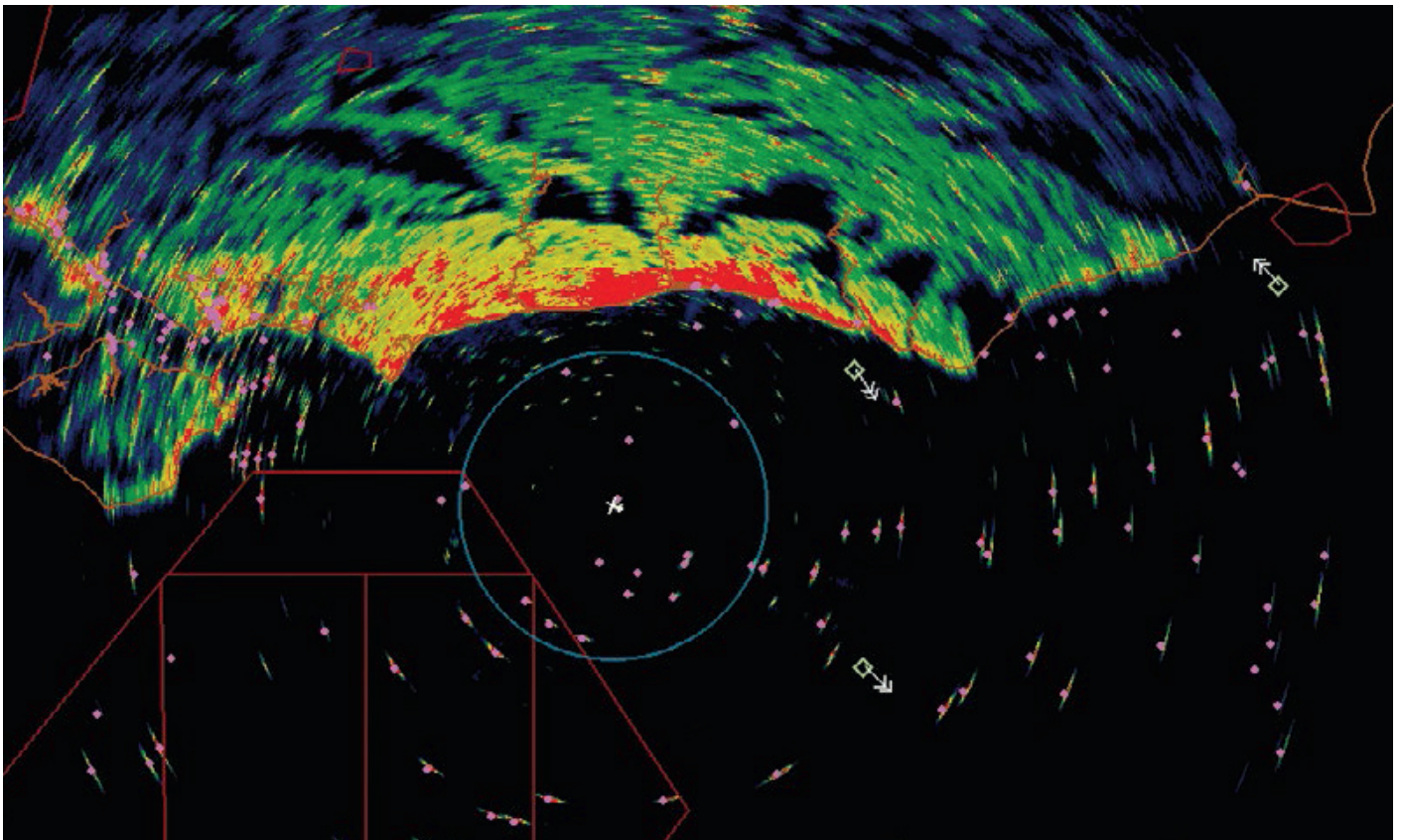
KEY FEATURES

- Genuine multi-domain capability
- High performance sea surveillance, notably against 'difficult targets'
- Land surveillance with wide swath
- Very high resolution ground mapping
- Small and low speed ground target indication

KEY BENEFITS

- Class-leading maritime surveillance capability
- AESA-enabled small target mode (STM)
- Very high resolution, wide swath SAR Mapping
- Small radar cross section (RCS), low minimum detectable velocity (MDV), multi-channel moving target indication (MTI)
- Air-to-Air surveillance, track and intercept
- Instantaneous multiple mode interleaving
- Difficult target detection from high altitude
- High reliability for persistent operations
- Flexible configuration, installation and integration
- Multiple fixed antennas, choice of antenna sizes
- Belly-free, obscuration-free 360° coverage
- Open standards interfaces
- Compact, lightweight LRUs





Osprey is particularly well suited to unmanned air systems (UAS) operations, with very high reliability for persistent surveillance, and difficult target detection capability from high altitude, facilitating platform line of sight (LoS) communications and improved platform fuel efficiency.

CHARACTERISTICS

- Frequency: X Band
- Scan coverage: Installation dependant
- Maximum range: 200NM
- Mean Time Between Failure (MTBF): >2,000 hours
- Cooling: Unconditioned air
- Weight (Approx. installation dependent): 28kg/62lbs (Single Antenna, Processor and Receiver LRUs, and IMU)
- Interface standards: Ethernet, RS422, ARINC 708, ARINC 429

Video outputs: Multiple options for Mission System and cockpit display compatibility

DIMENSIONS (H X W X D APPROX.)

- Processor: 200x125x230mm, (8x5x9 inches)
- Receiver: 206x255x175mm, (8x10x7 inches)
- Antenna: 200x510x140mm, (8x20x6 inches)

FUNCTIONS

- Track While Scan: Up to 1000 tracks, with Automatic Track Initiation (ATI)
- Track Identification: AIS and Inverse Synthetic Aperture Radar (ISAR)
- Mode Interleaving: Simultaneous multi-mode operation

CAPABILITIES

- Maritime Surface Surveillance: Maritime surveillance Small target mode
- Strip and Spot SAR: High resolution wide
- Ground Mapping: Area ground mapping
- Moving target detection: Ground, Maritime and Air MTI Air-to-Air Intercept
- Navigation: Land mass discrimination, Weather detection, Turbulence detection
- Beacon detection: Search and Rescue Transponder (SART)
- Target imaging/classification: ISAR, Range profiling

For more information:

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