

DEFENDER

Single mast Radar with a stabilized electro-optical surveillance system

APPLICATIONS

- Border Security
- Force Protection
- Coastal Surveillance
- Critical Infrastructures
- Mobile Surveillance
- Airport and Harbors
- Harsh Environments



DEFENDER 140

stabilized
electro-optic system

DEFENDER 100

not stabilized
electro-optic system

MAIN FEATURES

- Solid State Electronics
- Graceful Degradation
- Fast Radar Power Up
- Continuous System Health Monitor and Built in Self Test
- Pulsed, Coherent
- Pulse Compression
- Pulse Doppler
- Doppler Processing
- Signal Processing
- Waveforms
- Automatic Power Optimisation
- Adaptive Clutter Suppression
- 360° and Sector Scanning
- Resistant to Jamming
- Constant False Alarm Rate

DEPLOYMENT

GEM elettronica normally interacts with the customer conducting border security and advise on the best methods of deployment for antenna radome and electro optic sensor selection.

A common method of deployment includes GEM radome and cameras co-located on a single mast. This simplified approach enables the radar and cameras to be quickly and cost effectively deployed on a single mast with one cable connection giving 360 degree pan and tilt capability (no blind arcs).

POWER and COMMUNICATION

- Military specification batteries for mobile and man portable applications.
- Solar panel and battery for mast mounted radar systems.
- Portable generators.
- Microwave and satellite communication links, portable or fixed, depending on the deployment method.



Security and surveillance of the land borders and national coastlines is vital to any nations; GEM elettronica Land Border Security solutions is based on wide range of specialized sensors integrated in an advanced command and control system to support military and law enforcement agencies in their real-time surveillance missions. **DEFENDER 140** (with stabilized electro-optical turret) and **DEFENDER 100** are specifically designed to provide complete radar based solutions for border security, Airport Security, UAV detection, Base and Perimeter Protection, Mobile Surveillance Solutions and Wildlife reserve applications.

In border security DEFENDER 140 and DEFENDER 100 allow security agencies to monitor and intercept threats in remote and difficult access locations where usually smugglers and traffickers operate: this configurations are multi radar and electro optic camera system deployed via a Single Mast Solution for mobile and semi-permanent requirements.

DEFENDER systems are equipped with the radar radome and integrated with electro-optical systems manufactured by GEM (or other manufactures) and can be integrated within a transportable structure, such as vehicle-mounted or fixed single mast systems, through a simple mounting interface.

These systems are well-matched for a variety of operational requirements.



DEFENDER structure allows radar and Night/Day camera surveillance over 360° with pan and tilt capability: the radar and cameras can be mounted on the same side of the mechanism, as the radar equipment is free from any interference.

Additionally, the cameras can also operate independently from the radar.

As an option, it is possible to fit the system with long range electro optical system with stabilized payload: in this case, due to high level of stabilization, the electro optical system is installed on top the radar through a metal plate.

When DEFENDER equipments are deployed with a single mast system, GEM control and display software application allows the user to gain the full situational awareness by combining radar and camera images: radar and cameras images can be displayed on Tablet, PC or laptop, and tracking from multiple sensors can be merged into a single display.

KEY FEATURES

DEFENDER 140 and **DEFENDER 100** are GEM Single Mast Solution providing a fully integrated and easy deployable system consisting of a BSR-50 pulse Doppler radar with a wide range of electro-optical sensors manufactured by GEM (or even by 3rd party manufacturers) : the electro-optical system DEFENDER 140 (with stabilized payload) and DEFENDER 100 (not stabilized payload) both mounting a day and thermal imaging camera, provide 360° pan and tilt capability with no blind arcs so the same are capable to comply with any operational requirement. The GEM Radar utilized in both DEFENDER 140 and DEFENDER 100 systems, is the coherent solid state X-band BSR-50 radar that use pulse Doppler technology. The design concept, based on high reliability and fit and forget design, make both the ideal solution for a wide range of applications; the single Mast Solution is easy to deploy and, with its high Doppler processing, is able to reduce greatly the land clutter allowing potential threats enhanced surveillance.



“RUGGED” LAPTOP

- Docking connector 80-pin
- HDMI Type A
- VGA D-sub 15-pin
- Headphones/speaker Mini-jack stereo
- Microphone/line in Mini-jack stereo
- Serial D-sub 9-pin
- Ext. antenna conn. 50 ohm coaxial
- USB 3.0 (x 1), USB 2.0 (x 3) Type A
- Optional IEEE 1394a (FireWire) 4-pin
- 10/100/1000 Ethernet RJ-45
- Optional 10/100/1000 2nd LAN (Ethernet) RJ-45



Optional

Weight

4 Kg “Rugged” Laptop
Tripod (Battlefield version): 5 Kg

Dimensions Laptop

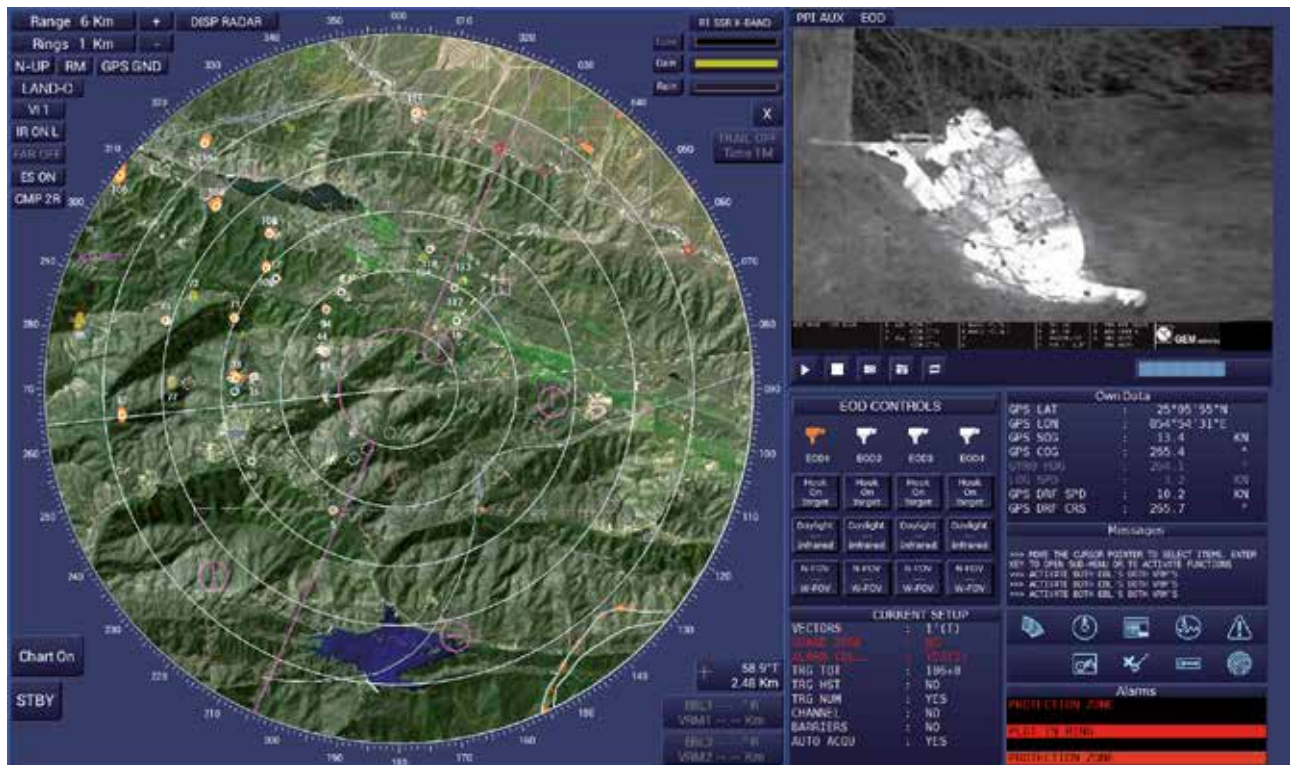
11.5" (L) x 11.9" (W) x 2.9" (H)
7.9 lbs. (8.2 lbs.with optional media bay 2nd battery)

GEM SOFTWARE Management Application

In DEFENDER configuration radar is paired with electro optical camera manufactured by Gem (or even other manufacturers) and provides a complete situational awareness information to GEM control and display software application. The operator is able both the target.

DEFENDER control and visualization software is predisposed for integration of a range of complementary sensors as electro optical that can be designed on target.

GEM software application may show the camera information in the same picture of the radar.



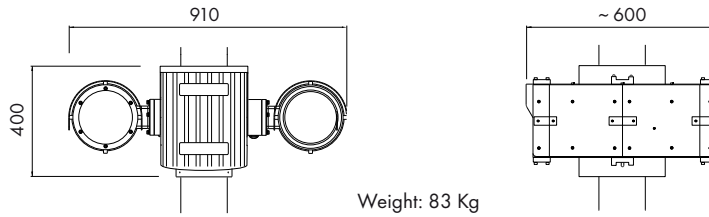
GEM DEFENDER control and display software can integrates multiple sensors, such as radars and camera, into a single, easy to use display package. The management application software allows the operator to get a real-time situational awareness by early detection of possible threats and will provide “actionable data” to launch prompt response missions and counter measures. The system makes the tracks “fusion” of geo-referenced radar tracks from multiple radar heads into one user-friendly display.

DEFENDER can achieve istantaneously threats in security areas and perimeters also through user-determined parameters.

Radar tracks, displayed in an easy to understand format will assist the user in detect, recognize, identify and then classify methodology.

Radar tracks and additional data can betransmitted through a range of communications options determined by the operational requirement. Multiple iterations can be integrated to build a wider surveillance network with data and communications passed automatically to ensure a real time response capability.

DEFENDER



DEFENDER-140 Stabilized electro-optic system

Turret aspect and type of display	Optronic turret * (see note)	Stop system	TV camera: Type of detector	450 TVL color camera: Field of view	TV camera: lens and zoom ratio	Environmental conditions	IR Detector, spectral bandwidth and resolution	IR camera HFOV	NETD	Video Tracker	Power absorption	Interfaces to the external world
T-shape, 15" LCD	a) 2 gyros b) ± 40° c) Nx360° d) 80°/s e) 0.2 mrad	Brakes	1/3" CCD	HFOV: Wide 21° Narr. 0.22°	17:1000 mm 60x F3.5:F16	-10°C:+55°C ext 0°C:+50°C int	Cooled, InSb 3-5 μm 640x512	Wide 15.2° Narr. 0.57°	< 25mk	Option	110÷220 Vac, 47÷65Hz, one phase, 1000 VA peak	RS-422/LAN

Note: Optronic turret: a) number of gyroscope - b) elevation sector - c) azimuth sector - d) slewing rate - e) stabilization accuracy



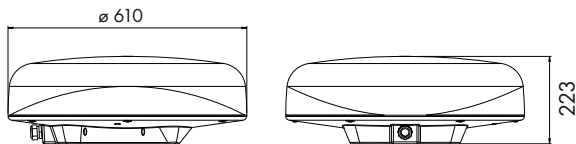
DEFENDER-100 Not stabilized electro-optic system

Turret aspect and type of display	Optronic turret * (see note)	Stop system	TV camera: Type of detector	450 TVL color camera: Field of view	TV camera: lens and zoom ratio	Environmental conditions	IR Detector, spectral bandwidth and resolution	IR camera HFOV	NETD	Video Tracker	Power absorption	Interfaces to the external world
T-shape, 15" LCD	a) 2 MEMS gyros b) ± 40° c) Nx360° d) 80°/s e) 0.4 mrad	Brakes	1/4" CCD	HFOV: Wide 57° Narr. 1.7°	3.4:122 mm 36x F1.6:F4.5	-10°C:+55°C ext 0°C:+50°C int	Uncooled, VOx 8-14 micron 320x240	Wide 5.7° Narr. 2.8°	< 50mk	Option	at 220 Vac, 50Hz, one phase, 1000 VA peak	RS-422

Note: Optronic turret: a) number of gyroscope - b) elevation sector - c) azimuth sector - d) slewing rate - e) stabilization accuracy



BSR-50



Weight: 12.25 Kg.

PERFORMANCES

Peak Power	50W
Antenna Azimuth Beam Width	3.8° ± 0.2° @ -3dB
Antenna Elevation Beam Width	25° ± 2°
Range Discrimination	45m
Range Accuracy	5m RMS
Azimuth Accuracy	0.8° RMS
Number of Tracks	Selectable up to 500
Probability of False Alarm	10-4 Pfa
Moving Target Detection	Up to 128 Filters
Constant False Alarm Rate	√
Frequency Band	9.3 - 9.5GHz
Frequency Selection	9 User Selectable
Instrumented Range	80 Km
Minimum target Speed	0,2 m/sec

DETECTION RANGE



ENVIRONMENTAL CONDITIONS

Operating Temperature	-0° C to +55° C
Storage Temperature	-40° C to +85° C
Salt FOG	MIL-STD - 810G (meth. 509.5)
Vibrations	MIL-STD - 810G (meth. 514.6)
Shock	30g - 11 ms
Waterproof	IP 66
Electromagnetic Interferences	MIL-STD 461
Reliability	MTBF ≥ 50.000 hours

POWER REQUIREMENTS

Power Supply	+19-32 VDC 100-250 VAC (with Optional Inverter)
Power Consumption	< 80 WATT

INTERFACE

Transceiver LAN	GIGABIT ETHERNET RADAR OUTPUT (FIBER OPTICS IN OPTION)
ASTERIX	Asterix Cat 240 Protocol
VIDEO OUTPUT	Radar Video Data Output Over LAN
GPS	RF Input for internal GPS/Galileo receiver
"RUGGED" LAPTOP	- Docking connector 80-pin - HDMI Type A - VGA D-sub 15-pin - Headphones/speaker Mini-jack stereo - Microphone/line in Mini-jack stereo - Serial D-sub 9-pin - Ext. antenna conn. 50 ohm coaxial - USB 3.0 (x 1), USB 2.0 (x 3) Type A - Optional IEEE 1394a (FireWire) 4-pin - 10/100/1000 Ethernet RJ-45 - Optional 10/100/1000 2nd LAN (Ethernet) RJ-45

