

Blighter® Orbiter Radar



Blighter Orbiter Radar
(HP version shown)

- Low cost, lightweight vehicle mountable radar
- Detects a moving vehicle at 16 km and a walking person at more than 7 km
- 360° surveillance with PESA e-scan performance
- Reduced SWaP architecture:
 - 56 kg mast payload
 - 105 W power consumption
- Deployable on vehicle masts or trailer masts
- Wide 20° continuous elevation coverage (56° coverage via motorised elevation control)
- Non-rotational central post for mast-top camera mounting
- Supports both continuous 'scan & pan' and 'stare' surveillance modes

Blighter Orbiter is a new product from the Blighter range of ground surveillance radars (GSRs) designed to address the growing requirement for low-cost and lightweight mobile radar surveillance. Blighter Orbiter builds on the reliability, low power consumption, and ground clutter rejection capabilities of the Blighter B400 series radars by incorporating an azimuth positioner unit.

Blighter Orbiter is based on Blighter Surveillance Systems' (BSS) B402 ground surveillance radar system, fitted with W20S wide elevation beam antennas. This configuration offers maximum performance in the most compact size, with the 20° wide elevation beam being ideal for mobile deployment in hilly and mountainous areas.

The radar can detect a single walking person at distances of up to 7.4 km, over 360° (in four 90° quadrants). However, in typical deployments faster scanning modes may be used to reduce the target revisit time to a minimum. Operating in Vortex fast-scan mode, Blighter Orbiter can achieve a full 360° 'scan & pan' surveillance in just 20 seconds. Blighter's coactive FMCW Doppler fast-scan processing detects small and slow moving targets in a single 90° electronic-sweep, meaning that it can then immediately move onto the next 90° quadrant.

The positioner uses a compact yet high performance motor allowing the positioner and radar to be optimally accelerated and decelerated between surveillance quadrants. The positioner has four precisely defined set positions, each at 90° to one another so that the radar is precisely pointed in each one of its 90° 'scan & pan' surveillance quadrants.

For surveillance over a narrow sector of less than 90°, the positioner is made to stare at any azimuth angle so that the radar's PESA e-scan beam is centred about the area of interest.

Blighter Orbiter actually rotates around its mast, allowing it to sit beneath an integrated electro-optic (EO) camera system without obstructing its view. Other long-range mast-mounted radars have to sit on top of the mast, thus creating a conflict with the EO system.

As standard, the ground surveillance radar is supplied with antennas that provide a 20° wide elevation beamwidth, which is ideal for most surveillance applications. A motorised, elevation control is included that allows a further $\pm 18^\circ$ of physical tilt for situations where the surveillance vehicle is high on a mountain top or deep in a valley.

The azimuth positioner is controlled directly by a serial port on the radar. This means that the entire Blighter Orbiter appears as a single integrated sensor with the new scan modes and 360° capability programmed into the radar unit. This makes it simple for both existing and new customers to integrate the Blighter Orbiter into their own command and control (C2) systems. ➔

BlighterView HMI 2, BSS's own C2 software platform, provides the additional controls for the new Blighter Orbiter scanning modes: 'scan & pan' and 'stare'. BlighterView HMI 2 is designed to integrate with a wide range of 3rd party EO camera systems.

Specification

Architectural Overview

- Radar type: E-scan Frequency Modulated Continuous Wave (FMCW) Doppler Ground Surveillance Radar
- Frequency band: Ku band
- Spectrum occupancy: 15.7 to 17.2 GHz
- Scan type: electronic scanning in azimuth ('e-scan') using a Passive Electronically Scanned Array (PESA)
- Pan type: fully integrated positioner allowing 360° surveillance
- Transmitter power (nominal): 1 Watt (standard power transmitter version) or 4 Watt (high power transmitter version)
- Multi-radar operation: supported and unlimited
- Embedded software and firmware: field upgradeable via network connection

Target Detection Performance

- Maximum detection ranges:
 - Crawling person (RCS 0.1 m²): 3.2 km (2.0 mi.)*
 - Walking person (RCS 1 m²): 7.4 km (4.6 mi.)*
 - Moving RIB (RCS 5 m²): 14.2 km (8.9 mi.)*
 - Moving vehicle (RCS 30 m²): 16.0 km (9.9 mi.)*
 - Large moving vehicle (RCS 100 m²): 22.1 km (13.7 mi.)*
 - Large moving vessel (RCS 1000 m²): 32.0 km (19.9 mi.)*
- Maximum targets per scan: 700

- False Alarm Rate (FAR): 1 false alarm per day
- Minimum detectable target radial velocity: 0.37 km/h (0.23 mph)

* HP version fitted with W20S antennas

Coverage

- Instrumented maximum range: 2, 5, 8, 16 or 32 km (1.2, 3.1, 5.0, 9.9 or 19.9 mi.)
- Instrumented minimum range: less than 10 m (33 ft.)
- Azimuth scan angle: 90° horizontal e-scan; 360° via integrated positioner
- Elevation beam: 20° vertical elevation beamwidth
- Elevation adjustment: -18° to +18° (motorised)
- Fastest scan time (for 90°): 1 s
- Fastest 'scan & pan' time (for 360°): 20 s

Target Output & Identification

- Data format: QZ (custom, open standard data format)
- Target output port: available for cueing of pan/tilt-mounted cameras and thermal imagers
- Doppler audio modes: optional

Connectivity & Software

- Main I/O interface (for radar control and target data): 10/100 Ethernet network interface
- Auxiliary I/O interfaces: RS-232 and RS-422 control lines, opto-isolated control/status inputs and isolated switched contact outputs

- Software (SDK): API software library (Windows) and generic Interface Control Document (ICD) are both available to System Integrators

Electrical

- Battery/regulated PSU input range: from 24 V to 28 V (DC)
- Vehicle supply input: 24 V (DC)
- Power consumption (from 28 V regulated PSU)*: 105 W (nominal)

* SP version (HP version consumes 165 W)

Physical, Environmental & Reliability

- External dimensions of radar unit (W x H x D)*: 666 mm x 503 mm x 128 mm (26.2 in. x 19.8 in. x 5.0 in.)
- Weight of Blighter Orbiter radar system (approx.):**: 56 kg (124 lb.)
- Static top load capacity of positioner: 100 kg (220 lb.)
- Operating temperature: from -32° C to +55° C (from -25° F to +131° F)
- IP rating: IP66 (dust tight and protected against powerful water jets)
- Radar Unit MTBF: > 65,000 h

* SP version excluding positioner, antennas, mountings and solar shield.

** SP version inc. positioner, antennas, mountings and solar shield (add 5 kg for HP version).

Errors and omissions excepted. Blighter Surveillance Systems Ltd reserves the right to modify specifications without notice. Blighter radars are protected by a number of international patents. The Blighter name is an international registered trademark.

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