Blighter® Revolution 360

Blighter Revolution 360 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:
  - 50 kg mast payload
  - 70 W power consumption
- Deployable on vehicle masts or trailer masts
- Long life, ultra high reliability positioner
- Wide 20° continuous elevation coverage (40° coverage via mechanical elevation control)
- Non-rotational central post for mast-top camera mounting
- Supports both continuous 'scan & pan' and 'stare' surveillance modes

Blighter Revolution 360 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 Revolution 360 builds on the reliability, low power consumption, and ground clutter rejection capabilities of the Blighter B400 series radars by introducing a unique azimuth positioner unit, based on a maintenance-free cable-drive technology.

Blighter Revolution 360 is based on Blighter Surveillance Systems' (BSS) B402 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 Revolution 360 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.

Blighter Revolution 360 maintains its ultra high reliability by use of a unique positioner that is remarkably simple and reliable. The 'cable-drive' mechanism in the positioner is unaffected by temperature, dust, sand, ice or snow. Any accumulation of dirt or ice, if left static for a time, is simply knocked off when the positioner next moves. The cable-drive positioner uses a compact yet high performance servo 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 Revolution 360 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 radar is supplied with antennas that provide a 20° wide elevation beamwidth, which is ideal for most surveillance applications. A simple, low-cost manual elevation control is included that ➥

allows a further ±10° 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 Revolution 360 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 Revolution 360 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 Revolution 360 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 cable drive 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 targets per scan: 700
- Maximum detection ranges:
  - Crawling person (RCS 0.1 m^2): 3.2 km (2.0 mi.)*
  - Walking person (RCS 1 m^2): 7.4 km (4.6 mi.)*
  - Moving RIB (RCS 5 m^2): 14.2 km (8.9 mi.)*
  - Moving vehicle (RCS 30 m^2): 16.0 km (9.9 mi.)*
  - Large moving vehicle (RCS 100 m^2): 22.1 km (13.7 mi.)*
  - Large moving vessel (RCS 1000 m^2): 32.0 km (19.9 mi.)*

* HP version fitted with W20S antennas

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

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: +10° to -10° (manual)
- 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)*: 70 W (nominal)

* SP version (HP version consumes 135 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 Revolution 360 radar system (approx.)**: 50 kg (110 lb.)
- Operating temperature: from -32° C to +60° C (from -25° F to +140° F) Note: extended operating temperature version available
- IP rating: IP66 (dust tight and protected against powerful water jets)
- 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).

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