



## Intelligent E-scan Detection Radar

- Lightweight and low cost GSR suited to fixed installation on masts or towers
- Detects moving vehicles and persons
- Integrated Vortex fast-scan technology
- Unsurpassed ground clutter suppression with low false alarm rate
- Fully electronic scanning (E-scan) using PESA technology for ultra high reliability
- Simultaneous Doppler and FMCW processing whilst fast-scanning (no mode change required)

SensorTec Surveillance Systems addresses a broad range of security requirements in the defence, homeland security and civil/commercial markets. SensorTec radars are part of a range of advanced BSS technologies that provide class-leading protection against conventional and asymmetric/terrorist threats.

the SensorTec radar scans and detects moving vehicles and persons (including 'crawlers') over a wide area and provides exceptional detection performance out to 8 km.

Detected targets are reported via a standard Ethernet TCP/IP network connection, allowing target recognition and identification through the automatic slew-to-cue of optional cameras or thermal imagers. Accurate positional information is reported, including target lat/long co-ordinates, range and bearing. The data bandwidth required for target output and radar control is very low.

### Electronic-scanning (E-Scan)

The SensorTec ST-ESR138 is a low cost e-scan ground surveillance radar (GSR). SensorTec e-scan radars have no moving parts to wear out, maintain or replace and offer dramatic improvements in reliability over mechanically scanned radars. SensorTec radars are all-in-one fully integrated units comprising antennas, signal processing, plot extractor, GPS and compass. SensorTec radars are proven to withstand harsh environmental conditions and provide many years of maintenance free operation. The radar operates in all weather conditions and includes a built-in precipitation filter that suppresses false detections from rain or snow. Day/night 24-hour operation is fully supported.

## Low-power FMCW Doppler Technology

SensorTec radars incorporate a unique combination of FMCW and Doppler processing technology, ensuring unsurpassed ground clutter cancellation with the ability to detect incredibly slow movement. Radio transmission power is very low, making the radar safe for human operation and difficult to intercept (i.e. electronically covert). Power consumption is low, allowing operation from battery, vehicle or mains.

## Wide Elevation Beam

In order to maximise long range detection performance, radars are typically mounted high on a tower or on top of a hill. However, when mounted in this way, the narrow vertical elevation beam of traditional radars results in the problem of 'dead ground' close to the radar. SensorTec radars benefit from having a very wide vertical elevation beam, allowing them to detect targets in the distance as well as close-up simultaneously. In complex mountainous regions, the SensorTec radar's wide elevation beam also ensures that hill tops and valleys can be scanned simultaneously, without the need to physically tilt the radar.

| Specification                  |   |
|--------------------------------|---|
| Architectural Overview         |   |
| Radar type                     | E-scan Frequency Modulated Continuous Wave (FMCW) Doppler Ground Surveillance Radar (GSR)           |
| Frequency band                 | Ku band   |
| Scan type                      | fully electronic scanning in azimuth ('e-scan') using a Passive Electronically Scanned Array (PESA) |
| Transmitter power (nominal)    | 1 Watt  |
| Multi-radar operation          | up to 16 radars in close proximity  |
| Embedded software and firmware | field upgradeable via network connection  |

| Target Detection Performance                           |  |
|--|--|
| <b>Maximum detection ranges</b>                        |  |
| Crawling person (RCS 0.1 m2)                           | 1.5 km (0.9 mi.)   |
| Walking person (RCS 1.0 m2)                            | 3.3 km (2.1 mi.)   |
| Moving vehicle (RCS 30.0 m2)                           | 8.0 km (5.0 mi.)   |
| Large moving vehicle                                   | (RCS 100.0 m2): 8.0 km (5.0 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)   |
| Coverage   |  |
| Instrumented maximum range                             | 5.0 km or 8.0 km (3.1 mi. or 5.0 mi.)  |
| Instrumented minimum range                             | less than 10 m (33 ft.)  |
| Azimuth scan angle                                     | 180° horizontal e-scan   |
| Elevation beam   | 20° vertical beamwidth   |
| Fastest scan time (for 180°)                           | 1.3 s  |
| Target Output & Identification                         |  |
| Data format  | QZ (custom, open- standard data format) over TCP/IP  |
| 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 12 V to 28 V (DC)   |
| Vehicle supply input range            | from 12 V to 24 V (DC)   |
| Power consumption (from 12 V supply)  | 38 W (average)   |
| Physical, Environmental & Reliability |  |
| External dimensions (W x H x D)       | 645 mm x 490 mm x 410 mm<br>(25.4 in. x 19.3 in. x 16.1 in.)   |
| Weight of radar unit                  | approximately 22.0 kg (48.5 lb.)   |
| Operating temperature                 | from -32° C to +60° C (from -25° F to +140° F)<br>Note: extended operating temperature version available |
| IP rating                             | IP66 (dust tight and protected against powerful water jets)  |
| MTBF                                  | > 65,000 h (zero maintenance)  |

ST-ESR138 radar unit only (i.e. excluding lifting eye, mounting brackets, solar shield, etc.)

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