

# SMRi



The ability to see all aircraft and surface vehicles in any weather condition – including heavy rain – is essential for accurate airport surveillance and safe airport operations. Sensis high-performance surface movement radar (SMRi) is the most advanced radar available for accurately identifying aircraft and vehicles on the airport surface. The X-Band SMRi features high resolution and frequency diversity to decrease the clutter cell size. Additionally, advanced signal processing techniques continually adapt to changing weather conditions for seamless weather performance and advanced clutter suppression. Even in very high rainfall rates and for the highest detection probability requirements, Sensis SMRi provides up to 40% more detection range than other surface movement radars. Further, Sensis SMRi features fully solid state transmitter technology for exceptionally high reliability and ease of maintenance and an open architecture COTS design to protect against obsolescence.



*Sensis SMRi antenna*

Whether a simple radar replacement or a complete Advanced – Surface Movement Guidance and Control System, Sensis SMRi is the best solution available for accurate, safe, and reliable airport surveillance.

## Benefits

**High Reliability and Availability** – solid state design and extensive BIT/FIT to the LRU level reduces system failures and lowers maintenance cost

**Superior All Weather Performance** – frequency diversity improves heavy rain performance; automatic clutter suppression and advanced signal processing for adaptation to changing weather

**Reduced False Targets** – with advanced multi-path processing

**Minimizes System Obsolescence** – with an open architecture design, COTS hardware and software

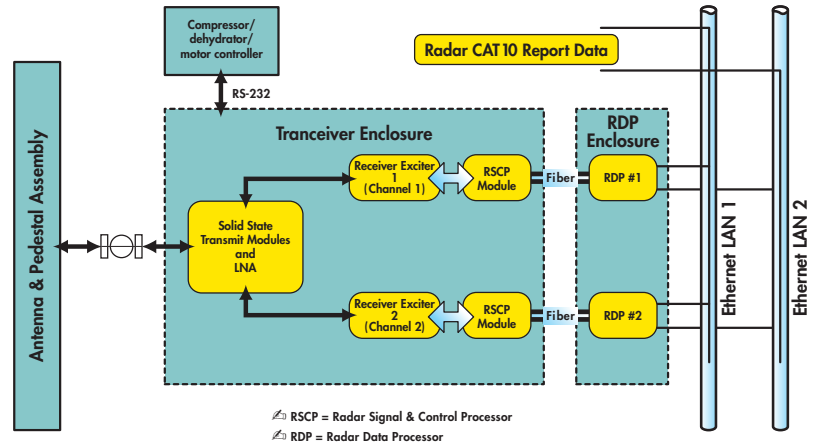


*Sensis SMRi transceiver cabinet*

## System Block Diagram and Specifications

Sensis SMRi provides robust performance in key areas: detection performance, resolution, user control, reliability and maintainability. The system has three subsystems: antenna, transceiver, and Radar Data Processor (RDP). Using a circularly polarized, slotted waveguide antenna or a corporate feed antenna, cast aluminum turntable housing, and an associated control unit, the **Sensis SMRi Antenna** assembly provides a stable and reliable RF emitter and detector. Nominal antenna gain is 37 db characterized by an inverse cosec<sup>2</sup> elevation beam width of 10° and azimuth beam width of 0.35°. The pedestal assembly includes optical encoders and a 4 kilowatt 3 phase motor. The antenna control unit includes motor protection, user safety circuitry, pedestal monitors and optional anti-condensation heaters.

Featuring a common transmitter and two receivers for redundancy, the **Sensis SMRi Transceiver** handles all RF conversions, fully digital waveform generation and signal processing. The transmitter is comprised of hot-swappable modules and meets all performance requirements when any one of the modules fails. The transceiver utilizes diversity of 16



frequencies which improves performance in severe weather conditions and ensures full frequency diversity when one channel fails.

The **Sensis SMRi Radar Data Processor (RDP)** accepts digital target data over fiber optic cable from the transceiver, performs signal and data processing, and relays the data via Ethernet interfaces for display. RDP algorithms include clutter and multipath rejection, and an adaptive threshold computation mitigating the effects of rain. Additionally, the RDP is fully adaptable with user configurable processing parameters, map generation, and recording and playback functions.

## SMRi Specifications

### Antenna

|                             |   |
|-----------------------------|---|
| <b>Type</b>                 | Two antenna types: circular polarized - slotted waveguide or corporate feed |
| <b>Frequency Range</b>      | 9.0 – 9.2 Ghz   |
| <b>Gain</b>                 | 37db  |
| <b>Horizontal BW @ 3 db</b> | 0.35°   |
| <b>Vertical BW @ 3 db</b>   | 10° inverse cosec <sup>2</sup>  |
| <b>Azimuth Encoders</b>     | Optical   |
| <b>Rotation Speed</b>       | 60 rpm  |
| <b>Max Wind Load</b>        | 270 km/hr   |
| <b>Dimensions</b>           | 6.5m/7.3m (l) x 0.64m (w) x 0.41m (h)                                       |
| <b>Weight</b>               | 350 kg  |
| <b>Drive Motor Power</b>    | 4Kw<br>3 Phase<br>220 VAC   |

### Transceiver

|                                   |   |
|-----------------------------------|---|
| <b>Transmitter / Receiver</b>     | X-band solid state, on line replaceable power modules |
| <b>Frequency</b>                  | Diversity of 16 frequencies                           |
| <b>Peak Power</b>                 | 50 W per module                                       |
| <b>Pulse Repetition Frequency</b> | 16384 Hz  |
| <b>Waveform Synthesis</b>         | Digital   |
| <b>Signal Processing</b>          | Digital   |
| <b>RF Input</b>                   | WG (WR90) 16 Waveguide                                |
| <b>Video Out</b>                  | Digital packets via optical fiber                     |
| <b>Dimensions</b>                 | 1.9m (h) x 0.9m (w) x 0.76m (d)                       |
| <b>Weight</b>                     | 290 kg  |

### RDP

|                                 |                                       |
|---------------------------------|---------------------------------------|
| <b>HW/SW</b>                    | COTS with Sensis software             |
| <b>Data / Signal Processing</b> | Clutter, multipath rejection, etc.    |
| <b>Display Load</b>             | > 200 targets                         |
| <b>Control &amp; Monitoring</b> | SMRi status, configuration            |
| <b>Recording / Playback</b>     | 8 bit video, target plots             |
| <b>Adaptation</b>               | User configurable                     |
| <b>Input</b>                    | 8 bit video via fiber                 |
| <b>Output</b>                   | Ethernet, ASTERIX Category 10         |
| <b>Dimensions</b>               | 1.8m (h) x 0.6m (w) x 0.91m (d)       |
| <b>Weight</b>                   | 295 kg (including power conditioners) |

While every effort is made to ensure data accuracy, please note that data may be subject to change.

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