Traffic Control Systems

SOLID STATE X-BAND SURFACE MOVEMENT RADAR (SMR)

The SMR Enhanced Surface Airport Tracking Radar (E-SATR) is an X-Band, state-of-the-art, solid-state, high resolution radar for complete ground movement control in A-SMGCS systems. It has been developed in accordance with EUROCAE MOPS standards and the ICAO requirements for performance and integration purposes in A-SMGCS systems.

Based on the company's expertise in the field of SMR radar systems, E-SATR uses solid-state components combined with the latest advanced technologies to set new standards in SMR/A-SMGCS. The radar includes an X-Band antenna based on an End Fed Slotted Array in lengths of either 19 or 21 feet.

E-SATR provides superior performance as solid state SMR in terms of resolution, clutter rejection, target detection, plot extraction and automatic tracking. These are in addition to higher system availability in a modern, versatile and adaptable modularity at Unit and LRU level.

The radar combines outstanding detection performance with high range resolution. It provides high detection probability across the entire airport scenario, while minimizing false alarms, echoes and ghosts even in the most complex airport environments.

E-SATR comprises an antenna unit and two swappable identical channels of transceiver and processor units that provide built-in redundancy. E-SATR can be provided also as a single channel configuration to match lower budget applications whilst maintaining very high reliability and superior system availability.

E-SATR

The transceiver and processor unit can be installed in either a single indoor rack unit close to the antenna unit, or split across two rack units. One is installed outdoors near the antenna unit, and the other installed indoors, potentially a large distance from the outdoor unit. This second option can be useful in case of very high towers by maintaining the simpler, lower power and less expensive SMR installation arrangements.

The system has a wide display and keyboard to facilitate local maintenance. Output plots and tracks are sent via a LAN interface in ASTERIX format and raw video is transmitted in digital format. Performance is compliant with EUROCAE and ICAO are fully satisfied with standard 19 feet antenna with circular polarization to reduce rain effects. For superior performance and/or specific requirements, a 21 foot antenna is available.

The transceiver unit uses pulse compression. This supports high resolution and longer detection ranges, even when transmitting low peak RF power with proprietary waveforms to achieve complete airport area coverage and optimised radar performance in bad weather conditions.

The receiver is of a double super heterodyne design and has a very high dynamic range, both linear and logarithmic.

The processor includes a custom made, flexible, digital waveform generator and related matched filter/detector. It includes a post processor software package to facilitate target detection, ghost rejection and reduced false alarm targets, plus target tracking with automatic initialization over the specific areas. In the event of heavy clutter, the processor can easily manage and resolve plot fusion, multi-path reflections, splitting and data recovery.

A specific anti-reflections algorithm is fully integrated in the post processor to provide smart plot filtering by eliminating false alarms caused by reflections.

EditorMapSMR is a user-friendly software tool to facilitate the system set-up and enable local control of all E-SATR functionalities. It allows E-SATR to easily adapt to any airport scenario, such as the initial definition of the automatic tracking areas, and to support any specific end-user requirements.

TECHNICAL CHARACTERISTICS

ANTENNA	
Type	End Fed Slotted Array Antenna
Operation frequency	9300MHz to 9550MHz (optional 9000MHz to 9200MHz)
Polarization	Circular (RCP or LCP)
Type of coverage	Fan beam
Azimuth beamwidth	< 0.4°
Elevation beamwidth	< 20°
Gain	> 36dB
Side lobe level	< -27dB
Azimut encoder	Optical, up to 16384 pulse
Rotation rate	60rpm

TRANSMITTER/RECEIVER	
Architecture	Very high modular with FAIL slot capability
Transceiver type	Fully solid-state
Frequency	9300MHz to 9450MHz Diversity or agility up to 16 frequencies (optional 9400MHz to 9550MHz or 9025MHz to 9175MHz)
Peak power	40W or 80W
Transmitter Waveform	Pulsed with digital pulse compression
Transmitter resolution	Up to 4m
PRF	8192Hz stagger
Noise figure	1.5dB nominal (LNFE) Overall 3.7 dB nominal
RF STC	> 40dB
Dynamic range	Up to 120dB
Cooling	Forced air

DIGITAL SIGNAL PROCESSOR	
Data signal processing	Clutter rejection, rain rejection, multipath rejection, antisquint
Target capacity	Up to 1000 targets for scan
Track range	Up to 6Km, fully ICAO compliant
Protocol data ouput	Ethernet, ASTERIX CAT10 for plots and tracks

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SECURITY & INFORMATION SYSTEMS

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