AIR TRAFFIC MANAGEMENT

SURFACE MOVEMENT RADAR

Supplying ATM systems around the world for more than 30 years

Indra reserves the right to modify these specifications without prior notice.

Only able to detect even the worst weather conditions.

Friendly user interface to manage all configuration parameters.
AIR TRAFFIC MANAGEMENT

SURFACE MOVEMENT RADAR

Supplying Flight strips and System controls more than 30 years
SURFACE MOVEMENT RADAR

Continuous wave technology to improve highly reliable airport manoeuvres

Introduction

Indra’s SMR is a continuous wave radar based on the latest technology, which offers great flexibility to adapt to customer needs.

The radar is designed to detect and locate stationary, moving, individual and multiple targets located in airport manoeuvres and range areas of extended single and/or multiple ranges.

Indra’s SMR is designed to be deployed as a standalone system obtaining excellent performances. The modular double channel for reception, transmission, processing and output makes the radar system suitable for the installation of high resolution with state-of-the-art due to it is fully manufactured in solid-state technology.

System features

• Good solid state transmitter fault resistant
• Very high transmitter output power
• High level of integration: Fully modular transmitters/receivers, processors is integrated in a single unit. The SMR is designed to be deployed as a stand-alone system as part of an ARS
c

System description

The SMR radar consists of a linear array antenna equipped with a low level steerable element. The system is equipped with two redundant and testable local area receivers (LAR). All of these are housed in a single 19" rack in Eurocontrol Asterix format. The system is designed to detect and locate targets located in airport manoeuvres and range areas of extended single and/or multiple ranges.

The radar site contains a local display where radar data are displayed for support their broadcast, supervision and adjustment tasks.

Main technical features

• System availability: 99.99%
• Beam width, azimuth: 60 rpm
• Polarization: Circular
• Gain: >35 dBi minimum
• Antenna revolutions: >4600 m
• Waveform: X Band (9.0 to 9.5 GHz)
• Frequency band: >200 MHz
• Transmiter output power: > 200 kW
• Frequency diversity: 4 frequencies
• Frequency modulation (CW-LFM): Linear Frequency Modulation Continuous Wave (LFM-CW)
• Target processing capability: > 300
• Azimuth accuracy: <0.044º
• Range coverage: >4600 m
• Range coverage: >100 / 6000 m
• Range resolution, 1 m² target: < 6 m
• Azimuth resolution at 2 Km: <15 m
• Range coverage with 16 mm/h rainfall: > 4600 m
• Range coverage: > 100 / 6000 m
• Minimum processing delay: < 0.25 s
• Maximum processing delay: < 0.4 s
• FFT length: 2048 points complex
• A/D converter: 12 bits
• Video bandwidth: 7.5 MHz
• Receiver noise figure: < 4.5 dB
• LFM sweep: > 200 MHz
• Transmiter/receiver/processor with Local Area Networks (LAN).
• Antenna with circular polarization, cosecant radiation diagram
• Digital extraction of I and Q signals from the baseband signal
• High gain antenna with an inverted square cosecant radiation diagram
• Waveform generation using DDS technology (Direct Digital Synthesis)
• Intelligent BIT (Built-in Test Equipment) with Built-in Test Equipment Interface

 Friendly parameters configuration display

• Radar features define SMR and detection areas
• The information displayed in the airport map is used to adjust and improve the performance of the radar system
• Specific areas are defined to initiate, filter and adjust the system parameters

System availability

• Maintenance, adjustment tasks and costs MTBF and MTBCF values that simplify maintenance, supervision and adjustment tasks.
• Intelligent BIT (Built-in Test Equipment) with Built-in Test Equipment Interface
• Avionics technology provides high MTBF and MTBCF values that simplify maintenance, adjustment and repair tasks.
• Local and remote control and monitoring system
• Maintenance of availability and maintainability. Solid state technology provides high MTBF and MTBCF values that simplify maintenance, adjustment and repair tasks.
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• Availability, reliability and maintainability:
• Solid-state technology provides high MTBF and MTBCF values that simplify maintenance, adjustment and repair tasks.
• Reliable operation with very simple solid-state low power design allows highly reliable operation with very simple solid-state low power design allows highly reliable operation with very simple solid-state low power design allows highly reliable operation with very simple solid-state low power design allows highly reliable operation with very simple solid-state low power design.
SURFACE MOVEMENT RADAR

Continuous wave technology to improve highly reliable airport manoeuvres

System description

The SMR radar consists of a linear array antenna and a ground sub-system mounted on the top of a building or tower and the use of state-of-the-art technology in digital signal processing to improve the performance of the radar system. The system is designed for use in airports and is capable of being configured to operate in various modes, including single-channel or dual-channel operation. The radar is designed to detect and locate targets in heavy weather conditions, such as fog or rain, and can provide radar information for both airport and surface operations. The radar system is designed to be compatible with a wide range of systems, including those used for airport surveillance and surface management. The radar system is designed to be easy to maintain and operate, and is designed to be cost-effective and reliable. The radar system is designed to be compatible with a wide range of systems, including those used for airport surveillance and surface management.

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System features

• Solid-state transmitter fault resistant
• Very low transmitter output power
• High level of integration: Fully modular transceivers, receivers and processors are integrated in a single unit
• Dual redundant channel for the system processing techniques allow the system obtaining excellent performances

Main technical features

• Frequency band: X Band (9.0 to 9.5 GHz)
• Transmiter output power: 5 watts, continuous wave
• Frequency diversity: Frequency diversity in each channel, favouring suppression of clutter
• Waveform: Linear Frequency Modulation Continuous Wave (LFM-CW)
• Clutter suppression and CFAR
• FFT length: 2048 points complex
• Local Area Networks (LAN)
• Local and remote control and monitoring system diagnostic and supervision

Technical characteristics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beam width, azimuth</td>
<td>60 rpm</td>
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<td>Elevation beam form</td>
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<td>Minimum processing delay</td>
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**SURFACE MOVEMENT RADAR**

Continuous wave technology to improve highly reliable airport manoeuvres

**Introduction**

Indra's SMR is a continuous wave radar solution that can run on fully modular technology which offers great flexibility to adapt to customers needs. The radar is designed to detect and locate stationary, moving, individual and multiple targets located in airport manoeuvre and ramp areas of extended airports. Then, it offers low power density allowing highly reliable operation with very simple maintenance.

Indra's SMR system provides high resolution in comparison with other SMR. The continuous wave makes it easier for the system processing techniques allowing the system obtaining excellent performances. This SMR radar is characterized by the high level of integration. The modular double channel system composed by redundant transmitters, receivers and processors is integrated in a single rack. The SMR system is designed to be deployed as a tracking system or integrated as part of an A-SMGCS system.

**System description**

The SMR radar consists of a linear array antenna active and passive subsystems installed on the top of a building or tower and the powerful transmitters and receivers to detect and track targets by means of a powerful LFM (Linear Frequency Modulation Continuous Wave) technology.

SMR is a continuous wave radar solution based on COTS products. The SMR system allows an automatic and efficient detection of targets located in airport manoeuvre and ramp areas at extended range even in low visibility conditions caused by fog or rain. Its dual redundant channel system allows the radar to face air traffic management problems caused by the malfunction of indicators. This SMR system is designed to be deployed as an identification system to support the Air Traffic Management (ATM) operations.

All these features allow SMR to have a high level of integration. The modular double channel system composed by redundant transmitters, receivers and processors is integrated in a single rack. The SMR system is designed to be deployed as an identification system or integrated as part of a ground-based equipment system.

**System features**

- Solid state transmitter fault tolerant
- Very low transmitter output power
- High level of integration:
  - Fully modular system
  - Fully redundant system
- Dual redundant channel for the transmitter/receiver/transponder system with automatic reconfiguration
- Continuous wave mode with linear frequency modulation (LFM-CW) technology, improving detection of targets in false radars

**Main technical features**

- **Main technical features**
  - **Response area coverage:** 100,000 m
  - **Range accuracy:** ±0.0001 m
  - **Range resolution:** 1,000 cm
  - **Range resolution at 5 Kms:** ±1,000 cm
  - **Target processing capability (2000 Map):** ±3,000
  - **Processing delay:** ±0.01 ms.
  - **Frequency band:** X Band (9.0 to 9.5 GHz)
  - **Transmit power:** 5 watts, continuous wave
  - **Number of frequencies:** 4
  - **Maximum processing delay:** ±0.25 s

- **System availability:** >99.99%

**System availability**

- **Beam width, azimuth:** 60 rpm
- **Elevation beam form:** Inverse cosecant squared
- **Antenna revolutions:** < 0.4º
- **Polarization:** Circular
- **Elevation accuracy:** < 0.044º
- **Range coverage with 16 mm/h rainfall:** > 4600 m
- **Min/max oblique range coverage:** 100 / 6000 m

- **Technical features**
  - **Latency high resolution modes:** Oblique and altitude change of aircrafts
  - **Manual/automatic map backups:** 2048 points/seconds
  - **Training support and COTS:** Based on COTS products

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