AIR TRAFFIC MANAGEMENT

PRIMARY SURVEILLANCE 2D S band RADAR

Supplying ATM systems around the world for more than 90 years

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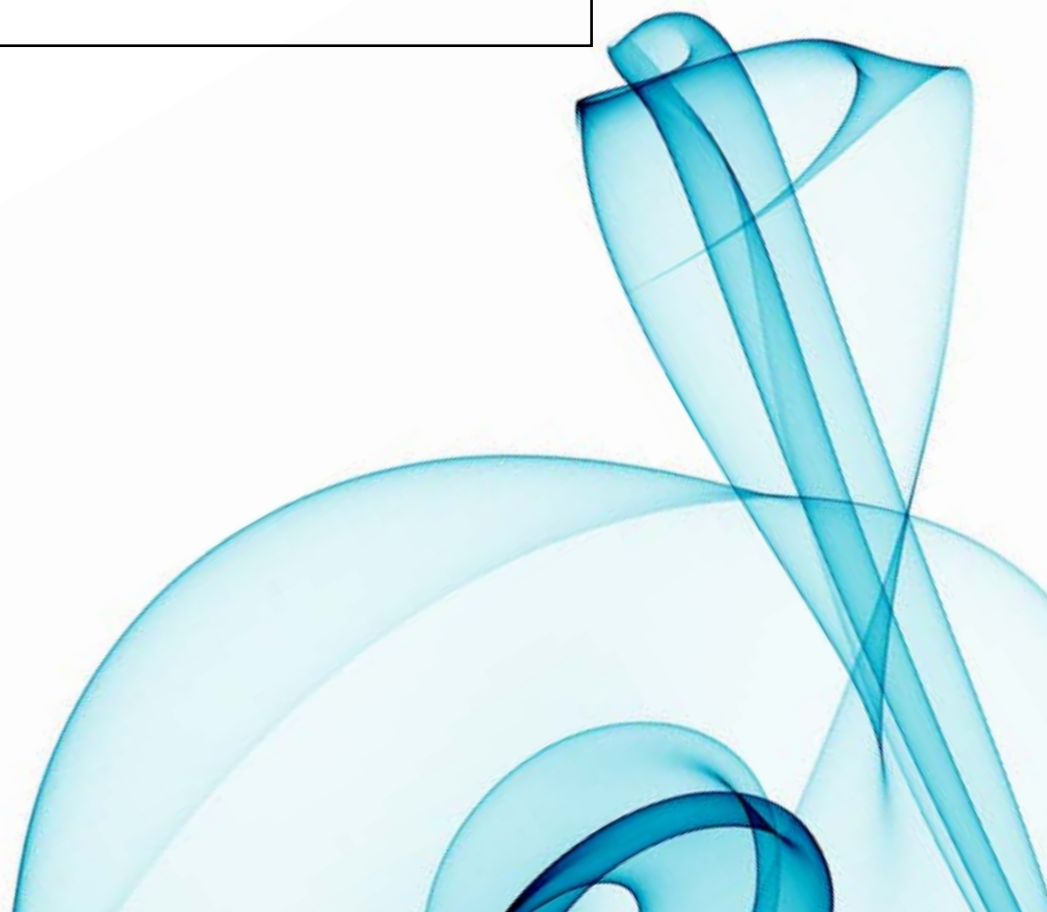

PRIMARY SURVEILLANCE 2D S band RADAR

Indra's PSR 2D S band Radar solution is a fully solid-state radar system that incorporates the latest technologies into an airport en-route surveillance radar system. the radar.

PSR 2D S band Equipment

Technology benefits

Features

- All solid state with MTD performance
- ICAO and EUROCONTROL performance
- Uncompromised Doppler visibility detects aircraft in adverse weather conditions
- Excellent range resolution with unique technology to detect small aircraft close to large ones
- Calibrated ICAO compliant six-level weather mapping
- No RF switching of signal received with two antenna beams and 4 receivers each channel
- COTS and Open system architecture, readily interfaces to your ATC system
- Additional redundancy points
- CE marking
- European interoperability requirements

Benefits

- Best value and high performance at competitive price
- High reliability and ease of maintenance results in significant operating cost savings
- Easy maintenance through user-friendly "expert systems" technology
- Low false alarm aircraft detection in bad weather improves controller productivity
- Accurate weather situation picture allows aircraft to be safely routed around storms
- Full capacity to be integrated with MSSR/ Mode S as an advance surveillance station entity

Discriminators

- The most technologically advanced ATC system - solid state, programmable, A-MTD Doppler processing
- High receiver dynamic range solves clutter performance problems with solid-state radar
- Ultra low Doppler Filter sidelobes provide unsurpassed rejection of weather
- User-friendly radar to operate and maintain
- Programmable processor (parameters and site adaptation)
- The highest top-quality-range resolution, graceful multipath redundancy

Primary Surveillance 2D S band Radar

Main features

The radar is a highly reliable S-band surveillance radar designed as an unattended system intended to operate twenty-four hours a day, 365 days a year, while simultaneously performing system self tests, reporting status and surveillance data to the Air Traffic Control System.

Apart from the antenna, transmitter and waveguide components, the equipment in the system is configured in dual channels to provide a totally redundant system. Cross connections between redundant modules permit additional failures to occur while the system continues in operation, in comparison to other systems. The transmitter is implemented using N+2 redundancy providing inherent high reliability with a fail-soft operation. Due to power margin and considering graceful degradation, the transmitter can be maintained without interruption of service.

The configuration of the radar consists of a Terminal Approach radar to 60 nm with a rotation rate of 15 rpm, a Mid-range Terminal Approach version to 80 nm with a rotation rate of 12 rpm, and 100 nm with a rotation rate of 10 rpm, performance of the systems is identical except for the extended coverage provided by the Mid-range version.

- Internally redundant architecture
- Solid-state Transmitter with graceful degradation and hot repair
- High dynamic range receivers (84 dB at signal processor input)
- Sampling at IF, digital I&Q generation and demodulation
- Commercial-off-the-shelf (COTS) Power-PC based Generic Processors for Signal and Data Processing-growth for the future, scalability, load balancing, portability
- Fully programmable processing parameters-site adaptation and optimization
- The A-MTD employs adaptive processing techniques in Time and Doppler domain to uniquely identify aircraft and clutter returns
- User friendly control and monitoring interfaces - Graphical for ease of understanding
- Wide range of interfaces

Characteristics summary

Frequency	2.7 to 2.9 GHz
Frequency Diversity & Agility	2 frequencies (Long/short pulse) 75 MHz frequency diversity. Possible exchange of frequencies for subsequent CPI
Peak power	22 Kw
RF TX &	Sectorize (1.4°)
Blanking	Synchronous clutter map
Pulse width	Short pulse: 1.2 µs Long pulse: from 60 to 98 µs
PRF	700 to 1300 Hz (custom-built)
Stability	63 dB
MTI improvement factor	57 dB
Sub-Clutter visibility	>50 dB
Instrumented range	60 nm or 80 nm or 100 nm
Detection range	>60 nm or >80 nm or >100 nm
Reliability	
Availability	99.999%
MTBCF	45,000 hours
MTTR	20 minutes
Resolution	
Range	230 m rms (short pulse) 170 m rms (long pulse)
Azimuth	2.5° rms
Accuracy	
Range	50 m, rms
Azimuth	0.15°, rms
Receiver	
Noise figure	2 dB
Sensitivity	-126 dBm
Dynamic range	84 dB at signal processor input (without pulse compression)
STC	3 stages (2 RF and digital)
ADC	16 bits @ 93 MHz
Antenna	
Beams	1 transmit, 2 receive
Gain	34 dB (low beam) 32.5 dB (high beam)
Azimuth beamwidth	1.35°
Elevation beamwidth	4.5° cosecant squared +40°
Rotation speed	10/12/15 rpm
Polarization	Linear (vertical) Circular (right hand)
Receiving paths	4 simultaneous each channel
Processing	
Type	A-MTD doppler filter bank
Filters	14
False alarm control	Interference suppression/detect R-CFAR, CM-CFAR, MTAT, MTAC Clutter and Digital STC map Anomalous prop detection Windfarm mitigation, LTE immunity
Weather channel	US-NWS 6 level detection Ground clutter suppression filters
Capacity	>1500 targets

Coverage

The coverage of the system is as above, operating at 15 rpm with a 1 m^2 target (standard target Swerling Case I) is such that a target is detected within the Operational Coverage Volume (OCV), with a Pd (Probability of detection) of at least 80% at video extractor inputo guarantying an overall Pd at plot level better than 90%.

The graph shows that detection requirements are fully accomplished: detection range is 87.9 nm.

The previous graph shows the fail-soft capabilities that allow detection range of at least 60 nm with failure in 20% of transistors or 2 Power Amplifiers switched off.

For 80 nm configuration operating at 12 rpm, detection range is 90,3 nm (Data reporting is shown up to 80 nm).

ISO 9001:2000

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