

Primary Surveillance Radar



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Advanced S-Band Solid-State Primary Surveillance Radar Morava 10

PSR Morava 10 is a latest generation primary surveillance radar designed and manufactured by NRPL under ISO 9001:2008 certified quality system. The radar is intended for ATC surveillance within airport terminal area. PSR Morava 10 extended range feature allows using it for en-route application as well.

PSR Morava 10 is a field proven PSR system installed at numerous sites worldwide. The system can be flexibly adapted for operation in different environment including wind-farm fields, mountains, and coastal areas. PSR Morava 10 is a very compact and energy efficient solution which reduces demands to installation sites and non-radar auxiliary equipment.

PSR Morava 10 fully meets and often surpasses requirements and recommendations of ICAO and EUROCONTROL standards.

PSR Morava 10 characteristics were proven by civil aviation authorities of Lithuania, UK, Kazakhstan, South Korea and Czech Republic.

PSR Morava 10 is a cost-effective and low maintenance

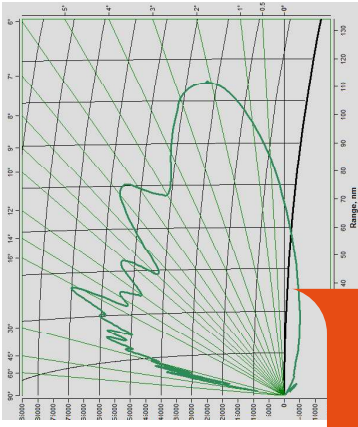
cost solution featuring fully solid-state, highly modular and reliable design with integrated comprehensive BITE system. The radar offers an improved system stability, effective clutter attenuation and elimination of false targets with maintained high probability of target detection up to a distance of 120 NM.

High-precise dual-beam antenna ensures reliable coverage within the area and high performance of the radar even under severe ground clutter conditions. Advanced beam switching and combining algorithms mitigate dynamic high-speed clutter such as road traffic, wind turbines and trains. PSR Morava 10 also includes an independent high-resolution weather channel providing precise information on weather conditions (US-NWS 6 level).

PSR Morava 10 is very flexible and can be easily integrated with WSSR, ADS-B or MLAT systems. In this case, a common CMS will display status and performance parameters of all systems simultaneously and PPI screen will display combined targets processed by advanced built-in tracking system.

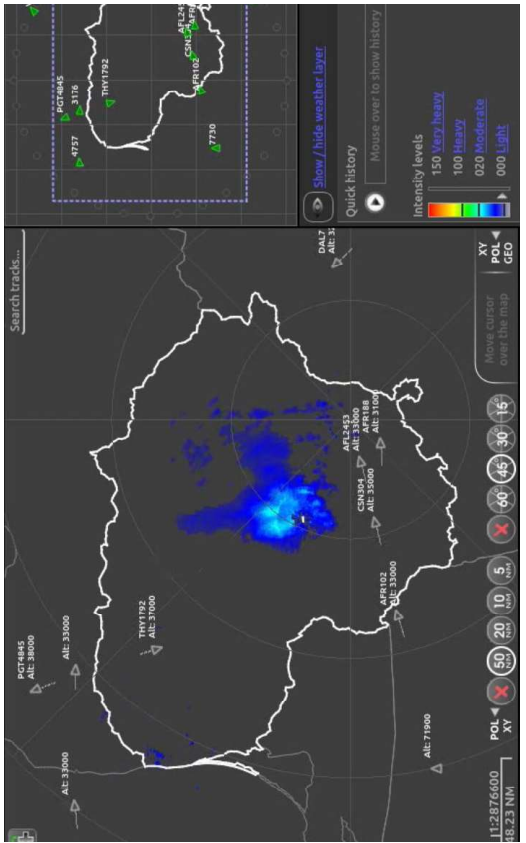
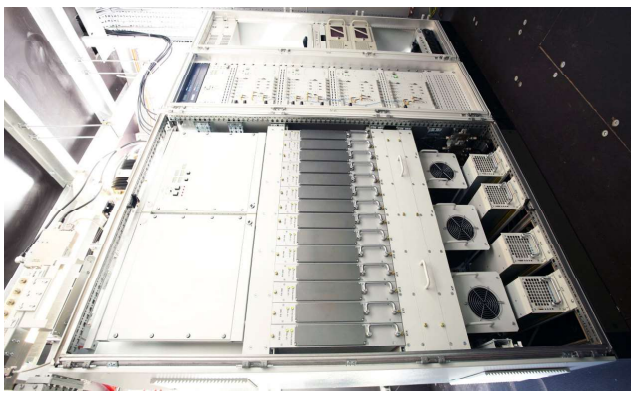
Main Features

- Advanced solid-state S-band PSR
- High performance fail-soft transmitter with extra-long pulse feature
- Extended range up to 120 NM
- 4G networks interference mitigation
- Advanced MTD algorithms
- Field proven wind-farm effect mitigation
- Independent 6 level weather channel
- Advanced CMS with remote support capability
- CAP 670 approval



Blake diagram for 100 NM coverage
(1 module off, Pd=80%, RCS=1 m², Sweeping Case 1, 12 RPM)

Frequency band	S-band, 2700 – 2900 MHz
Frequency diversity and agility	Full frequency diversity; frequency agility with 1 MHz step
Peak RF output power (12/24 modules)	16/28 kW
Pulse width	Short pulse: 1 µs Long pulse: adjustable, 40–300 µs
Antenna	Low/high beam gain: 34 / 33 dB Polarization: linear/circular
Elevation	0.3° – 45°
Rotation rate	6–15 RPM
Minimal range	0.2 NM
Instrumental detection range	60 / 80 / 100 / 120 NM
Accuracy	50 m / 0.1°
Resolution	230 m / 2°
Signal processor	A-MTD, MTAC and MITAT suppression, advanced beam switching and combining, interference suppression, advanced dynamic clutter maps
Sub-clutter-visibility	> 55 dB
Post processor	Plot processing using weight-based algorithms and high precision maps
Tracking system	Multiple input-processing supports more than 1000 tracks
Output format	ASTERIX or any other by request



Antenna System

- Double-curvature antenna reflector with two beams provides cosec² coverage diagram
- Polarizers controlled by signal processor allow switching between linear and circular polarization which significantly improves weather clutter attenuation
- Dual motor antenna drive system
- Dual azimuth encoder system
- Antenna drive system can be environmentally protected by antenna shelter
- Antenna drive system includes comprehensive BITE with numerous sensors (oil level, vibration, temperature etc) displayed on CMS

Transmitter

- Fully solid-state, highly modular system with 12/24 amplifying units, allowing uninterrupted operation during maintenance procedures
- Very long pulses up to 300 μ s
- Distributed BITE system with detailed diagnostics and online performance calculation
- Fail-soft architecture with air cooling
- Low power consumption and energy saving due to high efficiency
- High gain over the whole bandwidth
- Target detection characteristics guaranteed with one or two failed amplifiers

Receiver

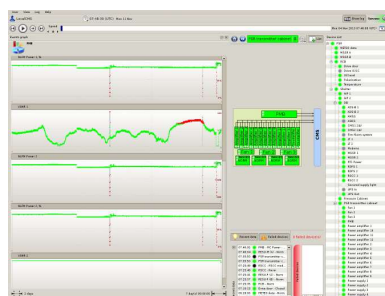
- Super-heterodyne receiver with double frequency conversion
- IF analogue-to-digital conversion to provide extended dynamic range
- Automated digital gain control guarantees high dynamic range stability
- Digital sensitivity time control for expanding dynamic range in high-clutter regions
- One set of local oscillators for generating and receiving signals guarantees high phase stability
- Extended self-testing of the whole reception channel including antenna
- Receiver parameters are monitored by sophisticated BITE system

Signal and Data Processor

- Adaptive MTD
- Digital NLFM pulse compression
- Doppler signal filtering
- US-NWS 6 level high-precision weather maps
- CFAR adaptive filtering
- MTAC, MTAT suppression
- Advanced beam switching and combining
- Interference suppression, advanced dynamic clutter map
- Plot processing using weight-based algorithms and high precision maps
- Multiple input tracking and data combining

Control and Monitoring System

- Fully redundant system
- Any number of local and remote CMS terminals
- Highly adaptable to local communication lines such as serial, optic, LAN, radio link etc.
- Non-radar equipment control can be easily implemented in CMS displaying all available data
- Real-time performance calculation
- Information archiving, replay and analysis
- SNMP support
- Factory remote support capability
- OS independent



Radar Data Display

- Multiple data (plots and/or tracks) input display including PSR, MSSR, ADS-B and MLAT
- Weather maps display with up to 256 levels
- Raw video display
- Geographical maps and air navigation charts
- Surveillance data archiving and replay