

# MONOPULSE SECONDARY SURVEILLANCE RADAR WITH MODE S CAPABILITY



**MSSR-1 – Monopulse Secondary Surveillance Radar developed by ELDIS Pardubice, s.r.o. – is a fully modular system, which meets or exceeds ICAO and MARK X recommendations and standards and allows extension according to increasing needs of the customer. Individual modules of the equipment can be used either in new or in older MSSR systems.**

### Radar configuration:

- Antenna unit (ASSR)
- Antenna switch
- Control transponder
- Dual interrogator-receiver units (Hot master / standby)
- Dual extractors (Hot master / standby)
- Maintenance display unit
- Control and monitoring system

### Antenna Unit ASSR

The unit is composed from antenna pedestal, drive, antenna frame, and antenna itself. The drive rotate together with the antenna support frame and the antenna. The unit is fitted with two asynchronous motors,

the gear-box, the two- or three-channel rotary joint and two azimuth encoders.

The following antenna types are available:

**ASSR-20 - LVA 2 - channel SSR antenna (20 column radiators),**

**ASSR-35 - LVA 3 - channel SSR antenna (35 column radiators).**

The antenna is composed of a set of vertical column radiators that are fed by a horizontal feeder created by a set of strip power splitters.

Each antenna of ASSR series has a main beam (SUM).

The ASSR-20 antenna has the DIF and OMEGA beams integrated in the SLS beam.

The ASSR-35 LVA antenna has a separate DIF beam, which, together with SUM beam, serve for monopulse computation of target azimuth. This antenna has the OMEGA beam as well, which implements the SLS feature.

### Interrogator–Receiver Unit MSSR-1

The Interrogator–Receiver Unit is the key component of a MSSR. It contains all the circuits necessary for interrogations generation, reply

receiving and processing in individual interrogation modes. The unit includes an extensive BITE internal diagnostics. Thanks to full redundancy of critical subsystems and cross-linked configuration, the system brings enhanced accessibility,



including automatic backup switchover features. MSSR-1 is a flexible modular system that allows easy extension of system configuration for additional functions according to requirements for ATC systems (or Air Defence, systems).

## Interrogator transmitter unit

The interrogator transmitter is a two-channel transmitter, while structure of the channels is identical.

The receiver channels are fully identical and automatically calibrated. Test signals are joined with output amplitude-detected video signals. During the time when replies are not received or processed, an extensive testing is performed.

## Extractor unit

The Extractor analyzes all received signals and detects individual reply codes and aerial targets. It is composed from the reply detection unit, individual modes processing unit and target correlation unit.

## Data processing

Post processing unit performs correlation between targets in respective modes and integrates them into the most probable target position message. It also performs analysis based on internal database, cancels the replies which are garbled or damaged by interference and transmits the target messages including quality status of the detected information into the superior system. The database is periodically updated after several antenna scans and the codes are validated by statistical analysis.

Control and diagnostic unit is responsible for controlling, on-line monitoring the parameters of transmitter / receiver and extractor and also for communication with respective subsystems.



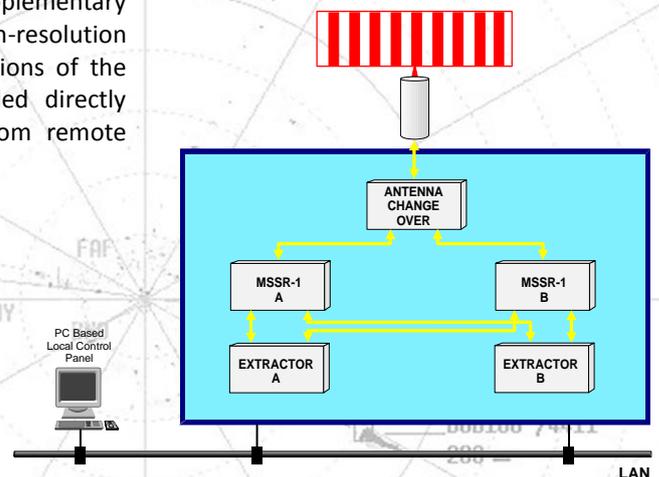
## MSSR-1 system parameters

Frequency band		1030 & 1090 MHz
Antenna gain	ASSR-20	> 20 dBi
	ASSR-35 LVA	> 27 dBi
Mode		1; 2; 3/A; C; up to Mode S level 5
Input peak power of the transmitter		min. 62 dBm
Power supply		3x230/400 V ±10 %
Resistance from wind in operation / out of operation		30/50 m/sec
Operating temperature range (outdoor parts of the equipment)		-50 °C to +50 °C
Operating temperature range (indoor parts of the equipment)		-10 °C to +50 °C
Range		from 0.5 to 256 NM
Antenna revolution		from 4.5 to 15 / min
Antenna beam width in a horizontal plane (ASSR-20)		2.2° at -3 dB level 4.2° at -10 dB level
Sensitivity for SNR 10dB		min. -83 dBm
Dynamic range		min. 80 dB
Altitude resolution (mode C)		100 feet
Altitude resolution (mode C/S)		25 feet (100 feet)
Range accuracy		±27 m (r.m.s.)
Targets processing capacity		min. 125 / sec
Azimuth accuracy		±0.1°
Output data format		ASTERIX Cat. 048, 034, 001, 002

## Display unit

The display unit displays analogue radar signal, extracted digital data, and other supplementary information on a high-resolution PC screen. Basic functions of the radar can be controlled directly from radar site or from remote technical workstations.

## Block Diagram of MSSR-1 Radar



## Contacts:

ELDIS Pardubice, s.r.o.  
Dělnická 469  
530 03 Pardubice  
Czech Republic

tel: +420 466 052 443  
fax: +420 466 670 423  
E-mail: [marketing@eldis.cz](mailto:marketing@eldis.cz)  
[www.eldis.cz](http://www.eldis.cz)

**ELDIS RADAR SYSTEMS**  
YOUR BEST CHOICE