

RP - 5M/ TWT RADAR

RP-5M/TWT radar in ELDIS design is intended for precise aircraft vectoring to the glide path/course line, for check and possible correction of the pilot decision at the approach manoeuvre.

RP-5M/TWT radar follows up from verified mechanical concept of the original equipment. Significant improvement of system and technical parameters was reached through implementation of the latest electronics level both in the microwave part, and particularly to quite new method of processing received signals and their high-quality display. Relative independence and virtually trouble-free radar operation is maintained on high level owing to the original control and diagnostic system controlled by the computer.



Antenna unit

Beams of azimuth and elevation antennas are created with the help of combined primary feeds. Continuously adjustable polarizers effectively suppress returns from meteorological and ground clutter, and increase this way probability of a target detection.

Transmitters

Part of the radar is TWT transmitter operating in time and



frequency diversity mode. Transmitter is working with compression of transmitted pulse - Barker 13. Solid state modulator consisting of four modules ensures good transmit pulse shape. Transmitter performance is ensured also in case of a single module failure. The modules can be replaced without the operation interruption. Transmitter diagnostics monitors transmitted power and VSWR.

Receivers

On the receiver input, multistage protections prevent LNA damage by the power penetrating from the transmitter or nearby radars. Prior to the receiver, STC (Sensitivity Time Control) circuit is included, which contributes to good operation of the signal processor. It is possible to select among several pre-set characteristics, or to choose adaptive STC mode. Receiver is a superheterodyne with double mixing and low noise microwave amplifier (LNA) on its input. Output intermediate frequency signal is processed in a two-channel IF amplifier. Receiver diagnostics

monitors the receiver noise figure in each sweep.

Signal processing

RDE (Radar Data Extractor) block is part of signal processing. RDE contains:

- AMTD signal processor
- plot extractor

AMTD signal processor

It detects signals from IF circuits, selects radar returns according to Doppler properties, and adaptively analyses received signals. In accordance with attained results, it regularly and automatically adjusts parameters of the signal filtering. Targets detection occurs on the basis of targets contrast against a background evaluation, which enables adaptive STC control and its timing. It ensures significant enhancement of meteorological clutter, angel echoes and wilful jamming suppression coefficient. Low-flying and tangent-flying targets detection was simultaneously attained. Automatic adaptive signal evaluation significantly enhanced relation between machine detection of target, and results filtering by human being.

Plot extractor

Extractor resolves upon the target existence, calculates exact co-ordinates and converts summing information on target to a message, which can be transmitted via modem for further processing. Modern, high-performance hardware is utilised enabling application of demanding software. High capacity and quality of data processing is ensured, and overflow risk is minimised this way.

Control and diagnostics

Control and diagnostic system is based on the LCMS computer. The system diagnoses deciding blocks of the equipment, and if engineer's intervention needed to the radar operation, it enables setting and local control with the help of control interfaces, and remote control via a communication synchronous serial line.

Climatic conditions

Radar structure and air-conditioning system ensure the radar operation in the range of outside temperature $-50\text{ }^{\circ}\text{C}$ ÷ $+50\text{ }^{\circ}\text{C}$.

Antenna system can operate in wind up to speed of 30 m/s.

Radar power supply

The radar is supplied from TN-S $3\times 230/400\text{ V}$ 50 Hz network via five conductors. Two mains voltage supplies can be connected to the radar via the mains switchboard.

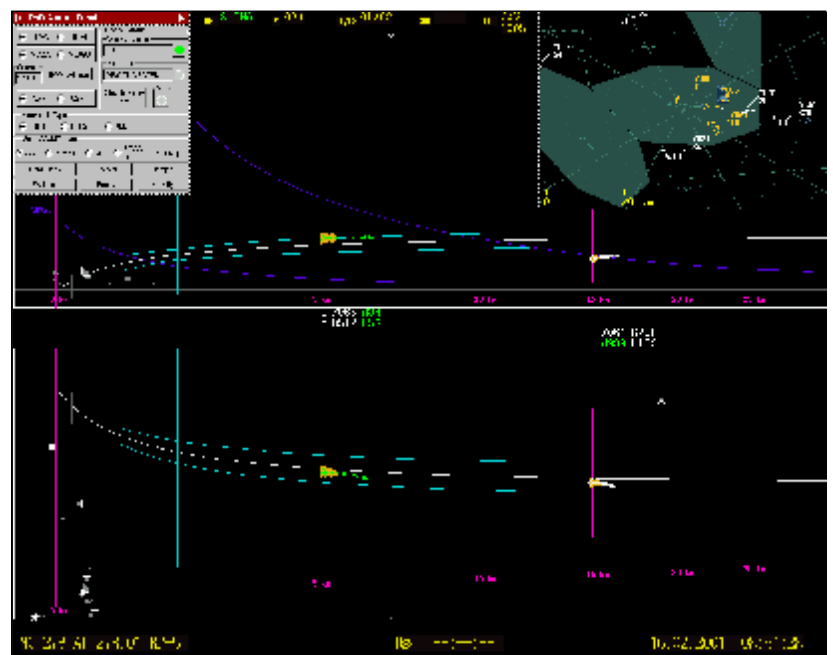
In case of higher voltage fluctuation, the automatic circuit switches over to the reserve supply.

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Basic Specifications

Operating frequency	9,25 to 9,5 GHz
Range	30 km
$(\sigma = 1\text{ m}^2; P_d = 0,8; P_{fa} = 10^{-6}; \text{rain } 4\text{ mm/hour})$	
Mechanical scanning	
in azimuth	$\pm 15^{\circ}$
in elevation	-1° to 14°
Accuracy	
in range	1 % of range (min 30 m)
in azimuth	0,6 % of range (min 9 m)
in elevation	0,4 % of range (min 6 m)
Transmitter output	40 kW
Pulse length	2,6 μs (Barker 13)



Emergency Console

Radar is possible to equip for emergency console. Emergency console of the RP flight controller enables the control of final flight phase when the

control console out of operation. Emergency console is periodically utilised as an engineer's console for the equipment parameters control and setting.