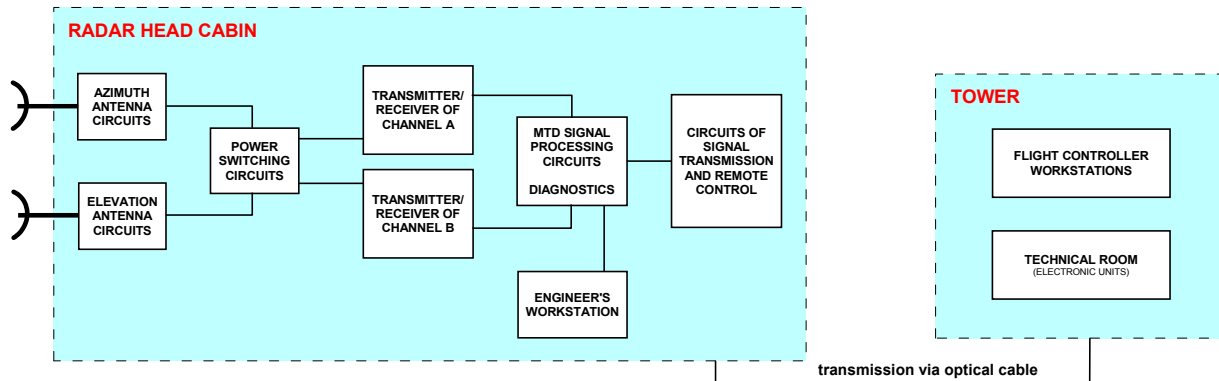


## ARPL-5 COMBINED SURVEILLANCE AND APPROACH RADAR



*Combined SRE/PAR radar by ELDIS company is designed for the air traffic control, precise aircraft guidance to glide path / course line, and for the pilot decision checking during the approach and landing manoeuvre. SRE/PAR radar supports following functions:*

*Check and control of aircraft operations in the vicinity of the respective airport up to the distance of 50 km.*

*Guidance of aircraft from an optional direction to the glide path axis.*

*Check and control of approach and landing operations in azimuth as well as in elevation.*

*Possibility of connecting to SSR or a direction finder, and displaying their data.*

*Check and measurement of flight altitudes in the course of landing operations.*

*SRE and PAR radar information transmission to flight controller workstations.*

### **SRE/PAR Radar in ELDIS Configuration**

The SRE/PAR radar equipment operates in X-band and is built in a stationary container. The equipment issues from well-trying mechanical design. Considerable increase of system and technical parameters was reached owing to the contemporary electronics level implantation into the

microwave part, quite new method of the signals processing, and their high-quality displaying.

Relatively autonomous and virtually fail-safe radar operation is kept on high level with the help of the original management and diagnostics system controlled by a computer.

### **Technical Description**

SRE/PAR basic configuration consists of following units:

- Antenna system with azimuth and elevation antennas
- Radar head cabin is placed in the runway vicinity and built into a container. It consists of transmitters, receivers, MTD-circuits and circuits for transmission and remote control & monitoring.
- Processing units are placed at the approach controller's workplace. They consist of a surveillance and approach radar monitor with logging system and remote control possibility.
- Optical cable is intended for connection of the radar head cabin and the processing unit up to the distance of 5 km.
- Set of spare parts and basic technical documentation.

### **High-Frequency Part of the Radar**

Power microwave part is designed on the basis of a classical waveguide. Azimuth and elevation antenna beams are created with the help of multiple primary radiators irradiating antenna reflectors. Continuously adjustable polarisers together with adaptive STC suppress effectively echoes from atmospheric and height zoned terrain, which considerably improves a target finding probability. Low noise microwave amplifier improving the receiving path sensibility is designed on the basis of microstrip technology and MIC. The amplifier is protected against penetrating power by means of a system of protections included in the receiver waveguide path. Received signal is further processed by double-mixing because of higher interference tolerance. Diagnostic system supports the receiver noise factor continuous measurement and the transmitter waveguide path matching check.

### **Transmitter**

Magnetron transmitters with thyratron modulators in X-band (3 cm) are applied. A and B transmitters operate in diversity mode.

New developed power transmitter parts meet requirements for considerable increasing the magnetron service life, which is substantially dependent on operating conditions

## Specifications

### Azimuth antenna:

Beam width at -3 dB level	≤ 0.60°
Beam width at -10 dB level	≤ 1.15°
Side lobes	< -20 dB
Gain	39.7 dB at 9100 MHz
Reflector feeder	4 element radiator
Polarisation	variable from linear to circular
Range	40 NM
Coverage	360°
Elevation roof	12 000 ft

### Elevation antenna:

Beam width at -3 dB level	≤ 0.44°
Beam width at -10 dB level	≤ 0.77°
Side lobes	< -25 dB
Gain	36.4 dB at freq. 9100 MHz
Reflector feeder	2 element radiator
Polarisation	variable from linear to circular
Range	20 NM
Scanning angle	-1° ÷ +9°
Elevation roof	6 000 ft

### Transmitters

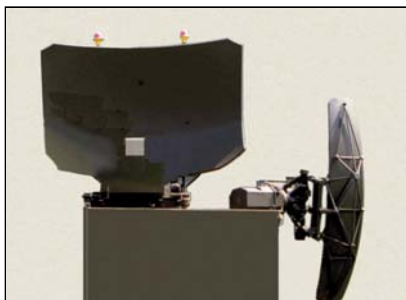
Transmitter A/B operating frequency	9000 MHz < $f_A$ < $f_B$ < 9500 MHz
Pulse power of a single transmitter	180 kW
Mean repetition frequency	2500 kHz
Staggered repetition frequency	max. ± 10 % from mean value
Transmitted pulse width	ca 0,5/0,3 μs
Diversity delay	0,9 ÷ 1,1 μs
Route VSWR	≤ 1,25

### Receiver

Microwave route attenuation at reception	≤ 8 dB
STC dynamic range	min 30 dB
Noise figure of microwave receiver	max 2,0 dB
IF frequency	30 MHz
Gain of IF amplifier	40 ÷ 80 dB
Dynamic characteristic	Logarithmic/ Linear
Data transmission to controller workstations	optical cables
Power supply	3 × 400 V / 50 Hz

### Climatic Conditions

Temperature range	Antenna unit	-50 °C ÷ +50 °C
	Radar Head Cabin	+5 °C ÷ +40 °C
Maximum admissible wind speed for operating/ turned out equipment		72/100 km per hour respectively



stability, i.e. the way of heating, cooling, power rise time after turning-on, and current pulse quality.

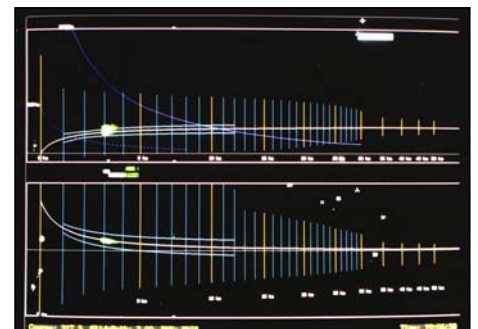
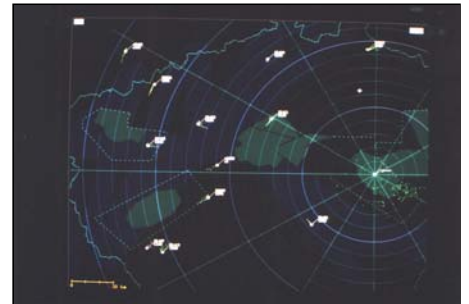
Transmitter and radar power parts are designed as operating units, properties and interface of which are selected so that approach radar modular structure established.

## Signal Processing

New principle of processing by the MTD signal processor utilising fixed and automatically tuned filter brings further considerable increase of input signals quality for extractor stable operation also in expressively worsened meteorological conditions.

## Control and Diagnostics

Control and diagnostic system is based on the CCU computer. The system diagnoses crucial units, and in case of engineer's intervention in the radar operation, the system enables both local setting and control with the help of control interface, and remote control via communication synchronous serial lines.



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