Rodnik

X-band radar for detection of low-flying and ground objects

Designation

The radar is designed for detection, measurement of the coordinates and parameters of motion (azimuth, range, height echelon, range rate) of low-altitude and ground-based platforms, as well as targets at medium and large heights, automatic target classification and tracking within the assigned zones, output of radar information to a user according to the assigned protocol.

Design features

- digital active phased array (PA) used as the antenna system;
- each transmitting element of the PA has its own transceiver unit — a solid-state one with digital forming of the probing signal modulation law;
- space surveillance, detection of targets, measurement of the coordinates and recognition are automatic, without involvement of the operator;
- the radar is mounted on a unitized mobile hydro-mechanical platform installed on a special-type trailer chassis. The radar automated workstation is remote-located at the user's command post;
- on Customer's request, the radar can be mounted on any transporter (chassis) or a stationary tower (platform) supplied by the Customer.

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Specifications

Working frequency range	X
Polarization	vertical
Space scanning:	
in azimuth	circular sequence
in elevation	consecutive-simultaneous
Coverage:	
azimuth	360°
range	
in engaging UAVs	from 300 to 20000 m
engaging all other target types	from 2500 to 50000 m
elevation	from 0° to 20°, from 0° to 40°, from 0° to 60°, from 0° to 80°
range rate	
in engaging UAVs	from 5 to 100 m/s
engaging all other target types	from 5 to 1000 m/s
Resolution:	
range	300 m
azimuth	3°
range rate	5 m/s
The radar provides detection ranges with a conditional 0.5 true detection probability and 10^{-5} false alarm probability:	
bomber with σ_t=5 m^2 RCS	
at the altitude from 200 to 10000 m	40–50 km
fighter-bomber with σ_t=3 m^2 RCS	
at the altitude from 200 to 10000 m	30–45 km
fighter with σ_t=1m^2 RCS	
at the altitudefrom 200 to 10000 m	20–25 km
cruise missile with σ_t=0.1 m^2 RCS at 200 m altitude	17 km
fixed-wing UAV with σ_t=1 m^2 RCS at 200 m height	20 km
fixed-wing UAV with σ_t=0.01 m^2 RCS at 200 m height	10 km
multi-rotor type UAV with σ_t=0.001 m^2 RCS at 200 m height	6 km
Information update rate	10 s, 5 s
Targets tracked	up to 100
Time of continuous operation from exterior electrical network	minimum 24 h
Switch-on time with functional check	maximum 10 min

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