AMBER-1800

Ground-based mobile VHF-band radar AMBER-1800 provides automatic deployment on prepared sites and is designed for detection of air targets, determination of their coordinates and distribution of radar information to consumers. Transmitter and receiver of AMBER-1800 radar are solid-state.

Introduction

Mobile VHF-band radar AMBER-1800 is designed on the basis of automatically deployed multi-section antenna system. The antenna itself represents a stacked array of dipole-slot antennas with linear horizontal polarization.

Performance characteristics of the stacked array antenna:

- elevation of the antenna phase center – 6 meters;
- operational frequency band from 140 MHz to 180 MHz;
- output impedance – 50 ohms;
- beamwidth – 6 degrees;
- level of sidelobes – minus 20 dB;
- antenna rpm – 3 to 6.

Time of deployment (stowing down) and leveling of the antenna mast assembly after vehicle positioning on prepared site does not exceed 12 minutes.

Radar design

- hardware cabin with main electronic equipment – vehicle No. 1;
- vehicular platform with leveling system carrying antenna mast assembly (AMA) and deployment system, antenna-feeder system, two electric power plants – vehicle No. 2.

Functions of AMBER-1800

- automatic detection of air targets and determination of their coordinates (plots: azimuth, range);
- automatic generation of tracks and tracking of air targets in specified areas of airspace;
- displaying of video, plots and tracks, automatic distribution of air situation to consumers over provided data links;
- automatic issuance of air target elevation measurement commands to radio height-finders, correlation of measured elevation with the tracks;
- recording and storage of air situation and interfaces of radar operators;
- control of radar operation modes, technical monitoring and diagnostics.

Composition

- antenna-feeder system;
- AMA automatic deployment system;
- platform automatic leveling system;
- antenna rotation and tilt system;
- transmitting system;
- receiving system;
- information processing, displaying and distribution system (operator and remote workstations with 500m standard cable);
- recording, monitoring and diagnostics system;
- power supply system: two power plants, transformer 380V – 220V, automatic load transfer and power distribution unit of the hardware cabin;
- communication system;
- temperature control system.

Semitrailer is leveled automatically/manually by electric drives installed on the chassis.

Performance characteristics

Parameter	
Range of working frequencies	140 – 180 MHz
Frequency agility: – method for frequency agility – discreet steps – frequency setting accuracy	 electronic 200 kHz ±10 kHz
Probing signal types and duration: – amplitude modulated signal – phase shift keyed signals – PSK-13 – PSK-42, PSK-51	 6 μs 13 x 6 μs (42,51) × 6 μs
Transmitter pulse power	8/30* kW
Capability of instant probing signal power and structure changes	implemented
Detection range for a target with RCS of 2.5m², at the antenna height of h_a=6 m: – min range – at altitude of H=100 m – at altitude of H=500 m – at altitude of H=1000 m – at altitude of H=3000 m – at altitude of H=10000 m – at altitude of H>10000 m	 2.7 km 30 km 60 km 70 km 110 km 300 km 400 km
Detection accuracy: – range – azimuth	 270 m 0.40°
Resolution: – range – azimuth	 1100 m 6°
Range of MTI	0 – 400 km
Clutter suppression ratio	> 40 dB
Dynamic range of receiver and digital signal processor	> 100 dB
Automatic control of upgraded height-finders	implemented
Start-up time	3 min
Power consumption	6 kW
Time of deployment/stowing down (after installation on site of operation)	12 min
Environmental conditions: – wind speed – icing	 up to 35 m/s up to 10 mm

* - For AMBER-1800L variant