



SECONDARY RADARS

Secondary radars of PJSC “ALMAZ R&P Corp.” manufacture do comply with all regulations of ICAO (Annex 10) and of the Russian standards and are intended for integration into primary radars. SSRs are designed using modern element base with solid-state version of transmitters-receivers and usage of special integrated processors in signal and data processing systems.

Equipment composition

Integrated SSRs comprise the following:

- Solid-state transmitters with possibility of output power immediate adjustment;
- Receiving modules of ATC and RBS channels;
- Equipment for digital threshold processing of signals;
- Equipment for supplementary data decoding;
- Device for measurement of coordinates (data primary processing);
- Device for track initiation and tracking (data secondary processing);
- Device for transfer of data and for reception of remote control commands;
- Automated system of monitoring and control (ASMC);
- Set of SPTA and operational documentation;
- Remote-field monitor.

Integration into a primary radar

SSRs may be integrated into primary radars of various types. In the course of integration, an interface is realized both basing on timing and rotation signals and on reply signals. Reply signal interface can be ensured both via video-data (in case of integration into an old-fleet radar) and via digital interface.

Digital interface of data between SSR and PSR is provided via Ethernet or via RS-232 channel, and thereat PSR processor ensures reception from SSR and processing of codograms containing coordinate or air-route data of SSR, association of coordinates and decoded data of secondary radar with air-route data of PSR, and sending



Appearance of Cabinet of SSR of the type Lira-V and Lira-VMk

combined data to consumers. For the case of SSR integration into a primary radar with analog indicator, the output for video data is provided. In this case control over SSR may be carried out from local panel.

For obtaining the required overlap of detection zone, the following various types of antenna systems can be used in the course of SSR integration into a primary radar:

- Special, additionally mounted antenna phased array (if PSR design does admit this);

- Reflector-type antenna of primary radar with additional special exciters of secondary channel and additional antenna for side-lobe suppression.

Automated system for monitoring and control (ASMC) is intended for ensuring remote control over SSR operation modes as well as for carrying out automated functional and diagnostic monitoring for the purpose to define equipment technical status and places of faults for repair and maintenance activities.



Basic Technical Specifications of Secondary Radars

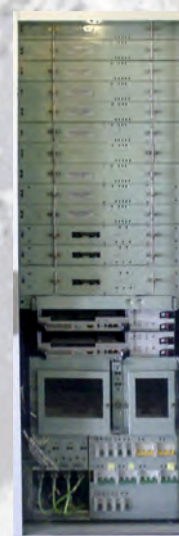
Technical parameters	Lira-V	Lira-VMk	Lira-VA	Lira-VM
Sphere of application	Integration into mobile radars	Integration into mobile radars	Integration into stationary ATC Radars	Integration into stationary radars
Operation modes	ATC (3K1, 3K2) RBS (1, 2, 3/A, C)	RBS (1, 2, 3/A, C)	ATC (3K1, 3K2) RBS (1, 2, 3/A, C)	(1, 2, 3/A, C, S), "Parol"
Maximal coverage, km	400	400	400	400
Minimal coverage, km	1	1	1	1
Maximal height, km	20	20	20	20
Elevation angle, deg.	0.25...45*	0.25...45*	0.25...45*	0.25...45*
Probability of reply detection, not less than	0.95	0.95	0.95	0.98
Probability of obtaining true supplementary data, not less than	0.98	0.98	0.98	0.98
Accuracy of measurement of range coordinate, m	100	100	50	50
Accuracy of measurement of azimuth coordinate, deg.	0.12	0.12	0.1	0.1
Resolution in range, m	150	150	150	100
Resolution in azimuth, deg.	3.5	3.5	3.5	0.6
Power consumption, kW Equipment redundancy, %%	0.5	0.5	1.0 100	1.5 100
MTBF, hrs	10 000	10 000	10 000	20 000

In remote mode the possibility is provided of altering output power, setting various interrogation modes, changing of internal triggering periods with possibility of staggering, setting laws of STC including different ones in azimuths, as well as displaying status of all systems of SSR with localization of faults.

Software of built-in computers, hardware of processing devices and all performance data are easily adaptive for meeting new requirements.

Remote-field monitor of SSR ensures checking of correctness of directional pattern shaping, and detection of faulty elements. Upon a command of ASMC, the remote-field monitor emits the codes specified, and basing on these codes the equipment checking procedure is carried out.

During last 8 years our enterprise has manufactured more than



Equipment Cabinets of Lira-VA SSR (left picture) and Lira-VM SSR (right picture)