



SMALL-SIZE METEOROLOGICAL COMPLEX "CMS-1"



"Almaz-Antey"

Concern

Small-Size Meteorological Complex "CMS-1" is intended for measurement of atmospheric parameters by means of upper-air sounding up to 40km altitude, and by means of automated meteorological station as well as surveillance of weather phenomena (including dangerous phenomena like storms, hail, squall) within the radius of up to 150km from "CMS-1" stand point.

"CMS-1" can be installed in areas of airdromes, helipads, ports etc. for the purpose to ensure meteorological support of operation of infrastructure objects applicable.

The system offered allows:

-Ensuring possibility of surveillance of meteorological phenomena within the radius of up to 150km including dangerous phenomena;

-Reducing significantly the time for warning population about dangerous weather phenomena;

-Enhancing reliability and quality of meteorological observations;

-Reducing operational expenses of systems and objects critical towards affect of dangerous meteorological phenomena.

Economical efficiency of using "CMS-1" is defined by the following:

-Significant reducing of operational expenses of meteorological support services owing to application of latest techniques (ultra-sonic automated meteorological stations, usage of aerological sounders based on GPS/GLONASS navigational system, solid-state transmitters of high reliability in "DMRL-3" Meteorological Radar);

-Possibility to install "CMS-1" Small-Size Meteorological Complex with no necessity to carry out any capital construction work.



"CMS-1" Complex in Deployed Status



Aerological Sounder

BASIC SPECIFICATIONS OF "CMS-1" COMPLEX

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Ser.	Parameter Denomination	Value
<u>No.</u>	Basic Specifications of "DMRL-3" Meteorological Radar	
	Frequency band MHz	from 9550 up to 9650
	Coverage	
-	Instrumented range, km, not less than	150
	Maximal height of detection, km, not less than	20
	Antenna	
	Туре	parabolic reflector
	Width in two planes, degrees, not more than (reflector size, not less than)	1.6 ± 0.1 (1.65)
	Polarization	horizontal
		and vertical
	Accuracy of setting the angle, deg.	0.1
	Maximal rotation speed, rpm	24
	Transmitter	
	Туре	transistor-type
	Pulse power, kW, not less than	0.3
	Signal width, μs	0.15-100.0
	Pulse repetition frequency, Hz	300-5000
	Type of signal modulation	MONO/LFM
	Receiver	
	Noise factor, units	2.2
	Intermediate frequency, MHz	300
	Stability of sounding signal, dB	50
2	Basic Specifications of the System of Meteorological Measurements	
	(Based on Automated Meteorological Station)	
-	Temperature range measurable, [°] C	from -50 up to +50
	Admissible fundamental error of measurement, within the limits of, "C	± 0.5
	Speed of horizontal wind, m/s	from 0.1 up to 30
1	Admissible fundamental error of measurement, within the limits of, m/s	± (0.1 +0.02V)
	Wind direction, deg.	from 0 up to 360
	Admissible fundamental error of measurement, within the limits of, deg.	± 4
	Relative humidity of air, %	from 10 up to 100
	Admissible fundamental error of measurement, within the limits of, %	± 3
	Atmospheric pressure, hPa	from 693 up to 1067
	Admissible fundamental error of measurement, within the limits of, hPa	± 1
3	Basic Specifications of the System of Aerological Sounding	<u> </u>
	Iemperature range measurable, °C	from -90 up to +50
-	Limiting error of temperature measurement, °C	± 0.8
	Relative humidity of air, %	from 0 up to 100
	Limiting error or numidity measurement, %	±8
	Aurospheric pressure, nPa	from 1100 up to 10
	DMS error of everage wind, m/s	100 Up to 200
1	KINS-error of average wind measurement, m/s	0.7
	Villa airection, deg.	trom 0 up to 360
	Kivio-error of wind direction measurement, deg.	1.5

Small-Size Meteorological Complex "CMS-1" provides for the users meteorological data including:

-Generation of maps of cloudiness upper boundary, horizontal and vertical cross-section of radar parameters of meteo objects (reflectivity, velocity, spectrum width, differential reflectivity, differential phase and cross-correlation factor);

-Calculation of wind profile at availability of radar reflectivity from near to ground layer up to the upper boundary of cloudiness, and evaluation of wind shear in clouds at availability of radar reflectivity with resolution of not worse than 15m with preliminary filtration of clutter reflections;

-Sounding of atmosphere parameters (temperature, pressure, relative humidity) by means of radio souner let into free air;

-Measurement of coordinates and velocity of a radio sounder using the signals of GLONASS and/or GPS satellite radio navigation system;

-Storage and output of data received to the user in the form of codograms required, including the meteomessages.

EXAMPLES OF MAPS GENERATED BY DATA SECONDARY PROCESSING SOFTWARE



Map of Dangerous Phenomena and Table of Dangerous Phenomena



Horizontal Wind Profile



Visibility

Wind Shear



Horizontal Wind



Upper Boundary of Clouds



Lower Boundary of Clouds

COMPOSITION OF "CMS-1" SMALL-SIZE METEOROLOGICAL COMPLEX

- "CMS-1" Complex comprises the following components:
- -Solid-state 3cm-band Doppler Meteorological Radar "DMRL-3" with the radome;
- -System of upper-air sounding based on radio sounders;
- -System of meteorological measurements based on automated meteorological station; -Workstation for meteorologist;
- -Auxiliary systems (including electric power supply system, system of ensuring temperature modes); -Auto-chassis of the type of KAMAZ-5350;
- -Emergency SPTA set.



Equipment of "CMS-1" inside the Container on Auto-Chassis







Equipment of "CMS-1" during Adjustment in Assembly Workshop

Appearance of Wind Measurer

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