

**Future Polar Orbiting Meteorological Satellite Systems**

**FUTURE POLAR ORBITING METEOROLOGICAL SATELLITE SYSTEM  
METEOR-3M**

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Summary and purpose of document

This WP presents status of preparation of future Russian polar orbiting meteorological system METEOR-3M

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Action

No action required

**FUTURE POLAR ORBITING METEOROLOGICAL SATELLITE  
SYSTEM METEOR-3M**

First polar orbiting meteorological satellite of Meteor-3M series is presently prepared for launch that is planned to IV quarter of 2000. Second satellite Meteor-3M N 2 launch is planned to 2003.

The orbital parameters of these satellites are the following:

**Table 1**

Satellite	Inclination, deg.	Altitude, km	Period, min	Ascending node equator crossing time
Meteor-3M N1	99.6°	1024	105.3	09:15
Meteor-3M N2	99.6°	1024	105.3	10:30 (16:30)

The payload of Meteor-3M N1 satellite (given below in table 2) includes scanning instruments of visible and IR range MR-2000M (similar to those at Meteor-3), KLIMAT-2 (modernized scanning IR radiometer KLIMAT installed on board Meteor-3). For imaging and sounding missions Meteor-3M N 1 will carry the microwave (MW) scanning radiometer MIVZA (5 channels in the range 18-90 GHz). Sounding mission will be supported with MW radiometer MTVZA (20 channels in the range of 18.7-183.36 GHz). This instrument will provide data for atmospheric temperature and humidity soundings as well as for oceanographic researches such as microwave diagnostics of the active ocean layer processes.

**INSTRUMENTS PAYLOAD OF METEOR-3M N 1 SATELLITE**

**Table 2**

Instrument	Application	Spectral Band	Swathwidth, km	Resolution, km
MR-2000M	Cloud cover mapping	0.5 - 0.8 $\mu\text{m}$	3100	0.7 * 1.4
KLIMAT-2	Cloud cover mapping, SST	0.65 – 1.0 $\mu\text{m}$ 10.5 - 12.5 $\mu\text{m}$	3000	3 * 3
MIVZA	Total humidity of the atmosphere	20.0 35.0 94.0 GHz (5 channels)	1500	80 – 40
MTVZA	Atmospheric temperature and humidity profiles	18.7; 22.2; 33.0; 36.5; 42.0; 48.0; 52.3-56.0; 91.65; 183.3 GHz (20 channels)	2600	75 – 15
MSU-E	Multispectral images of high spatial resolution	0.5 – 0.6 $\mu\text{m}$ 0.6 – 0.7 $\mu\text{m}$ 0.8 - 0.9 $\mu\text{m}$	45	45 m
SAGE III	Profiles of aerosols ozone, NO <sub>2</sub> , etc.	0.29 - 1.55 $\mu\text{m}$ (9 channels)		1 - 2 (vertical)
SFM-2	O <sub>3</sub> vertical distribution	ultraviolet		
KGI-4	Space environmental monitoring	Protons, electrons, Alpha particles, ions fluxes		
MSGI-5	Space environmental monitoring	Geo-active irradiances		

The updated summary of payload of Meteor-3M N1 and M2 is given in Table 3. New sensors for imaging and sounding mission are planned to install on board of Meteor-3M N2. Those are: - multichannel scanning radiometer MSR (4 channels in visible and IR, similar to channels 1,2,4,5 of AVHRR, spatial resolution is close to 1 km).

- advanced IR atmospheric sounder IRFS based on Fourier transform spectrometer (spectral range of 2 – 4.5  $\mu\text{m}$  and 5.0 – 16  $\mu\text{m}$ ; spectral resolution is equal or better than 0.5  $\text{cm}^{-1}$  . The IRFS primary mission is to provide data on temperature and humidity profiles and to meet WMO requirements on vertical resolution and accuracy of sounding in the troposphere.

The SAGE-III (USA, NASA) sensor is planned to install on board of Meteor-3M N1 satellite (in frame of the agreement between NASA and Rosaviakosmos).

Both satellites of Meteor-3M series will allow standard 1.7 GHz downlink channel. HRPT mode is foreseen on Meteor-3M N2.

**METEOR-3M SATELLITES PAYLOAD COMPOSITION SUMMARY**

**Table 3**

Instruments mission and name	Meteor-3M N 1	Meteor-3M N 2
Imaging mission Multispectral scanning systems	MR 2000M KLIMAT-2 MIVZA MSU-E	MSR** MZOAS**
Sounding mission Advanced multispectral sounders	MTVZA*	MTVZA IRFS*
Heliogeophysical mission SEM	KGI-4 MSGI-5	KGI-4 MSGI-5
Optional mission Trace gases monitoring	SAGE III (USA) SFM-2	TBD

\* Pre operational mission

\*\* Pre operational mission is performed in case of successful ground tests