

Future Polar Orbiting Meteorological Satellite Systems

**STATUS OF PREPARATION OF METEOR-3M N1
POLAR ORBITING METEOROLOGICAL SATELLITE AND
FUTURE METEOR-3M N2 SATELLITE**

Summary and purpose of the WP

METEOR-3M N1 satellite is being prepared to launch at in November 2001 from Baikonur kosmodrom.
METEOR-3M N2 satellite sketch designing will be completed in 2001, the satellite launch is planned to 2004.
Satellites and payloads characteristics are presented.

Action proposed: no action required.

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METEOR-3M N1 SATELLITE

First polar orbiting meteorological satellite of Meteor-3M series is designed for operational providing of hydrometeorological and heliogeophysical information on the atmosphere, Earth surface and the World Ocean.

The METEOR-3M N1 satellite has been shipped to Baikonur kosmodrom on August 28th, 2001. Works on its launch preparation are presently under way. The satellite launch is planned in November 2001 (Zenith-2 launcher).

The spacecraft main parameters are the following:

| | |
|----------------|---------|
| Satellite mass | 2500 kg |
| Payload mass | 800 kg |
| Lifetime | 3 years |

The orbit parameters are the following:

| | |
|-------------|--------------|
| Altitude | 1018 ± 10 km |
| Inclination | 99.64° |

Instruments payload of the METEOR-3M N 1 satellite is presented in Table 1.

Instruments payload of the METEOR-3M N 1 satellite

Table 1

| Instrument / mass (kg) | Application | Spectral Band | Swathwidth (km) | Resolution (km) |
|------------------------|---|--|-------------------------|-----------------|
| MR-2000M1 46.6 | Cloud cover mapping | 0.5 - 0.8 μm | 3100 | 0.7 x 1.4 |
| KLIMAT 82.5 | Global and regional cloud cover mapping, SST | 10.5 – 12.5 μm | 3100 | 3 x 3 |
| MIVZA | Total humidity of the atmosphere | 20.0-94.0 GHz (5 channels) | 1500 | 80 – 40 |
| MTVZA 100 | Atmospheric temperature and humidity profiles | 18.7-183.3 GHz (26 channels) | 2600 | 12 – 75 |
| MSU-E 29 | Multispectral images of high spatial resolution | 0.5 – 0.6 μm 0.6 – 0.7 μm 0.8 - 0.9 μm | 50 within FOV of 430 | 25 m |

| | | | | |
|----------------|---|---|---|---------------------|
| SAGE III 88 | Profiles of aerosols ozone, NO ₂ , and other small atmospheric gazes | 0.29 - 1.55 μm (9 channels) | - | 1 - 2 (vertical) |
| SFM-2 | O ₃ and other small atmospheric gazes vertical distribution | UV band | | |
| KGI-4C | Heliogeophysics Space environment Monitoring (protons, electrons, alpha particles, ions fluxes) | 0.1 keV – 90 MeV (11 channels) | | |
| MSGI-5EI | Heliogeophysics Space environment monitoring (geo-active irradiances) | | | |

METEOR-3M N2 SATELLITE

The second satellite of polar orbiting meteorological satellite of Meteor-3M series is designed for operational providing of hydrometeorological and heliogeophysical information on the atmosphere, Earth surface and the World Ocean as well as for global climate monitoring.

The basic characteristics of both spacecrafts including payload and their principal manufacturer have been specified in the beginning of 2001 through the tender organized by Russian Aviation and Space Agency (RSA) together with Roshydromet and other Russian State departments selected the satellite manufacturer. In 2001 the satellite sketch designing will be completed and development of technical documents will be commenced. Meteor-3M N2 launch on sun-synchronized orbit is planned to 2004 by Strela launcher from Svobodniy kosmodrom.

The spacecraft main parameters will be the following:

| | |
|----------------|---------|
| Satellite mass | 750 kg |
| Payload mass | 320 kg |
| Lifetime | 7 years |

The orbit parameters will be the following:

| | |
|---------------|--------|
| Mean altitude | 835 km |
| Inclination | 98.68° |

Instruments payload of the METEOR-3M N 2 satellite is presented in Table 2.

Instruments payload of the METEOR-3M N 2 satellite

Table 2

| Instrument | Application | Spectral Band | Swathwidth | Resolution | Temperature |
|------------|-------------|---------------|------------|------------|-------------|
|------------|-------------|---------------|------------|------------|-------------|

| mass (kg) / power consumption (W) | | | (km) | (km) | retrieving accuracy (K) |
|--|---|--|------|--|----------------------------|
| MTVZA 80 / 80 | MW radiometer for atmospheric temperature and humidity profiles | 18.7-183.31 GHz (26 channels) | 2800 | 9 – 50 | 1.5 |
| GLOBUS 35 / 100 | Dynamics and meteorological parameters of clouds, snow and ice cover. | 0.5-12.6 μm (6 channels) | 2900 | 1 | 1 |
| IKFS-2 46 / 125 | Fourie spectrometer for atmospheric temperature and humidity sounding and radiation budget assessment | 5 – 15 μm | 2500 | Sampling 91-147 Spectral resolution 0.5 cm^{-1} | 1 |
| KGI-4C | Heliogeophysics Space environment Monitoring (protons, electrons, alpha particles, ions fluxes) | 0.2 keV – 90 MeV (11 channels) | | | - |
| MSGI-5EI | Heliogeophysics Space environment monitoring (geo-active irradiances) | | | | - |

The satellite instruments will allow global Earth surface and atmosphere observations each 12 hours; multispectral Earth surface and atmosphere observations; atmospheric temperature and humidity sounding in visible, IR and MW bands; radiation budget components measurements; heliogeophysical measurements; measurements of ozone and other small atmospheric gazes and data collection from DCPs.