Future Polar Orbiting Meteorological Satellite Systems

The METEOR-M-based polar orbit meteorological satellite system

Summary and purpose of the WP

As stipulated in the Federal Space Programme, the Russian Federation has been creating the METEOR-M spacecraft (SC) – a new generation of hydrometeorological polar-orbit satellites.

METEOR-M #1 is to be manufactured in 2007 and launched by the end of the same year.

The launch of METEOR-M #2 is planned for the end of 2008.

METEOR-M #3 is to be designed as oceanography satellite. The SC payload is currently under consideration. The launch of METEOR-M #3 is planned for the end of 2010.

Action proposed: no action required
The METEOR-M-based polar orbit meteorological satellite system

As stipulated in the Federal Space Programme, the Russian Federation has been creating the METEOR-M spacecraft (SC) – a new generation of hydrometeorological polar-orbit satellites.

METEOR-M #1 and #2 are designed to:
- acquire multispectral images (including radar ones) and the ‘earth surface – atmosphere’ outgoing radiation data in various energy distribution spectrum bands in terms of absolute energy values;
- obtain helio-geophysical information;
- collect and transmit data from independent measuring platforms (ground, ice and drift ones).

METEOR-M data are to be used for solving the following main tasks:
- regional and global weather analysis and prediction;
- analysis and prediction of the sea and ocean water areas condition;
- analysis and prediction aircraft flight conditions;
- analysis and prediction of the helio-geophysical situation in near-earth space and the state of ionosphere and Earth’s magnetic field;
- climate and global changes monitoring;
- monitoring of emergency situations;
- ecological monitoring of environment.

METEOR-M SC are to be put in sun-synchronous orbit with the following parameters:
- orbit mean altitude at the equator 832 km
- inclination 98.068 deg.
- orbital period 101.306 min.

The Information Complex of METEOR-M SC is to include the following devices:
1. Low Resolution Multispectral Scanner (MSU-MR);
2. Onboard Radar Complex (OBRC);
3. Medium Resolution Multi-channel Spectral Imaging System (KMSS);
4. System for acquiring the atmosphere thermodynamic parameters which includes:
   - the atmosphere temperature and humidity sounding module (MTVZA) – microwave radiometer;
   - equipment for atmosphere temperature and humidity sounding in IR-band – Fourier spectrometer;
Note: Fourier spectrometer is to be installed on METEOR-M starting from #2.

5. Helio-geophysical observation facility.

6. Onboard radio complex for collecting and transmitting data from ground observation platforms.

7. Onboard Radio Line:
   7.1. SHF band radio line
       Frequency band  8025 - 8400 MHz;
       Carrier frequency nominal  8128 (T1); 8320 (T2) MHz;
       Data rate     15.36, 30.72, 61.44, 122.88 Mbps

   7.2. UHF band radio line (HRPT format)
       Frequency band  1.69 – 1.71 GHz;
       Carrier frequency nominal  1.7 GHz;
       Data rate     665.4 kbps

   7.3. VHF band radio line (LRPT format)
       Frequency band  137.025 – 137.975 MHz;
       Carrier frequency nominal  137.1, 137.9 GHz;
       Data rate     80 kbps

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