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of RUSSIA
Agenda Item: C.1

Future Polar Orbiting Satellite Systems

RUSSIAN POLAR ORBITING METEOROLOGICAL SATELLITES METEOR-M

Summary and purpose of the WP

This document reports on design, main characteristics, onboard devices, development status and planned launch time of the future Russian polar orbiting meteorological satellite Meteor-M. It also briefly describes the composition and principal parameters of the ground receiving and processing complex for this satellite.

Action proposed: none.

RUSSIAN POLAR ORBITING METEOROLOGICAL SATELLITES METEOR-M

As stipulated in the Federal Space Programme of Russia to 2015, three hydrometeorological and oceanographic satellites are to be created within the framework of the METEOR-3M project.

METEOR-M #1 is to be launched in the first half of 2009. METEOR-M #2, a similar satellite, is to be put into orbit in 2010. Launching the oceanographic METEOR-M #3 is scheduled for 2012.

METEOR-M #1 is now fully assembled; its integrated tests are in progress. The satellite is to be put into sun-synchronous orbit with the altitude of 835 km. The equator crossing time in the descending orbit node is ~9h.30min. The orbit inclination is 98.77 degrees.

The satellite's information complex comprises:

- Hydrometeorological 6-channel visible- and IR-band scanner (MSU-MR);
- System of three 3-channel visible-band medium-resolution scanners;
- X-band sideways looking radar with 400-meter and 800-meter resolution;
- Helio-geophysical hardware;
- Data acquisition and transmission system.

METEOR-M #1 has three downlink radio lines:

- 2-channel SHF-band radio line (8.192 GHz and 8.320 GHz) with the 122.88 Mbaud data transmission rate;
- UHF-band radio line (1.7 GHz) with the 665.4 kbaud data transmission rate;
- VHF-band radio line (137 MHz) with the 80 kbps operating transmission rate (LRPT format);

METEOR-M #1 will be launched from Baikonur using the SOYUZ-2 launch vehicle (1b phase); a piggy-back launch of 5 microsattellites is planned.

METEOR-M #2 is supposed to be a copy of METEOR-M #1 with some of the service systems upgraded. Both satellites are designed using hermetically sealed (pressurized) containers. METEOR-M #2 is currently at the stage of flight systems integration.

METEOR-M #3, a hydrometeorological satellite of the next generation, will be manufactured using the non-hermetic technology. Its information complex aimed at providing water surface monitoring will include:

Multimode radar on the basis of the Active Phased Array Antenna (APAA) technology with the following characteristics: X band, spatial resolution from 1 to 500 m, swath (horizontal frame dimension) from 10 to 750 km;

Scatterometer (Ku band, spatial resolution =25x25 km, swath =1800 km);

4-channel coastal-zone scanner operating in visible band with the 80m resolution within the 800 km swath;

8-channel ocean colour scanner operating in visible band with the 1 km resolution within the 3000 km swath;

Hardware for radio occultation measurement of the Earth atmosphere parameters;

METEOR-M #3 is currently at the designing stage.

The ground segment for receiving and processing the data from Meteor-M satellites is based on Roshydromet complex. The major components are the three Regional Centers at different locations: European (Moscow, Scientific Research Center Planeta), Western-Siberian (Novosibirsk) and Far-Eastern (Khabarovsk). The ground segment also includes the network of LRPT and HRPT receiving stations. Roshydromet's main satellite Center Planeta performs the scientific and methodological management and coordinates the activities of the above mentioned acquisition Centers and stations. These Centers cover the whole territory of Russia, neighboring countries, as well as major part of Europe.