An Operator of Russian Space Systems of the Earth Remote Sensing

RUSSIAN FEDERAL SPACE AGENCY (ROSCOSMOS)
### Capabilities of Russian Orbital Constellation of Remote-sensing Systems in 2011-2012

<table>
<thead>
<tr>
<th>Type of spacecraft</th>
<th>Type of instrument</th>
<th>Linear resolution (meters)</th>
<th>Spectral bands (mkm)</th>
<th>Remote-sensing data acquisition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Resurs - DK</strong></td>
<td>Optical-electronic:</td>
<td>Up to 3 from 3.0 to 4.0</td>
<td>Panchromatic - 0.58 ÷ 0.8 Near IR - 0.7 ÷ 0.8</td>
<td>Up to 6 times per day, about 100,000 km² each day</td>
</tr>
<tr>
<td></td>
<td>• panchromatic;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• multi-zone</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Meteor – M</strong></td>
<td>Optical-electronic:</td>
<td>1000</td>
<td>0.5 ÷ 0.6 (6 channels)</td>
<td>2 times per day. Global Earth imaging during a day, up to 8 sessions. Russian territory imaging during 4 days</td>
</tr>
<tr>
<td></td>
<td>• visible band;</td>
<td>4000</td>
<td>3.5 ÷ 12.5 (6 channels)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• infrared;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>•Multi-zone</td>
<td>60 and 120</td>
<td>0.370 ÷ 0.900 (6 channels)</td>
<td></td>
</tr>
<tr>
<td><strong>Electro - L</strong></td>
<td>Optical-electronic:</td>
<td>1000</td>
<td>0.5 ÷ 0.9 (10 channels)</td>
<td>Global imaging of Eastern hemisphere every 30 min.</td>
</tr>
<tr>
<td></td>
<td>• multi-zone;</td>
<td>4000</td>
<td>0.5 ÷ 12.5 (10 channels)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• infrared.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Resurs – P</strong></td>
<td>Optical-electronic:</td>
<td>0.9, 12, 60, 24 ÷120</td>
<td>0.58 ÷ 0.80</td>
<td>Up to 18 times per day, about 250,000 km² each day</td>
</tr>
<tr>
<td></td>
<td>• panchromatic;</td>
<td>30</td>
<td>0.45 ÷ 0.90 (5 channels)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• multi-zone;</td>
<td></td>
<td>0.40 ÷ 1.10 (up to 150 channels)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>•hyperspectral</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Kanopus – V</strong></td>
<td>Optical-electronic:</td>
<td>2.5</td>
<td>0.58 ÷ 0.86</td>
<td>Up to 18 times per day, about 100,000 km² Each day</td>
</tr>
<tr>
<td></td>
<td>• panchromatic;</td>
<td>12.0</td>
<td>0.46 ÷ 0.84 (4 channels)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• multi-zone;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>MKA FKI</strong></td>
<td>Optical-electronic:</td>
<td>120</td>
<td>0.48 ÷ 0.95 (4 channels)</td>
<td>Up to 4 times per day, each day 400,000 km² 35,000 km²</td>
</tr>
<tr>
<td></td>
<td>• multi-zone;</td>
<td>50</td>
<td>0.40 ÷ 1.10 (up to 150 channels)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>•hyperspectral</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Dynamics of Russian orbital remote-sensing spacecrafts' constellation growth abilities by types of survey, volume and periodicity of data acquisition beginning from 2011-2012 provides the possibility of primary usage of national remote-sensing spacecrafts for Russian consumers and its large delivery abroad.
Federal Space Agency exercises the following powers in the relevant sphere of activities:

organizes: in the use (operation) of space technology in order to implement the Federal space programme;

provides: works in the prescribed manner on creation, production and exploitation (application) of space complexes.

(By the Provisions of the Federal Space Agency (Government Decree dated July 30, 2007 № 490-24)

Research Center for Earth operative monitoring of JSC “Russian Space Systems” (NTs OMZ) is an operator of Russian space systems of the remote-Sensing (by joint decision and order of Roscosmos, the Ministry of Russia and Roshydromet), the national operator of Russian ERS satellites (in cooperation with the Republic of Belarus) and an information centre of the Federal Space Agency

NTs OMZ performs round-the-clock full technological cycle of tasks in planning, reception, registration, processing, archiving, storage and dissemination of information from Russian ERS satellites

Research Center for Earth operative monitoring of JSC “Russian Space Systems” is an organization specially created by Roscosmos in 1999 for the implementation of the Federal Space Agency’ functions for the exploitation of new Russian ERS satellites.  (From 2009 NTs OMZ is a part of the JSC “Russian Space Systems”)
Basic Directions of Activities of the ERS Satellites Operator

Operator of the ERS satellites
Complex planning and coordination of works on operation of the earth remote-sensing satellite constellation.
Validation of remote-sensing data.
Provision of remote-sensing data to customers.

Provides the ERS satellites’ air-trials

Earth Aerial Digital Imagery

Creation and administration of the ERS data archive

Research Center for Earth Operative Monitoring of JSC “Russian Space Systems”

Provides services the Earth Remote Sensing data thematic processing services
Creation and provision of Various information products

Distribution of data from the foreign ERS systems

Roscosmos’ Geoportal administration

During the lifetime of the NTs OMZ its team consisting of 280 professionals (every tenth holds degrees) was formed and successfully works. Our personnel has experience in operating ERS satellites and providing successful implementation of all activities of the ERS satellites Operator.
Means of Data Reception and Registration from Russian and Foreign Satellites

PK-7 – reception of information from «Meteor-M», «Kanopus-V» satellites in X-diapason with left and right polarization at the speed up to 300 Mbyte/s
PK-5 – reception of information from «Resurs-DK» and «Kanopus-V» satellites in X-diapason with left and right polarization at the speed up to 300 Mbyte/s and form «Meteor-M» satellite in L-diapason at the speed up to 3 Mbyte/s
PK-3 – reception of information from in X-diapason with left and right polarization at the speed up to 300 Mbyte/s to the KA «Resurs-DK», with speeds up to 60 Mbyte/s from «Kanopus-V», «Terra» satellites and in L-diapason at the speed up to 3 Mbyte/s from «Meteor» and «NOAA» satellites
PK-2.4 – reception of information in X-diapason with right polarization at the speed up to 300 Mbyte/s and in L-diapason at the speed up to 3 Mbyte/s, provides reception from «Electro-L» satellite, there is a possibility to receive information from «Resurs» type satellites.
SKS-OMZ – space communication station to work with «Electro-L» satellite, information transmission speed – up to 15 Mbyte/s, confirmed – up to 70 Mbyte/s
SPI-137 – reception of information in R-diapason from NOAA satellite
Meteocomplex – reception of meteorological information received from Roshydromet via geostationary «Express AM-33» satellite to provide meteorological data for tasking imagery planning for «Resurs-DK» satellites.

ERS satellite operator can provide within 24 hours reception of data from spacecrafts’ orbital constellation consisting of 30 satellites
Currently data reception and registration is organized from Russian (Resurs-DK, Meteor-M and Electro-L), and foreign (Terra, NOAA, Aqua) ERS satellites.
Starting in 2011, data will be received from «Kanopus-V», «Resurs-P» and MKA-FKI satellites.

NTs OMZ is the only one of Russia’s Federal Space Agency Centre, equipped with a complete set of technical means for receiving space data from all Russian and foreign ERS satellites and scientific satellites, unparalleled in other ministries and departments.

Programme for the development of reception systems
2012 – PK-3.6
2013 – PK-5 (X and Ka) for satellites
2013 – SKS-OMZ/2 for «Electro-L» №2
Ground Infrastructure of ERS Data Reception

- ERS satellites Operator (Federal fund)
- Regional Centers of ERS data reception (regional funds)
- Ground communication lines
- Departmental information reception Centers
Information services of remote-sensing spacecrafts’ Operator for Russian and foreign users. Information system

The main page of the remote-sensing spacecrafts’ operator [WWW. NTSOMZ.ru](http://www.ntsomz.ru)

Information system provides information on the activities of remote sensing spacecrafts’ Operator, orbital constellation, systems of space data receiving and processing, current activities, scientific research projects, services for space data ordering and receiving.
Geo-information data bank

- Geoportal – Database information operational access complex
  - Continuous coverage of Earth surface
  - Overview coverage of low resolution
  - Full coverage of medium resolution (100%)
  - Fragmentary coverage of very high resolution
  - Thematic data

- Providing information:
  - Catalog of monitoring objects
  - Catalog of ground centers and receiving stations
  - Catalog of observation facilities characteristics
  - Catalog of maps and digital terrain models
  - Catalog of original images with metadata
  - Catalog of standard processing products
  - Catalog of thematic processing products

- Continuous coverage database
  - Catalog of continuous coverage
  - Continuous coverage layers
  - Thematic data layers

- Automatic control complex for remote sensing data-flow processing

- GIS reference database
  - Cartographic records and reference images of monitoring objects
  - Digital terrain models
  - Raster and vector maps
  - Standard processing products
  - Thematic processing products

Local subscribers
Remote subscribers

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Launched in Dec 2010 Roskosmos’ Geoportal provides free access to information via Internet for a wide range of users and additional opportunities for authorized users.

- Metadata catalogue
- General catalogue of remote sensing data
- Continuous earth surface coating with space imagery data
- Provision of space information and thematic products on customers demands
- All features of free access to Geoportal
- Access to thematic data segments and special thematic products
- Very-high resolution data access
Information services. Roscosmos’ Geoportal

The main page of Geoportal
http://геопорталроскосмоса.рф
http://geoportal.ntsomz.ru

Geoportal Roskosmos provides operative access, data search, satellites’ characteristics, remote sensing data and products of its processing ordering, as well as the ability to monitor ground-based sites and facilities in time.
Thank you for attention!

Russian Federal Space Agency