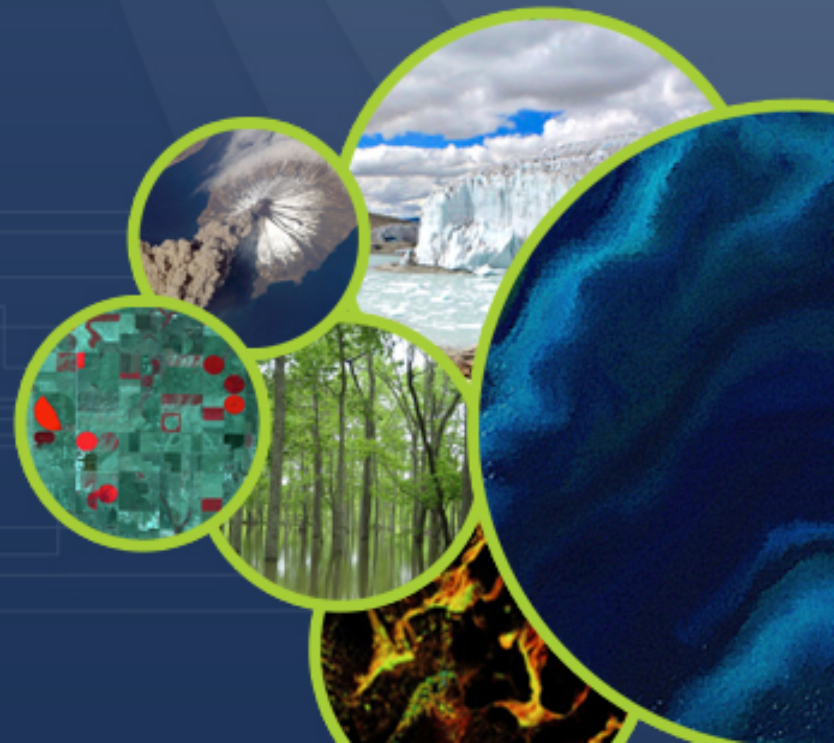


THE RUSSIAN SPACE REMOTE SENSING SYSTEMS

The State Space Corporation ROSCOSMOS

28 – 30 October 2019



THE RUSSIAN REMOTE SENSING CONSTELLATION IN 2019



ROSCOSMOS

The Russian Earth remote sensing constellation provides information support in solving a wide range of tasks in various spheres of state economic activity

Today the Russian orbital constellation consists of ten satellites:

Electro-L 2

Meteor-M 1
Meteor-M 2

Kanopus-V 1
Kanopus-V-IK
Kanopus-V 3
Kanopus-V 4
Kanopus-V 5 (*flight tests*)
Kanopus-V 6 (*flight tests*)

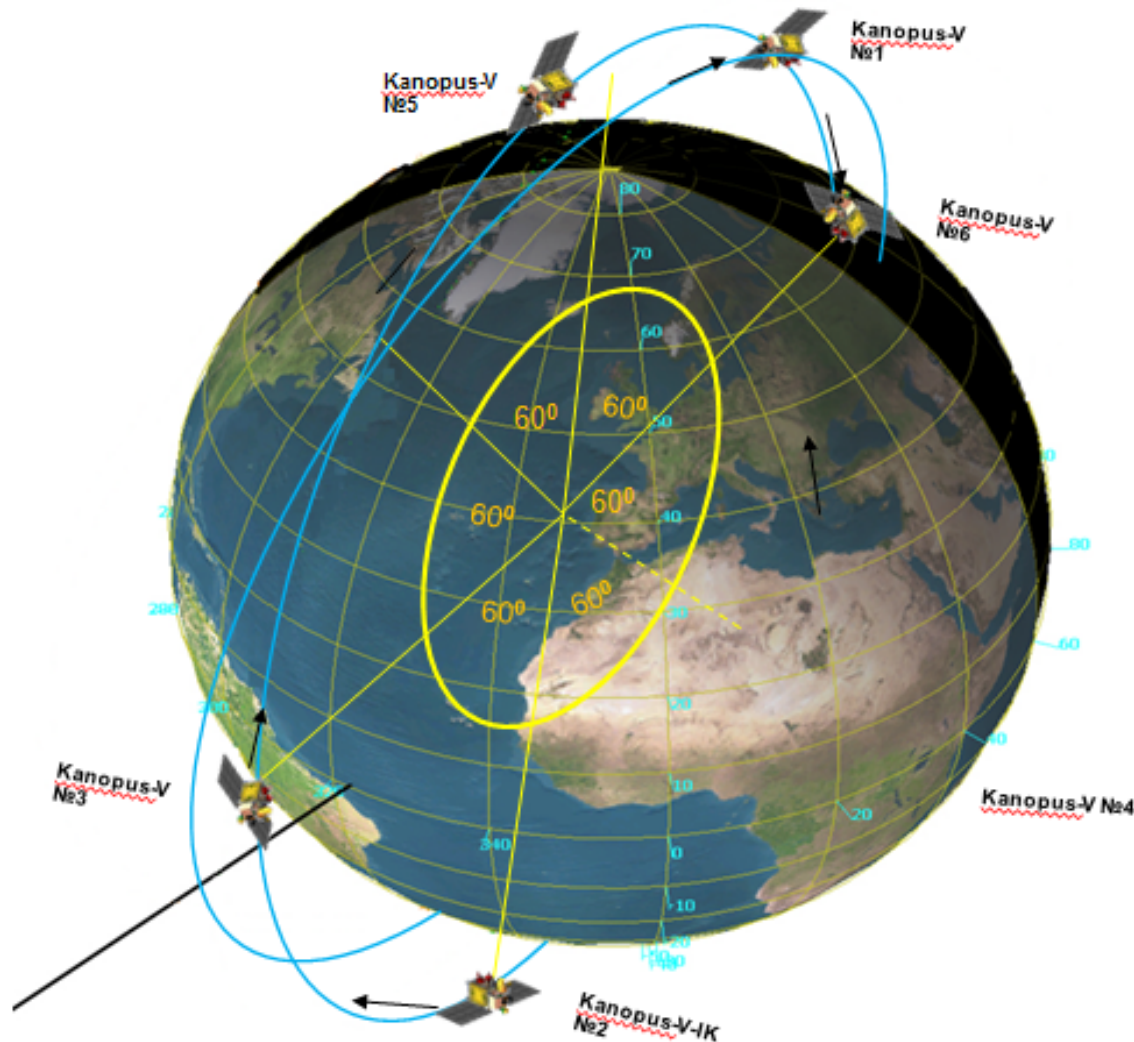
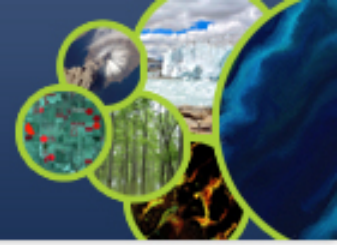
Resurs-P 1



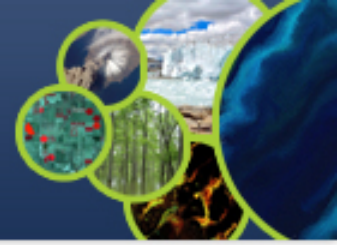
The performance of the Russian orbital constellation is more than 1 million square kilometers per day (high resolution)

Kanopus-V

6 satellites constellation



- ROSCOSMOS HAS CREATED AN ORBITAL CONSTELLATION OF 6 SATELLITES OF KANOPUS-V TYPE
- ALL 6 SATELLITES ARE LOCATED EVENLY WITH AN ANGLE OF 60 DEGREES
- THE CONSTELLATION CAN PROVIDE UP TO 1.1 MILLION SQ. KM OF HIGH AND MID RESOLUTION DATA DAILY
- THE CONSTELLATION CAN PROVIDE PANCHROMATIC, MULTISPECTRAL AND INFRARED DATA
- ANY POINT IN THE WORLD CAN BE ACQUIRED AT LEAST ONCE PER DAY, REVISIT PERIOD IS 1 DAY
- SOME POINTS HIGHER THAN 40° PARALLEL CAN BE ACQUIRED TWICE PER DAY



Spacecraft	Resurs-DK (archive only)	Meteor-M			Kanopus-V and Kanopus-V-IK			Resurs-P			
Characteristics											
Launch date	15.06.2006	18.09.2009 15.10.2014 28.11.2017 05.07.2019			22.07.2012 14.07.2017 01.02.2018 27.12.2018			25.06.2013 26.12.2014 13.03.2016			
Life time	3 years	5...7 years			5...7 years			5 years			
Swath width, km	28.3 / 16	KMSS			MSU- MR	PSS	MSS	MSU- IK- SRM	Geoton	SHMSA- VR	
		MSU- 100	MSU-50								
		900	450	2800							23
Space resolution, m: •panchromatic band •multispectral band	1 / up to 3	-	-	-	2.5	-	200	better than 1	12		
	2 - 3 / 3 - 5	60	120	1000	-	12.5				2-3	23.8
Spectral bands	3 / 1	3	3	6	1	4	2	7	6		
Revisit time, days	-	2			4			3 - 4			







**МЕТЕОР-М
(КМСС)**

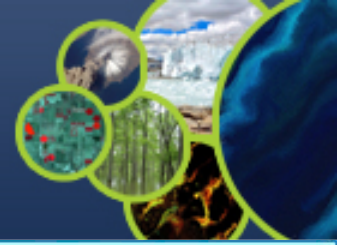
Крымский полуостров

DEVELOPMENT OF THE RUSSIAN REMOTE SENSING CONSTELLATION

(planned by The Russian Federal Space Program 2016 – 2025)



INTEGRATED GEOGRAPHICALLY DISTRIBUTED INFORMATION SYSTEM OF EARTH REMOTE SENSING



EO Constellation








Luch-5B satellite array

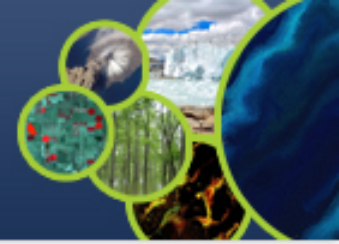
Luch-5A satellite array

United geographically distributed ERS information system – a complex of geographically spread ground centers of EO data reception, processing, storing and distribution. This system is intended to provide the users with EO data and related products in order to solve socioeconomic, scientific and applied tasks.



Legend

-  SC ROSCOSMOS ERS spacecraft operator (NTS OMZ, JSC RSS)
-  ROSCOSMOS ERS UGDIS regional centers - 4
-  ROSGYDROMET ERS UGDIS regional Centers - 3
-  SC ROSCOSMOS and EMERCOM ERS UGDIS joint center in Arctic zone - 1
-  ERS UGDIS upcoming regional centers in Arctic zone, Antarctic, the Republic of Cuba - 4
-  ERS data communication channels between UGDIS centers
-  ERS data communication channels via satellite array "Luch"



TECHNICAL IMPLEMENTATION

INFO BASIS

Web-service of
online access

Integration into
systems and
services of users

Mobile
apps

THEMATIC SERVICES



Agriculture

Forestry

Infrastructure

Mineral resources

Ecology

Multilayer
basic
complete
coverage
with EO data

Spatial data

User data

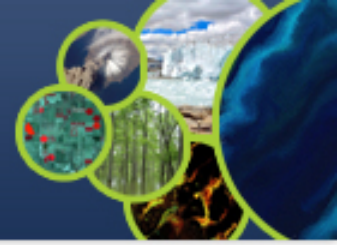
«Cloud» core of a
unified info space of
EO data and
products

TECHNICAL SUPPORT

Data
Processin
g Center

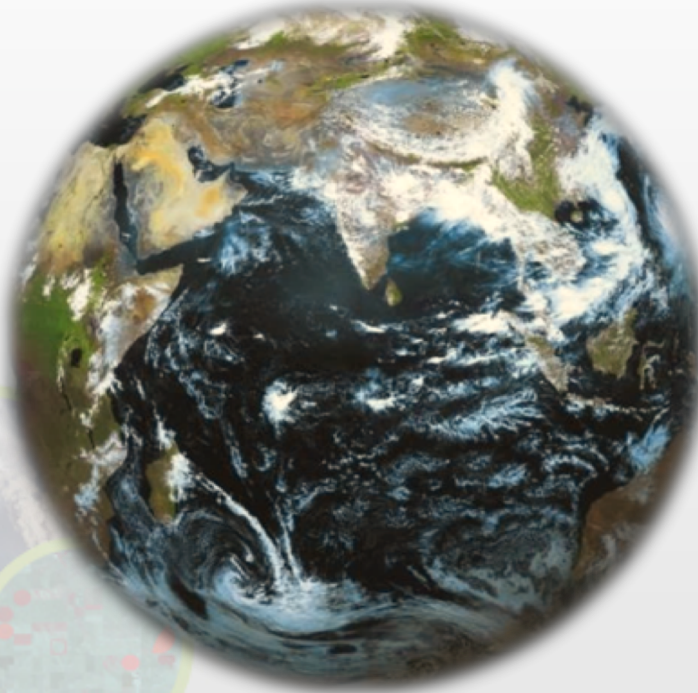
Basic
Geoinformation
Platform

Billing system



Info resources of the ground EO infrastructure

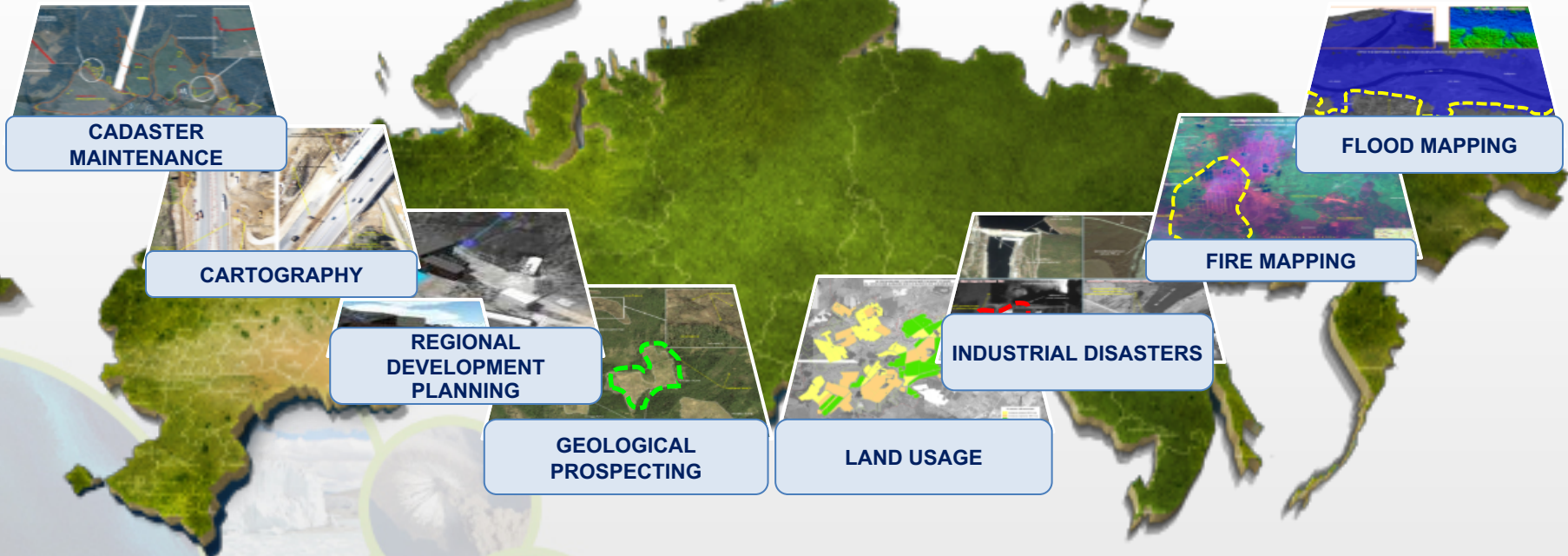
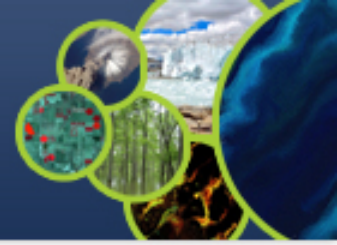
- ✓ Centralized control of informational resources;
- ✓ Source data for creation and swift update of complete coverage;
- ✓ Flow formation of base products;
- ✓ Creation of thematic products in 10 main socio-economic spheres;
- ✓ Complex 'space' services



Personified geoservices of data analysis and decision making

- ✓ Multi-scale complete coverage of various resolution (global to super-detailed);
- ✓ Basic and advanced solutions for mass and specialized users;
- ✓ Unified space for reception of services by federal and commercial users;
- ✓ Online billing and document workflow;
- ✓ Mobile setting up for new thematic tasks

«Cloud» core

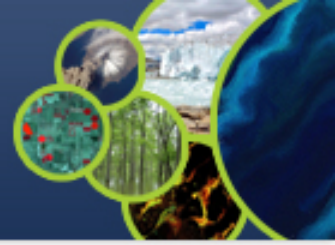


The Federal Law

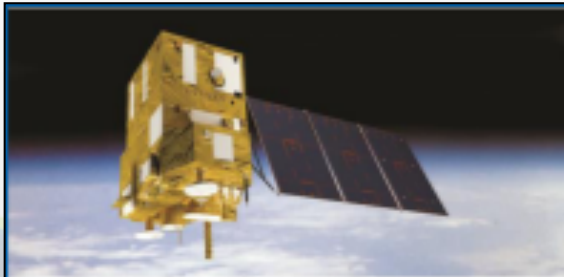
- stipulates the creation of federal EO data fund
- determines the purpose and contents of this fund
- establishes general terms for provision of data and its copies from the fund.

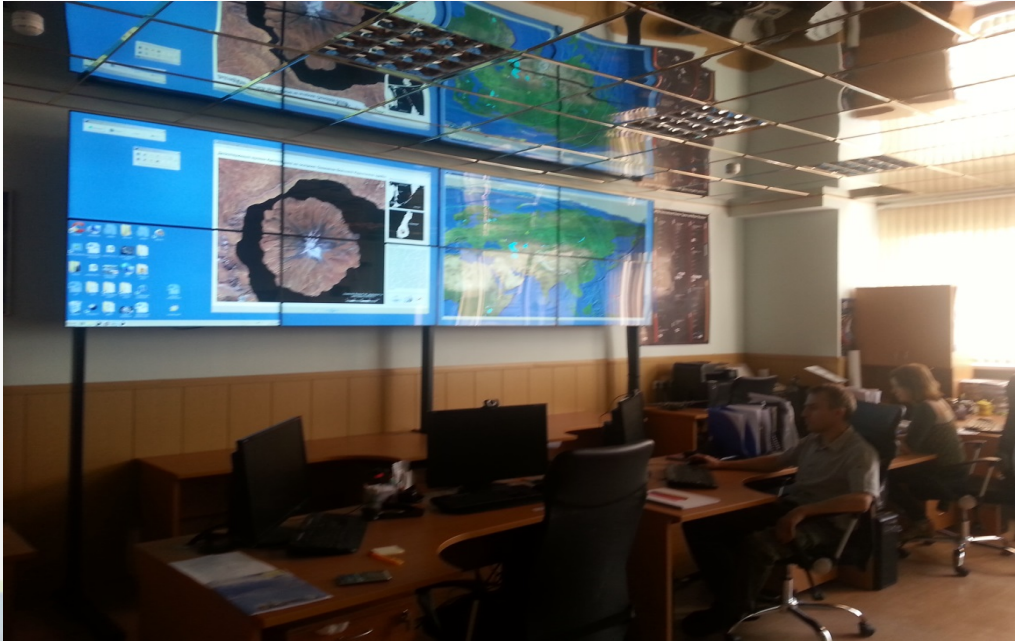
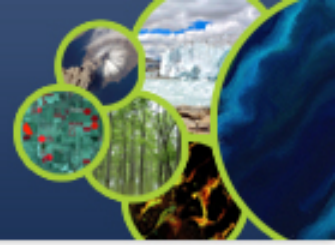
Creation of the Federal EO data fund is intended for organization of effective usage of EO data received from spacecraft created at the expense of federal budget, at the expense of private and juridical entities with no connection to federal spacecraft and purchased at the expense of the federal budget, as well as optimization of federal budget expenses in case of such data purchase.

This law will help ROSCOSMOS to better provide Russian archived EO data.



The task of this constellation is application of EO data for peaceful purposes and strengthening of international cooperation in the space sphere in order to respond to global climate changes, to protect the environment, to forecast and prevent disasters as well as their consequences mitigation, and to solve other global tasks with modern space technologies.

**CBERS 04****Kanopus-V1****Resourcesat-2****GF-1****ZY-3/02**



On August 28, 2013

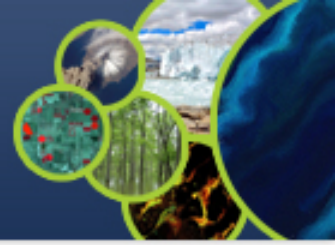
ROSCOSMOS joined the International Charter on Space and Major Disasters.

Research Center for Earth Operative Monitoring was assigned as the ROSCOSMOS' Operator in the Charter.

A specialized hard- and software system was deployed and a division responsible for the Charter activity support in Russia was established at the basis of Research Center for Earth Operative Monitoring

The activation of the International Charter on Space and Major Disaster mechanism enables the implementation of international resources of multi-purpose space facilities (more than 40 satellites) in crisis and emergency situations including usage for the benefit of member nations.





ROSCOSMOS works with the international Society for Digital Earth (ISDE)



ROSCOSMOS works with the International Society for Photogrammetry and Remote Sensing (ISPRS)

