COOPERATION OF THE RUSSIAN FEDERATION WITH INTERNATIONAL ORGANIZATIONS

RUSSIAN EO DATA ANALYTIC SERVICES AND SOLUTIONS

USAGE OF RUSSIAN EO SYSTEMS FOR DISASTERS MONITORING

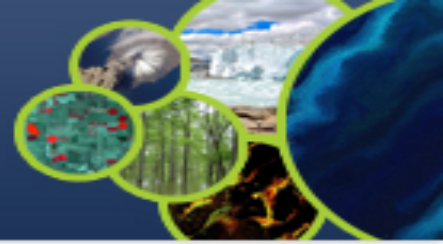
State Space Corporation ‘Roscosmos’

CEOS WGISS-55 and WGDisaster-19

Cordoba, Argentina

April 18 – 20, 2023

PARTICIPATION OF ROSCOSMOS IN CEOS AND OTHER INTERNATIONAL ORGANIZATIONS



State Space Corporation 'Roscosmos':

- **is a member of WGCV, WGISS and WG Disasters**
- **provides the latest information on Russian satellites to update the CEOS MIM Database**
- **hosted the following international events:**

CEOS Meetings:

- WGCV-33, Moscow, May 2011
- WGISS-38, Moscow, September 2014

Other events:

- ASEAN RS data training, Moscow, March 2015
- 13th GEO Plenary and Exhibition, Saint-Petersburg, November 2016
- 36th meeting of the International Charter on Space and Major Disasters, Moscow, October 2016
- AOMSUC-8, Vladivostok, October 2017
- CGMS-47, Sochi, May 2019
- 42nd meeting of the International Charter on Space and Major Disasters, Saint-Petersburg, October 2019

DIGITAL EARTH

AUTOMATED STREAM PROCESSING OF INFORMATION

АПОИ

COMPLEX OF COMPUTING MEANS

DIGITAL EARTH

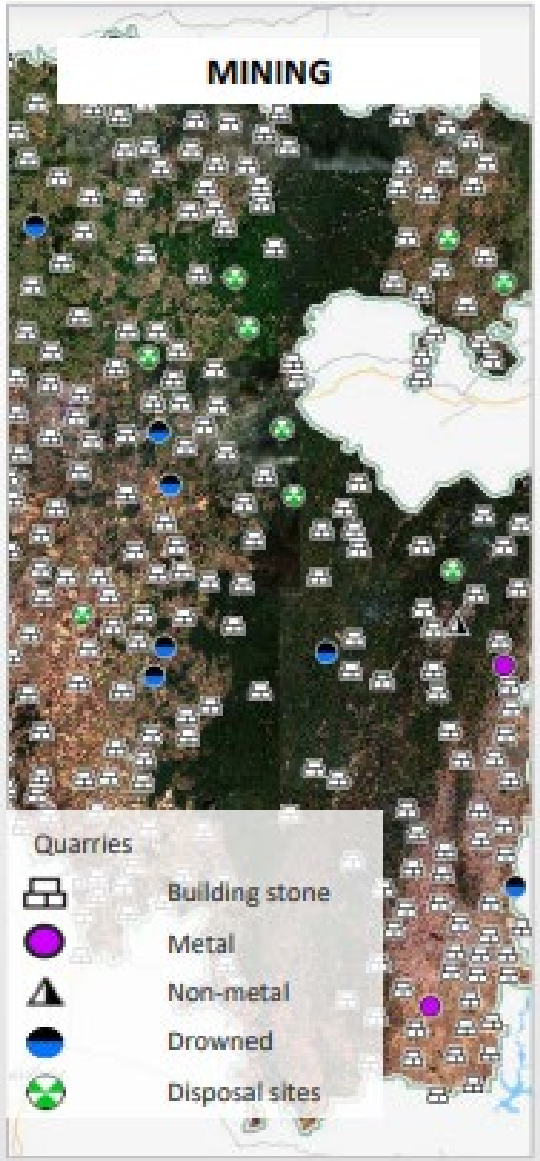
Subsystem «SERVICES»:
- 27 products
- Thematic layers
- Analysis ready reports

www.dgearth.ru

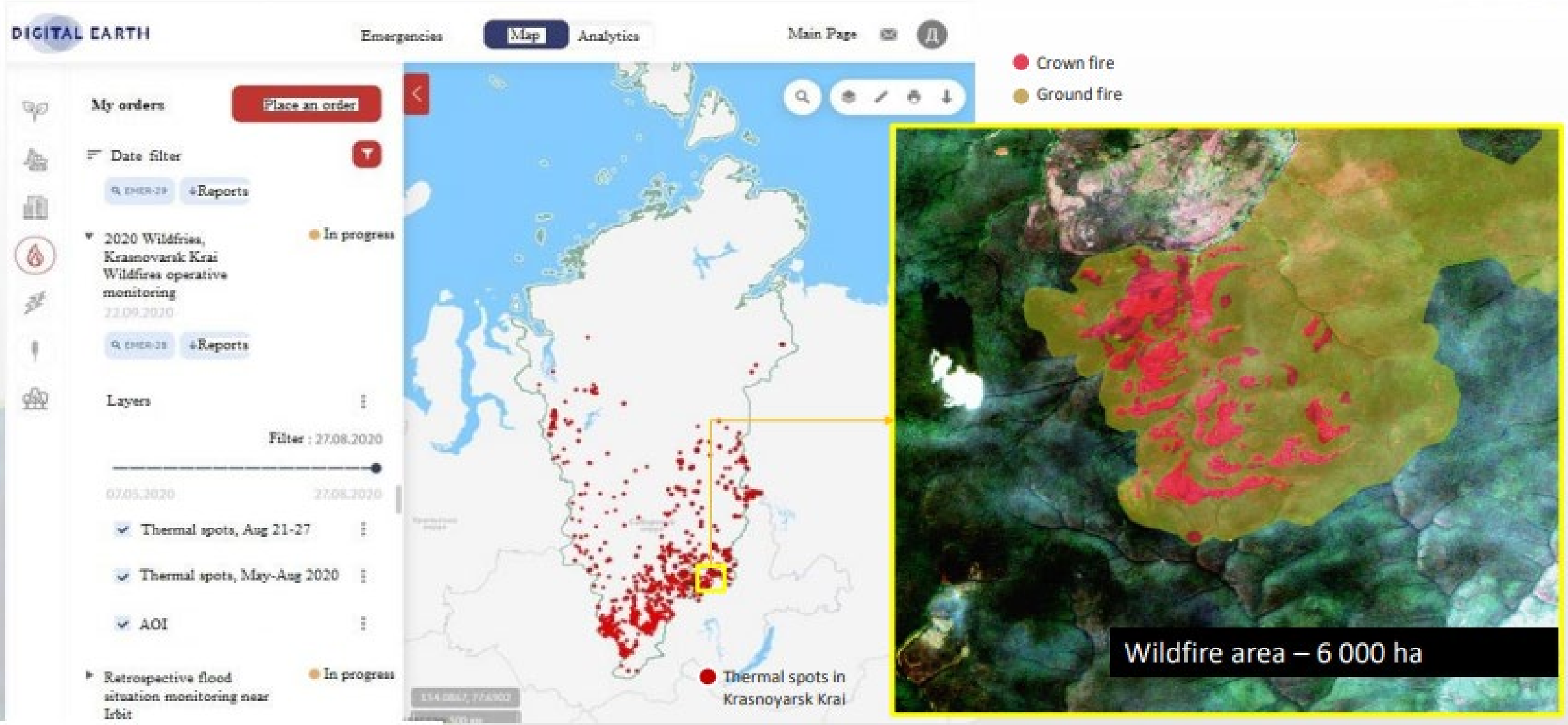
Subsystem «BASEMAP»:
- Entire country
- Consecutive updates
- Precise positioning

Federal data storage
- All time archive
- Automated delivery
- Improved image quality

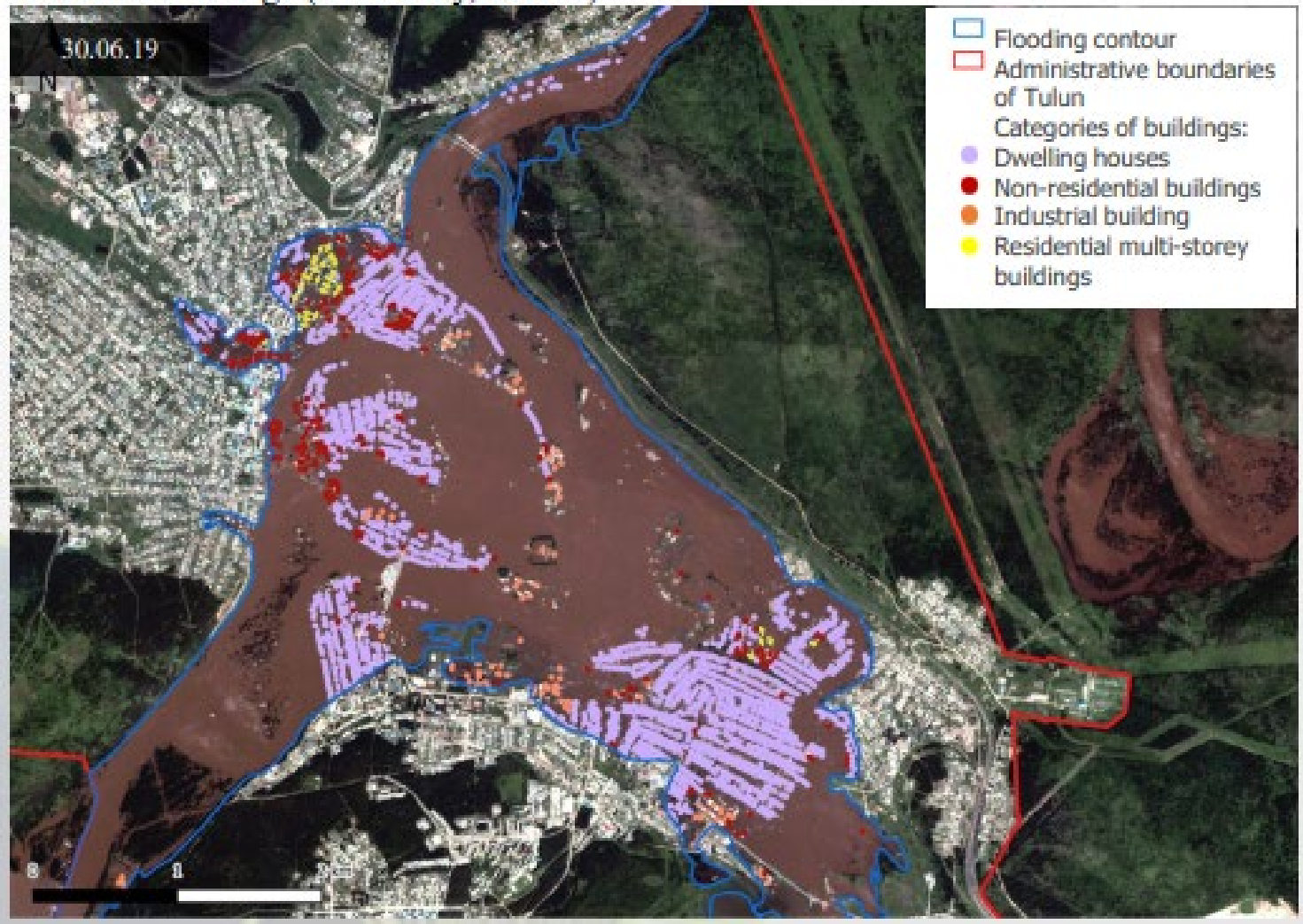
DIGITAL EARTH



DIGITAL EARTH

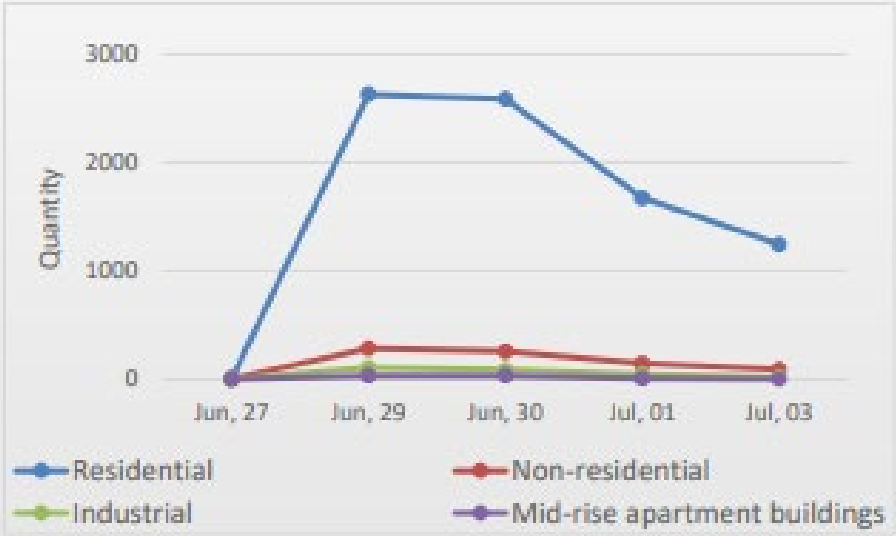


Flooded buildings (Tulun city, Russia)



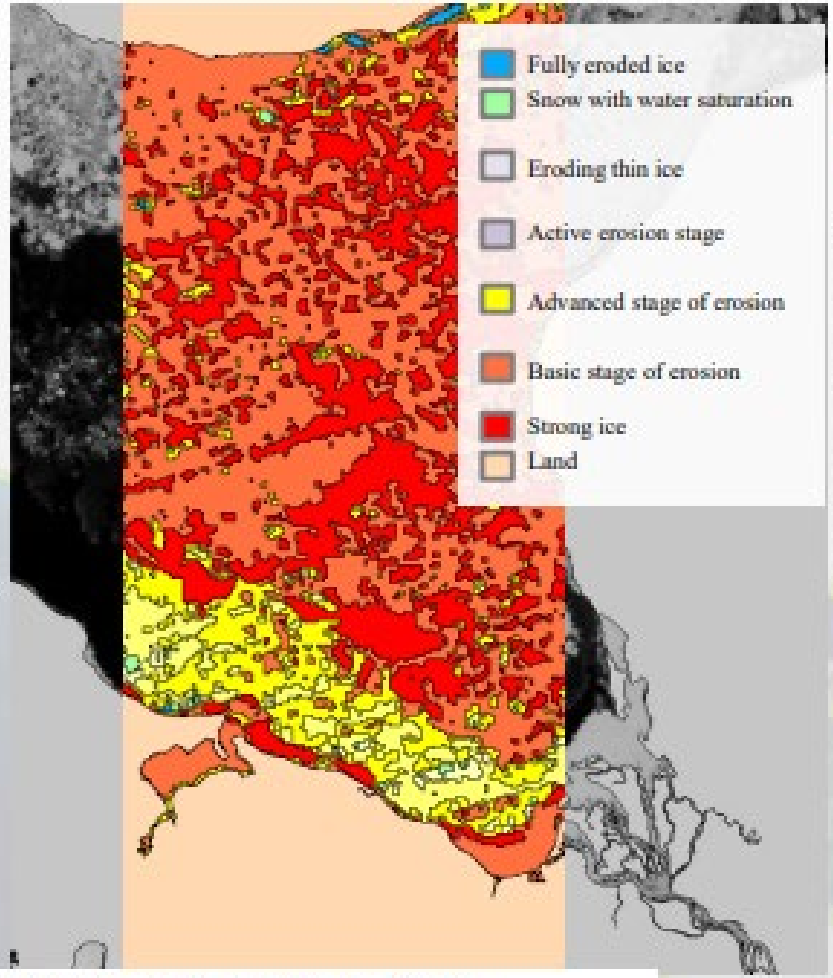
Dynamics of buildings flooding in Tulun

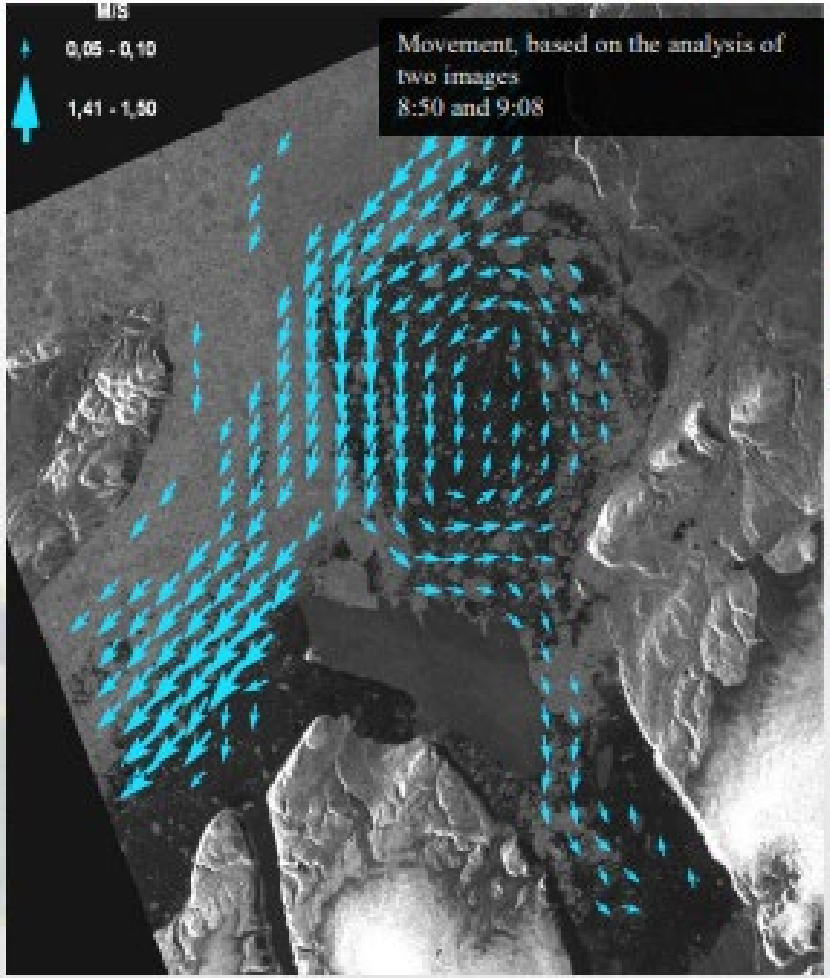
Building types	29.06.2019	30.06.2019	01.07.2019	03.07.2019
Residential	2629	2585	1672	1242
Non-residential	282	254	143	87
Industrial	103	85	40	16
Mid-rise apartment buildings	31	31	5	0

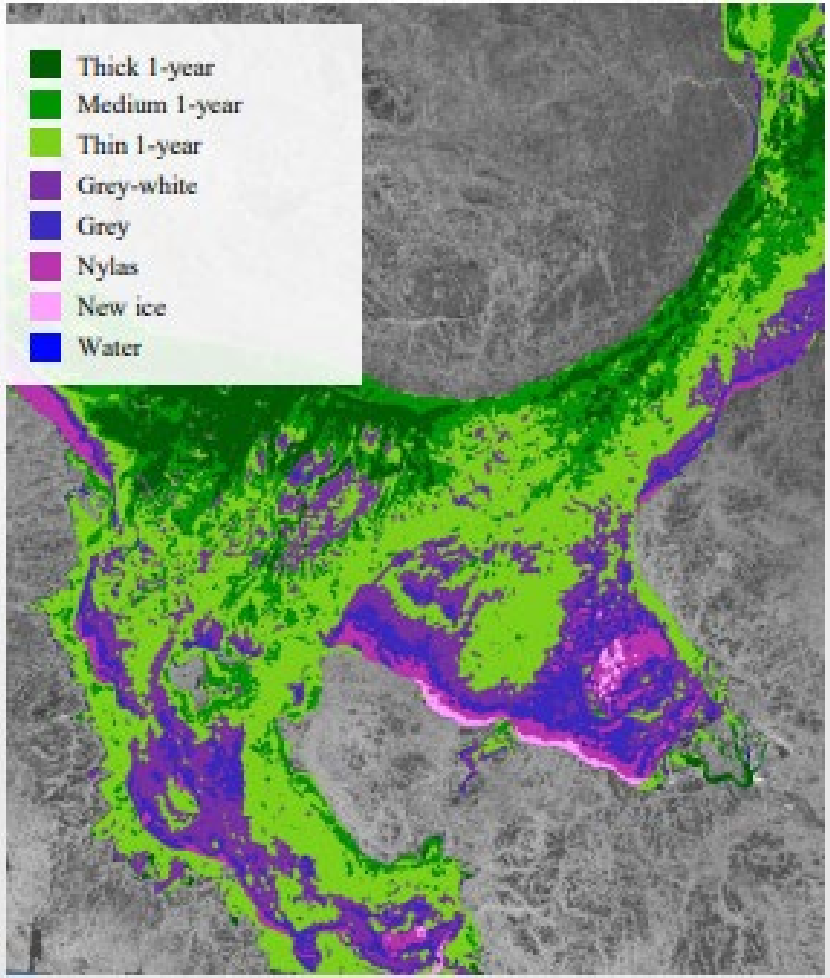


SNOW COVER MONITORING

- Ice melting stages map
- Tracking of snow and ice masses movements
- Map generation for age of ice

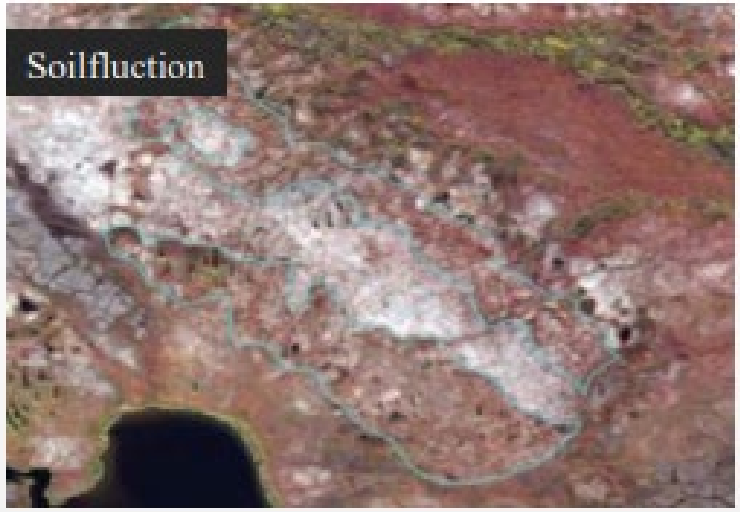


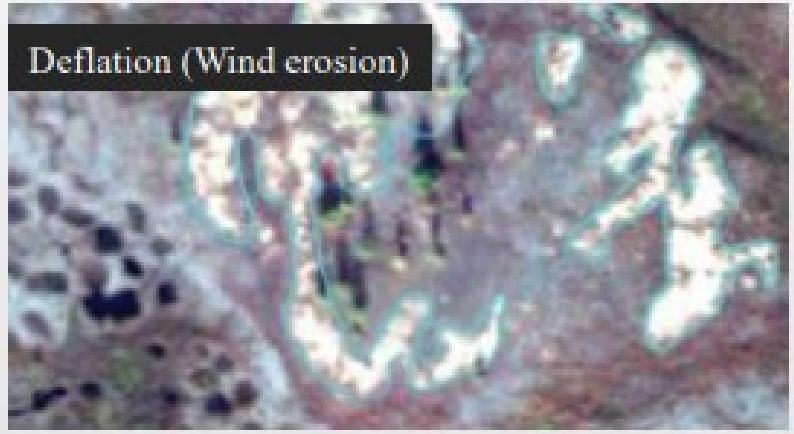




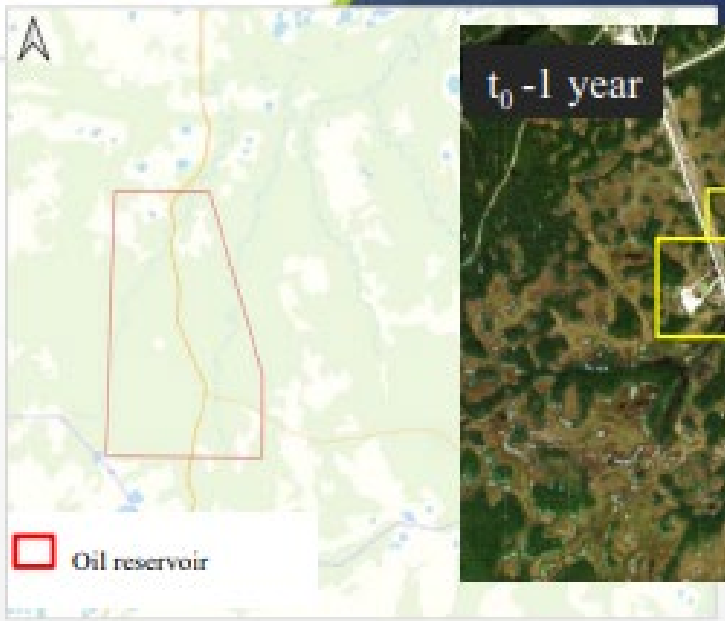
HAZARDOUS GEOLOGICAL PROCESSES

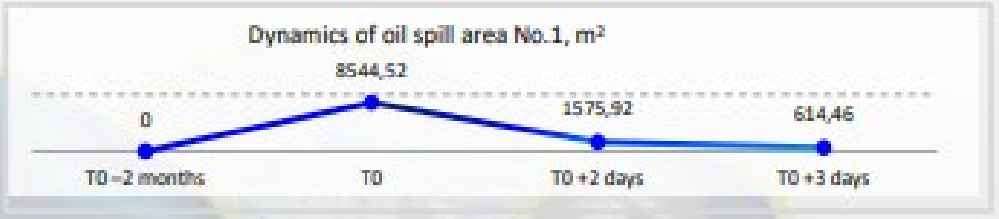
Routine monitoring of activities

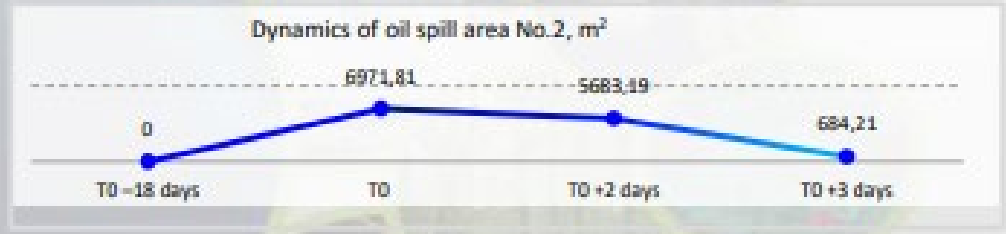




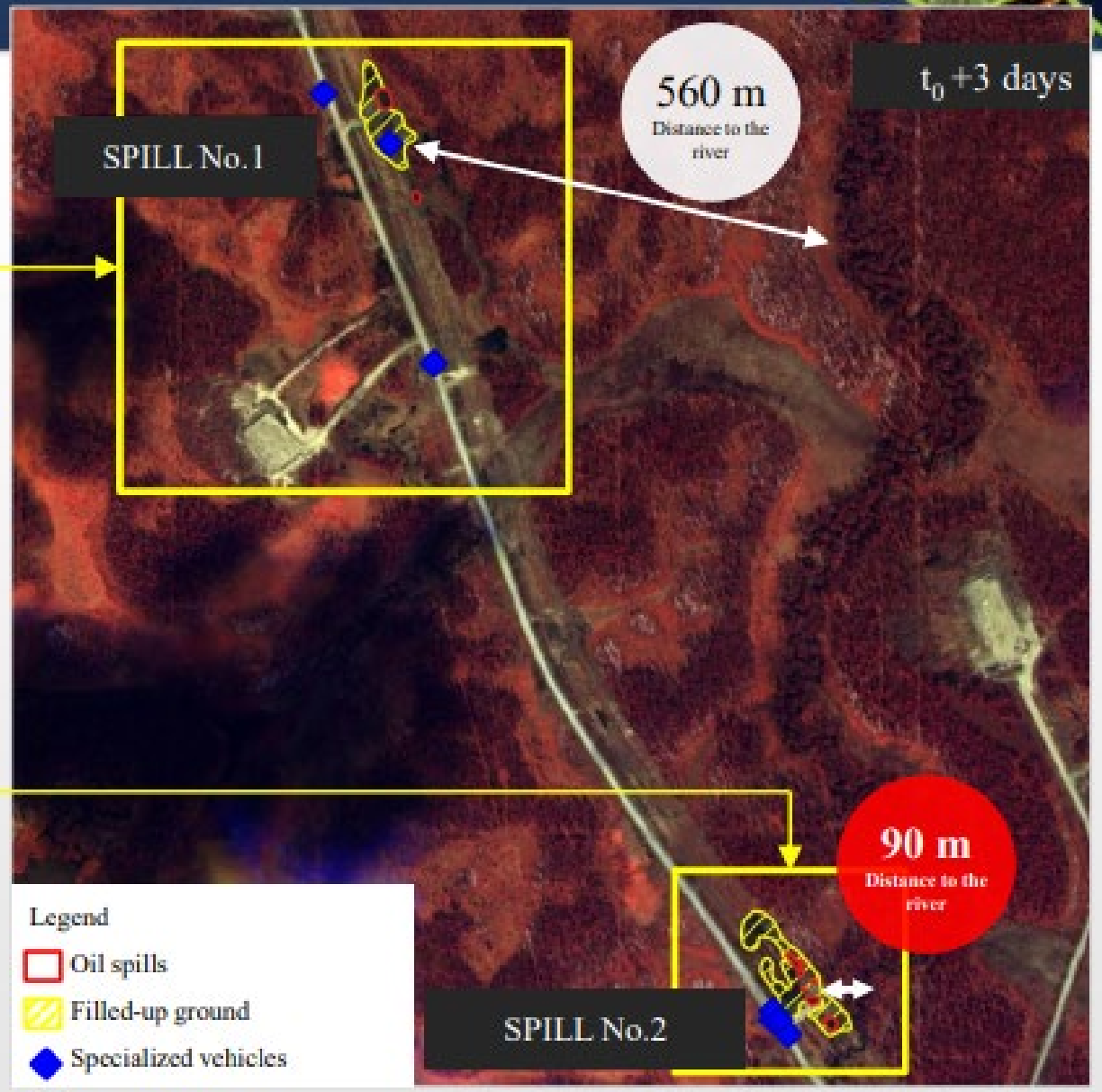
OIL SPILL MONITORING – 15 516,33 M²







T_0 – start of recovery actions



URBAN DEVELOPMENT

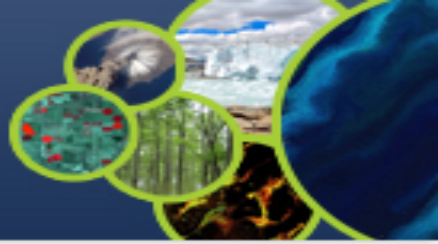
- Monitoring most important construction sites, early detection of possible schedule failures
- Urban area expansion and new settlements detection
- Detection of illegal constructions activities

AGRICULTURAL FIELDS MONITORING

- Overgrown
- Sown
- Plowed
- Grassland

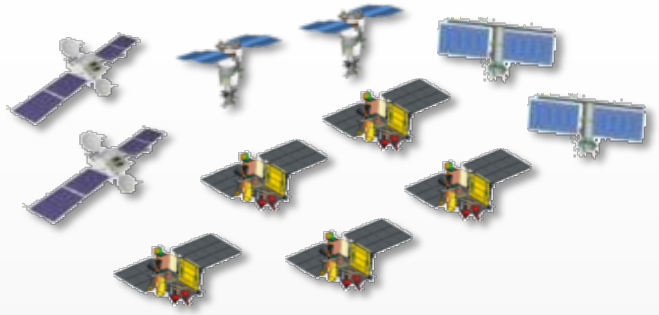
- AI-driven border recognition
- Field condition smart classification

THE FEDERAL FUND OF EO DATA



- Easy search, browse and order of archive EO data
- Fully automated EO data processing via new software complex and ready product delivery through personal dashboard
- Fully automated technological cycle of order fulfillment
- High rate of order fulfilment (from several minutes to 10 working days since request submission)
- Orders can be done by private entities and paid online. Fast processing of orders submitted by legal entities via an offer contract

MAIN STAGES OF EO DATA PROCESSING



Information from EO spacecraft

APOI*

Databank

Geoportal

- Radiometric correction
- Geometric correction
- Atmospheric correction
- Quality control
- Data insertion to Data Bank
- Data release on the Geoportal

*APOI – automated stream processing of information

Satellite tasking

Data order via EO Data Fund

API

Services

New acquisitions

Data from EO Data Fund

Federal and regional executive bodies

Private entities

Legal entities

RUSSIAN INFORMATIONAL EO SERVICES

Services and products

7 industrial services
27 info products

FOREST CONTROL
3 basic products
3 monitoring products

ECO-MONITORING
2 basic products
2 monitoring products

AGRI-MONITORING
2 basic products
3 monitoring products

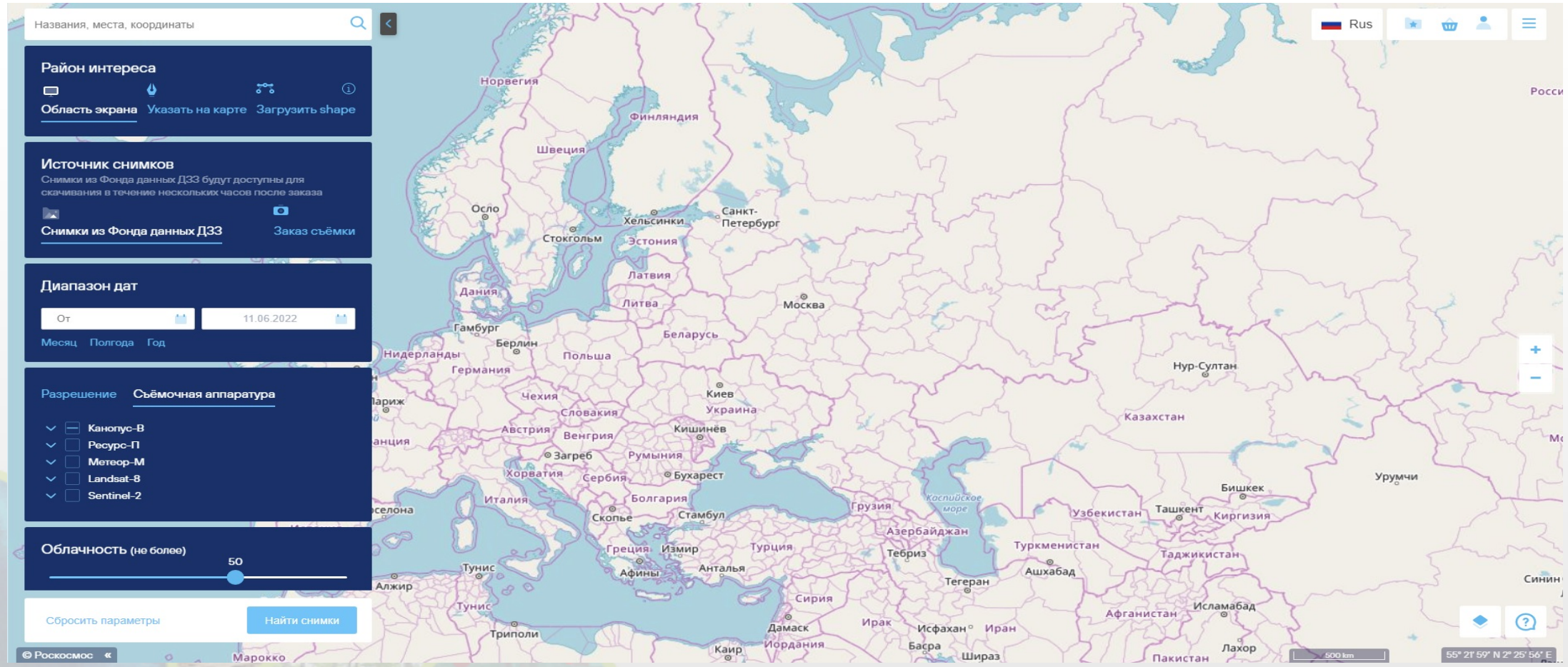
CONSTRUCTION CONTROL
2 basic products
2 monitoring products

QUARRIES
2 basic products
1 monitoring product

EMERGENCIES
1 basic product
4 monitoring products

DISTURBED LANDS
Includes services:
- Eco-monitoring
- Quarries
- Agri-monitoring

NEW GEOPORTAL OF ‘ROSCOSMOS’



Geoportal of Roscosmos is a resource which combines functions of browser for satellite imagery with a mechanism for search and order of data from the Federal EO Data Fund.

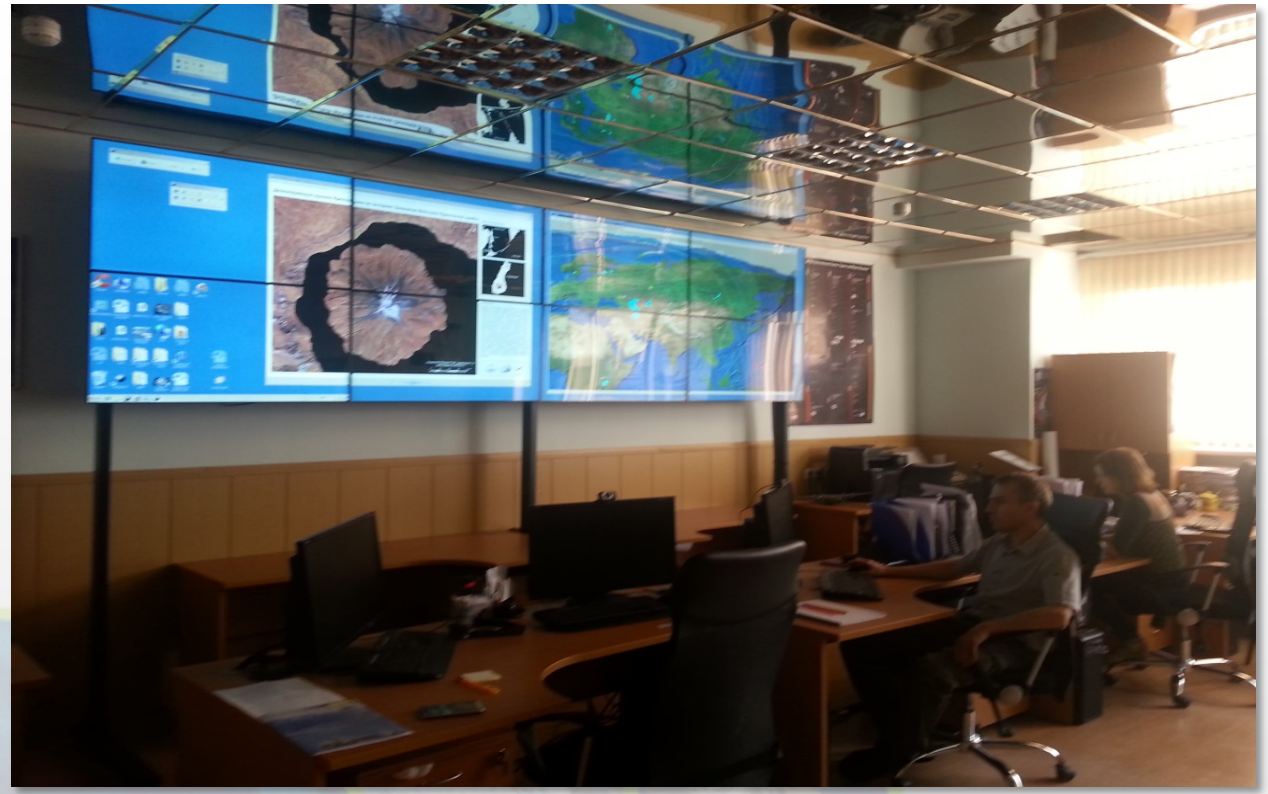
https://next.gptl.ru

RUSSIAN EO SYSTEMS USED IN DISASTERS MONITORING

Spacecraft / Characteristics	Resurs-DK (archive only)	Meteor-M			Kanopus-V and Kanopus-V-IK			Resurs-P (archive only)	
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	
Onboard sensor	28.3 / 16	KMSS		MSU-MR	PSS	MSS	MSU-IK-SRM	Geoton	KSHMSA-VR
Swath width, km		MSU-100: 900	MSU-50: 450	2800	23	20	2000	38	97
Resolution, m: •Panchromatic band •Multispectral band	1 / up to 3 2 - 3 / 3 - 5	MSU-100: - 60	MSU-50: - 120	1000	2.5 -	- 12.5	200	Better than 1 2-3	12 23.8
Number of spectral bands	3 / 1	3	3	6	1	4	2	7	6
Revisit time, days	-	2			4			3 - 4	

UNIFIED GEOGRAPHICALLY DISTRIBUTED INFORMATION SYSTEM OF EARTH REMOTE SENSING (ETRIS DZZ)

COOPERATION OF ROSCOSMOS WITH THE INTERNATIONAL CHARTER ON SPACE AND MAJOR DISASTERS



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.

DISASTERS MONITORING

Since its accession to the Charter Roscosmos has been continuously participating in the Charter operational activities by providing Russian EO data to the countries impacted by natural and manmade disasters. In the period of 2013-2022 Roscosmos took part in ***361 Charter activations*** and provided to its members and authorized users more than ***100 million sq. km*** of Russian EO data (***more than 4 400 scenes***).

In addition, Roscosmos also provides its EO data to the EMERCOM of Russian and ensures the provision of foreign EO data of Charter members and Cooperating Bodies within the frame of major natural and manmade disasters monitoring over the territory of the Russian Federation and other countries. Within the period of 2013-2022 ***30 Charter activations*** were requested by EMERCOM, ***more than 384 million sq. km, (more than 7 000 scenes)*** of data provided.

Committee on Earth Observation Satellites

THANK YOU!