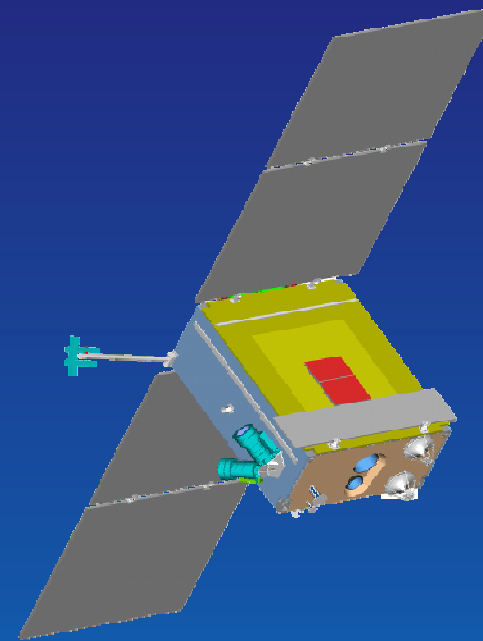


NATIONAL SPACE PROGRAM OF THE REPUBLIC OF BELARUS



According to the Decree of the President of the Republic of Belarus #278 of June 14, 2007 the Belarusian Space System for remote sensing of the Earth is being implemented and the National Space Program of the Republic Belarus has been developed - Resolution № 1517 of the Council of Ministers of the Republic of Belarus from October 14, 2008 "On National Program for Research and Use of Space in Peaceful Purposes for 2008-2012 years"

NATIONAL SPACE PROGRAM OF THE REPUBLIC OF BELARUS (2008-2012)



GOALS AND TASKS OF SPACE ACTIVITY

The main goal of the National Space Program is the development and effective use of scientific and technological potential of Belarus in the field of creating Space facilities and technologies for the solution of social and economical tasks in the interest of the branches of economy, safety of population and increase of science and education level in the country.

Main tasks of the program are:

- manufacture of Space vehicles for remote sensing of the Earth and perspective technologies for Space facilities creation;
- construction of ground infrastructure for Space information receiving, processing, distribution and Space vehicle control;
- development of information and Space technologies and systems and their introduction in different fields of social and economic activity;
- carrying out the scientific research and scientific and engineering works on creation of basic elements, systems and perspective technologies for Space equipment;
- creation of training and retraining systems and advanced training of staff involved in Space activity;
- forming the state policy in the field of Space activity.



**State customer-
coordinator of the program**

**National Academy of Sciences
of Belarus**

State customers of the task programs:

- State Military Industrial Committee
- Ministry of Education
- Ministry of Natural Resources and Environmental Protection
- Ministry of Extreme Situations
- Ministry of Agriculture and Food
- Ministry of Forestry
- State Property Committee



THE MAIN EXECUTORS OF THE PROGRAM

- Research and design-engineering institutions of the National Academy of Sciences of Belarus
- Universities and research institutions of the Ministry of Education of Belarus
- Design-engineering and industrial institutions of the State Military Industrial Committee of Belarus
- Design-engineering and industrial institutions of the Ministry of Industry of Belarus
- Institutions of the State Property Committee
- Other organizations of the State customers of task programs
- The head organization – the executor carrying out the scientific and organizational support of the program is the United Institute of Informatics Problems of the National Academy of Sciences of Belarus.



SUBPROGRAMS OF THE NATIONAL SPACE PROGRAM

- State program of scientific research "Development of scientific fundamentals, technologies and perspective instruments for carrying out complex investigations of Space and use of Space information" (Space research) 2010-2012 years (State Customer is the National Academy of Sciences of the Republic of Belarus);
- State science-technology program "Space Systems and Technologies" 2010-2012 (State Customer is the National Academy of Sciences of the Republic of Belarus);
- Subprogram "Development of Belarusian Space System for Remote Sensing of Earth" 2008-2012 (State Customer is the National Academy of Sciences of the Republic of Belarus);
- Subprogram "Perspective Belarusian Space Vehicles" for 2008-2010 (State Customer is State Military Industrial Committee);
- Subprogram "Ecological Monitoring, Hydro-Meteorological Observations and Assessment of Nature Use Efficiency" for 2009-2012 (State Customer is the Ministry of Natural Resources and Environmental Protection);

NATIONAL SPACE PROGRAM OF THE REPUBLIC OF BELARUS (2008-2012)



SUBPROGRAMS OF THE NATIONAL SPACE PROGRAM

- Subprogram "Application of Space Information in Geodesy and Cartography" for 2009-2010 (State Customer is the State Property Committee);
- Subprogram "Monitoring the Natural and Technogenic Emergencies with the Use of Space Information" for 2009-2012 (State Customer is the Ministry of Extreme Situations);
- Subprogram "Assessment of Actual Condition of Agricultural areas by Space Information Systems" for 2009-2012 (State Customer is the Ministry of Agriculture and Food);
- Subprogram "Creation of Professional Aerospace Education System" for 2009-2012 (State Customer is the Ministry of Education);
- Subprogram "Organization of Safety Support System for Information Space Technologies" for 2009-2011 (State Customer is the Operative Analytical Centre of the Presidential Office of the Republic of Belarus);
- Subprogram "Application of Space Information in the interests of the Forestry" for 2009-2012 (State Customer is the Ministry of Forestry).

State program of scientific research "Development of scientific fundamentals, technologies and perspective instruments for carrying out the complex investigations of Space and use of Space information" (Space research) 2010-2012 years (State Customer is the National Academy of Sciences of the Republic of Belarus)

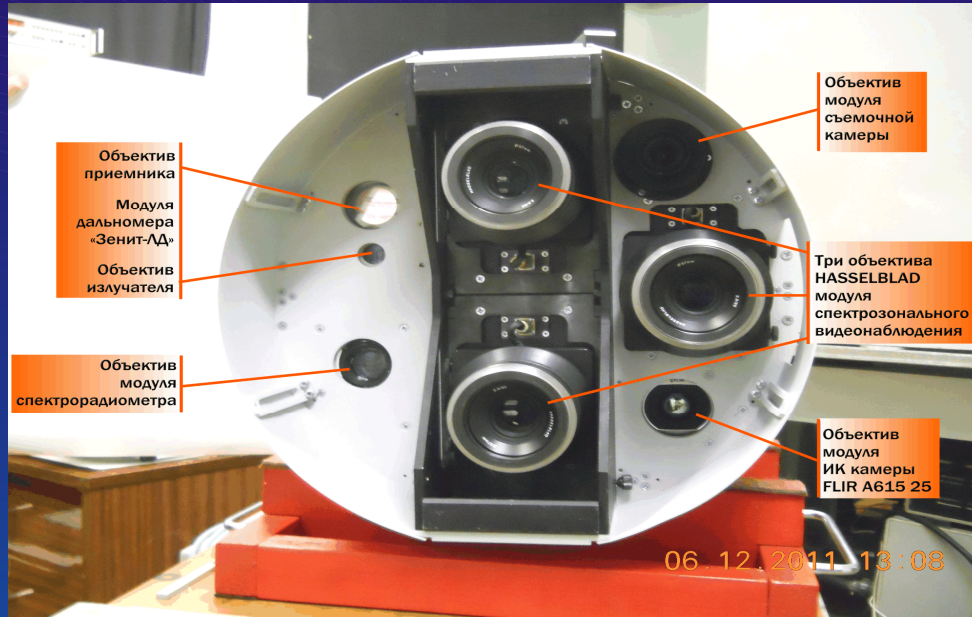
The Program was created to solve the tasks of scientific support of the National Space Program. 24 Belarusian institutions have participated in the Program including:

- 13 institutes of the National Academy of Sciences of Belarus
- 2 enterprises of the Ministry of Industry,
- 6 organizations of the Ministry of Education,
- 3 organizations of the State Committee of Military Industry

State science-technology program “Space Systems and Technologies” 2010-2012 (State Customer is the National Academy of Sciences of the Republic of Belarus)

- The automated measuring system for testing electronic components and units of Space devices was developed.
- The system “Monitoring - AK” – thematic processing remote sensing data and aviation spectra-zone system “AVIS” was created.
- A pilot sample of inertial navigation module with GPS correction” was developed.

NATIONAL SPACE PROGRAM OF THE REPUBLIC OF BELARUS (2008-2012)



Aviation spectra-zone system "AVIS"



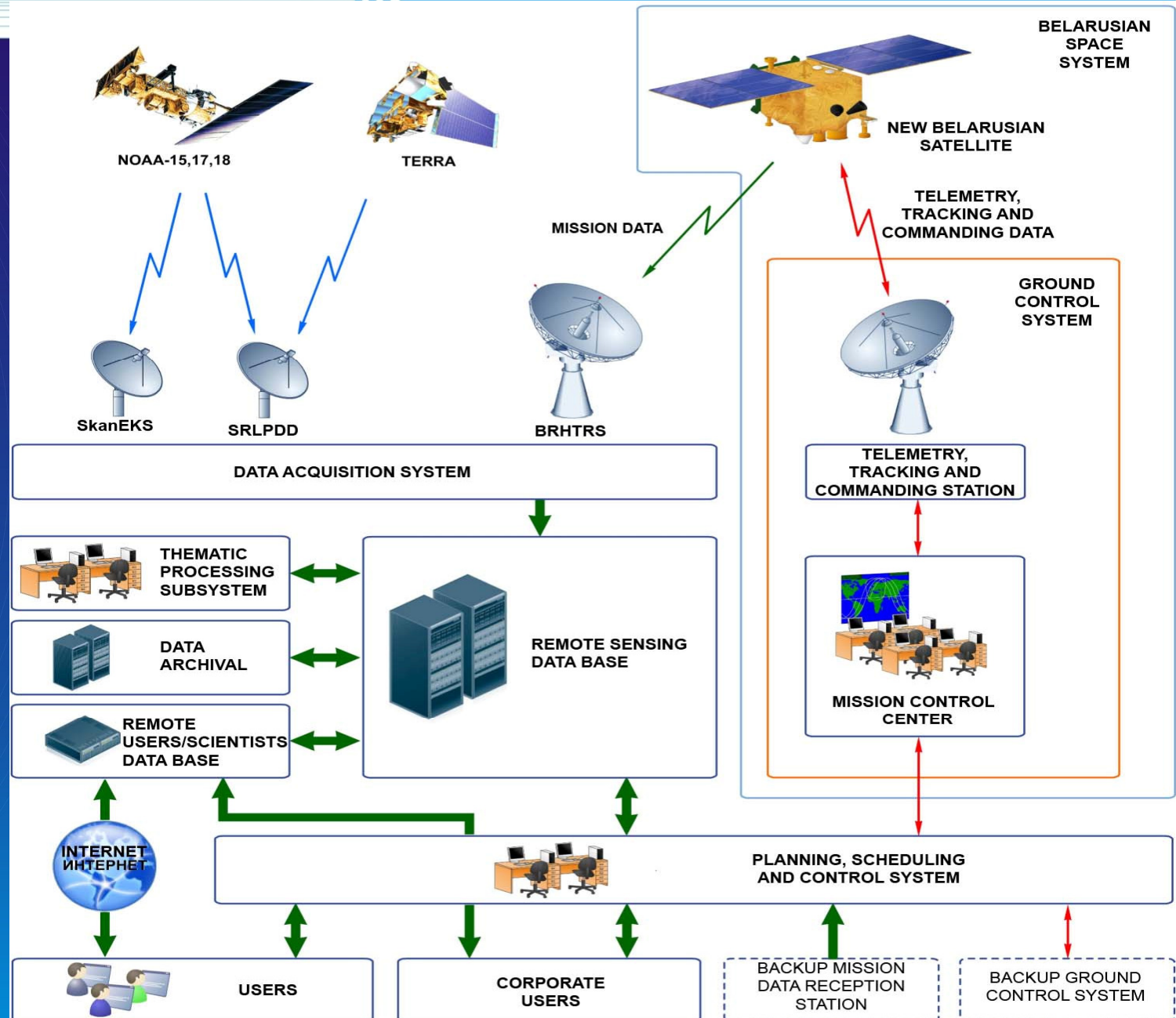
Subprogram "Development of Belarusian Space System for Remote Earth Sensing" 2008-2012 (State Customer is the National Academy of Sciences of the Republic of Belarus)

- Ground-based infrastructure of Belarusian Space System of Remote Sensing of Earth was created to provide the functioning of the new satellite and ground-based complex of flight control.
- The hard-software facilities were developed and upgraded for: data receiving, planning and control, thematic data processing, creation of the data base of digital information of the terrains, corporative networks creation.

NATIONAL SPACE PROGRAM OF THE REPUBLIC OF BELARUS (2008-2012)



BELARUSIAN SPACE SYSTEM FOR EARTH REMOTE SENSING

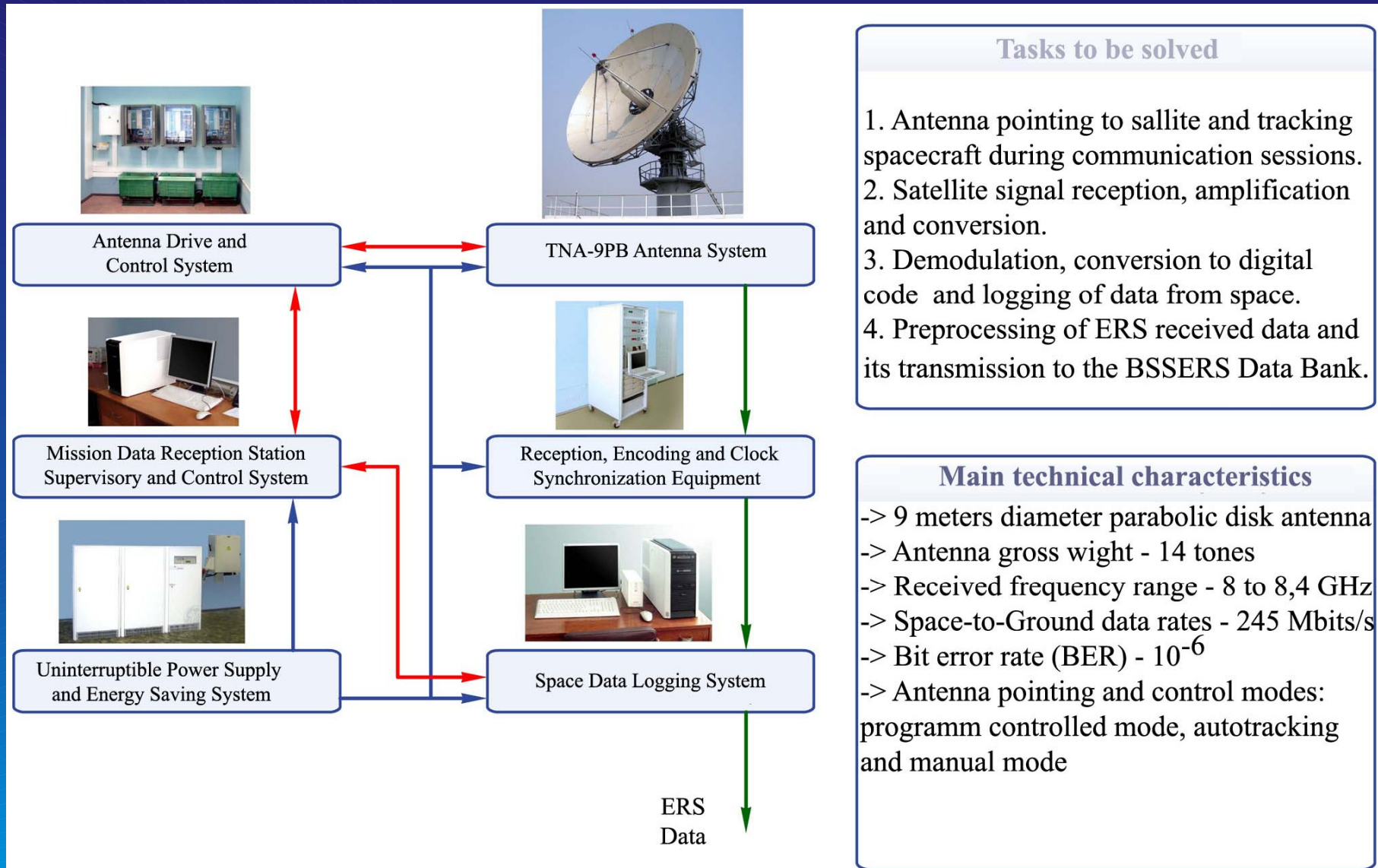


SRLPDD - System for Reception, Logging and Processing of Digital Data
 BRHTRS - Belarusian and Russian High-Throughput Reception System

NATIONAL SPACE PROGRAM OF THE REPUBLIC OF BELARUS (2008-2012)



GROUND RECEIVING STATION (TRACKING AND ACQUISITION STATION)



Tasks to be solved

1. Antenna pointing to satellite and tracking spacecraft during communication sessions.
2. Satellite signal reception, amplification and conversion.
3. Demodulation, conversion to digital code and logging of data from space.
4. Preprocessing of ERS received data and its transmission to the BSSERS Data Bank.

Main technical characteristics

- > 9 meters diameter parabolic disk antenna
- > Antenna gross weight - 14 tones
- > Received frequency range - 8 to 8,4 GHz
- > Space-to-Ground data rates - 245 Mbits/s
- > Bit error rate (BER) - 10^{-6}
- > Antenna pointing and control modes: programm controlled mode, autotracking and manual mode

**Flight Control Center and Command-Measuring Station of
Belarusian ground-based segment**

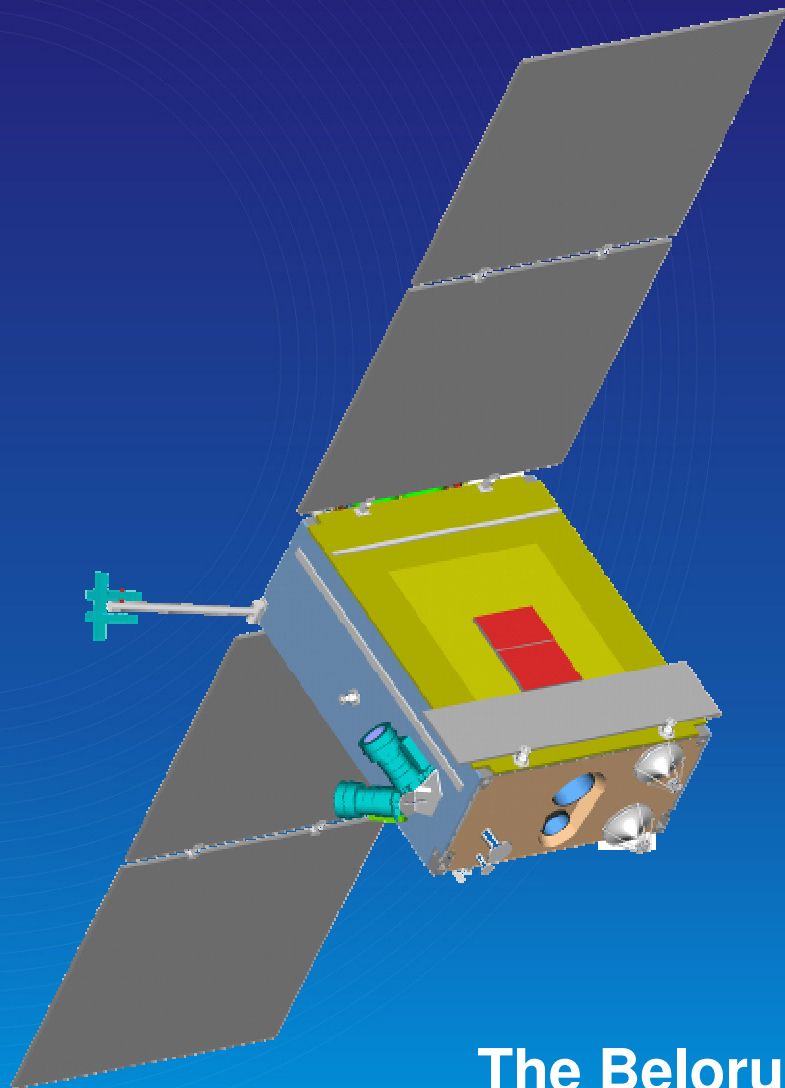


Flight Control Center



*Antenna system of Command-
Measuring Station*

BELARUSIAN SATELLITE MAIN CHARACTERISTICS



- ❑ Solar-synchronous orbit raising, km 510 ± 10
- ❑ Field of view, km ± 440
- ❑ Swath, km 20
- ❑ Resolution:
 - panchromatic subsystem, m 2,1
 - Multispectral subsystem, m 10,5
- ❑ In-orbit life, years ≥ 5
- ❑ Data transfer rate, mbyte/s up to 245,76
- ❑ Orientation accuracy, angl. min 5
- ❑ Orbital position definition accuracy, m 15

The Belorussian Satellite was launched on July 22, 2012

NATIONAL SPACE PROGRAM OF THE REPUBLIC OF BELARUS (2008-2012)



GEOGRAPHICALLY DISTRIBUTED DATABASE OF DIGITAL INFORMATION OF TERRAIN ON THE BASIS OF EARTH REMOTE SENSING

- Placement, gathering and cataloging of RS-information, digital maps and results of thematic processing
- Web-access to all resources with search function

№	Временные параметры		Верх-Левое		Верх-Правое		Ширина
	Дата и время создания ИР	Дата и время создания ЦИМ	Широта	Долгота	Широта	Долгота	
5	26.05.2006 14:24:06	03.2006 9.21	51° 09' 0.00" N	33° 38' 0.00" E	50° 58' 0.00" N	32° 35' 0.00" E	61° 00' 0.00" E
7	26.05.2006 14:46:28	02.2006 9.23	49° 08' 0.00" N	32° 34' 0.00" E	49° 58' 0.00" N	31° 33' 0.00" E	55° 38' 0.00" E
11	26.05.2006 15:11:26	03.2006	55° 00' 0.00" N	28° 00' 0.00" E	56° 00' 0.00" N	29° 30' 0.00" E	55° 20' 0.00" E
23	26.05.2006 16:36:29	05.2006	56° 11' 33.51" N	29° 20' 24.31" E	55° 46' 24.72" N	29° 09' 7.60" E	56° 17' 0.00" E
24	26.05.2006 16:31:30	12.1999	55° 46' 32.70" N	29° 09' 11.18" E	55° 21' 23.91" N	28° 57' 54.47" E	55° 51' 0.00" E
28	23.05.2006 9:08	24.03.2006 12:14:62	30° 36' 0.00" N	30° 36' 0.00" E	62° 30' 36.00" N	31° 30' 0.00" E	41° 10' 0.00" E
29	23.05.2006 16:21:16	03.2006 11:56:01	00° 0.00" N	39° 03' 0.00" E	68° 01' 0.00" N	40° 01' 0.00" E	53° 00' 0.00" E
30	31.05.2006 10:07:15	03.2006 12:04:58	17° 24' 0.00" N	28° 30' 0.00" E	58° 15' 36.00" N	28° 18' 0.00" E	54° 49' 4.00" E

Электронный каталог информационных ресурсов ДЗЗ - Microsoft Internet Explorer

Адрес: http://91.164.185/webzhitko/Default.aspx?control=...

Шаг 1. Выбор географической зоны интереса

Имя: _____ Пароль: _____ Войти

Заказ

Нет опечаточных символов

Список последних снимков

- Снимок № 957: Попытка с помощью КА "NOAA" в формате HRF. Дата и время снимка 03.09.2007 13:03:07
- Снимок № 958: Попытка с помощью КА "NOAA" в формате HRF. Дата и время снимка 03.09.2007 11:16:41
- Снимок № 955: Попытка с помощью КА "NOAA" в формате HRF. Дата и время снимка 03.09.2007 11:16:41

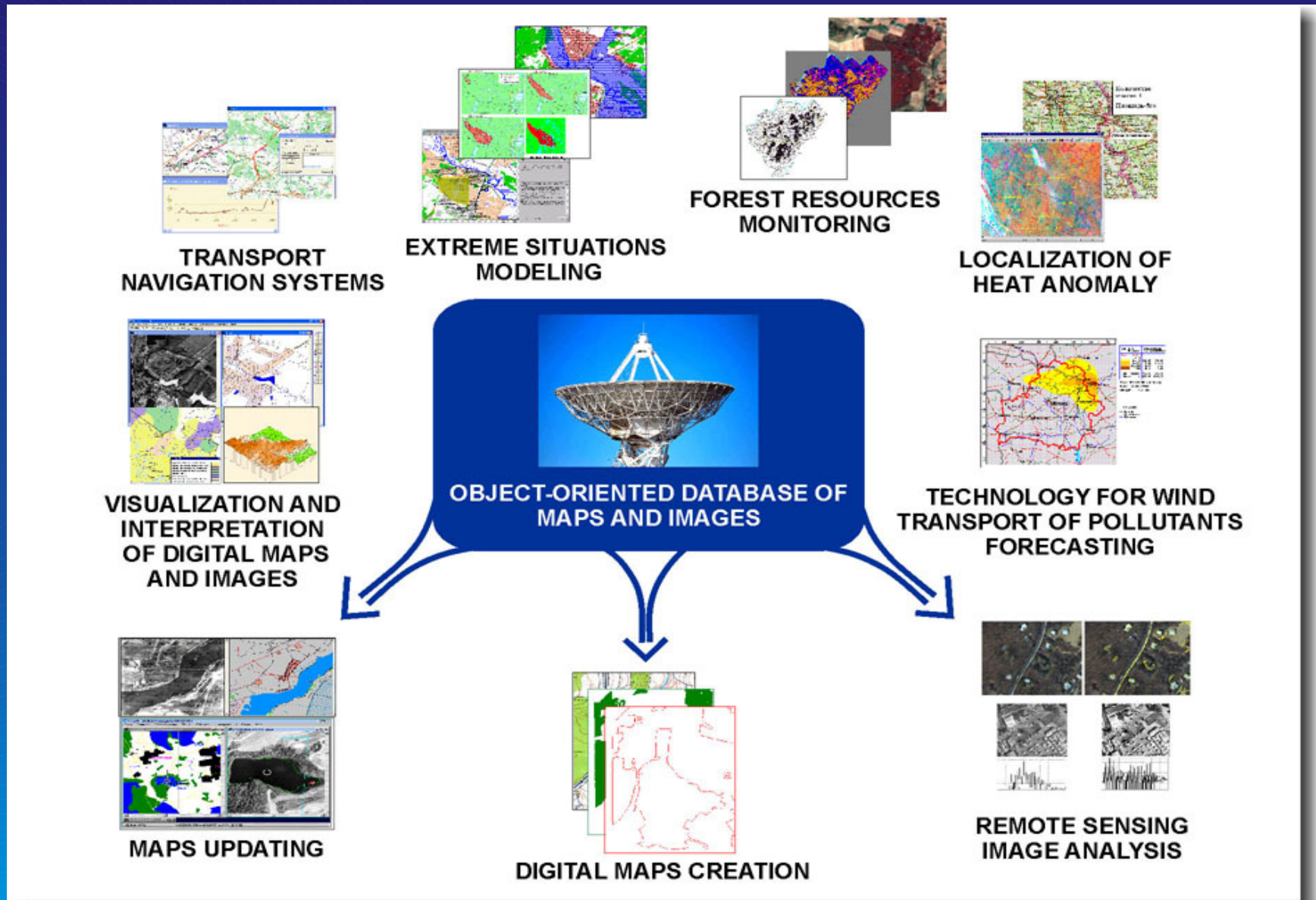
Дата и время создания ИР	Дата и время создания ЦИМ	Широта	Долгота	Широта	Долгота	Широта	Долгота	Широта	Долгота	Имя файла ИР
04.12.2006 11:10:11	2006 9:27	76° 59' 44.36" N	20° 21' 59.77" W	64° 07' 4.77" N	64° 39' 8.46" E	39° 22' 31.62" N	10° 14' 37.12" W	34° 05' 26.25" N	23° 27' 6.46" E	111110927
04.12.2006 11:10:11	2006 12:08	43° 19' 4.50" N	61° 26' 26.34" E	37° 45' 13.14" N	26° 16' 6.10" E	76° 40' 12.46" N	70° 46' 18.56" E	63° 56' 33.14" N	12° 00' 53.97" W	111112008
04.12.2006 11:10:12	2006 9:14	76° 48' 26.30" N	16° 47' 11.58" W	64° 09' 58.33" N						111112004
04.12.2006 11:10:12	2006 9:35	75° 54' 54.12" N	09° 48' 59.01" W	64° 27' 35.25" N						111112005
04.12.2006 11:10:12	2006 9:01	76° 24' 56.37" N	12° 54' 42.81" W	63° 45' 21.83" N						111112006
04.12.2006 11:10:12	2006 11:47	37° 34' 8.16" N	39° 10' 25.96" E	32° 26' 52.71" N						111112007
04.12.2006 11:10:12	2006 11:58	49° 23' 40.19" N	64° 12' 57.11" E	43° 15' 21.99" N						111112008
04.12.2006 11:10:12	2006 5:02	76° 31' 57.36" N	17° 38' 31.89" W	64° 45' 30.84" N						111112009
04.12.2006 11:10:12	2006 5:21	76° 25' 5.37" N	19° 09' 44.71" W	64° 46' 50.57" N						111112010
04.12.2006 11:10:12	2006 9:01	76° 24' 56.37" N	12° 54' 42.81" W	63° 45' 21.83" N						111112011
04.12.2006 11:10:12	2006 9:12	75° 13' 0.47" N	03° 13' 41.48" W	64° 02' 21.12" N						111112012
04.12.2006 11:10:12	2006 9:55	39° 57' 30.80" N	67° 07' 39.57" E	34° 41' 4.50" N						111112013
06.12.2006 11:24:11	2006 9:27	76° 59' 44.36" N	20° 21' 59.77" W	64° 07' 4.77" N						111110927

- Registration and processing of orders
- Resource Interchange with other data-banks

NATIONAL SPACE PROGRAM OF THE REPUBLIC OF BELARUS (2008-2012)



Software for Remote Sensing Data and Map Analysis



First Belarusian Satellite Images



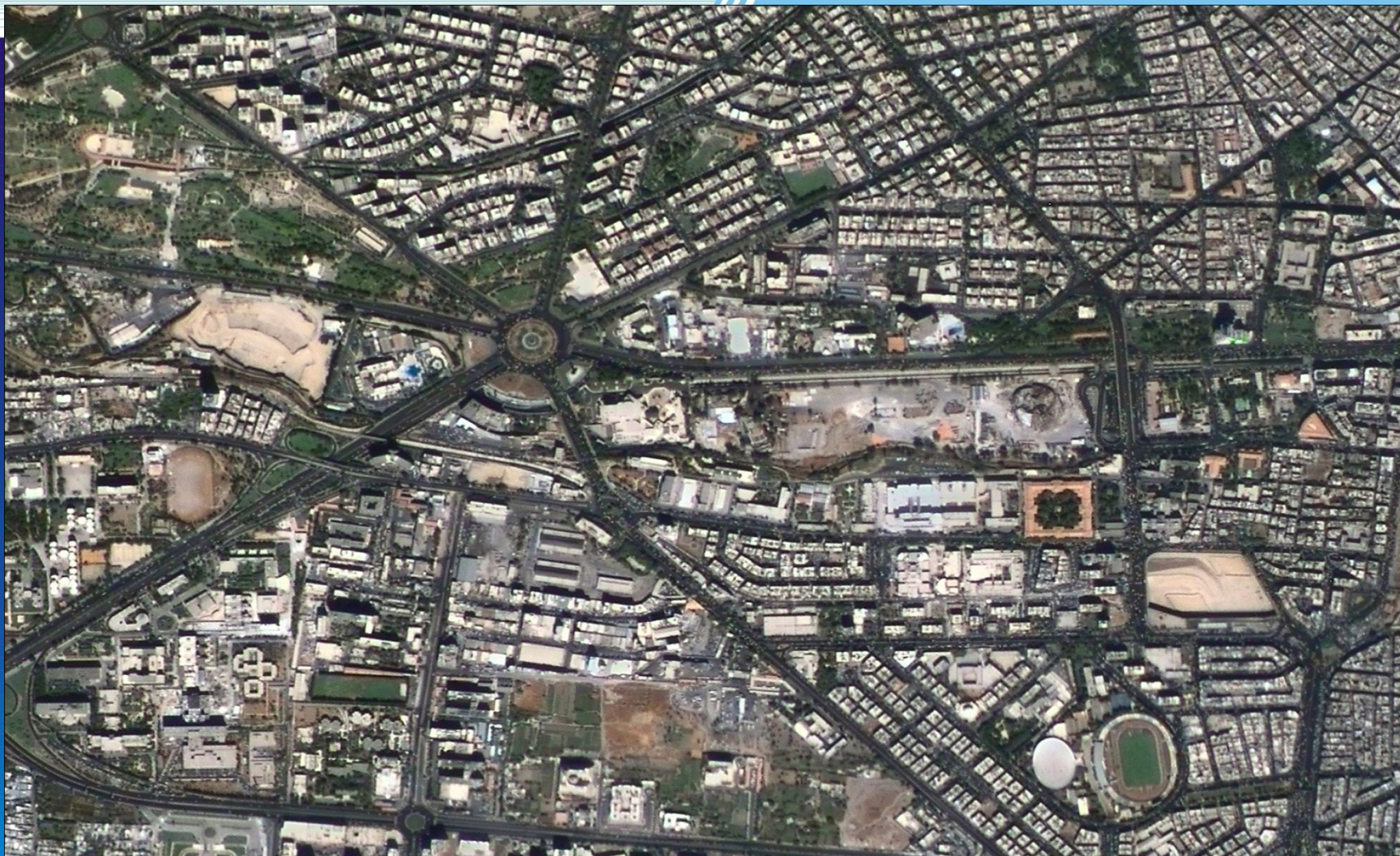
Bahrain airport, 10,5 m Resolution, 30.08.2012

First Belarusian Satellite Images



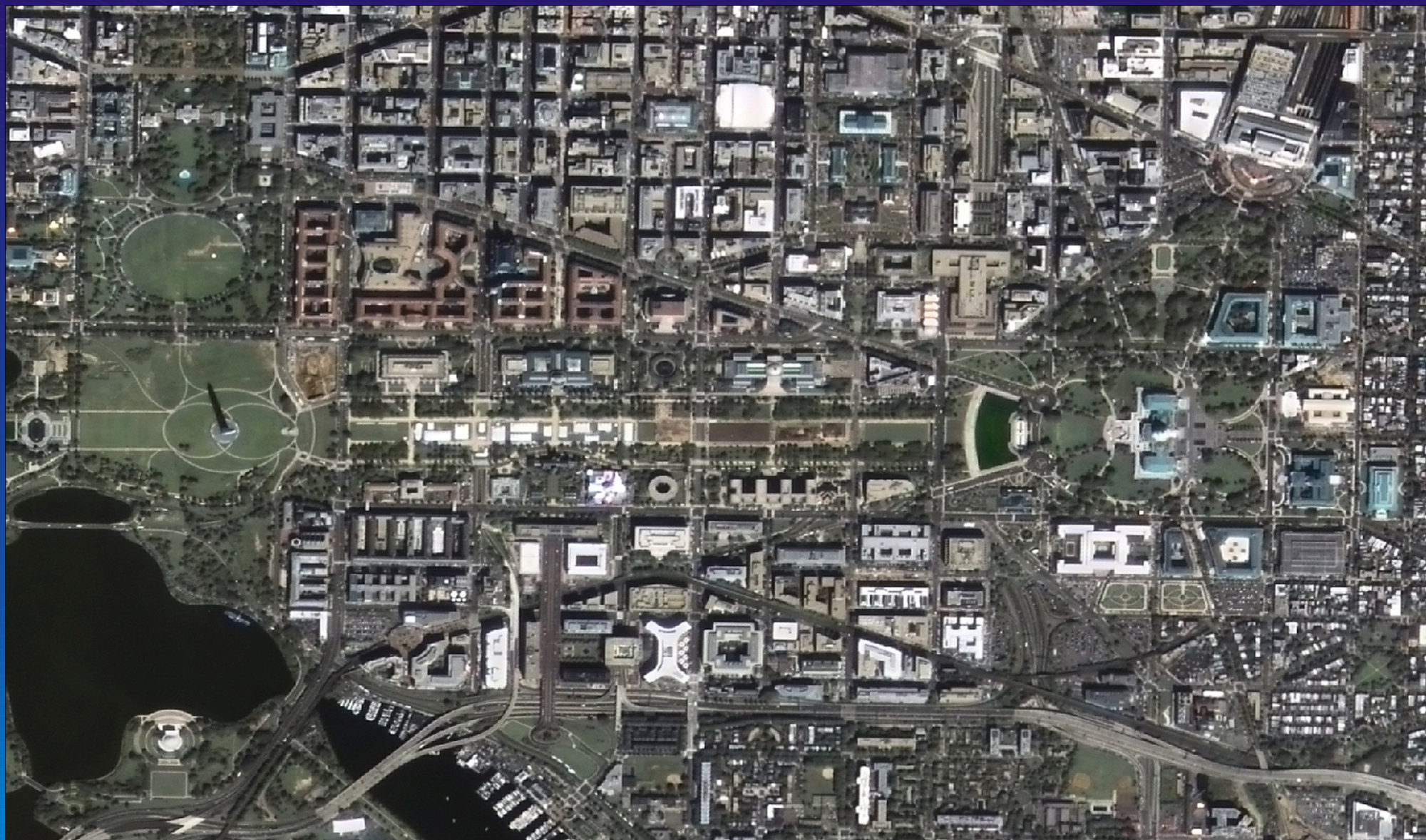
Bahrain airport, 2,1 m Resolution, 30.08.2012

First Belarusian Satellite Images



Damascus (Syria)

First Belarusian Satellite Images



Washington, White House

First Belarusian Satellite Images



Minsk- Arena, 10,5 m Resolution



Subprogram "Perspective Belarusian Space Vehicles" for 2008-2010 (State Customer is State Military Industrial Committee)

The technology for production of light-weight object-glasses for Space apparatus, the technology for Uninterruptible Power Supply (UPS) designed for working in Space, the technology for serial production of VLSI and also the technology for production of large (till 1000 mm) aspherical mirrors were developed.

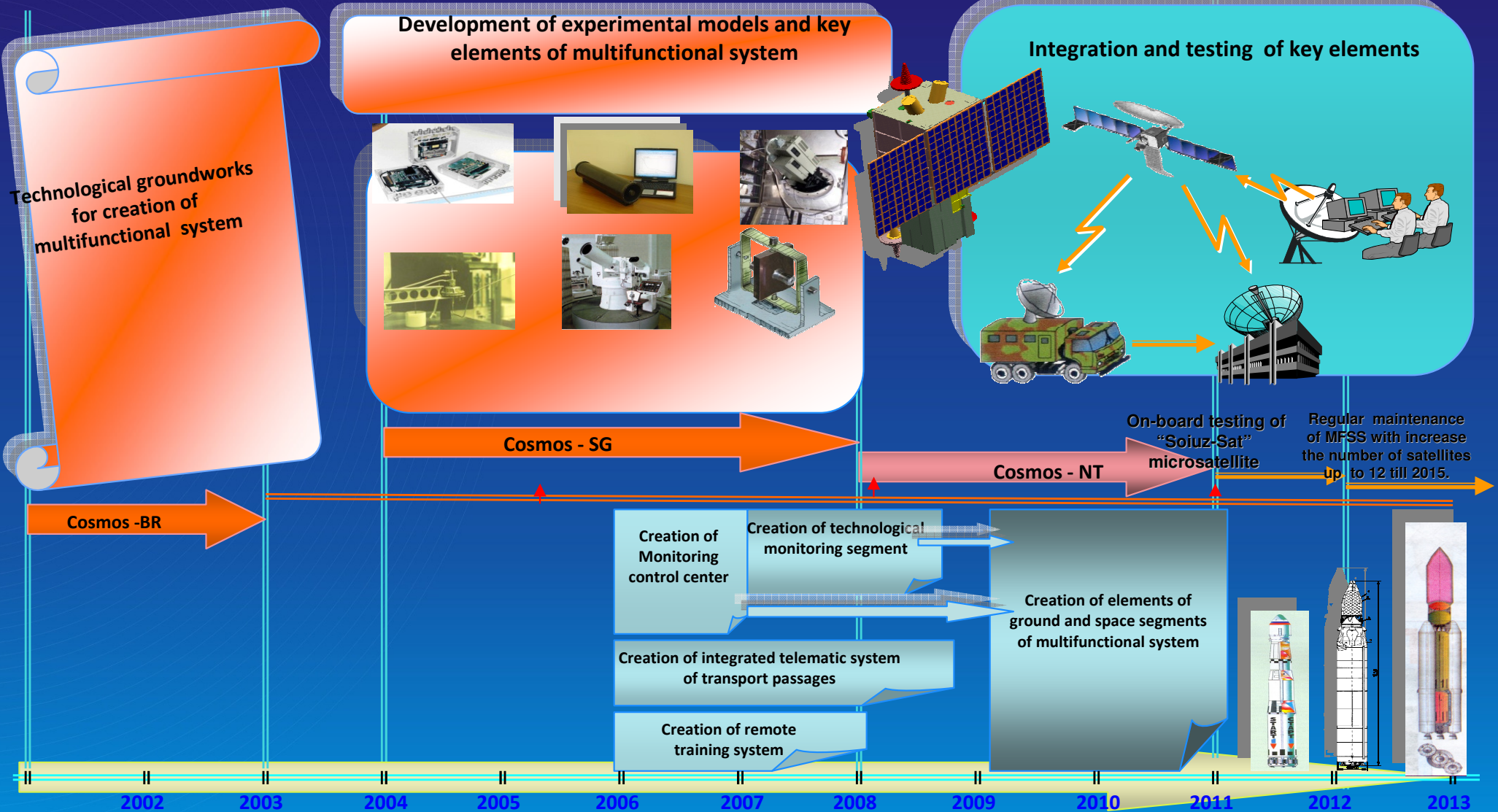
Cosmos -NT

In 2008-2011 the scientific technical program of Belarusian-Russian Union state "Development of Fundamentals, Technologies for Creation and Application of Orbital and Ground Aids for Multifunctional Space System" (Cosmos -NT), was included in the structure of the National Space Program. State Customer from Belarusian part is the National Academy of Sciences of Belarus.

NATIONAL SPACE PROGRAM OF THE REPUBLIC OF BELARUS (2008-2012)



MULTIFUNCTIONAL SPACE SYSTEM: RUSSIAN-BELARUSIAN PROGRAMMES



NATIONAL SPACE PROGRAM OF THE REPUBLIC OF BELARUS (2008-2012)



Realization of space activity under the National Space Program corresponds to state interests of the Republic Belarus and is in line with the modern world tendencies of state support of research, developments and technologies in the field of space. The program was worked out on the basis of available possibilities of Belarus economy taking into consideration the attraction of the budget and out of budget funds.

On the basis of the National Space Program a new space branch for the development of Belarusian national economy and space service for social and Government needs is to be created.

Implementation of the National Space Program will allow to accomplish systematic development of Belarusian space system for Earth remote sensing taking into consideration the launch of new Belarusian remote sensing satellite to enlarge the number of space information consumers in the country and abroad. This gives the possibility for the Republic to participate in creation of space satellite groups which in its turn will give the chances to join the countries-participants of the project for creation of International Aerospace Monitoring System.

The goal of the National Space Program of the Republic of Belarus for the years 2013-2017 is to integrate all the activity in Belarus in the area Space in framework of a new National Space Program.



Conception of the new National Space Program of Belarus for 2013 – 2017 is developed and is under consideration of the Council of Ministers of Belarus

Main activities

- 1. Further development of the Remote Sensing System of Belarus.
- 2. Creation of the National Satellite Communication System of Belarus and launching a Belarus Telecommunication Satellite.
- 3. Creation of the unified Navigation and Time support System in Belarus.
- 4. Further development of human resources supply, scientific and technological, legal and regulatory support of Space activity in Belarus.



Thanks for Your Attention!

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