MIIGAIK

1779-2013

JSC RUSSIN SPACE SYSTEMS

GLONASS Learning Centre

General Director RSS – Prof. Gennadiy Raikunov

President of the MIIGAIK - Prof. Victor Savinych,

Rector of the MIIGAIK- Prof. Prof. Andrey Maiorov ,

Deputy of the Rector of the MIIGAIK – Prof. Victor Nepoklonov,

Prof., CEO of Association GLONASS/GNSS Forum, Andrey Kupriyanov

The eighth Meeting of the International Committee on Global Navigation Satellite Systems (ICG-8), 10-14 November 2013, Dubai, UAE

- "The Moscow State University of Geodesy and Cartography education system and the global navigation satellites systems application"

  Victor Savinych, Vasily Malinnikov, Andrey Maiorov, Andrey Kupriyanov

United Nations/Moldova/United States of America Workshop on the Applications of Global Navigation Satellite Systems Chisinau, Moldova, 17-21 May 2010

- "The Moscow Geodesy and Cartography State University (MIIGAIK) experience in educating of specialists in applications of GNSS" Victor Savinych, Vasily Malinnikov, Andrey Maiorov, Andrey Kupriyanov

  United Nations/United Arab Emirates/United States of America Workshopon the Applications of Global Navigation Satellite Systems Dubai, 16-20 January 2011

- **"GNNS/GLONASS SPECIAL APPLICATIONS AND THE PROGRAMS OF PRACTICAL TRAINIG OF SPECIALISTS"** Victor Savinych, Andrey Maiorov ,
- Victor Nepoklonov, Andrey Kupriyanov
- The Seventh Meeting of the International Committee on Global Navigation Satellite Systems (ICG-7), 4 - 9 November 2012, Beijing, China

Working Group C: Information Dissemination and Capacity Building (WGC) held its sixth meeting in Beijing, China, on 7 and 8 November 2012 in conjunction with the Seventh Meeting of the International Committee on Global Navigation Satellite Systems (ICG), 4 – 9 November 2012 under the chairmanship of the United Nations Office for Outer Space Affairs and China.

- **"22. The Working Group noted that the Russian Education Centre lead by the Russian Space System JSC was developing GLONASS/GNSS education infrastructure, including distance learning education courses and programmes.**

- **The work of the Moscow State University on Geodesy and Cartography (MIIGAIK) was highlighted. It was noted that**

- **these courses provided through a distance-learning degree programme could be a good resource for effectively teaching diverse learners of all disciplines at the United Nations- affiliated Regional Centres for Space Science and Technology Education."**

GLONASS/GNSS Forum –is the member of the Federal GLONASS operator"SRINT"

Customer of services and user's equipment

Designers of the GLONASS system

Designers of navigation equipment, VTS, on base of GLONASS/GNSS systems

Universities and Scientific Institutions

Service providers

The association includes about 80 enterprises, growth for the year 10%

«GLONASS – Education» project

Federal Enforcement Jurisdiction

| RSS | ISS | CNIIMASH |

Education Working Group

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GLONASS/GNSS Forum

Moscow State University of Geodesy and Cartography

Moscow State Technical University n.a. N.E. Bauman

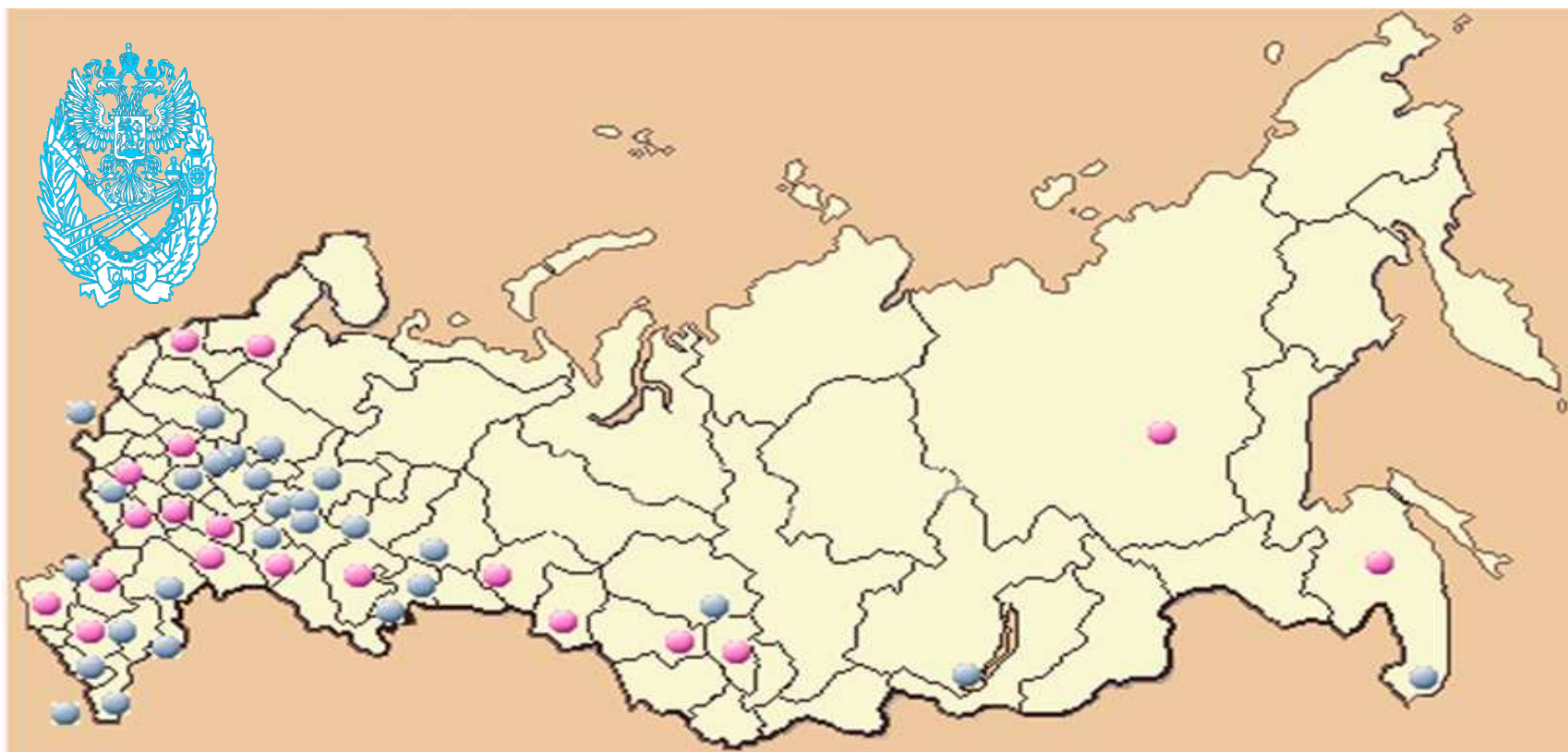Moscow Aviation Institute

Russian State Agrarian University

Peoples' Friendship University of Russia

Financial Technological Academy

The Educational Tutorial Association under MIIGAIK includes 24 higher education institutions of Russian Federation

More than 600 students graduated at the chairs of geodesy of institutes and universities annually

Московский государственный университет им. М.В.Ломоносова

Московский авиационный институт

Московский государственный технический университет им. Н.Э.Баумана

Рязанский государственный радиотехнический университет

Московский государственный университет геодезии и картографии

Московский физико-технический институт

Московский инженерно-физический институт

Московский институт радиотехники, электроники и автоматики

Московский энергетический институт

Белорусский государственный университет

Казахский национальный университет имени Аль-Фараби

Казахский национальный технический университет имени К.И. Сатпаева

Дальневосточный федеральный университет

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GLONASS/GNSS Forum is in cooperation with leading position organizations and universities of Russian Federation for the purpose of training and advanced training in GNSS applications.
The Moscow State University of Geodesy and Cartography is the member of GLONASS/GNSS Forum Association and developed several teaching materials   for specialists in high precision applications

The purpose of the education program is to add or to implement in GNSS
general curriculum the applications courses in accordance with the main strategic directions of social economic development and requirements

MIIGAiK
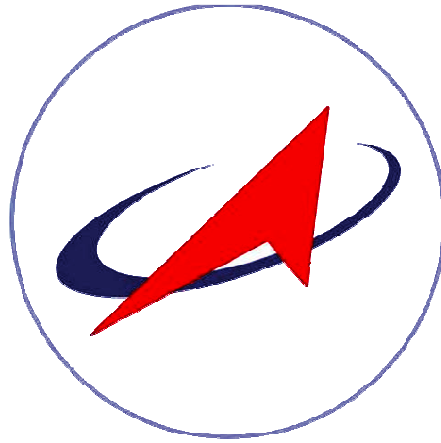
Russian Space Agency

Roskosmos

JSC "Russian Space Systems"

MIIGAIK takes part in Federal "GLONASS" program for developing of educational system for different applications

The "GLONASS –EDUCATION" could be the integrated part of international program GNSS application training and continuing education of specialists in different brunches of economy including UN affiliated educational Centers

Diffirent countries – providers of GNSS, created education process and retraining programs on base of geographical location, economy characteristics, mining of natural recourses, oil&gas transportation, transport infrastructure, precision agreculture, machine control etc.,etc

Three main segments of GNSS

User segment

Space segment

Applications
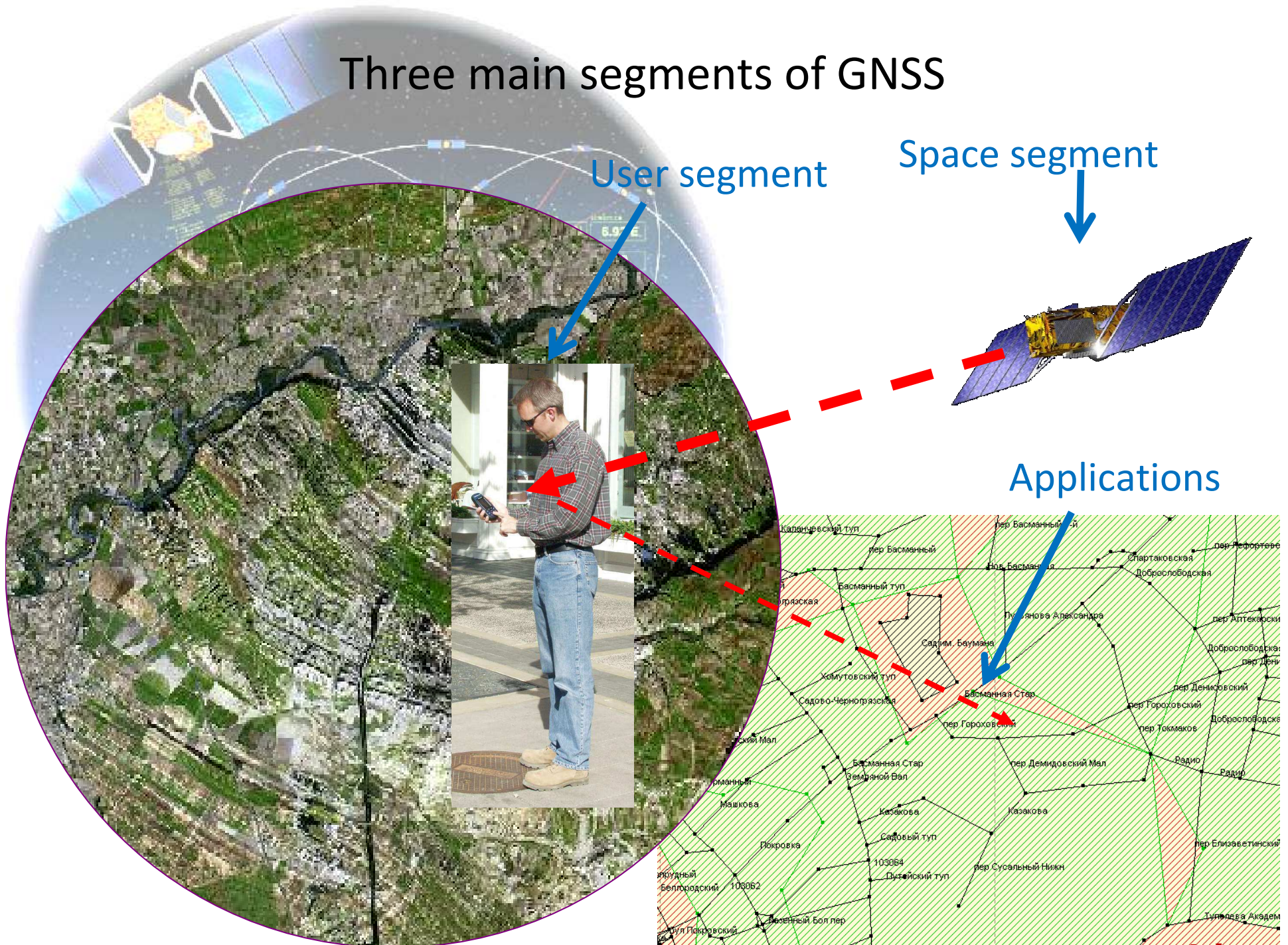
Education cources developed by MIIGAIK in accordance with Federal "GLONASS" program under management of Roskosmos and JSC "Russian Space Systems":

There are the following training courses were developed :

1. **"The fundamentals of satellite navigation"**
2. **"Application of satellite navigation to cadastral and land planning work"**
3. **"Application of satellite navigation to state geodetic networks"**
4. **"The organization and planning of field operations while making cadastral surveys with the use of the GNSS,GLONASS"**

5. " Application of satellite technologies in earthquake regions"

6. "Application of satellite navigation to railroad and VTS"

7. "Application of satellite navigation to monitoring building structures deformations"

8. "The Structure of satellite-based geodetic networks"

9. "GNSS (GLONASS) application for global, regional and local geodynamics"

10. "Metrological aspects GNSS (GLONASS) equipment applications."

11. "GNSS (GLONASS) technologies for the inventory of real estate lands and objects."

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12. "GNSS (GLONASS) technologies for monitoring of transport infrastructure objects, the procedure for keeping and making a digital cartographic basis"

13. "GNSS (GLONASS) technologies for making of digital navigation charts"

14. "GNSS -GLONASS application to topographic surveying and monitoring linear constructions (oil- and gas pipelines, power transmission lines)"

15. "GNSS (GLONASS) technologies and equipment in making underground metro lines, underground constructions, tunnels"

The each training course consist on:

- **The subject purpose;**
- **A curriculum;**
- **A syllabus;**
- **The subject glossary;**
- **The subject illustration material;**
- **A course of lectures (the theoretical material) of the subject;**
- **Questions for self-checking and keys to them;**
- **Tests for checking up the level of the subject mastering by students keys to them;**
- **A list of practice work to be done while studying the subject by students;**
- **Methodological instructions to the course paper;**
- **Methodological instructions for the teacher.**

The education structure of Moscow State University of Geodesy and Cartography consist on several levels:

- Pre-higher education professionally oriented with high-school children, including distance education,
- Bachelor's program
- Specialization
- Master's degree program
- Graduate school
- Doctoral candidacy
- Extended education, Professional development

GNSS SPECIAL COURSES

- Base course: <u>Global Navigation Satellite Systems</u>
- Space Geodesy
- Space Navigation
- Orbital Methods
- GNSS reference networks applications for monitoring of global, regional and local geodynamic, etc.,etc
- Survey technologies, methods and equipment on base of GNSS signals
- Monitoring of Constructions

POST-GRADUATE EDUCATION, GRADUATE SCHOOL

- **Geodesy** (INCLUDES ALL GNSS APPLICATIONS)
- **Cartography** (INCLUDES ALL GNSS APPLICATIONS)
- **Land management, cadastre and land monitoring** (INCLUDES ALL GNSS APPLICATIONS)
- **Aerospace research of Earth, photogrammetry** (INCLUDES ALL GNSS APPLICATIONS)
- **Geoinformatics** (INCLUDES ALL GNSS APPLICATIONS)
- **Optical and optoelectronic equipment and systems**
- **Geoecology**
- **Economy and management of nation's economy (in sectors including economy, development and management of enterprises, industry branches, complexes)**

GNSS education programs are parts of

- **University Education**
- **Extended education**
- **Professional development**
- **Training courses**
- **Distance learning**
- **Senior management and administration education**

The training course "The GNSS, GLONASS BASE COURSE"

- The purposes of the course are to give general knowledge on the GNSS main segments: the theory of coordinate determination, satellite constellations, signals structure, equipment, market segments of on the GNSS application. Practical application of satellite systems, to acquaint students with approaches and technologies of application of satellite navigation.

The training course «THE FUNDAMENTALS OF GNSS (GLONASS) APPLICATION TO RAILROAD SYSTEM AND VTS»

- The Course Purpose is to give general knowledge on the GNSS application to railway and motor transports.

- Practical application knowledge of satellite systems to transport.

- To acquaint students with approaches and technologies of application of satellite navigation to railway and motor transports.

After studying the course the students should get general ideas of the state-of-the-art situation and main directions of application of satellite navigation systems to various kinds of transport.

The training course «GNSS (GLONASS) TECHNOLOGIES AND EQUIPMENT FOR CADASTRE AND LAND MANAGEMENT SPECIALISTS»


- **Acquaintance of the students with GNSS technologies of defining coordinates with GPS-Glonass satellite receivers (single and dual frequencies).Processing, analyzing and estimating the accuracy of the results obtained for cadastre and land and real estate management.**
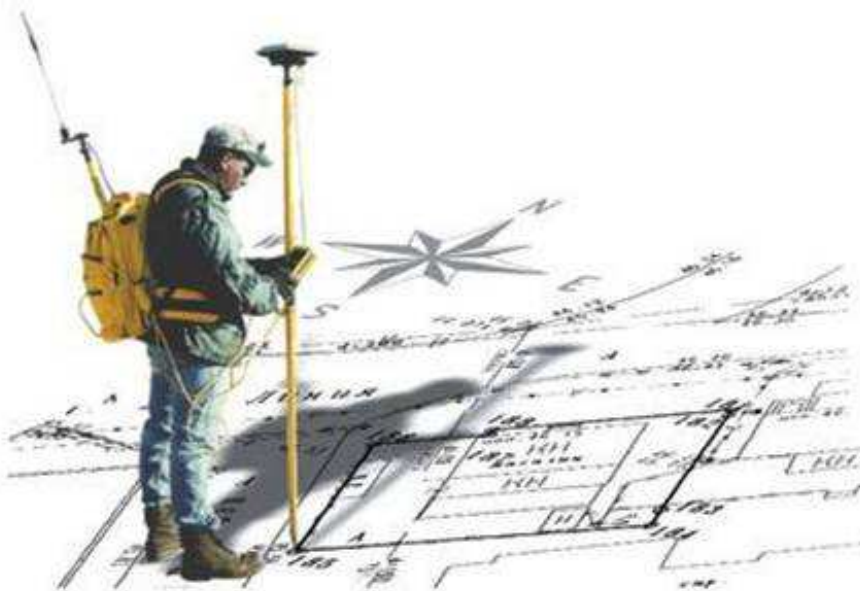

- Training of cadastre and land use specialists with knowledge of technologies of satellite-based geodetic measurements.
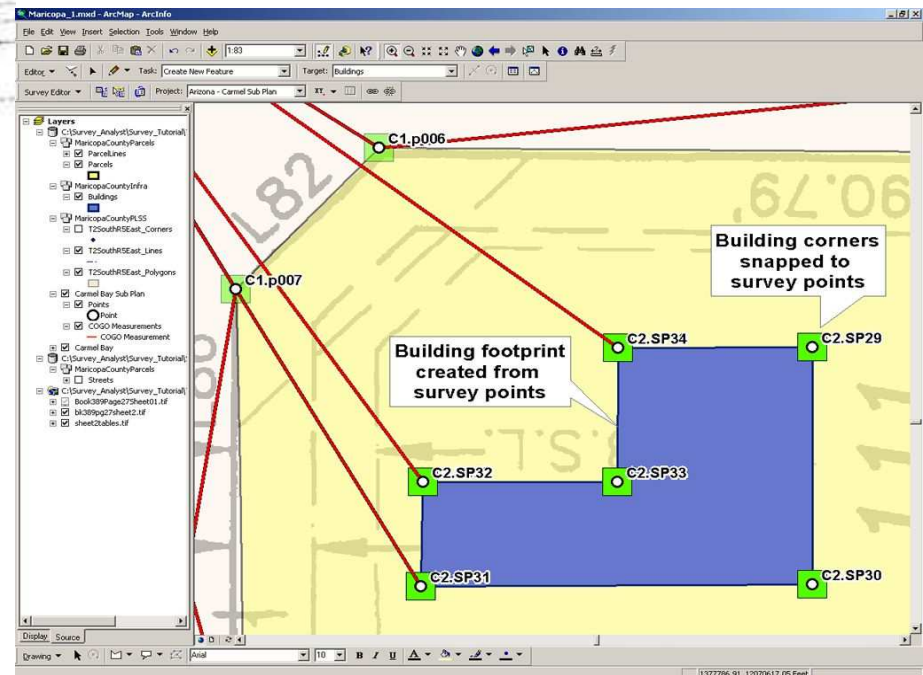
The training course «GNSS (GLONASS) APPLICACATION FOR STATE REFERENCE NETWORKS»
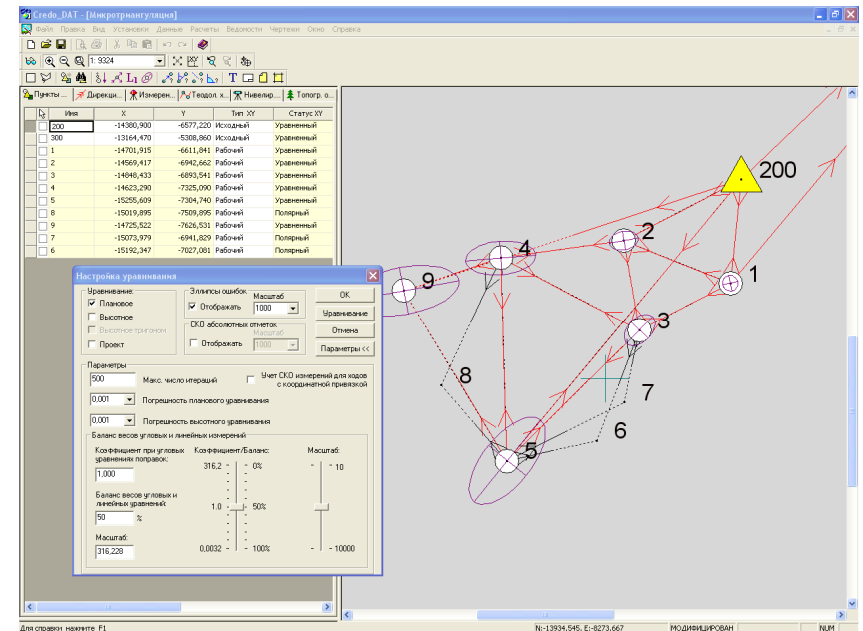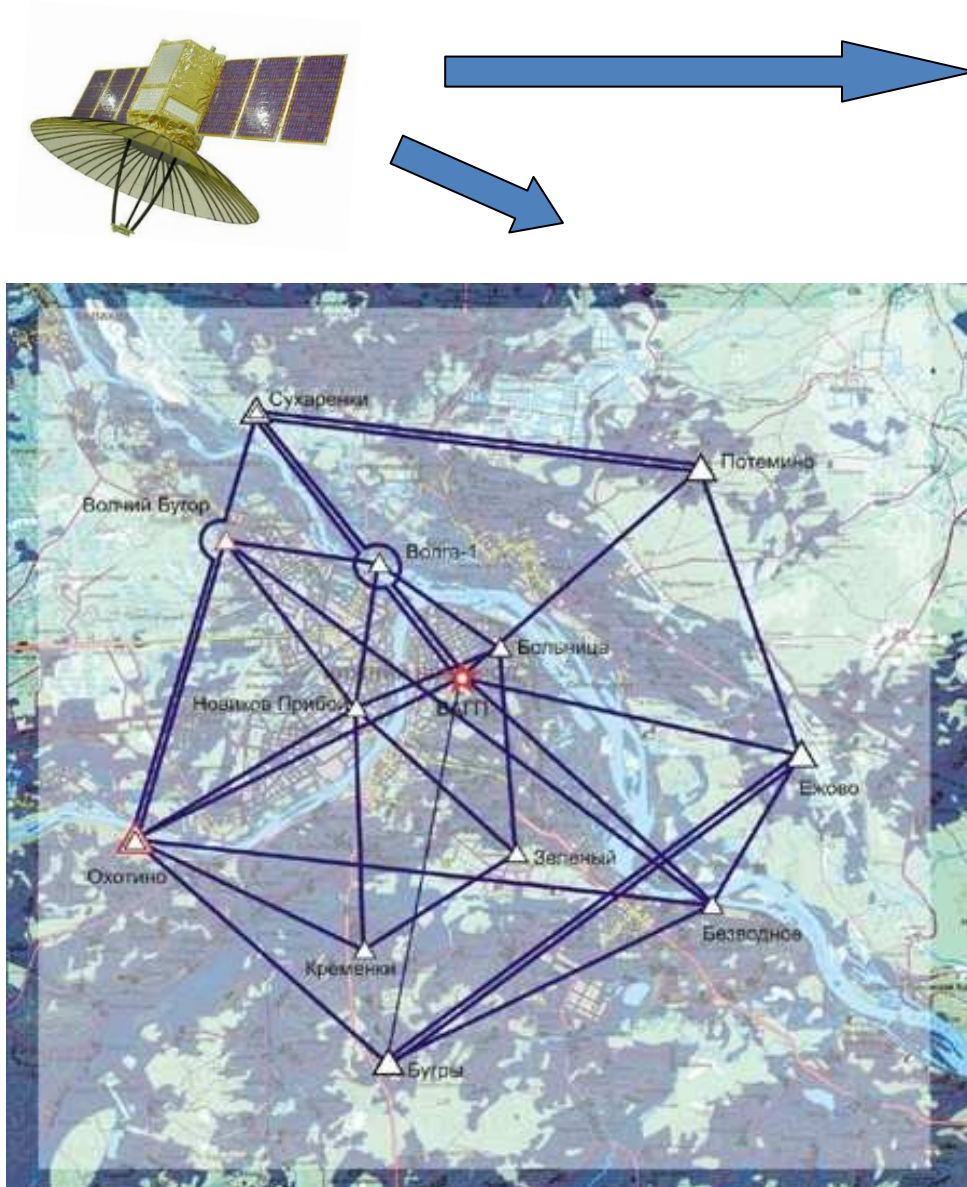
- **Students will have practical knowledge in technical design, optimization of network structure, equipment and software of GNSS used in state reference networks.**

# The training course «THE GNSS (GLONASS) APPLICATION IN EARRTHQUKE REGIONS»
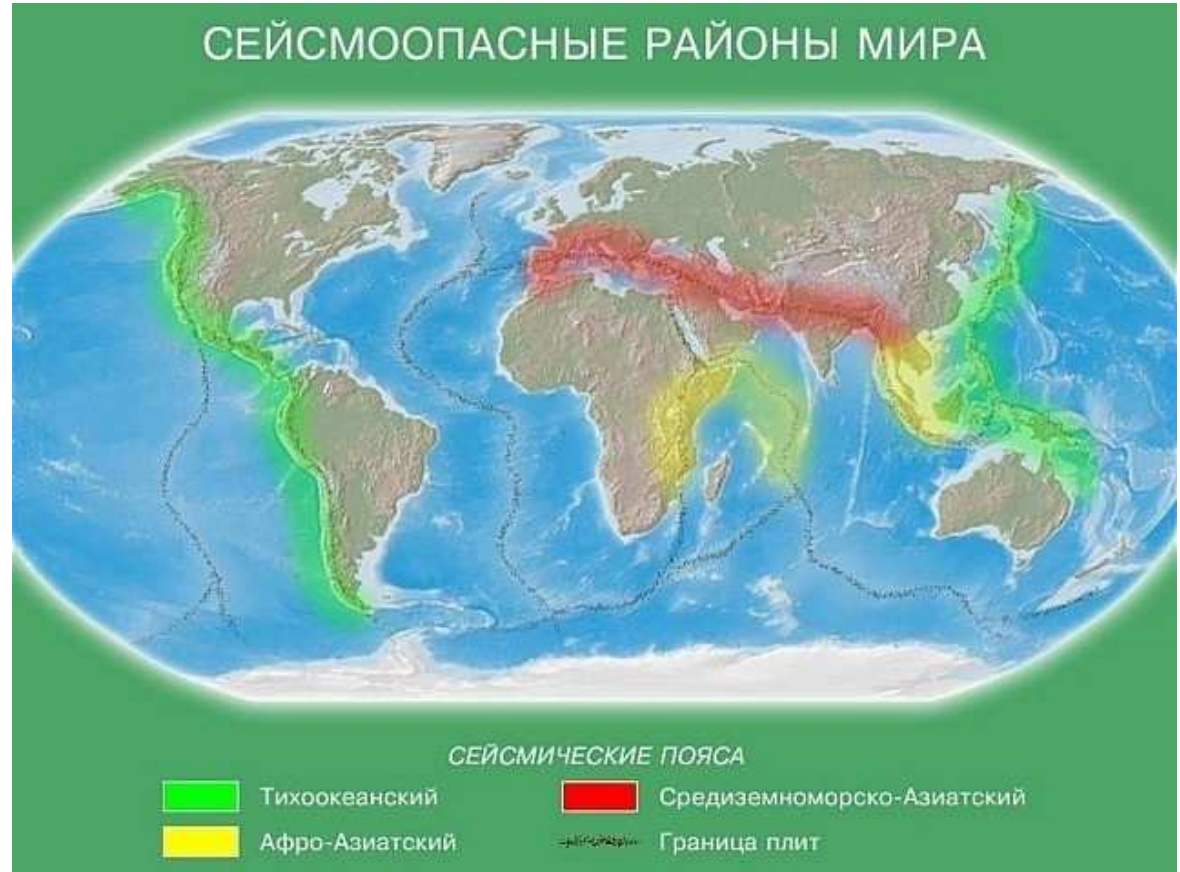
After the Course the students will have basic skills in modern methods for observing the motions and strains of the Earth's surface in seismoactive regions with the use of global navigation satellite systems.

The training course «GNSS APPLICATIONS FOR CONSTRACTIONS DEFORMATION »
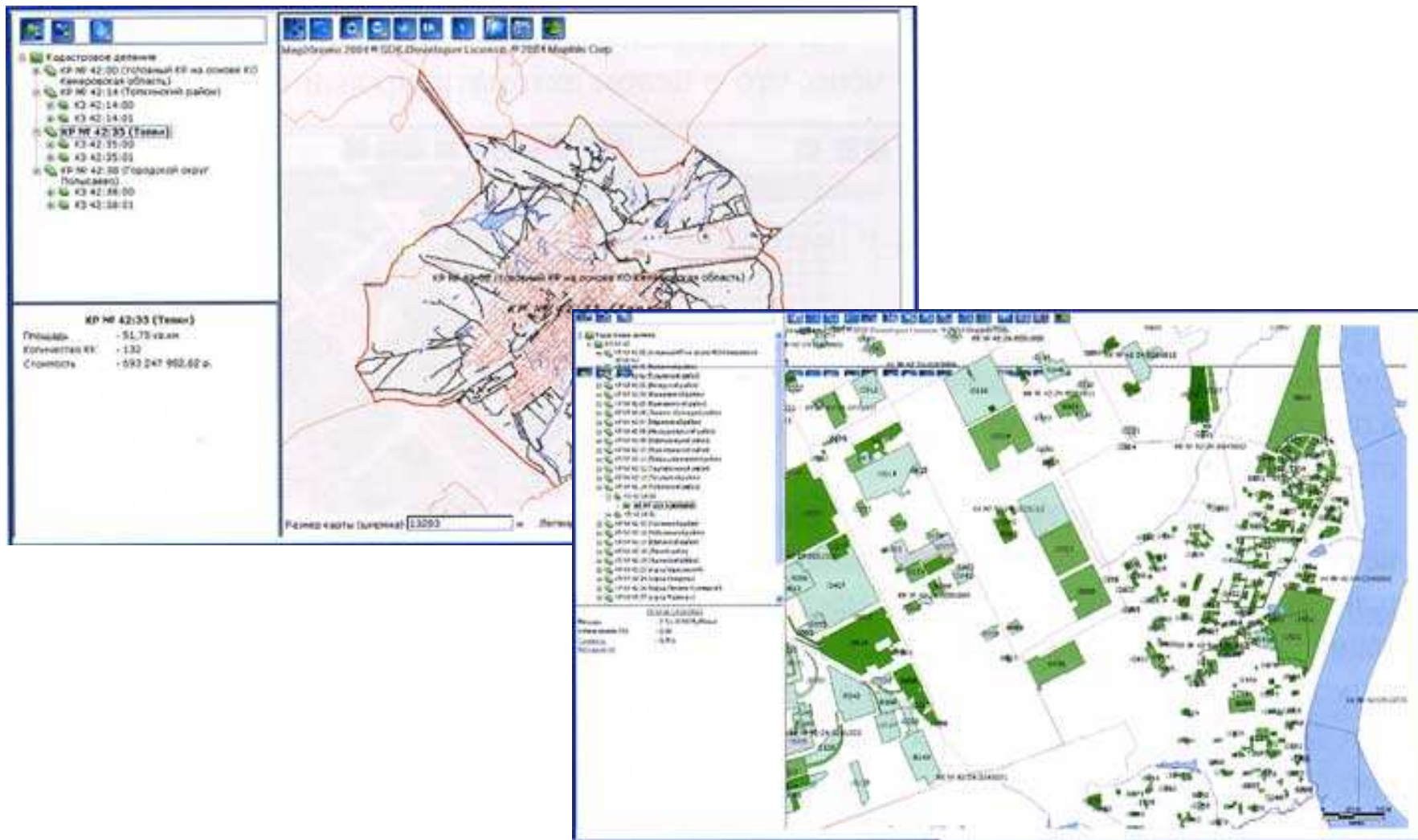

HIGH-RISE
BUILDINGS
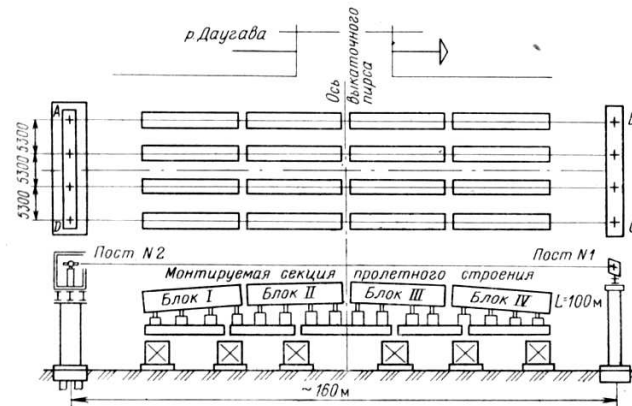
BRIDGES

DAMS

As result, student will have knowledge in equipment operation, software, technologies of monitoring of different types of engineering constructions with GNSS technologies.

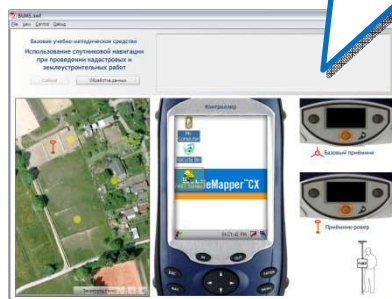# The training course « FIED SURVEY MANAGEMENT AND PLANNING OF CADASTRE WITH GNSS (GLONASS)»

The System of the context help and analysis of the student's activities

The example of the part of Oil&Gas Pipeline Monitoring training course of field application GLONASS-GPS equipment
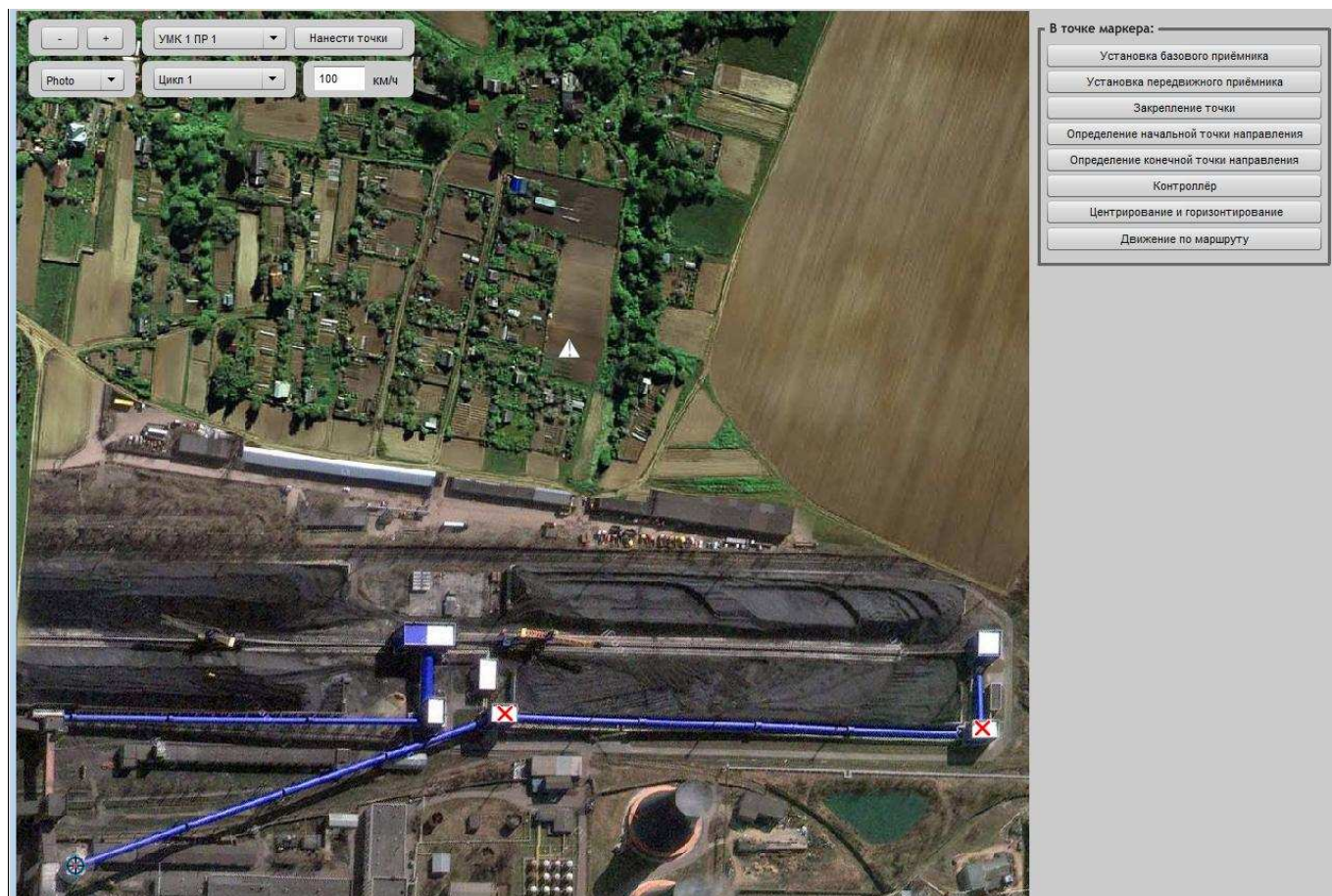
GLONASS Learning Center

Asia
India (CSSTE-AP)

Central America
Mexico (CRECTEALC)

South America
Brazil (CRECTEALC)

Africa
Morocco (CRASTE-LF)
Nigeria (ARCESSTE-E)

Map CENT-03-01 Rev.1
June 2003

Office for Outer Space Affairs (UN-OOSA)
United Nations

Considering the Resolution of the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space adopted by the UN General Assembly (A/RES/54/68) and implementation of United Nations Programme on Space Applications, in 2009 on ICG-4 WGC Russia first proposed to take into consideration the role of **Russian International Education Center** (Russian Space Systems, JSC) in international activities on GNSS information dissemination and training of specialists in this field

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Learning Programs for specialists in various fields

Cross-university system of distant learning

| Bases of satellite navigation | Applications of satellite navigation | Bases of remote sensing | Intergrated use of GNSS and RS data | COSPAS-SARSAT |

More than 1000 h. of theoretical and practical training

Construction and monitoring

Transportations

Precisious agriculture

Geodesy

DISTANT

LEARNING

FACILITIES

Information-Analytical Complex

Automated Complex of Distant Learning

Complex of Scientific, Technical and Methodical Supply

Universities

Experts

УЧЕБНЫЙ ЦЕНТР ГЛОНАСС

ICG Regional Informaition Centeres

National Universities

Consumers of educational products in various fields

Up-to-date information on GLONASS

Learning cources, facilities, multimedia

Curricula on GNSS

Popularization
Distant learning

Availability from any computer, gadget

Near-realtime monitoring of satellite constellation

Universal multimedia platform

Multimedia is highly perspective in specialists learning

Additional learning in basics of satellite technologies, its perspectives and applications

Students: specialists of organizations that use GNSS

2011: Course "Satellite navigation technologies and its applications"

**2012: Course "Practical use of integrated GNSS and Remote Sensing data",
students from Russia, Kazakhstan**

2013: Course "Practical use of GLONASS in national economy»

47 students from Russia, Moldova

… and many others will:
accelerate GNSS information drive
make contribution to International GNSS society push
forward development new education courses for training
specialists in deformation monitoring, homeland security,
precision agriculture, transportation, ITS, survey,
construction,… mass introduction of GNSS/GLONASS-GPS-
BEIDOW-GALILEO navigation technologies for social and
economic benefit

The database on GLONASS system and it's applications may be developed and provided through the ICG information portal by Russian International Educational Center

The working plan of Russian International Education Center and it's cooperation with the regional centres for space science and technology education affiliated to the United Nations may be designed respecting to the recommendations of the ICG (WGC)

Спасибо за внимание!

THANK YOU!

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