

GNSS education courses held by leading Russian corporations and universities in 2017

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Moscow State University Geodesy and Cartography,
GLONASS/GNSS Association Forum;
Pavel KAZAKOV - Russian Space Systems
Corporation;
Anatoly ZEYLIGER – Moscow Timiryazev
Agricultural Academy
RUSSIAN FEDERATION

ICG-12
1-7 December 2017

Training in Russian Space Systems

★ *Cooperation with leading universities:
target training*

★ *Basic subfaculties*

★ *Postgraduate study*

★ *Involving young people
in programs, grants, schools,
workshops*



Russian Space Systems profile faculties

Aerospace and geographic information systems and information technology; Electronic-computing devices and informatics



Information technology rocket telemetry



Physical and mathematical methods of designing complex technical systems of space technologies



Space industry



Space and aviation industry





International School on Satellite Navigation

September, 2017



56 hours (6 days)



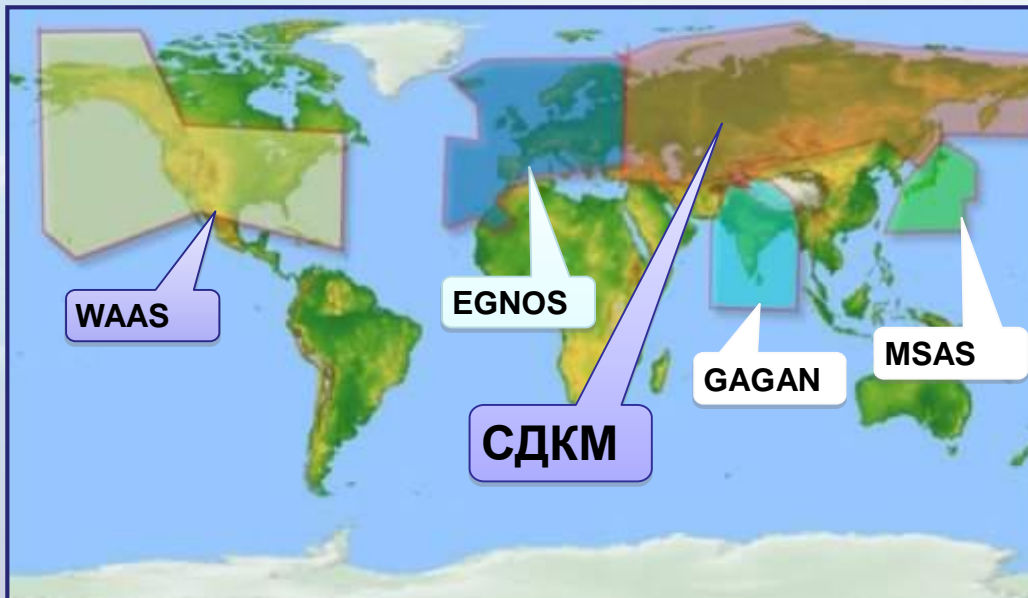
АО ГЛОНАСС





International School on Satellite Navigation

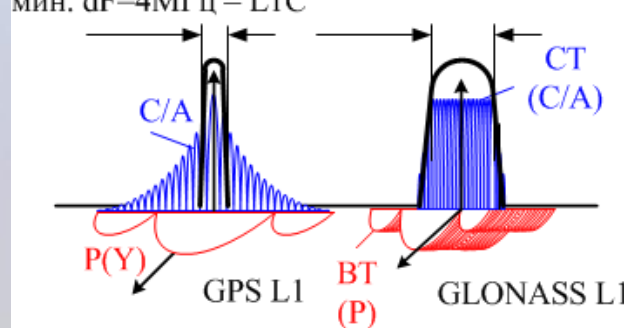
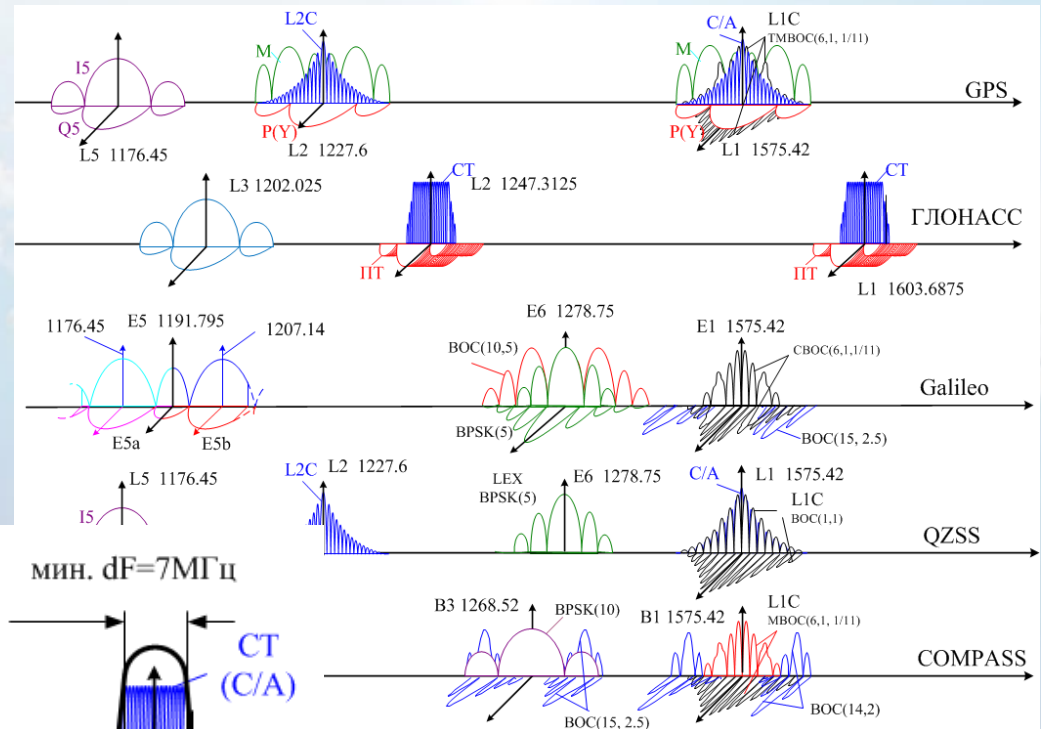
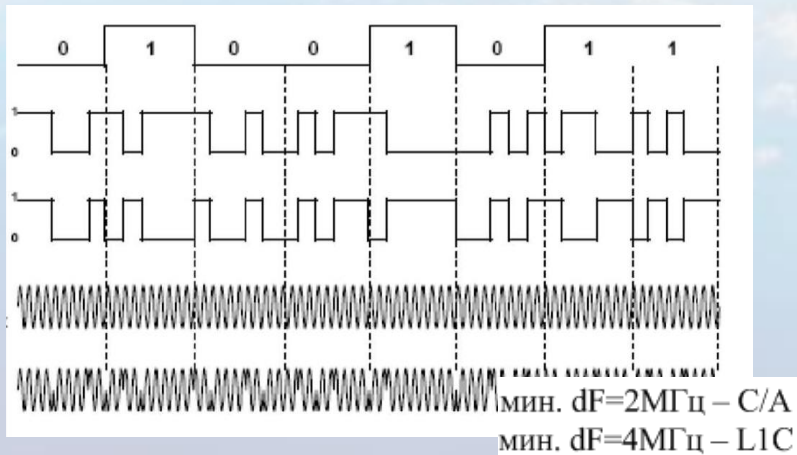
GNSS architecture, development, compatibility trends





International School on Satellite Navigation

GNSS Navigation signals





International School on Satellite Navigation

User equipment accuracy characteristics



ЭРА ГЛОНАСС – система экстренного реагирования при авариях

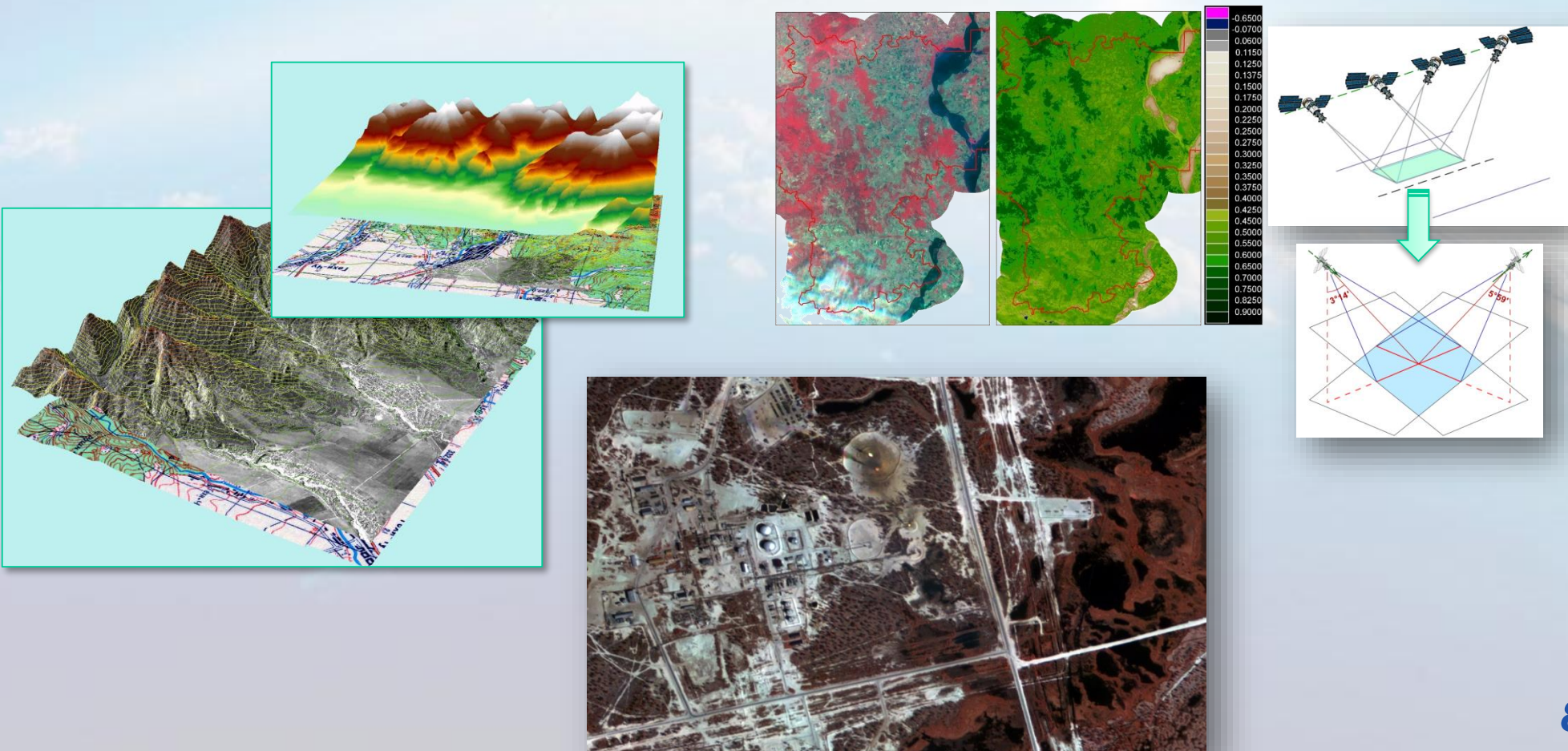
К 2013 году предполагается оснащение всех новых российских автомобилей ГЛОНАСС-оборудованием





International School on Satellite Navigation

The integrated use of GNSS and Remote Sensing data





International School on Satellite Navigation

Metrology, cartography

The screenshot displays a GIS software interface with several windows:

- Map View:** Shows a satellite-style map of Chelyabinsk, Russia, with a grid overlay. The city name 'ЧЕЛЯБИНСК' is visible.
- Редактирование классификатора (Classifier Editor):** A central window titled 'Редактирование классификатора: E:\Graphics\Panorama\W...' showing a grid of classification symbols. It includes fields for 'Код' (8010), 'Тип' (ТОЧЕЧНЫЕ), 'Ключ' (R000008010), and 'Слой' (ТЕМАТИЧЕСКИЙ - ГИС "Н").
- Редактирование знака (Symbol Editor):** A window titled 'Редактирование знака' showing a grid-based symbol editor. It includes options for 'Сохранить', 'Отменить', 'Очистить', 'Экспорт', 'Импорт', and 'Узор'. Parameters include 'Цвет фона', 'Размер рамки', and 'Размер знака'.
- Классификатор 10003g.rsc (Legend):** A window on the right showing a list of classification codes and their corresponding symbols. The list includes items like 'посевы конопли дикаротрашей' (8010 T) and 'посевы мака энтеотогенные' (8012 T).

Russian Space Systems: other educational activities



*Workshop “Use of Remote Sensing data”
(November 2017)*



*GNSS course for Moscow State University Gymnasium
students
(December 2017 – February 2018, planned)*



MIIGAIK Open Day, 2017





MIIGAiK special GNSS courses



- Base course: Global Navigation Satellite Systems
- Space Geodesy
- Space Navigation
- Orbital Methods
- GNSS applied geodesy, 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



(including GNSS applications)

- Geodesy
- Cartography
- Land management, cadastre and land monitoring
- Aerospace research of Earth, photogrammetry
- Geoinformatics
- 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)



Precision positioning as new level of mass GNSS service





The Fundamentals of GNSS/GLONASS Applications in Railroad and VTS

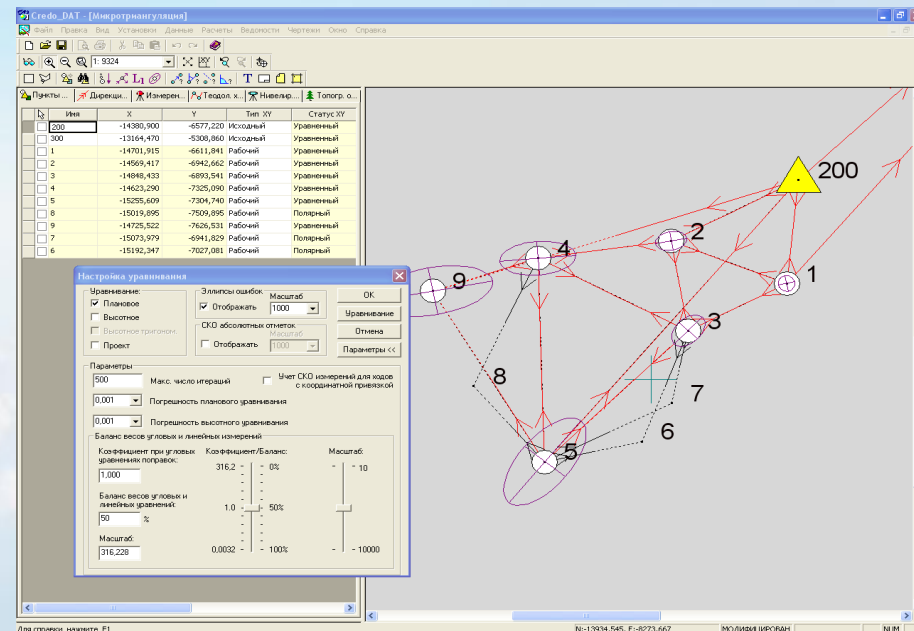
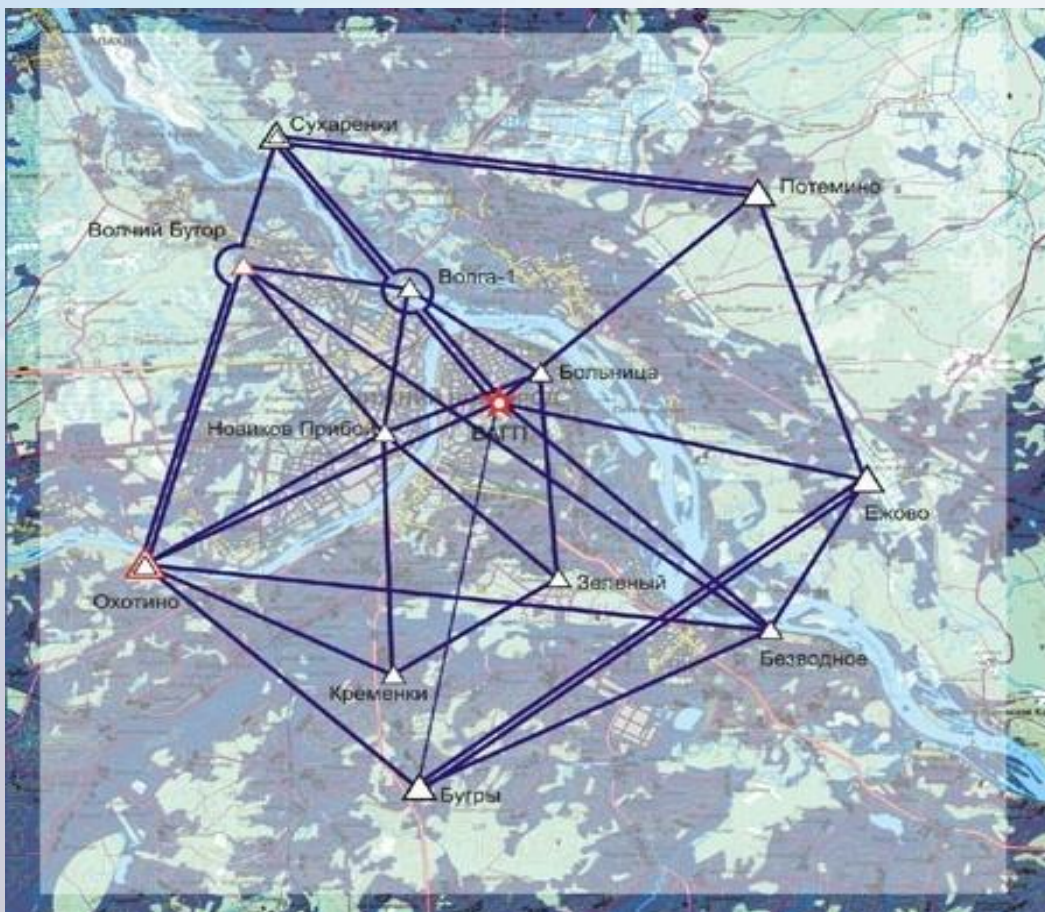
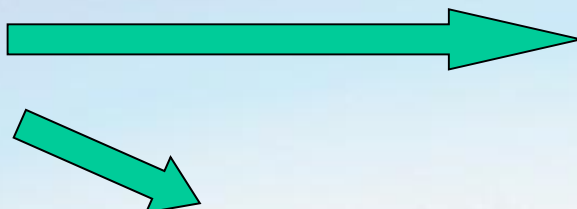
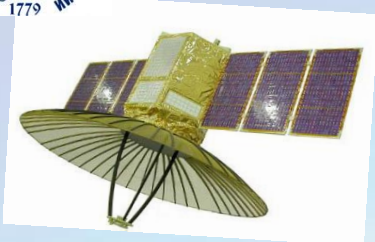


- **The Course Purpose is to give general knowledge on the GNSS application to railway and motor transports.**
- **Practical application knowledge of satellite systems to transport.**
- **To acquaint students with approaches and technologies of application of satellite navigation to railway and motor 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.



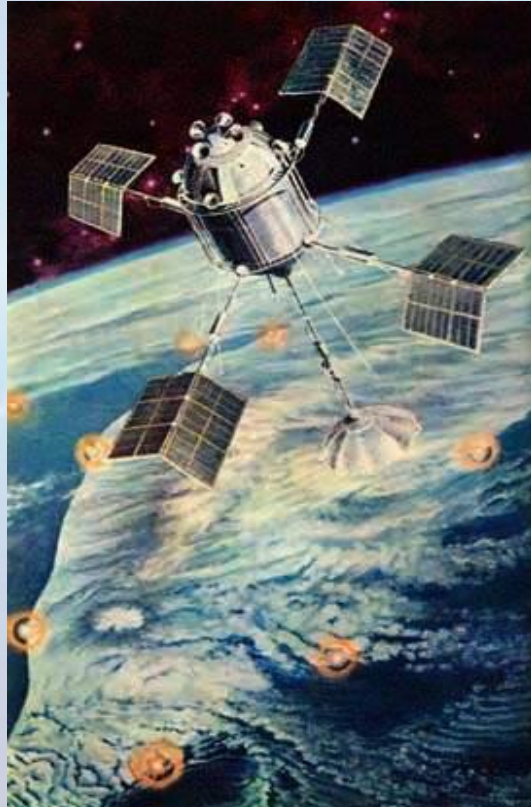
GNSS/GLONASS Application for State Reference Networks



Students get practical knowledge in technical design, optimization of network structure, equipment and software of GNSS used in state reference networks



The training course: GLONASS-GNSS applications in earthquake regions



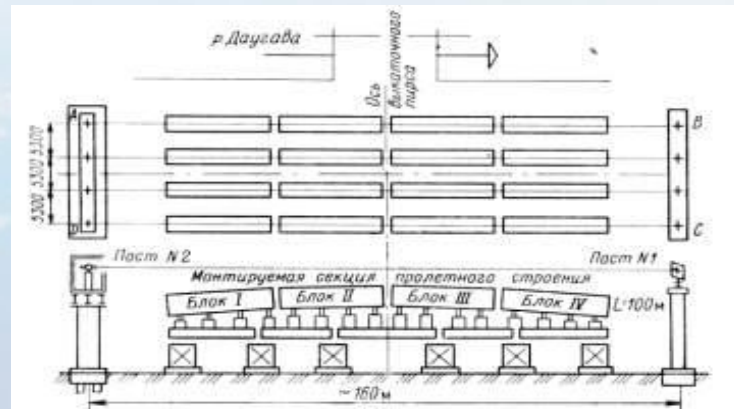
Students get basic skills in modern methods for observing the motions and strains of the Earth's surface in seism active regions with the use of GNSS



The training course: GNSS applications in constructions deformation monitoring



HIGH-RISE BUILDINGS



BRIDGES



DAMS

Students get skills in equipment operation, software, technologies of monitoring of different types of engineering constructions with GNSS technologies



Field survey management and planning of Cadaster with GLONASS-GNSS



The collage illustrates the integration of field surveying and cadastral planning. On the left, a handheld GPS device (FAST Sur...) displays a 'STORE PTS' window with a list of points and their coordinates (Pt: 5, Desc: , HT: 1.69, E: 4000136.99 N: 2199747.06, PDOP: 2.9, HRMS: 0.5). In the center, a close-up of a GNSS receiver's display shows '0.5 s' and '45%'/'70%', indicating signal strength and processing time. On the right, a computer screen displays a list of cadastral plots (КП № 42-00, 42-14, 42-35) and a map. Below the list, a detailed cadastral map shows green and blue areas, likely representing different land use zones or water bodies. The text 'База' (Base) is visible on the screen, suggesting a database of cadastral data.



GLONASS/GPS Oil & Gas Pipeline Monitoring



УМК 1 ПР 1 Нанести точки

Photo Цикл 1 100 КМ/ч

В точке маркера:

- Установка базового приёмника
- Установка передвижного приёмника
- Закрепление точки
- Определение начальной точки направления
- Определение конечной точки направления
- Контролёр
- Центрирование и горизонтирование
- Движение по маршруту



UniStrong equipment in studies (Applies Geodesy, 17.11.2017)



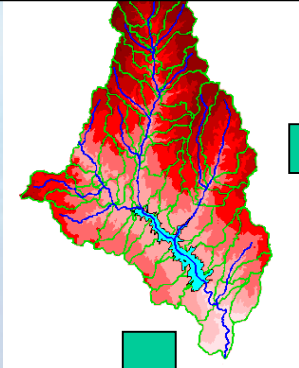
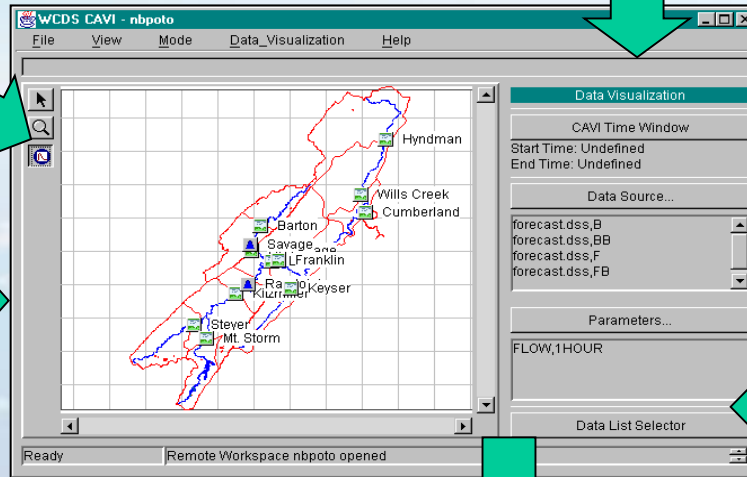


MIIGAik students and post-graduate practice





Moscow Timiryazev Agricultural Academy Training Courses and Software Tools



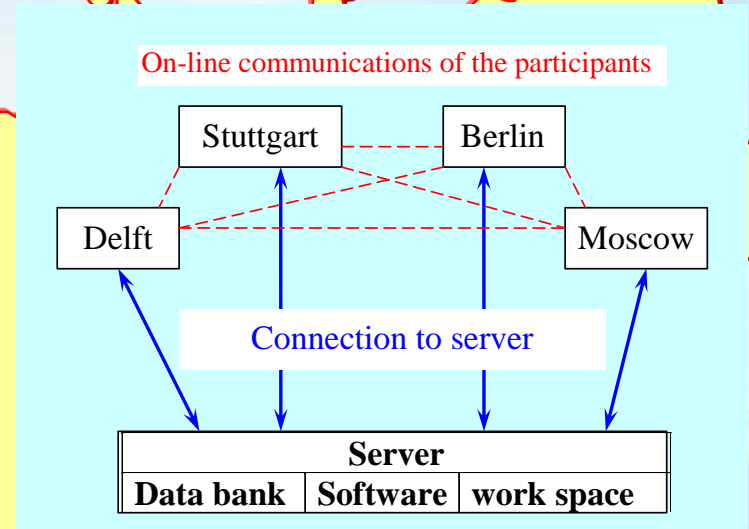


Moscow Timiryazev Agricultural Academy Electronic Training Courses





Web Hydro-Engineering





Conclusion



Joint Stock Company "Russian Space Systems", cooperated with set of leading Russian technical universities, such as Moscow State University of Geodesy and Cartography and Moscow Timiryazev Agricultural Academy perform different modern training courses on GLONASS-GNSS technologies.

Universities, training and information centers are always welcomed for cooperation!



Thanks for you attention!

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