



Federal Space Agency



GLONASS Status Update

Presented by Sergey REVNIVYKH,
Central Research Institute of the
Federal Space Agency

sergey.revnivykh@mcc.rsa.ru

UN/Zambia/ESA Regional Workshop on the Applications of Global Navigation
Satellite System Technologies in Sub-Saharan Africa,
26 - 30 June 2006, Lusaka, Zambia



Information Analysis Center of PNT. Mission Control Center. Central Research Institute of Machine Building



GLONASS Status Update: Content



- State Policy
- Current GLONASS Status
- GLONASS Modernization
- International cooperation
- Summary





- State Policy**
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State Policy Principles



- ❑ **GLONASS is a strategic element of the national security issue**
- ❑ **GLONASS is a dual-use system**
- ❑ **No direct user fees for civil GLONASS service**
- ❑ **Open access to the GLONASS civil signal structure for user equipment manufacture, applications development and value-added services**
- ❑ **Combine GLONASS/GPS receivers development and manufacture**
- ❑ **Compatibility and interoperability of GLONASS with GPS and future GALILEO**
- ❑ **Development of the GNSS global market**
- ❑ **Since 2006 binding equipment of Russian users by GLONASS or combine GLONASS/GPS receivers**





Basic Document for GLONASS Development



□ Federal GLONASS Program for 2002-2011.

↪ Approved by the Government Resolution at 20 August 2001, #587

□ The Program directions

↪ **GLONASS development and sustainment**

↪ **User equipment development and production for both civil and special users**

↪ **GNSS technique introduction into the transport section**

↪ **Geodesy reference system update**





New Presidential Initiatives



□ Directive issued at January 18, 2006

- ↪ To ensure GLONASS minimum operational capability (constellation of 18 NSV) by the end of 2007
- ↪ To ensure GLONASS full operational capability (constellation of 24 NSV) by the end of 2009
- ↪ To ensure GLONASS performance comparable with that of GPS and GALILEO by 2010

□ Directive issued at April 19, 2006

- ↪ To ensure the navigation equipment mass production: encourage the industry in the manufacture renovation
- ↪ Mass market development



Federal GLONASS Program Update





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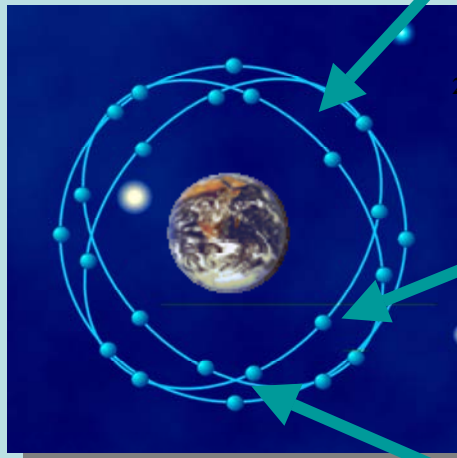


GLONASS Status at 22.06.06



In orbit: 16 SV
Operational: 14 SV
Flight Tests: 2 SV
Within lifetime: 10 SV

Block 35
Launch:
December 2006 г.



Глонасс № 96	Глонасс № 95	Глонасс № 89	Глонасс № 94	Глонасс № 11Л	Глонасс-М № 11Л	Глонасс-М № 12Л	Глонасс № 97
Запуск 26.12.2004	Запуск 10.12.03	Запуск 01.12.01	Запуск 10.12.03	Запуск 01.12.01	Запуск 10.12.03	Запуск 26.12.2004	Запуск 26.12.2004
CAC 3 г.	CAC 3 г.	CAC 3 г.	CAC 3 г.	CAC 5 лет	CAC 7 лет	CAC 7 лет	CAC 3 г.

9 10 11 12 13 14 15 16

Flight Tests

Глонасс № 87	Глонасс № 83	Глонасс № 98	Глонасс № 93	Глонасс № 92	Глонасс № 91	Глонасс-М № 11Л	Глонасс-М № 13Л
Запуск 13.10.00	Запуск 13.10.00	Запуск 25.12.05	Запуск 25.12.02	Запуск 25.12.02	Запуск 25.12.02	Запуск 25.12.2005	Запуск 25.12.2005
CAC 3 г.	CAC 3 г.	CAC 3 г.	CAC 3 г.	CAC 3 г.	CAC 3 г.	CAC 7 лет	CAC 7 лет



Интегральная доступность - Microsoft Internet Explorer

Адрес: <http://www.glonass-iacn.rsa.ru/pls/htmldb/f?p=200:24:8681204314828724521::NO::>

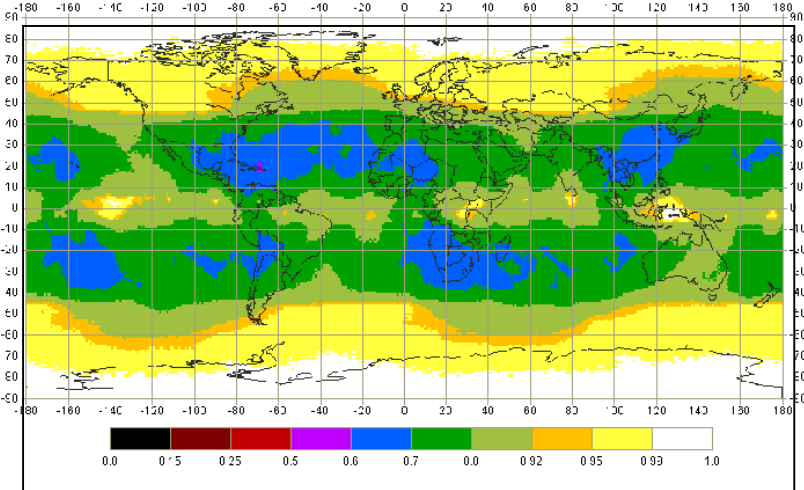
ФЕДЕРАЛЬНОЕ КОСМИЧЕСКОЕ АГЕНТСТВО
ИАЦ ИНФОРМАЦИОННО-АНАЛИТИЧЕСКИЙ ЦЕНТР
 ПРИКЛАДНОЙ ПОТРЕБИТЕЛЬСКИЙ ЦЕНТР
 ЦУП ЦНИИМАШ

[Главная](#) | [ГЛОНАСС](#) | [GPS](#) | [Архив](#) | [О ППЦ](#)

- Состояние ОГ
- Эфемериды
- Мониторинг
- Суточный мониторинг
- Зоны видимости
- Интегральная доступность
- Мгновенная доступность

Интегральная доступность навигации наземного потребителя по системе ГЛОНАСС для стандартных условий видимости на суточном интервале: угол места не менее 5 градусов.

Availability of 4 satellites in view



Доступность и максимальный перерыв навигации по поверхности Земли: 0.82, 2.1 час

Global availability 85%, the gap in navigation 2.1 hours

Пуск | EN | Все презентации 5-6 окт | ИИС-Контроль-презент... | Glonass Update Zambia | GLONASS Status and Per... | Интегральная досту... | 21:11

Мгновенная доступность - Microsoft Internet Explorer

Файл Правка Вид Избранное Сервис Справка

Назад Поиск Избранное

Адрес: <http://www.glonass-ianc.rsa.ru/pls/htmldb/f?p=200:25:8681204314828724521::NO::> Переход Ссылки

ФЕДЕРАЛЬНОЕ КОСМИЧЕСКОЕ АГЕНТСТВО

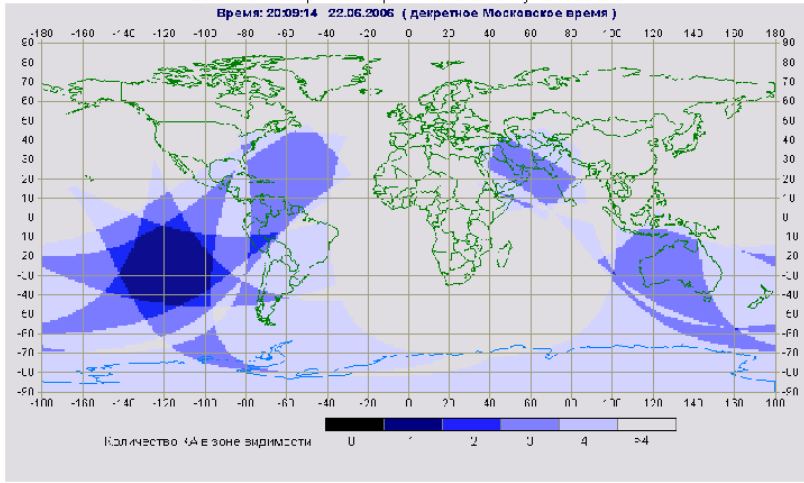
ИАЦ ИНФОРМАЦИОННО-АНАЛИТИЧЕСКИЙ ЦЕНТР
ПРИКЛАДНОЙ ПОТРЕБИТЕЛЬСКИЙ ЦЕНТР

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[Суточный мониторинг](#)
[Зоны видимости](#)
[Интегральная доступность](#)
[Мгновенная доступность](#)

Мгновенная доступность навигации системы ГЛОНАСС
 Количество видимых КА системы ГЛОНАСС на текущий момент времени по земной поверхности при минимальном угле места 5°
 Время: 2006.06.22 22:09:14 (декретное Московское время)



Количество КА в зоне видимости: 0, 1, 2, 3, 4, >4

© Информационно-аналитический центр (ЦУП), 2005
 E-mail: glonass-ianc@mcc.rsa.ru

[Главная](#) | [Карта сайта](#)

Интернет

Пуск EN Zambia ИНС-Контроль-презент... GNSS Application Zambia Мгновенная доступ... Входящие - Outlook Exp... UN/Zambia/ESA Regional... 21:49



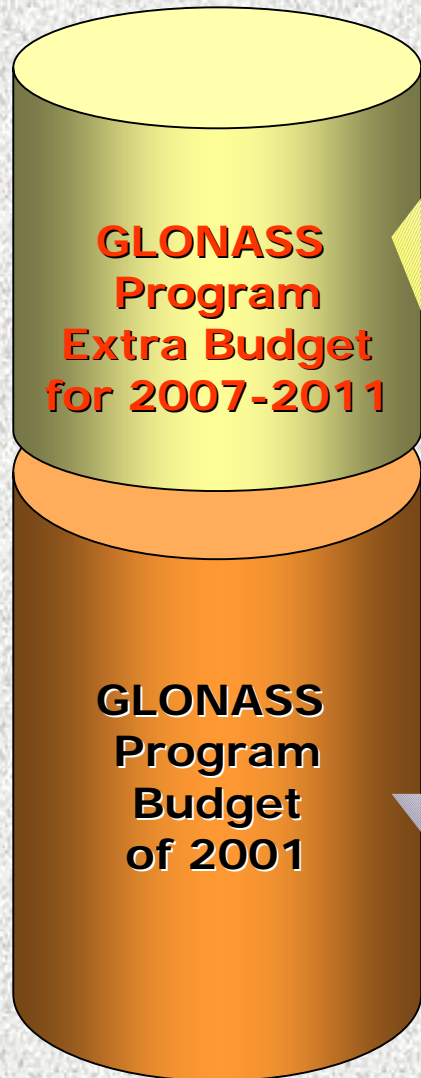


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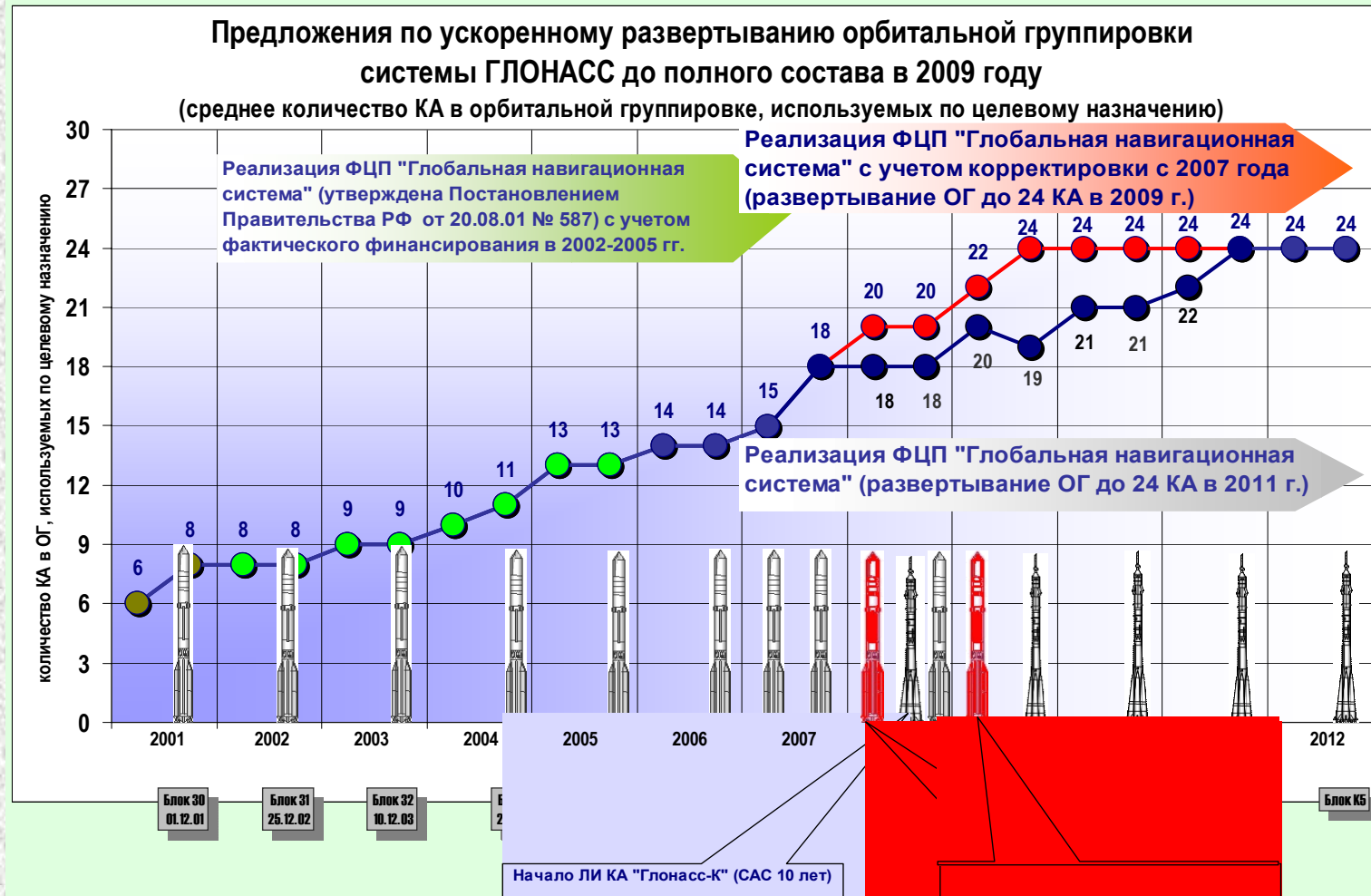




- Speed up of the constellation deployment
- GLONASS performance (accuracy first) comparable with GPS
- Multisystem receivers and end-user systems development
- Manufacture renovation for mass production of the user equipment
- Pilot projects implementation
- GNSS equipment combination with ground based radio-navigation systems (Chayka like)
- Non-classified navigation maps production (100 m and 50 m scale)
- Legal basis establishing for mass application of GNSS techniques
- Communication system modernization

Requirements of 2001:

- Full constellation in 2011
- Standard Performance



GLONASS deployment milestones:

- ↪ 18 satellites in constellation – 2007
- ↪ 24 satellites in constellation – 2009



GLONASS Service Modernization

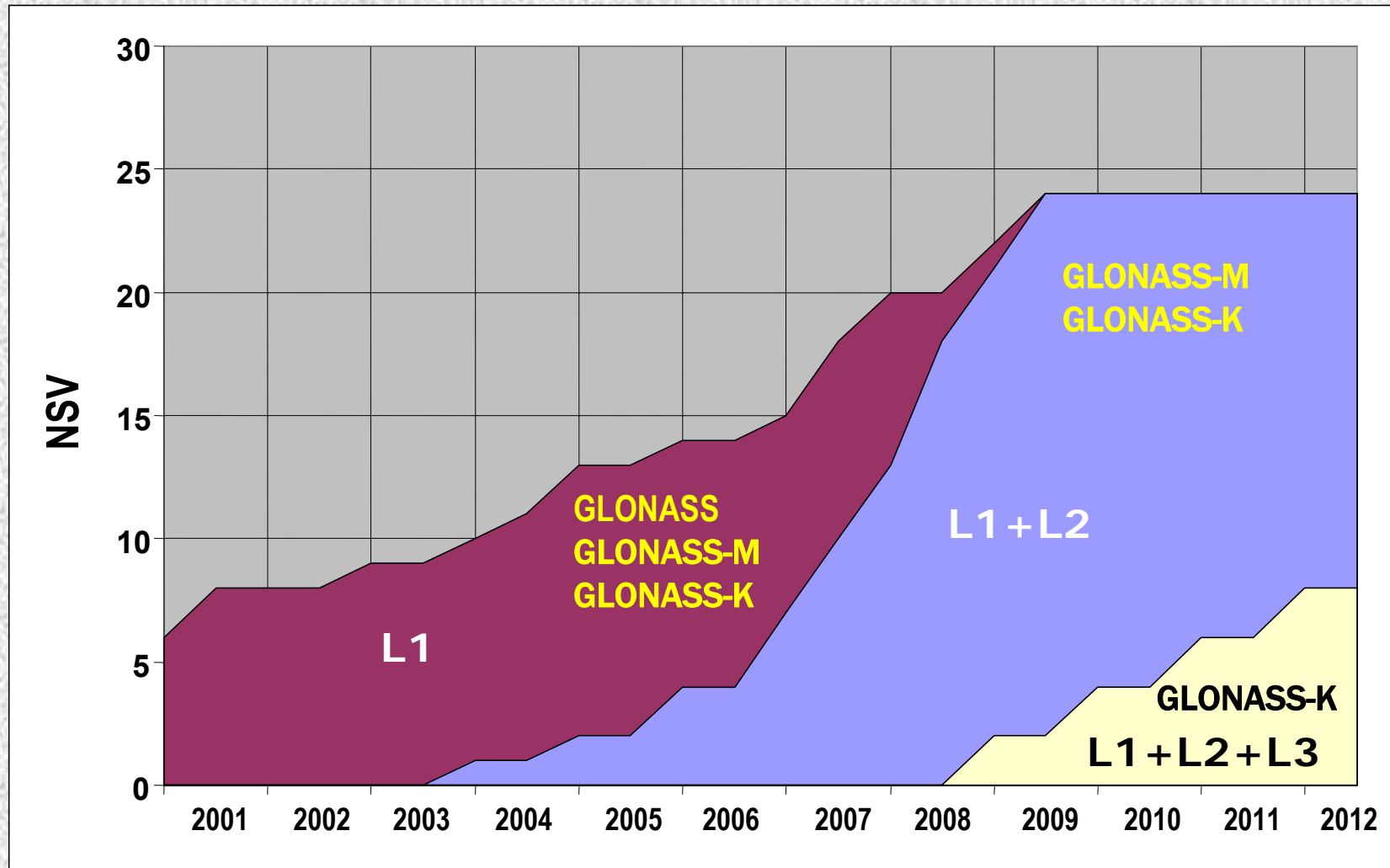


- ❑ Second civil signal at L2 frequency band **since GLONASS-M in 2003** for higher accuracy: 4 satellites in 2006
- ❑ Third civil signal at L3 frequency band since GLONASS-K in 2008 for higher reliability and accuracy, especially for safety-of-life applications
- ❑ GNSS Integrity information in the third civil signal (GLONASS-K, tbc) – reliability of navigation service
- ❑ Global differential ephemeris and time corrections in the third civil signal (GLONASS-K, tbc) – sub meter real time accuracy for mobile users
- ❑ Search and Rescue service (extension of COSPAS/SARSAT service) – shortening time of precise positioning and rescue for people in distress





Number of GLONASS satellites with civil signals





GLONASS Performance Modernization Plan



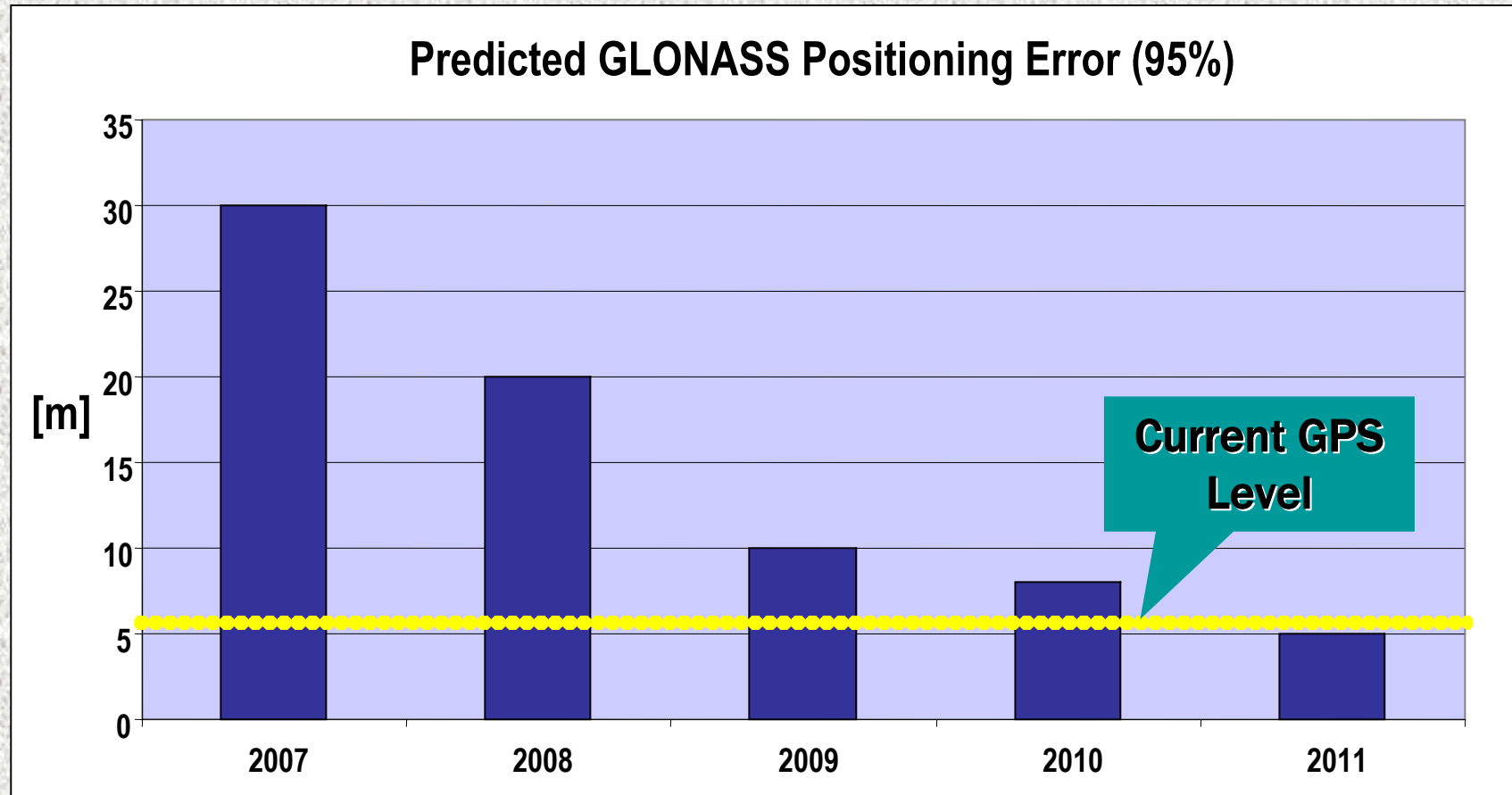
- ❑ **Satellite modernization**
 - ↪ Clock stability improvement
 - ↪ Dynamic model improvement (attitude accuracy, eclipse passing algorithm)
- ❑ **Receiving monitoring stations (RMS) network extension**
 - ↪ Space Force network (3 stations + 3)
 - ↪ Roscosmos network (9-12 stations)
 - ↪ Rosstandard network (3 stations at the UTC(SU) sites)
 - ↪ Cooperation with International GNSS Service and foreign agencies
- ❑ **GLONASS time keeping system modernization**
 - ↪ New system clocks with high stability (2 distributed clocks)
 - ↪ Synchronization system modernization
- ❑ **Geodesy system refinement in direction to ITRF : PZ-90.02 in 2006**
- ❑ **OD&TS software modernization based on one-way code and phase data processing**

GPS level accuracy for GLONASS to be achieved by 2009





Positioning performance improvement (for ideal user receiver)



**Modernization of Orbit and Time Determination Techniques
is a key to improve performance**





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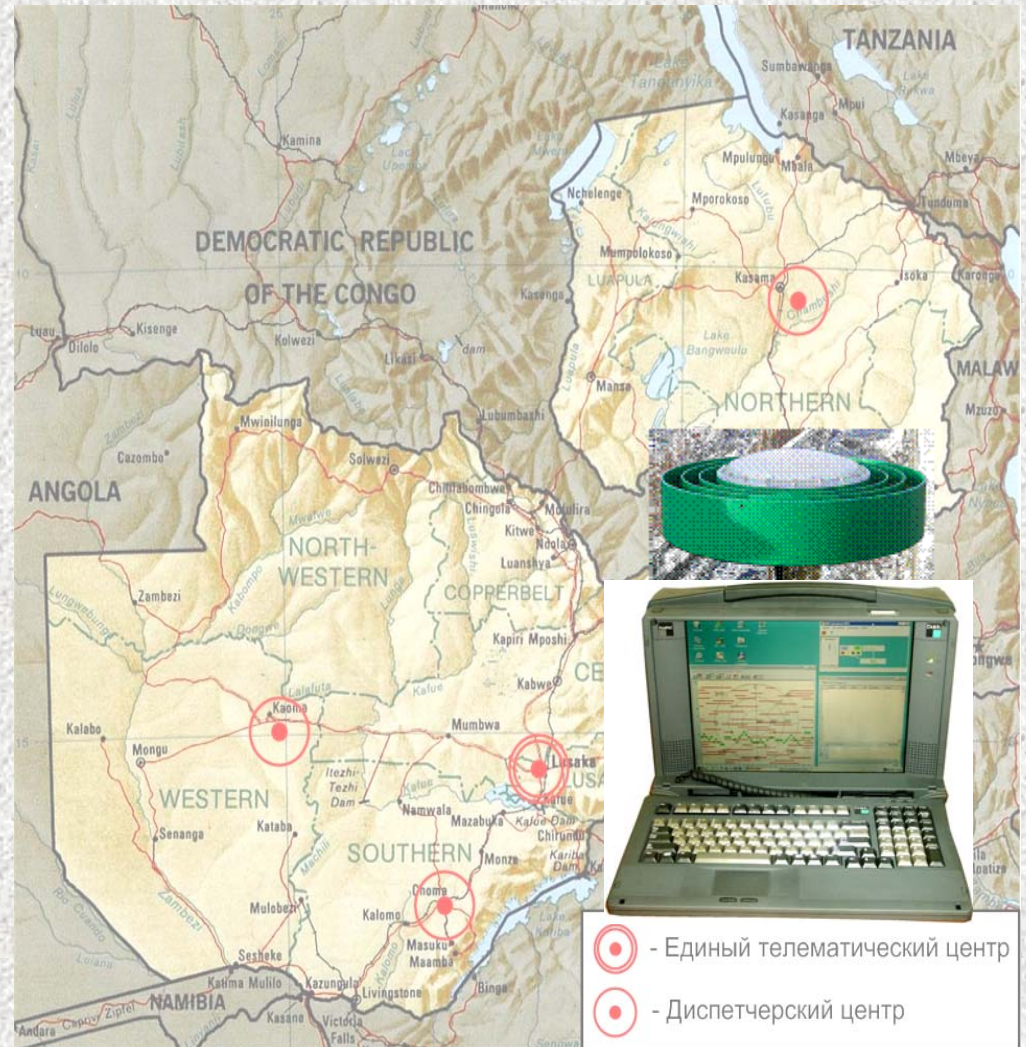
International Cooperation Goals



- ❑ **Promoting GLONASS as a part of world GNSS services market**
 - ↳ **Standardization**
 - ↳ **Frequency allocation protection**
 - ↳ **Development of multi-system user equipment and system augmentations**
- ❑ **Bringing users more reliability, navigation accuracy, and availability worldwide**
- ❑ **Developing GLONASS as compatible and interoperable system with existing and future GNSS**



- ❑ **Pilot projects implementation**
 - ↪ Evening session
- ❑ **Support of GLONASS operation and augmentations:**
 - ↪ **GLONASS Monitoring Station accommodation in Sub-Saharan Africa (Zambia...) as the Russian network extension**
 - ↪ **Laser and optical ranging system accommodation for measuring instruments calibration, dynamic model improvement, launch campaign support**





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Summary



- ❑ Positioning, Time and Navigation is a component of the critical state infrastructure for national security and economical growth
- ❑ GLONASS is a key element of the Russian Positioning, Time and Navigation service
- ❑ GLONASS remains as a dual use system
- ❑ GLONASS is open for civil use world wide. In combination with GPS can benefit users already now
- ❑ Governmental support to the spread use of satellite navigation in the different areas of national economy
- ❑ The main goal of the international cooperation is to provide better compatibility and interoperability with existing and future systems and augmentations for user benefit
- ❑ New Presidential Directive: to speed up the GLONASS constellation deployment with performance comparable with GPS and future GALILEO
 - ↪ 18 satellites in 2007
 - ↪ 24 satellites in 2009





GLONASS Status Update



Thank you much for you attention!

Sergey Revnivykh
Satellite Navigation Department of the Mission Control Center of
the Central Research Institute of Machine Building,
FEDERAL SPACE AGENCY

sergey.revnivykh@mcc.rsa.ru

