Federal Space Agency

GLONASS Status Update.
MCC activity in GLONASS Program.

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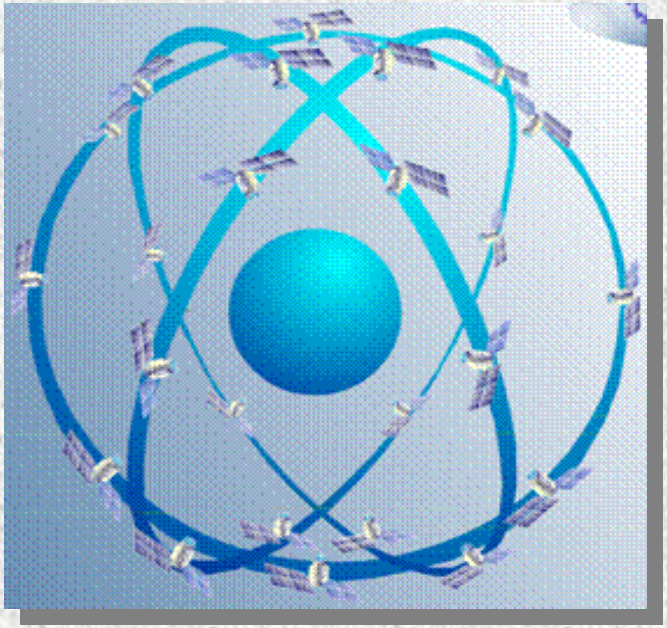
ILRS Canberra Workshop 2006

Outline

- GLONASS Status
- MCC activity in GLONASS Program
- GLONASS SLR data analysis
- Conclusions

SLR – one of the basic elements of GLONASS



Conditions:

- World wide SLR stations net
- Highest direct measurements accuracy
- Precise geodetic base

➢ Importance:

- Improving of the geodetic base for GLONASS on the way to ITRF
- Studying and improving of the SC motion model etc.
- Calibration and validation of the microwave means
- Testing and validation of the software and analysis results
- Monitoring of the real on-board ephemeris and clock

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

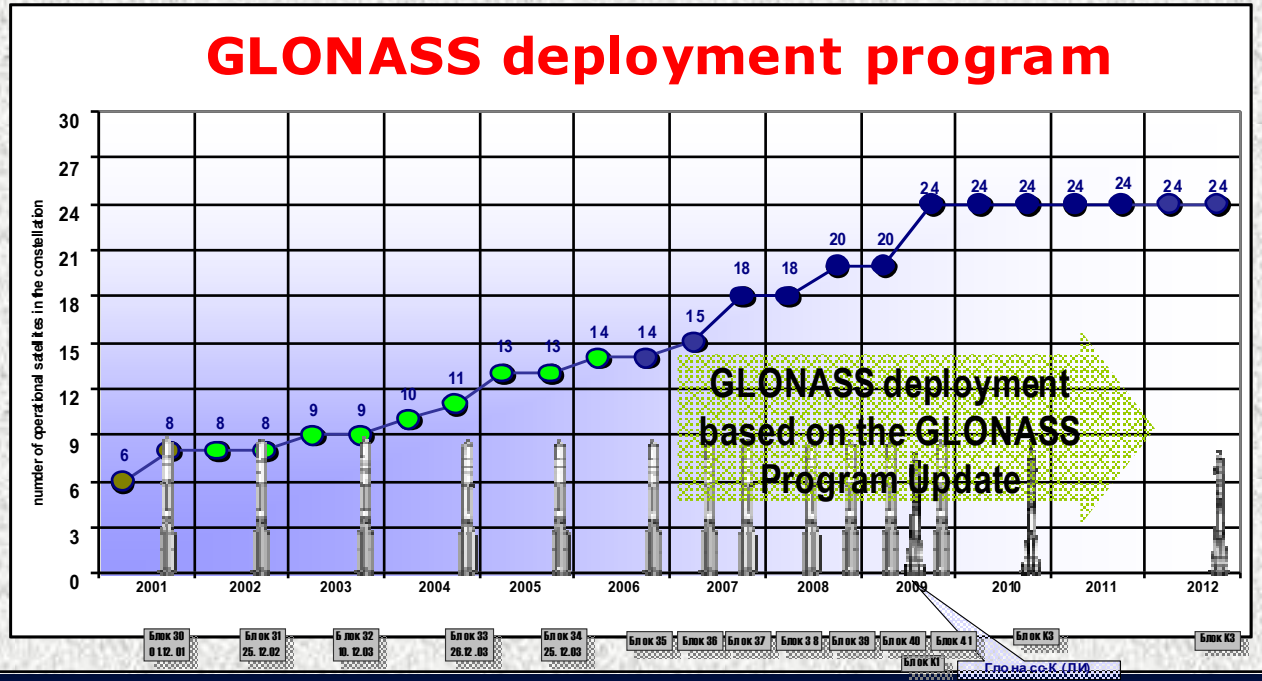
Basic Document for GLONASS Development

➢ Federal GLONASS Program for 2002-2011.

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

➢ The Program Update

- ❑ Program update approved by the Government Resolution at July 14 2006, # 423



GLONASS Interface

Informational Analytical Center (department of the Russian Mission Control Center) since August 15 has been formally assigned by the Federal Space Agency as the GLONASS official information portal for users

- Daily brief bulletins for GLONASS and GPS status based on the global data available (IGS network)
- GLONASS Control Center (Space Force) information
- NAGU generation
- Monthly bulletin with deep analysis of GLONASS performance
- GLONASS news
- GLONASS ICD

IAC is now acting as positive feed-back in the GLONASS control segment

www.glonass-ianc.rsa.ru

International Cooperation

IGLOS Pilot Project

The International GLONASS - Pilot Project (IGLOS-PP) is a pilot service of the International GPS Service (IGS) to track and analyse data from the Russian GLONASS satellite constellation. The products from the Service should facilitate the use of combined GLONASS and GPS observations for scientific and engineering applications, and allow users to experiment with the combined systems

as a prototype Global Navigation Satellite System.

ILRS support for GLONASS (1)

The ILRS supports this effort by a continuous tracking of three GLONASS satellites as part of their standard tracking protocol and by delivering precise GLONASS orbits through one of its Analyses Centers (MCC)

GLONASS satellites currently tracked by ILRS stations

GLONASS-87	Plane 1 Slot 3
GLONASS-95	Plane 1 Slot 7
GLONASS-89	Plane 3 Slot 22

ILRS support for GLONASS (2)

Time interval: 30.07.2006 – 26.08.2006

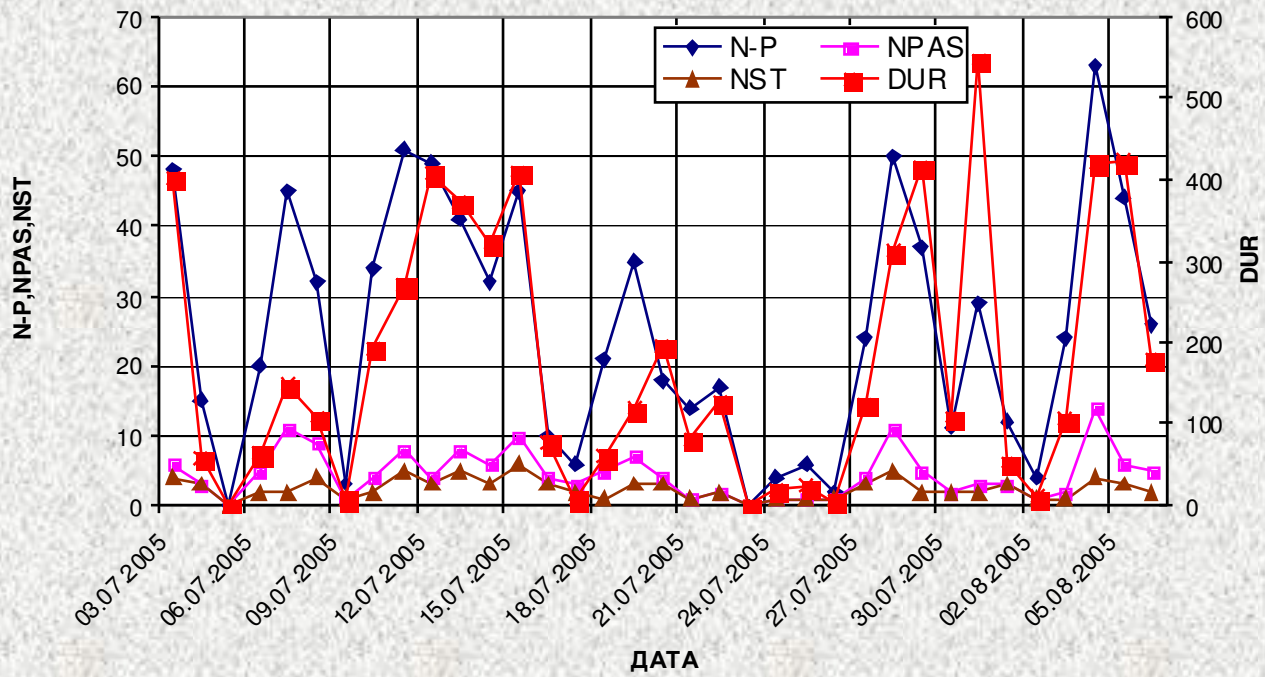
SC	Passes	Stations
GLONASS-07	133	14
GLONASS-22	154	15
GLONASS-03	220	16
Total	507	18

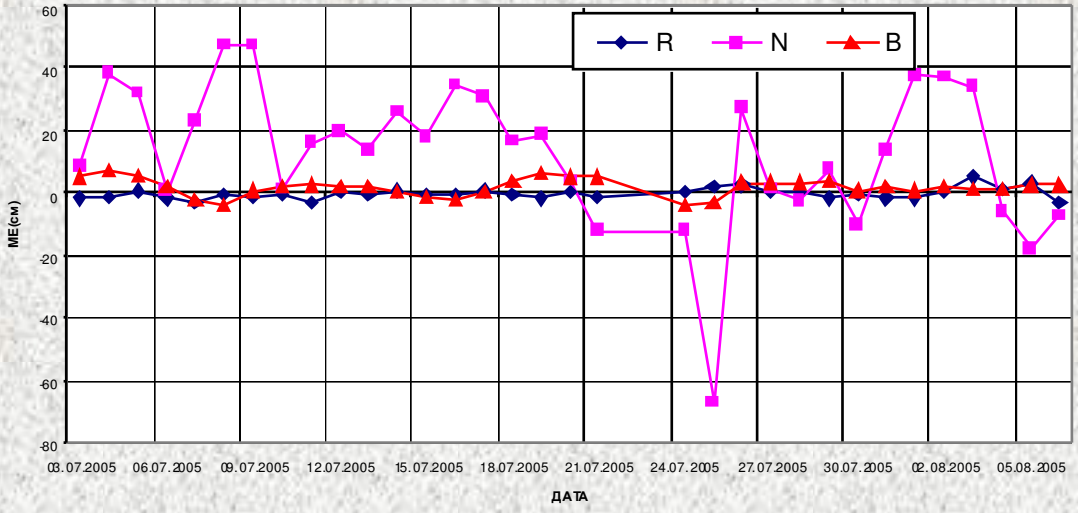
SLR data analysis

ГЛОНАСС-03. Статистика сеансов.

SLR data

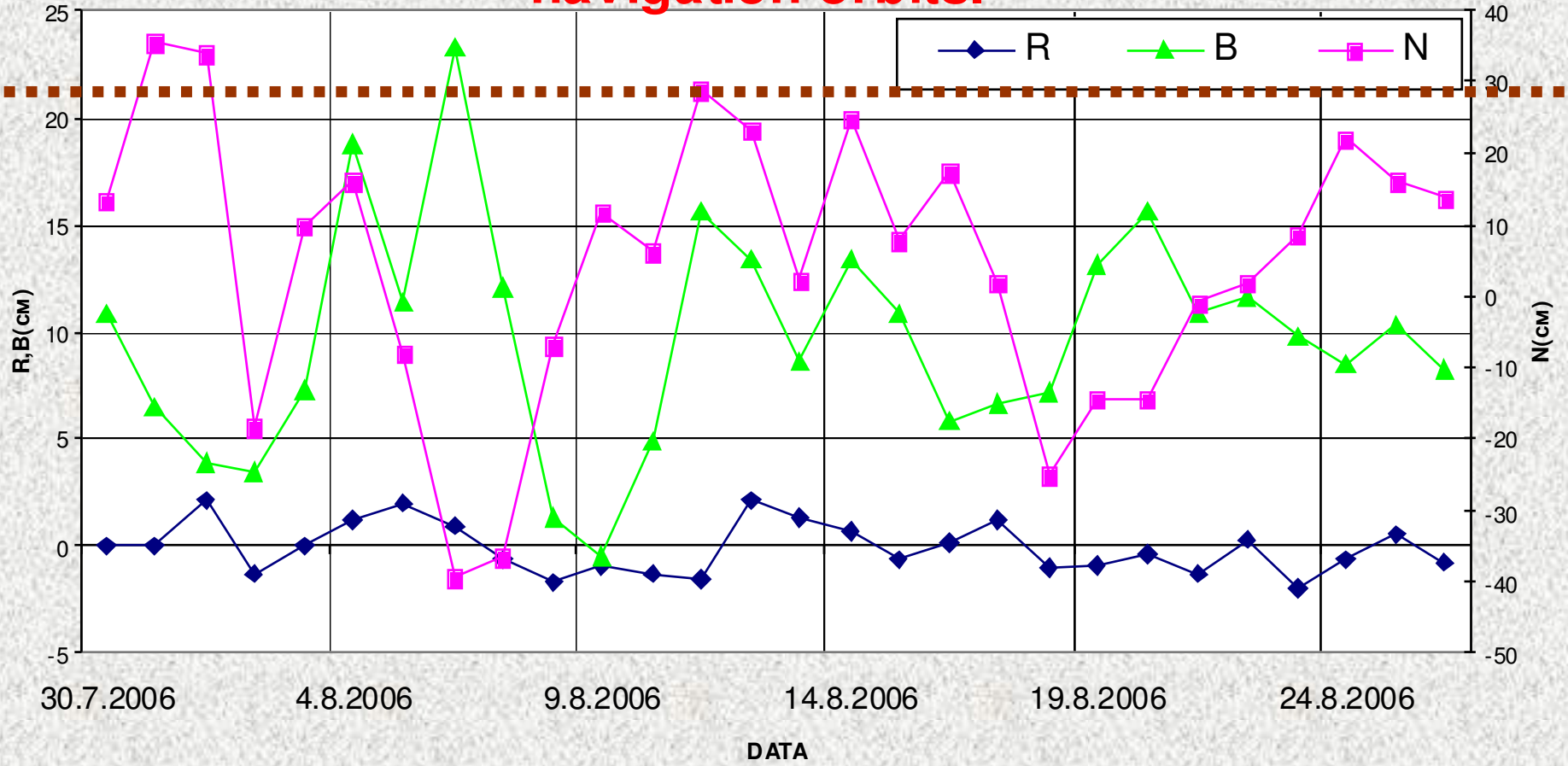
Orbit accuracy





Potential GLONASS Performance

GLONASS-89. Difference between SLR and navigation orbits.

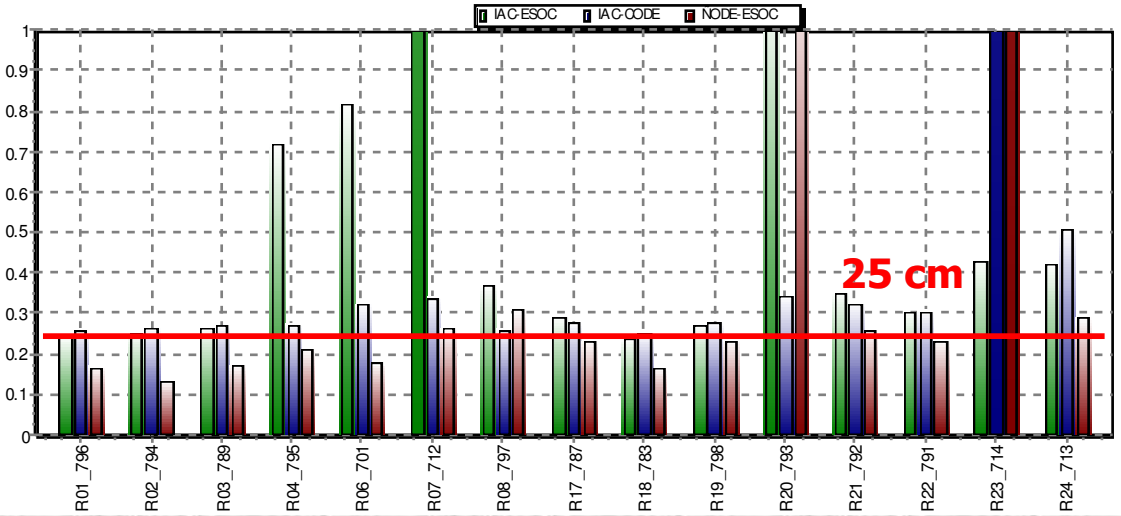


30 cm

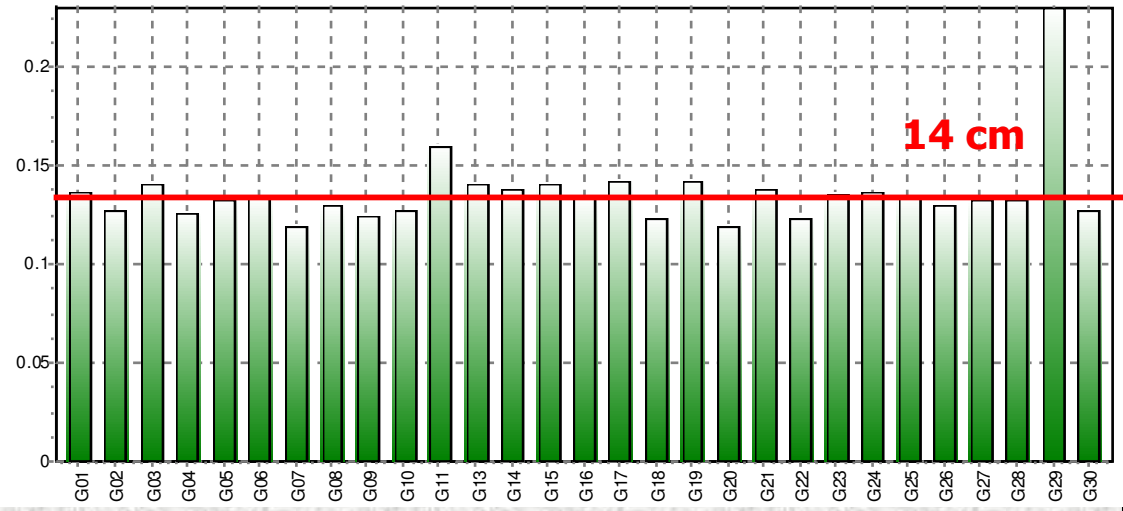
Differences between IAC and official IGS analysis centers solutions

Estimation interval: 01/09/05 - 01/09/06

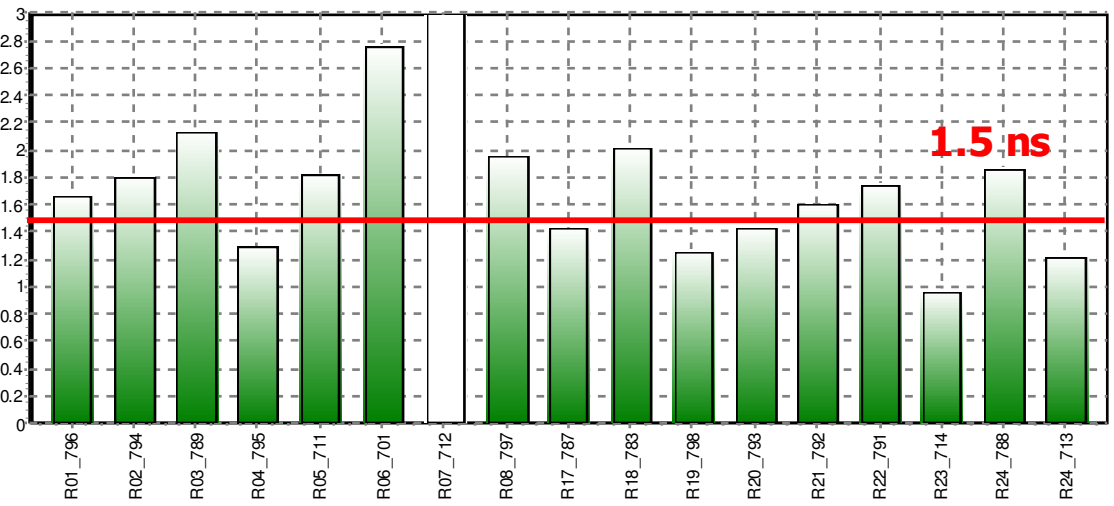
RMS of GLONASS orbit difference, m



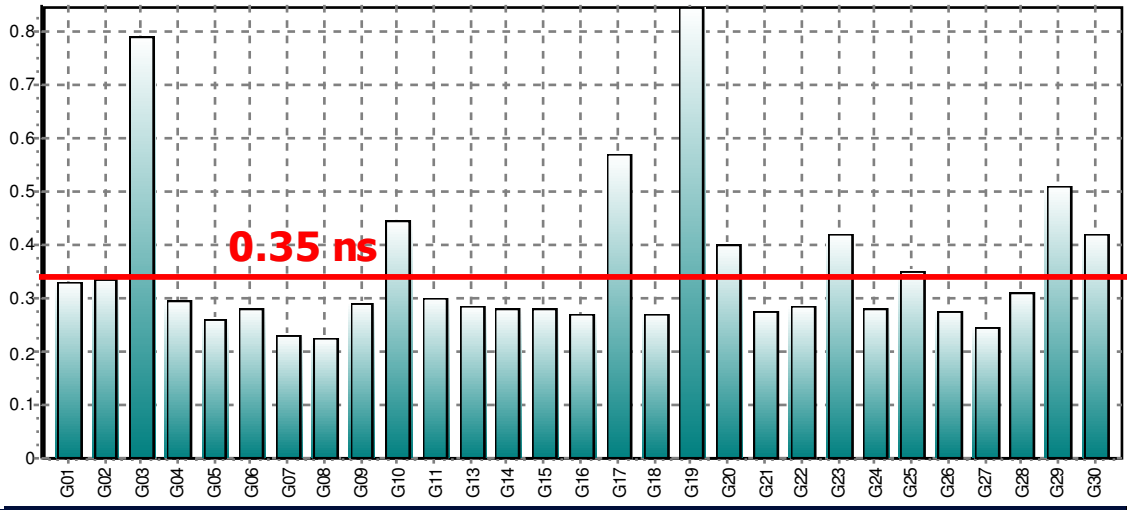
RMS of GPS orbit difference, m



RMS of GLONASS clock difference, ns

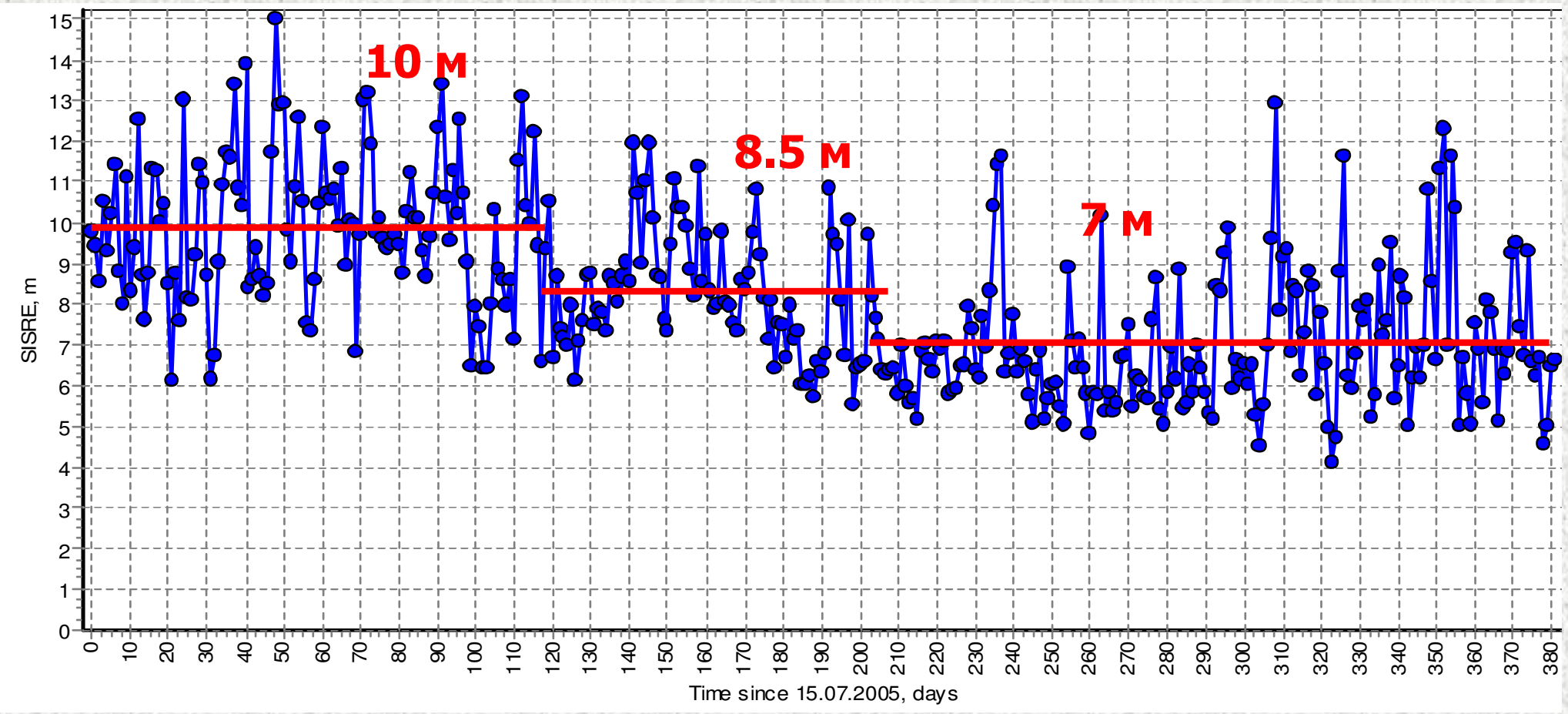


RMS of GPS clock difference, ns



GLONASS Performance Improvement for 2005-2006

SISRE, м



Conclusions

- ILRS support is very important for GLONASS modernization by the way to the Global Navigation Satellite System
- Need to continue/increase tracking of GLONASS satellites by ILRS: Collocation in space (Microwave / Laser)
- IGLOS-PP demonstrates the extensibility of IGS to accommodate other microwave systems (GLONASS, GALILEO).

Thank you for your attention!