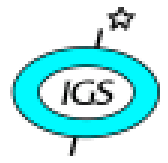


International GNSS Service – New Products for Real-Time Applications

Urs Hugentobler, Chris Rizos, Mark Caissy, Ruth Neilan

Presented by Jens Wickert



IGS Real-time Service (RTS)

- Launched on April 1, 2013
- International effort of many contributions (station operations, Data Centers, Analysis Centers, Combination Centers, Analysis Coordination, caster operation, ...)
- Maintain and extend real-time infrastructure (data transfer, broadcasting, product generation, combination, quality control)
- Develop necessary data formats and transmission protocols together with RTCM SC104
- Deliver (initially) real-time orbit and clock products
- Support scientific and other applications

IGS Real-time Tracking Network

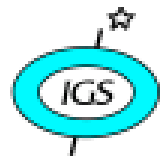


GM 2013 Mar 5 15:25:24

150+ stations

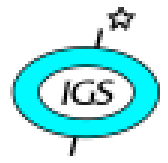
<http://igs.org>

IERS Retreat, Paris, France, 23/24 May 2013



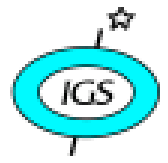
IGS Real-time Service

- Larger network than any private network, 150+ stations
- Real-time orbits at few cm, clocks at sub-ns
- Compelling redundancy concept
- But no service guarantee (Voluntary contributions)
- Open data policy
- Using open standards
- Will support RT-PPP



IGS Real-time Service

- Station operations: 64 agencies
- Analysis Centers: BKG, CNES, DLR, ESOC/ESA, GFZ, GMV, Geo++, NRCan, TU Vienna, Wuhan University
- Combination Centers: ESOC/ESA, BKG, NRCan
- Casters: BKG, GFZ, IGS CB, NRCan (soon also CDDIS)
- WG Chair: Marc Caissy (NRCan)
- Analysis Coordination: Loukis Agrotis (ESA)
- Data Flow Coordination: Georg Weber (BKG)



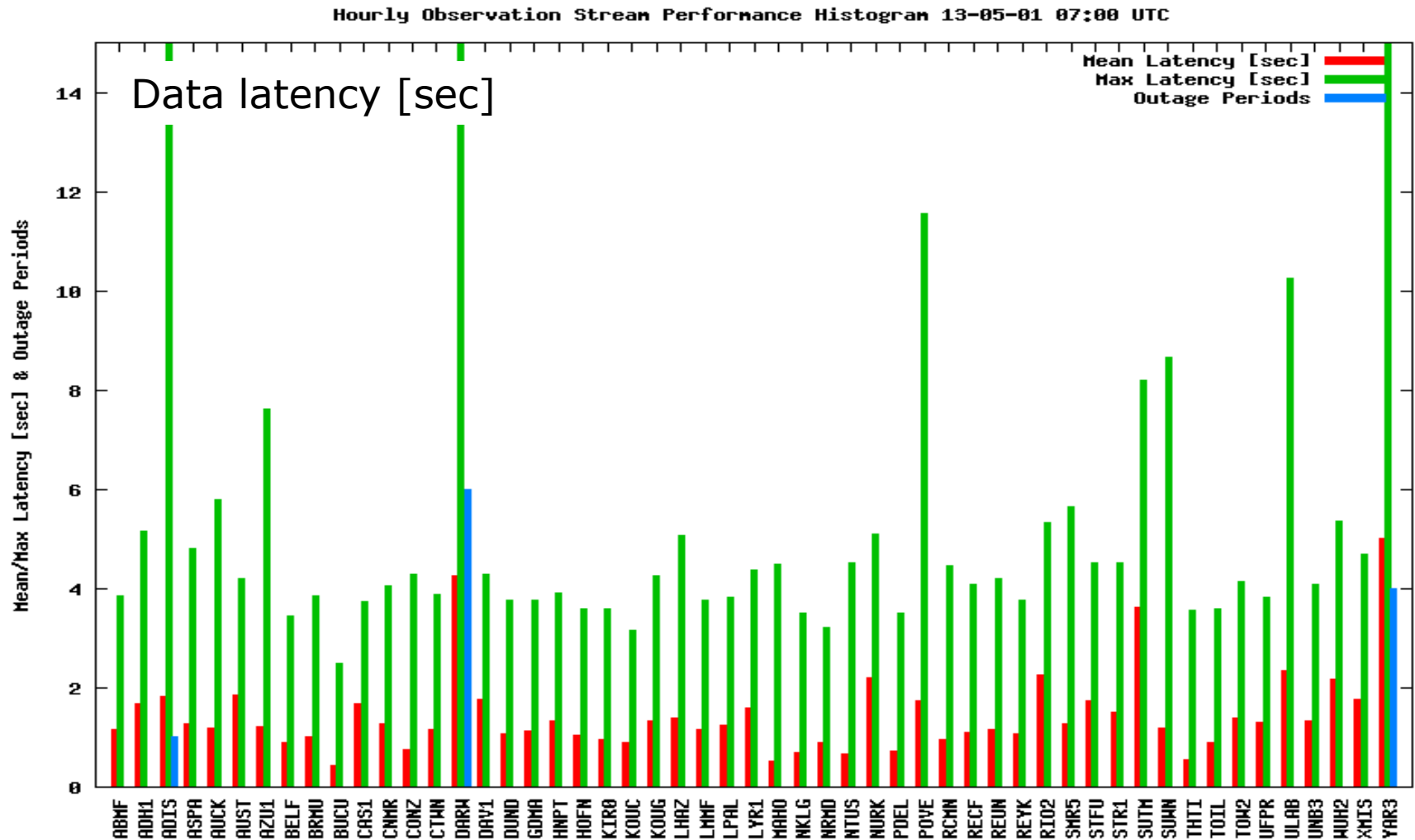
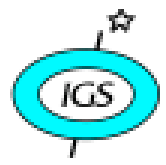
IGS RTS Products

- Service launched on April 1, 2013
- Initial Operational Capability (IOC), Full Operational Capability (FOC) expected later this year
- Rapidly developing into a multi-GNSS service
- Two GPS products and one experimental GPS+GLONASS product:

IGS01/IGC01	GPS-only	orb & clk	single epoch combo	1.8 kb/s
IGS02	GPS-only	orb & clk	Kalman combo	0.6 kb/s
IGS03	GPS+GLO	orb & clk	Kalman combo	0.8 kb/s

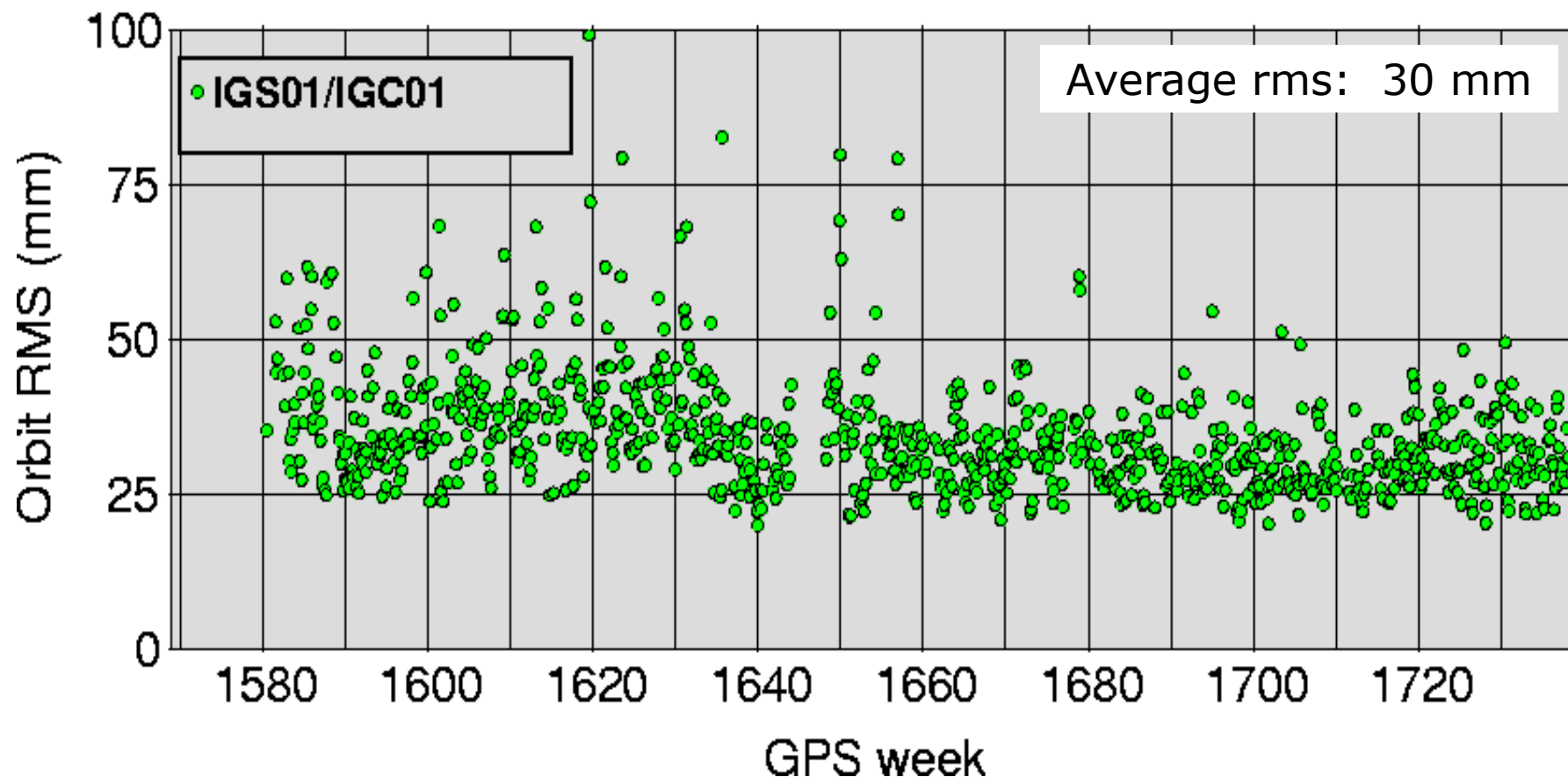
- Broadcast stream GPS+GLONASS+Gal (RTCM3EPH)
- Reference is ITRF2008
- Stream access via BKG/GFZ NTRIP Client (BNC) or RTKLIB

IGS RTS Data Latency



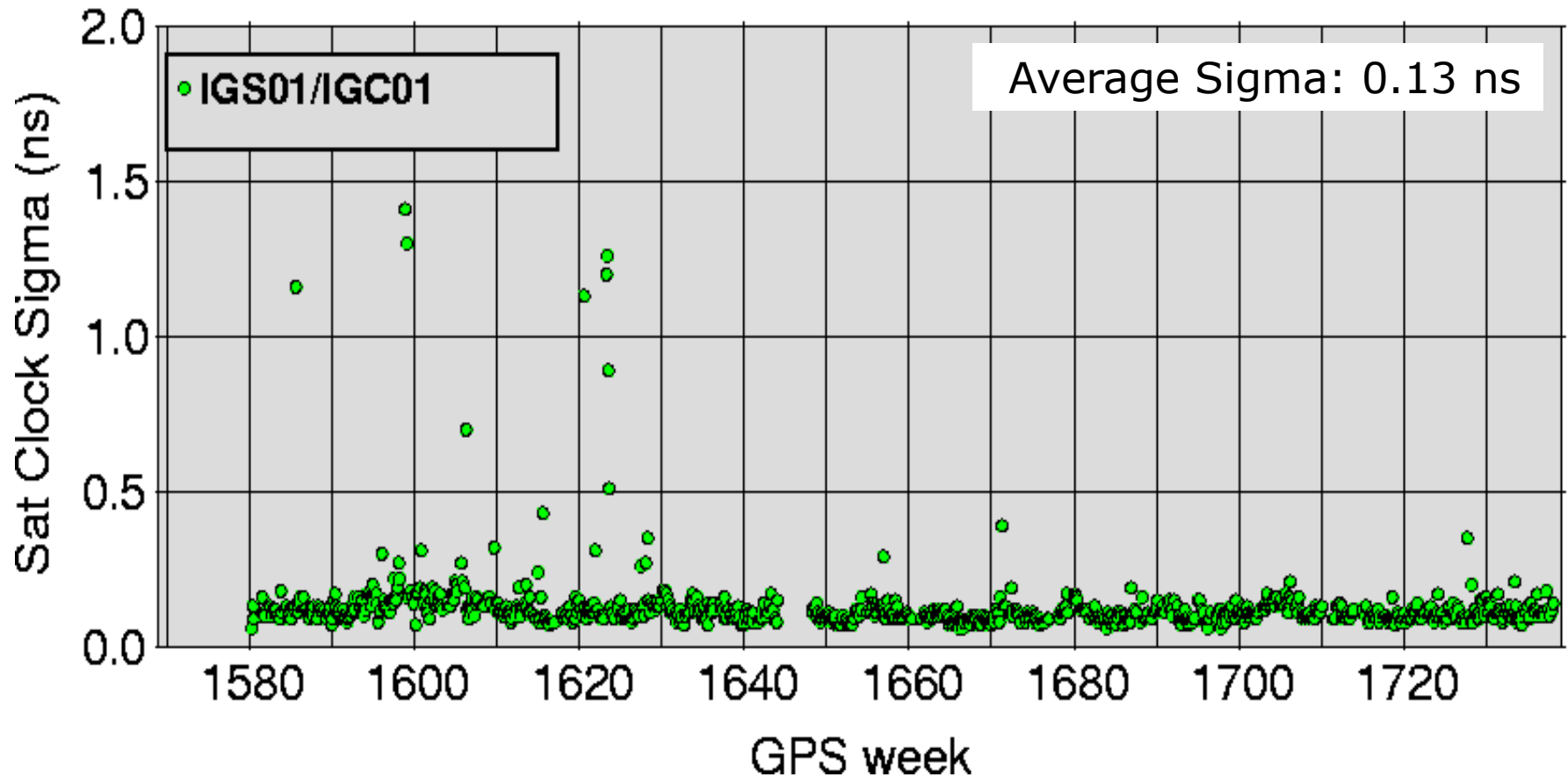
IGS RTS Product Performance

- Satellite orbit RMS (compared to IGS Rapid)

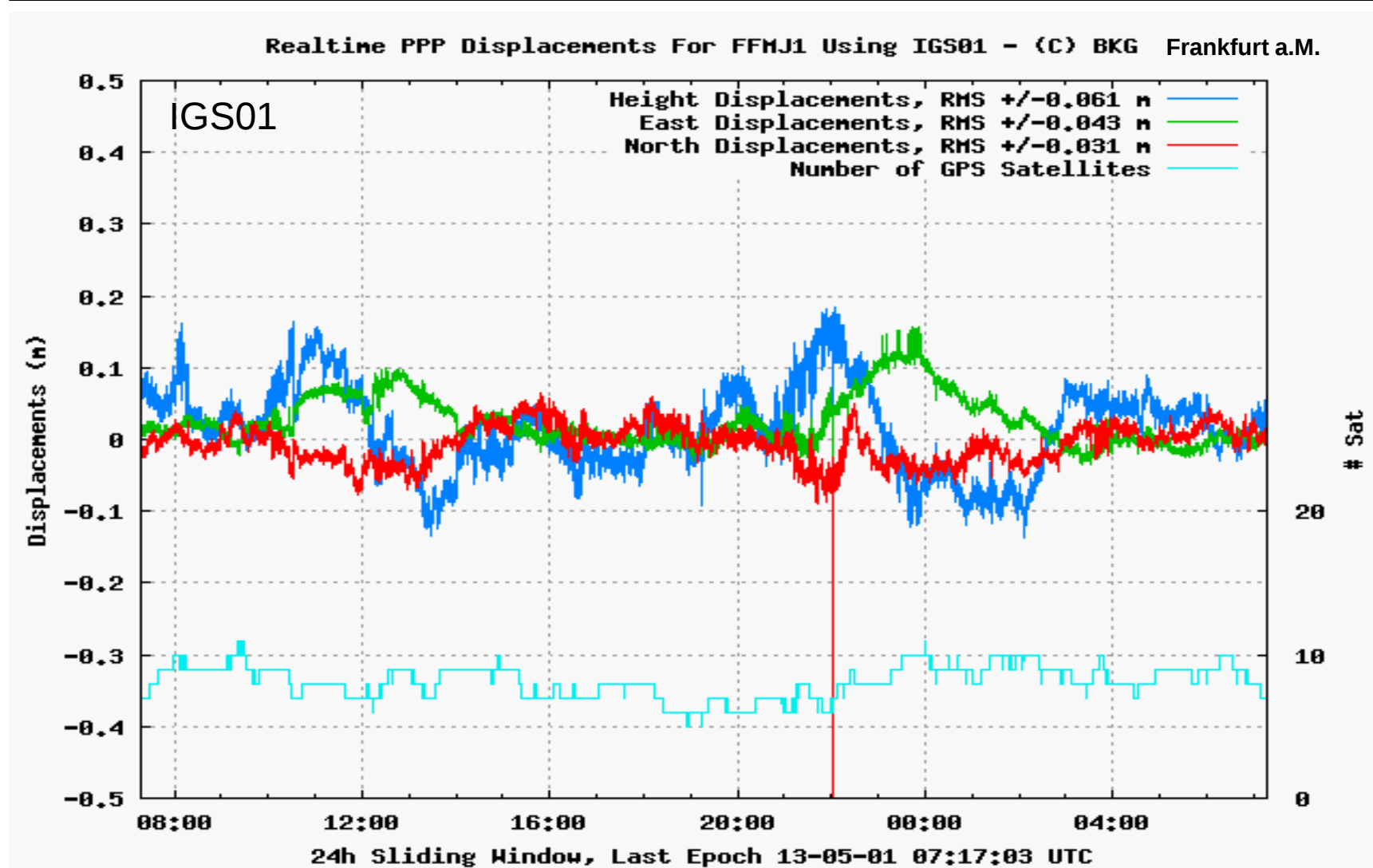


IGS RTS Product Performance

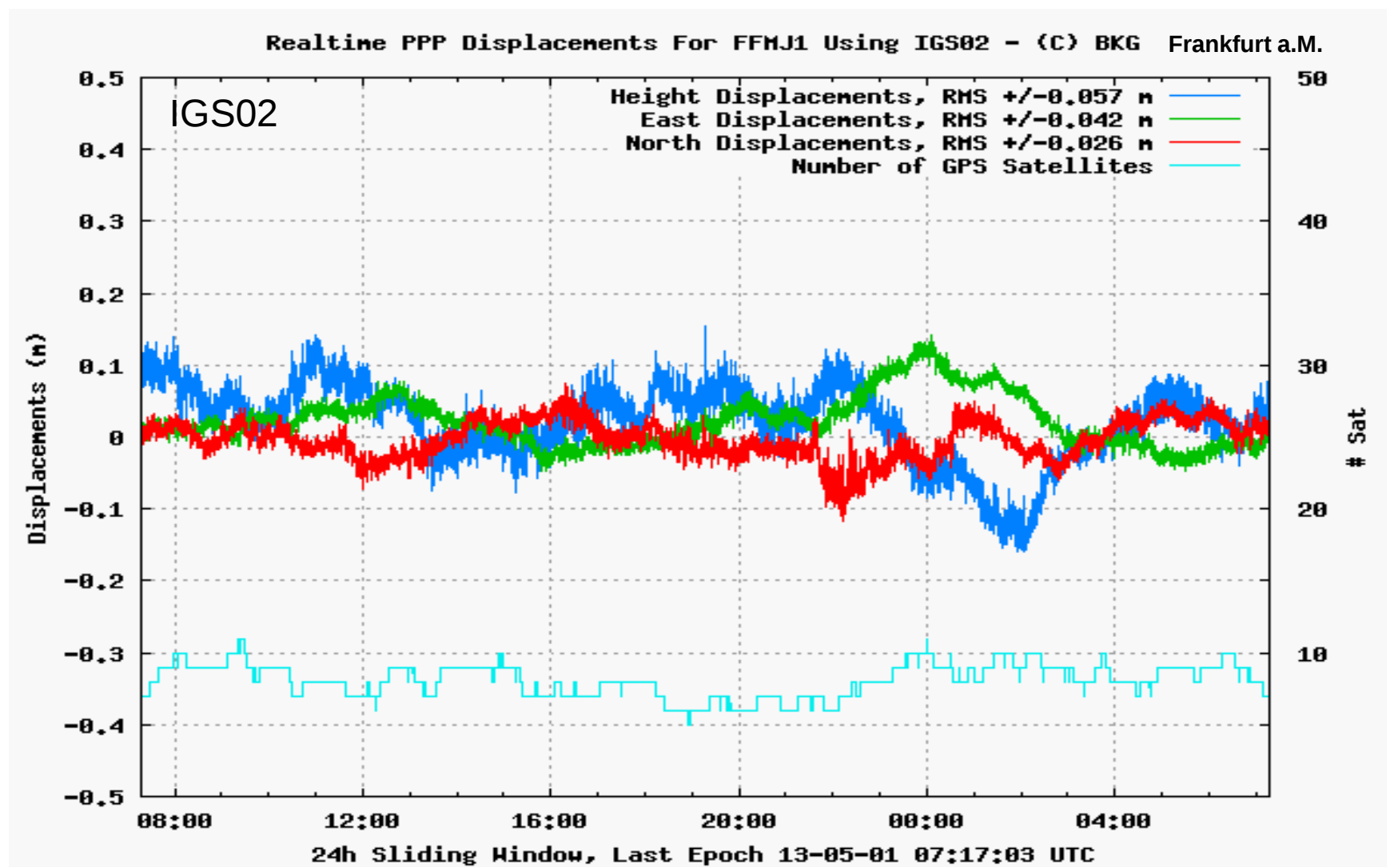
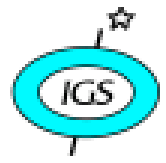
- Satellite clock std.dev. (compared to IGS Rapid)



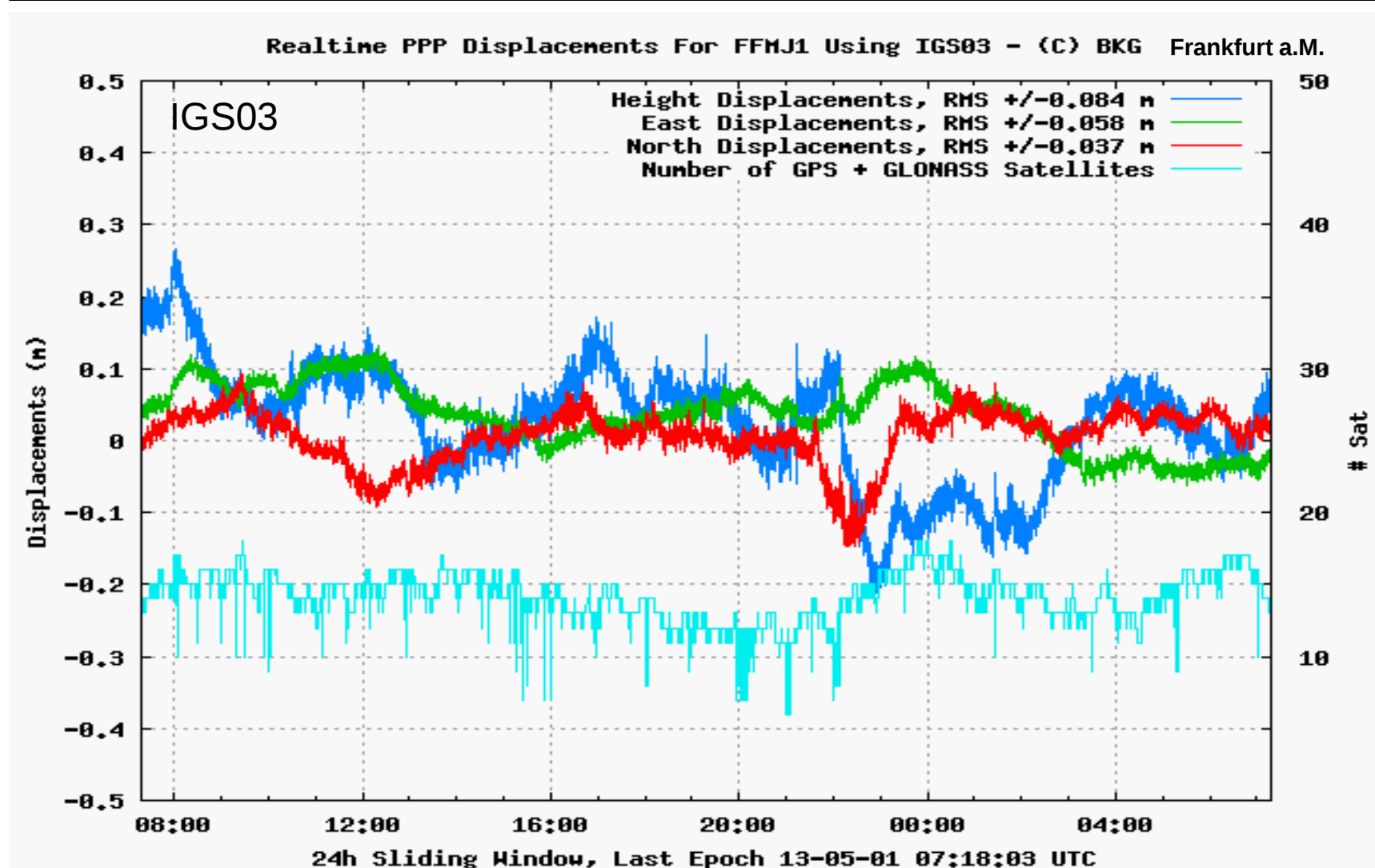
IGS RTS Product Performance



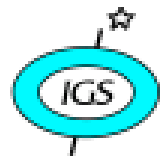
IGS RTS Product Performance



IGS RTS Product Performance



IGS RTS Applications



- Innovative support for public benefit applications
- Enables real-time precise point positioning (PPP) at global scales for scientific and hazard detection applications, weather and space weather forecast, multi constellation performance monitoring
- Rapidly detecting, locating, and characterizing hazardous events such as earthquakes and tsunamis
- Contributing to GGOS Theme 2 “Natural Hazards”

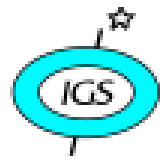
IGS RTS Users

By Organization Type	30-Apr-13
Academic	38
Aerospace	2
Civil Aviation Authority	1
Engineering Services/Consulting	40
GNSS Equipment/Software	34
Government (General)	4
Government (Geodetic/Mapping)	9
Government (Geological/Geophysical)	4
Government (Meteorology)	1
Military/Defense	1
Positioning Services	2
Telecommunications	4
Other	10

By Application Category	30-Apr-13
Academic Research/Instruction	24
Agriculture	4
Automotive/Vehicle Navigation	1
Aviation/Runway Mapping/Integrity Monitoring	1
Control Surveying	2
Meteorology	2
Mining/Oil/Gas	1
Photogrammetry/Airborne LIDAR	0
Radiation Monitoring	0
Receiver/Software Development	9
Robotics	2
SBAS Development	0
Seismology/Earthquake Warning	7
Single Frequency PPP development	16
Space Weather	0
Surveying/Mapping/GIS	30
Targeting/Guidance	3
Telecommunications/Smart Phone Positioning	4
Testing/Comparison of Positioning Systems	37
Time Synchronization	4
Other	3

By Country	5-Apr-13	22-Apr-13	30-Apr-13
Australia	6	8	9
Austria	1	1	1
Belgium	0	1	1
Bosnia and Herzegovina	2	2	2
Brazil	5	6	6
Bulgaria	2	2	2
Canada	7	9	10
China	2	5	6
Croatia	0	1	1
Cuba	0	1	1
Czech Republic	0	4	4
Egypt	1	1	2
Finland	1	1	1
France	2	2	3
Germany	2	4	4
Greece	1	1	1
Indonesia	1	2	2
Iran	2	2	2
Italy	3	3	3
Japan	5	9	9
Kenya	1	1	1
South Korea	2	4	5
Malaysia	3	3	3
Netherlands	0	1	1
New Zealand	0	1	1
Norway	0	1	1
Peru	0	1	1
Philippines	1	1	1
Poland	0	1	1
Romania	2	3	3
Russia	5	15	16
Saudi Arabia	2	2	2
Spain	2	4	4
Taiwan	0	2	2
UK	3	6	7
Ukraine	1	1	1
Uruguay	1	1	1
USA	14	27	28
Vietnam	0	1	1
	80	141	150

IGS Real-time Service Web Page



IGS.org - Real-time Service - Mozilla Firefox

IGS.org - Real-time Service

Search

Hot 108

IMnews Block popups

Neu laden Stopp SearchTheWeb Downloads Startseite

 **International GNSS Service**
Formerly the International GPS Service

About	Products Mail	Network FAQ	Projects Publications	Events FTP	Organization Site map
-------	------------------	----------------	--------------------------	---------------	--------------------------

Real-time Service

User Access Products RTS Monitoring Contributors More Information Support

The International GNSS Service (IGS) has ensured the availability of open access, high-quality GNSS data products since 1994. These products enable access to the definitive global reference frame for scientific, educational, and commercial applications – a tremendous benefit to the public.

Through the Real-time Service (RTS), the IGS extends its capability to support applications requiring real-time access to IGS products. RTS is a GNSS orbit and clock correction service that enables precise point positioning (PPP) and related applications, such as time synchronization and disaster monitoring, at worldwide scales. RTS is based on the IGS global infrastructure of network stations, data centers and analysis centers that provide world standard high-precision GNSS data products.

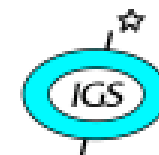
The RTS is currently offered as a GPS-only beta service for the development and testing of applications. The Russian GLONASS is initially provided as an experimental product and will be included within the service when the RTS reaches its full operating capability at the end of 2013. Other GNSS constellations will be added as they become available.

The RTS is operated by the IGS as a public service. Users are offered open and readily available access through subscription.

Copyright 2013 IGS

<http://rts.igs.org>



IGS Real-time Service Registration

Real-time Service

<http://rts.igs.org>

User Access Products RTS Monitoring Contributors More Information Support

Name*:	
Organization/Agency*:	
Street*:	
City*:	
Country*:	
Phone:	
Email*:	
Username*:	
Password*:	
Application*:	Please be as descriptive as possible regarding your real-time service data usage.
Number of Streams:	Please contact support if additional streams are desired. 2
Terms of Service*:	The IGS RTS is provided freely to all users. By completing this registration and/or using the Service, the Subscriber agrees to accept the Service as is, and also acknowledges that the IGS makes no assurances, implied or otherwise, for the accuracy or availability of the Service. The Subscriber also accepts that the Service can have outages and degradations in accuracy and that these events can render the Service unsuitable for any use. The Subscriber shall indemnify, defend and hold the IGS and its affiliates harmless from any loss or damage resulting from any claim by any person relating to the data services provided under this agreement. ☐ I accept the Terms of Service.