International GNSS Service – New Products for Real-Time Applications

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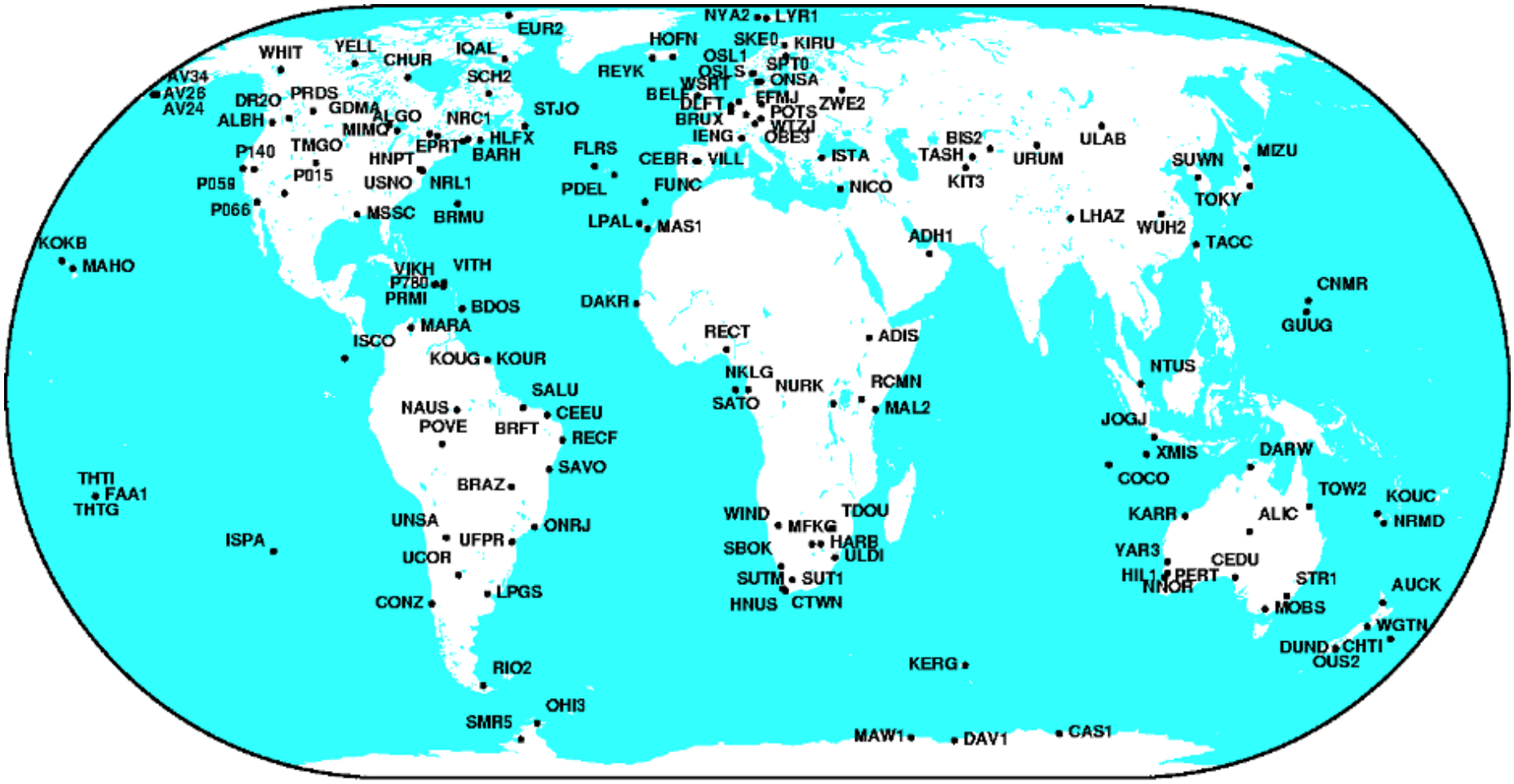
Presented by Jens Wickert

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



150+ stations

GMT 2013 Mar 5 15:25:24

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)

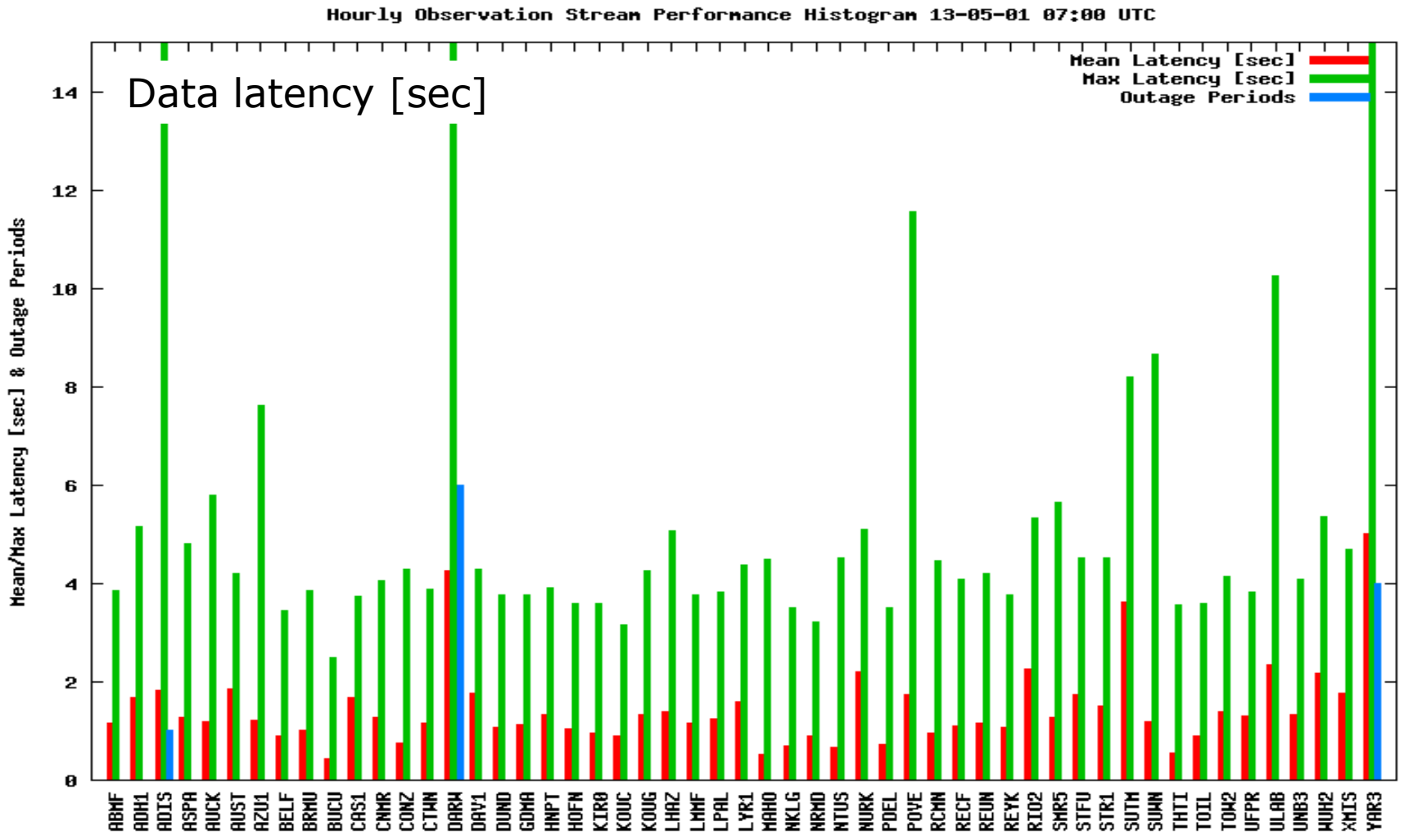
IGS RTS Products

- 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

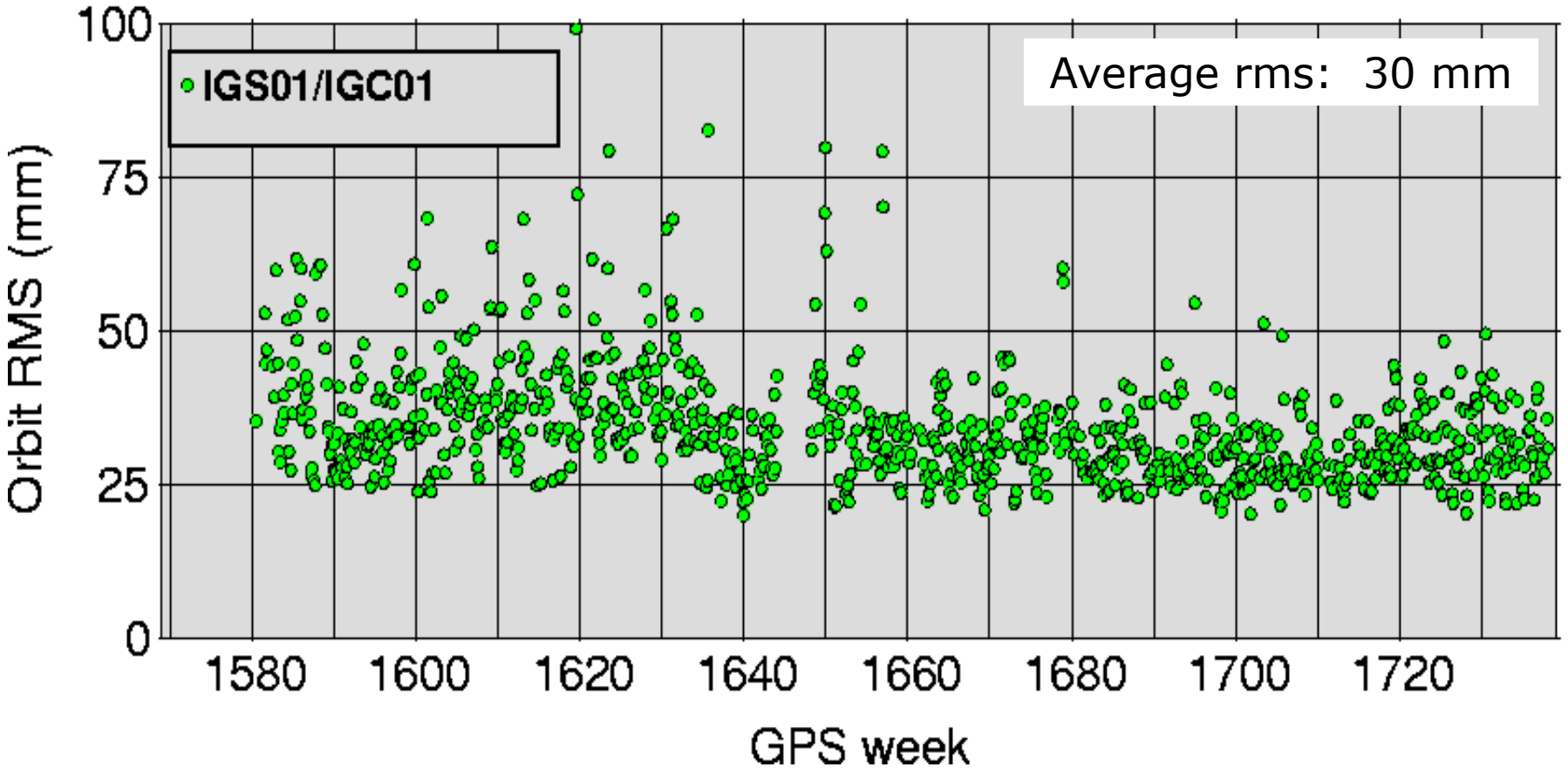
- Broadcast stream GPS+GLONASS+Gal (RTCM3EPH)
- Reference is ITRF2008
- Stream access via BKG/GFZ NTRIP Client (BNC) or RTKLIB

IGS RTS Data Latency



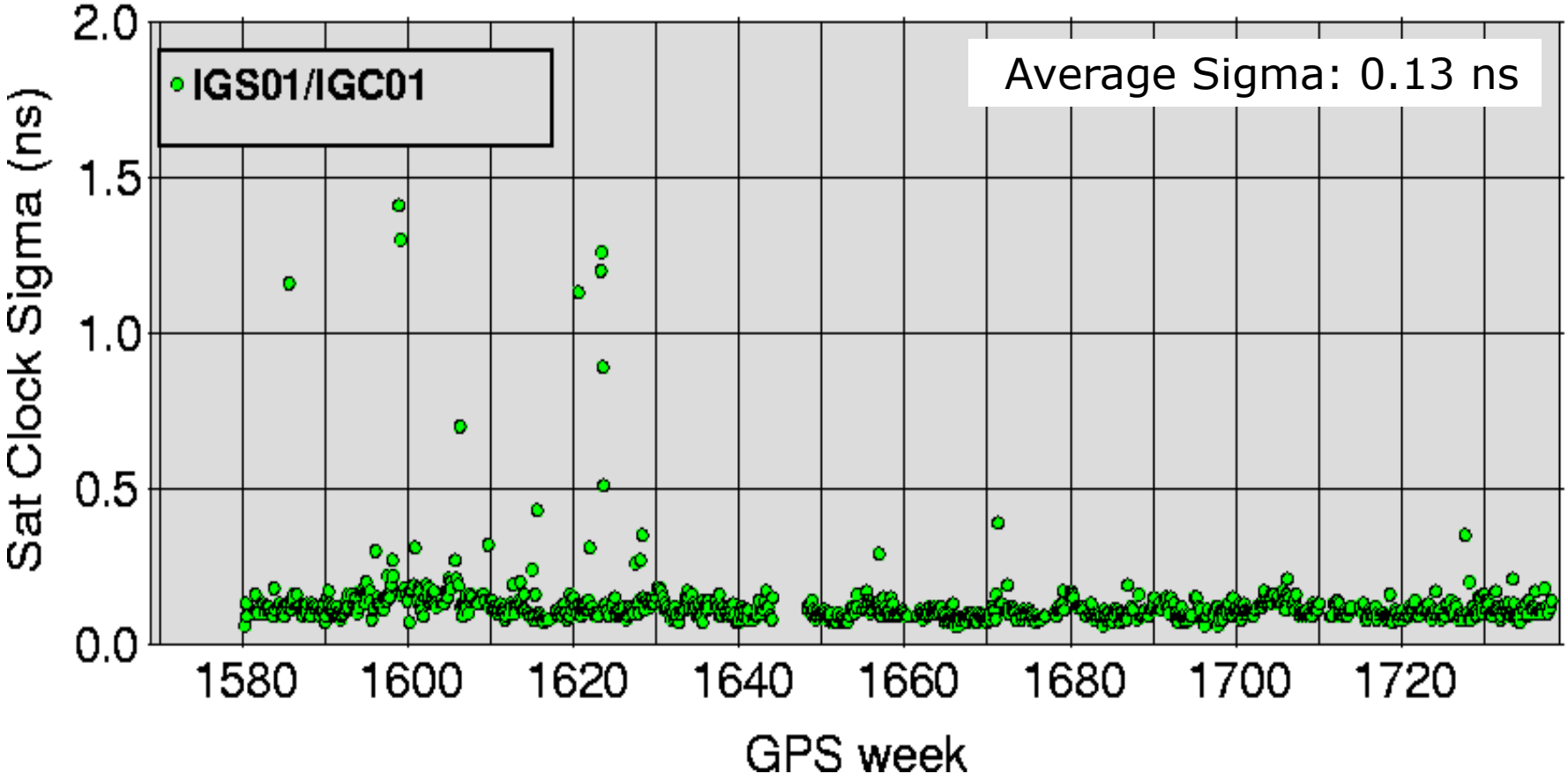
IGS RTS Product Performance

- Satellite orbit RMS (compared to IGS Rapid)

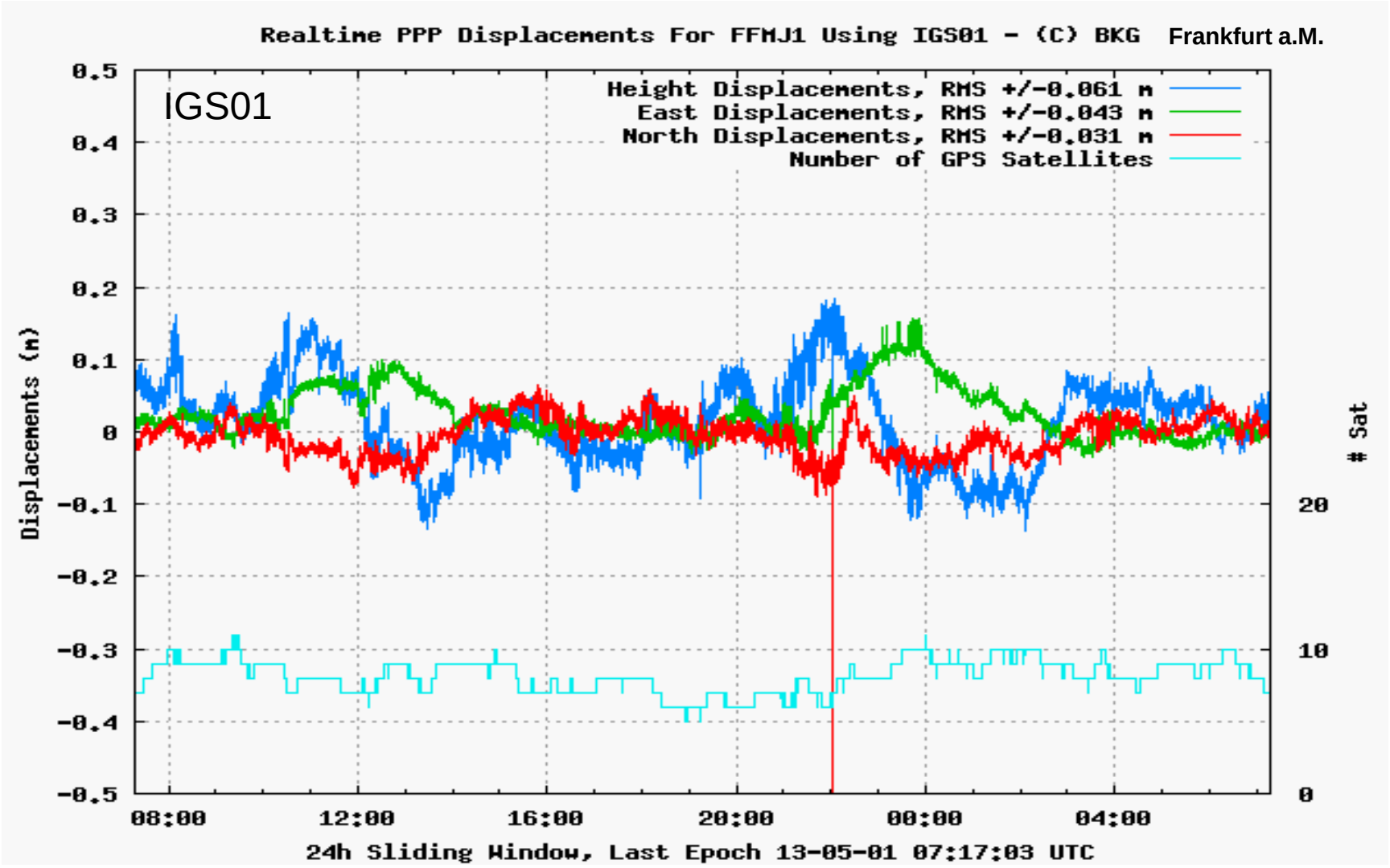


IGS RTS Product Performance

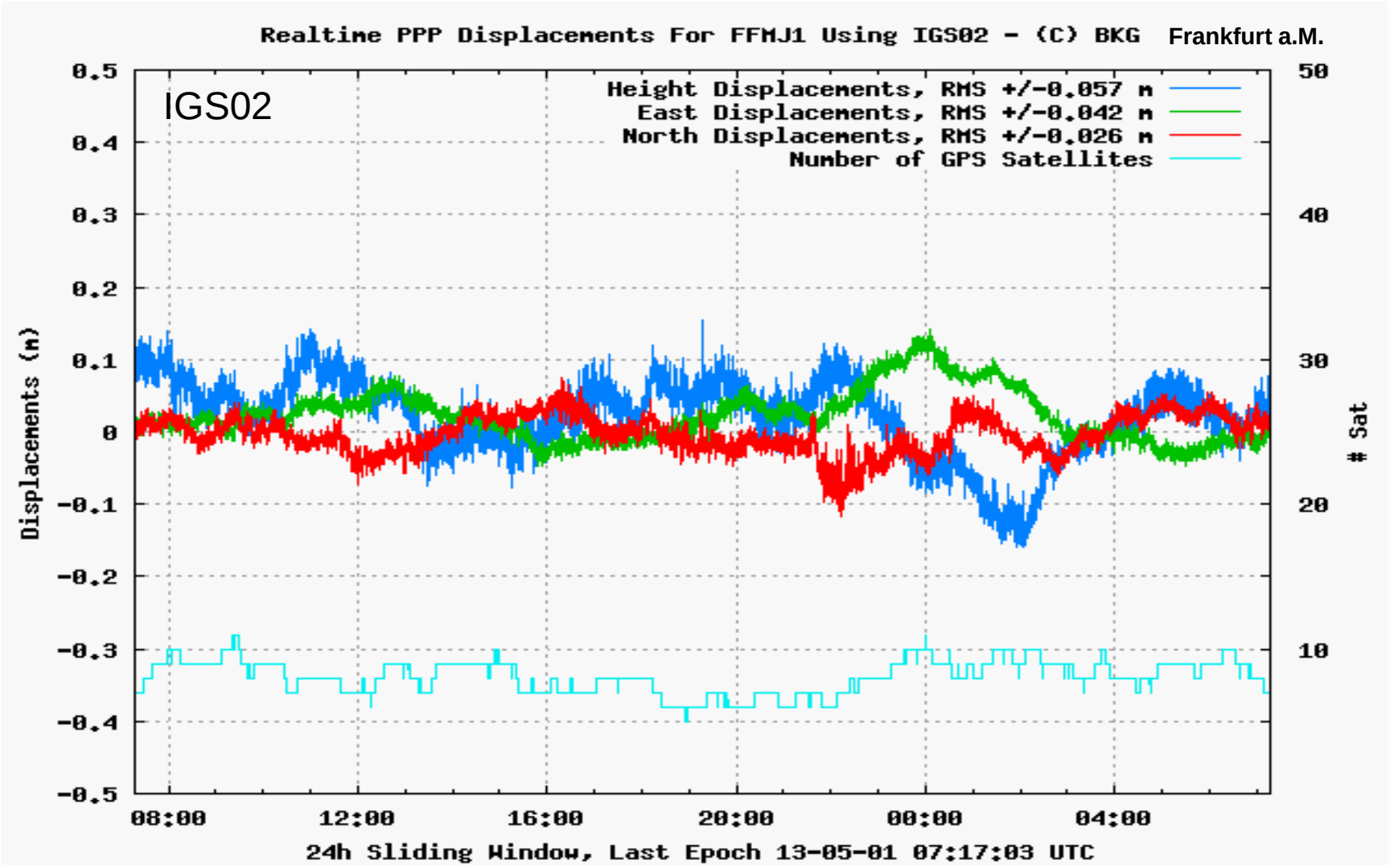
- Satellite clock std.dev. (compared to IGS Rapid)



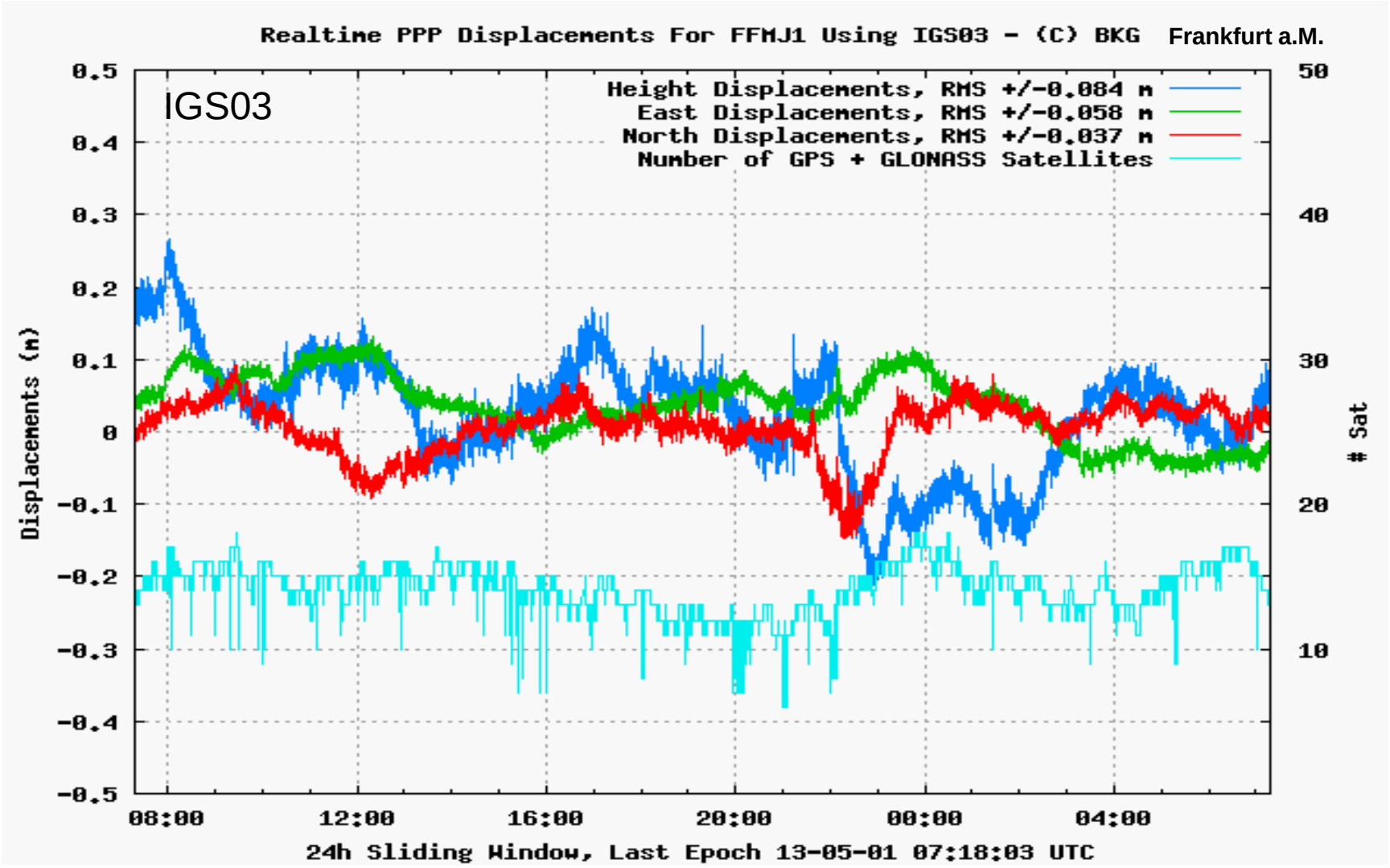
IGS RTS Product Performance



IGS RTS Product Performance



IGS RTS Product Performance



IGS RTS Applications


APF

- 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”

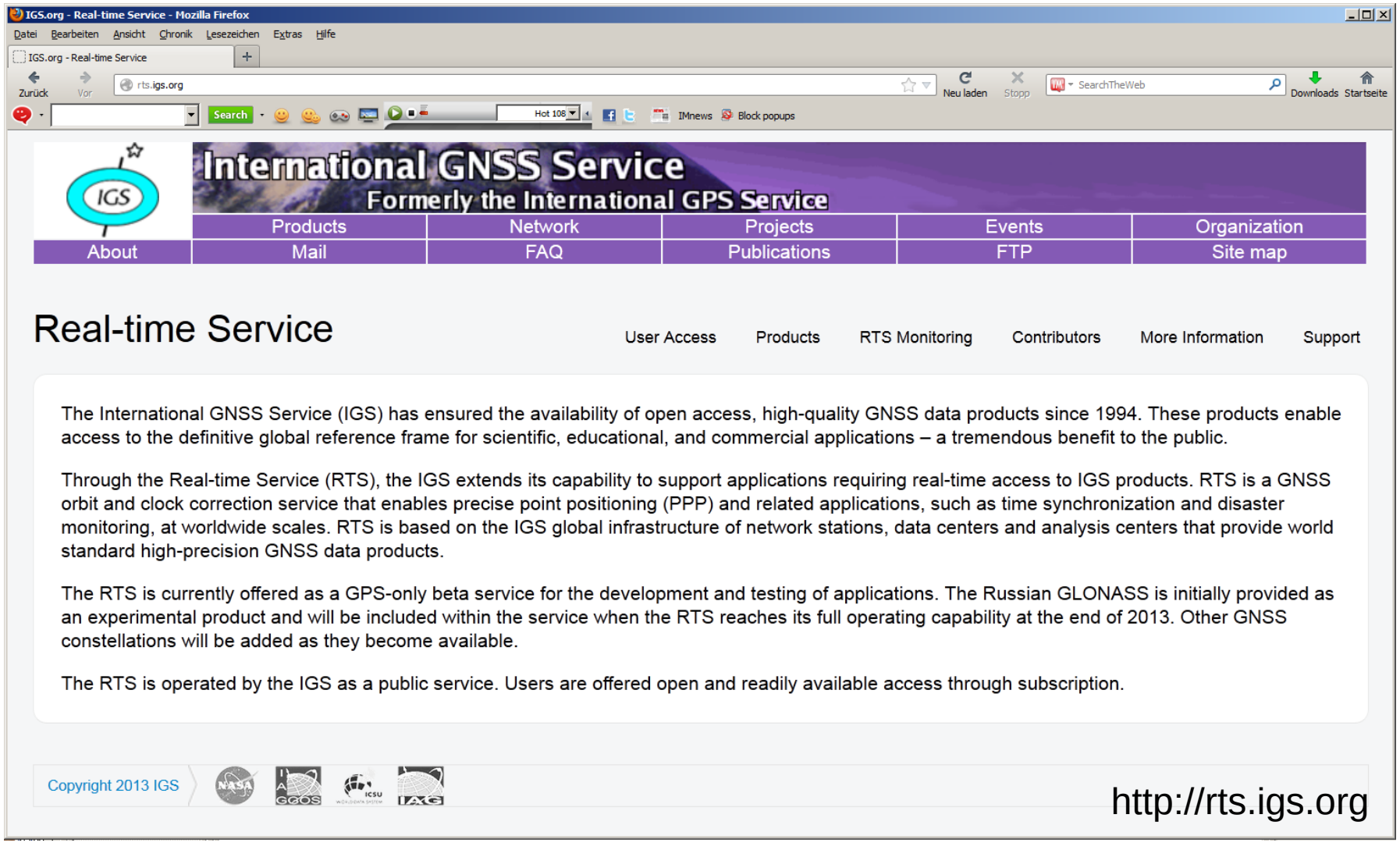
IGS RTS Users

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

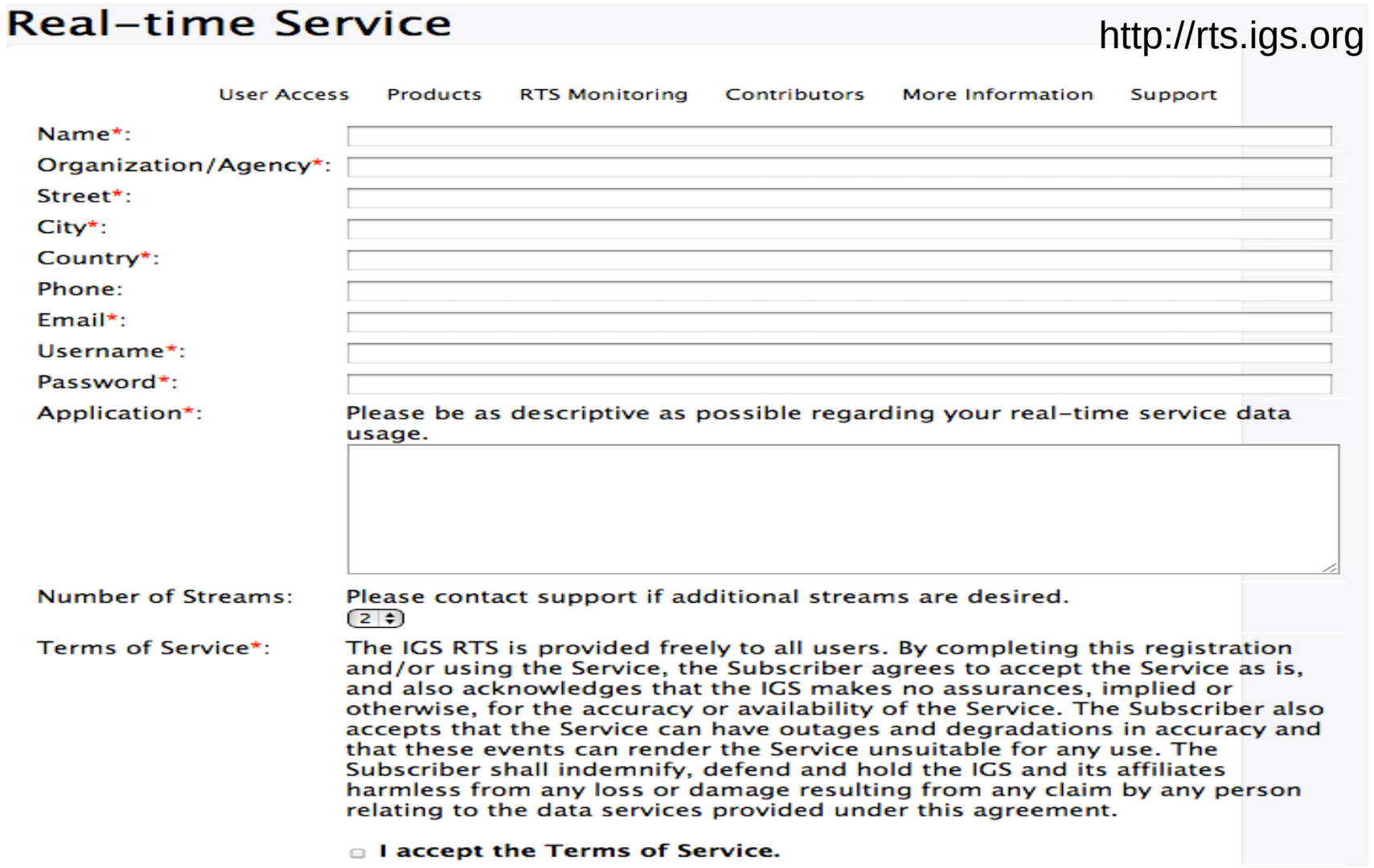
By Application Category	30-Apr-13
Academic Research/Instruction	24
Agriculture	4
Automotive/Vehicle Navigation	1
Aviation/Runway Mapping/Integrity Monitoring	1
Control Surveying	2
Meteorology	2
Mining/Oil/Gas	1
Photogrammetry/Airborne LIDAR	0
Radiation Monitoring	0
Receiver/Software Development	9
Robotics	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 Syncronization	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
Phillippines	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 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

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