Federal Agency for Cartography and Geodesy

EPN real-time analysis status report

Wolfgang Söhne

Federal Agency for Cartography and Geodesy

Stream upload redundancy concept

- One station streams real-time data to two different casters in parallel
- Mail by G. Weber to IGS stream providers on February, 28, 2013
- Existing casterwww.igs-ip.net

  Existing casterigs.orgfor the observations (~ 200 streams: 126 IGS, 66 EUREF, 1 MGEX)
- Existing casterproducts.igs-ip.net

  New redundant casterrt.igs.orgfor the products
- Several IGS stations also EPN stations→waiting with action for EPN

Stream upload redundancy concept

- So far, >10 stations also belonging to the EPN were able to upgrade the streaming profile (GFZ: POTS, OBE4; Portugal: FLRS, FUNC, PDEL; France: AJAC, BRST, …, TLSE ; GOPE; …)
- Within EUREF concentration on the remaining stations:

  123 streams in total

  - 68 pulled directly from national/local casteror viaigs-ip caster

  = ~ 55streams remaining

EPN RT web page

- **AI6:**"CB will distribute the link about the updated real-time analysis web pages to the TWG. TWG members should review the web pages. Once this is done, CB will add the EPN real-time orbits&clocks to the EPN CB as a new EPN product. Deadline: end of Nov. 2012"
- **Mail by CB and AC on January, 24**
- **One comment**

  (RP):"(…)monitoringprocedureoncompletenessandlatencyofobservationsshouldbeimplementedatASIandROBaswell."
- **http://www.epncb.oma.be/_organisation/projects/RT_analysis/**

Orbit and clock transformation

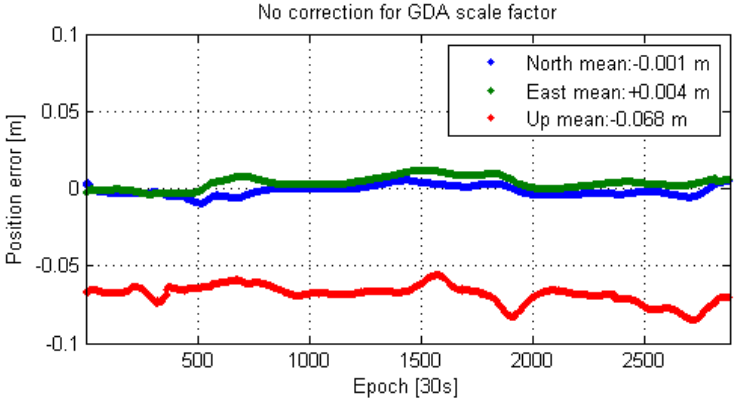
- **AI5:**"RD will provide to WS the method to take into account the scale difference between ITRF2008 and ETRF2000 through a correction of the real-time IGS08 clocks. Deadline: ASAP"
- **Satellite orbits are transformed, not the clockcorrections**

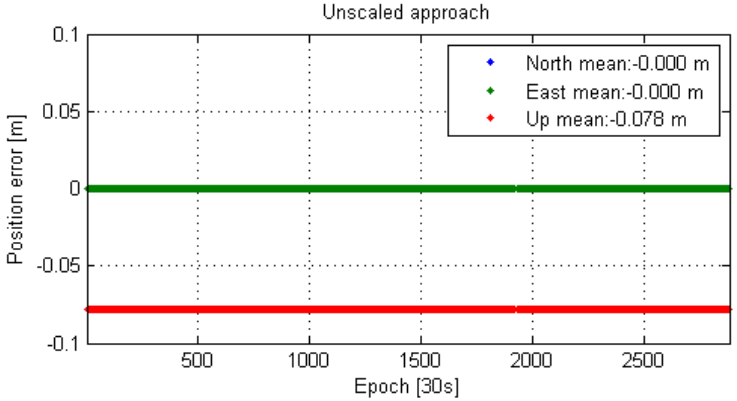
  → error in height for GDA94 ~ 6-8 cm, for ETRS89 ~ 6-8 mm
- **Correcting the clocks considering the scale:**

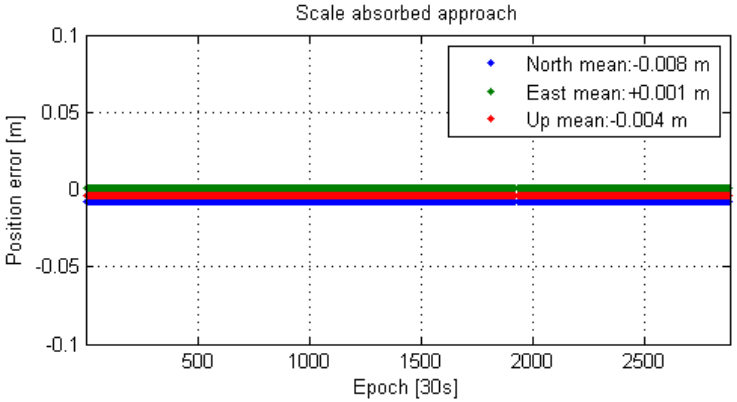
  (orbital height * scale) /speed_of_light
- **Formulahas been implemented inBNCv2.8 for relevant regional coordinate systems**

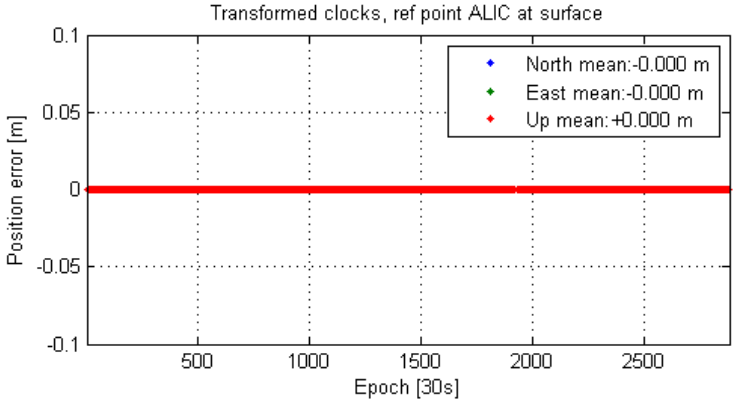
  →errorin height forGDA94 ~1-3cm, for ETRS89 ~fewmm

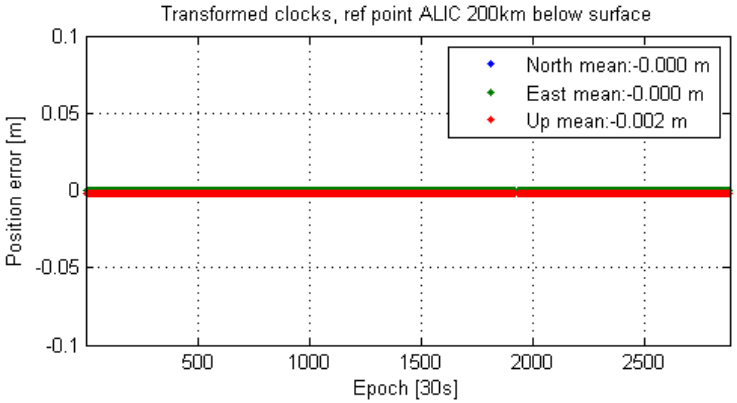
Orbit and clock transformation

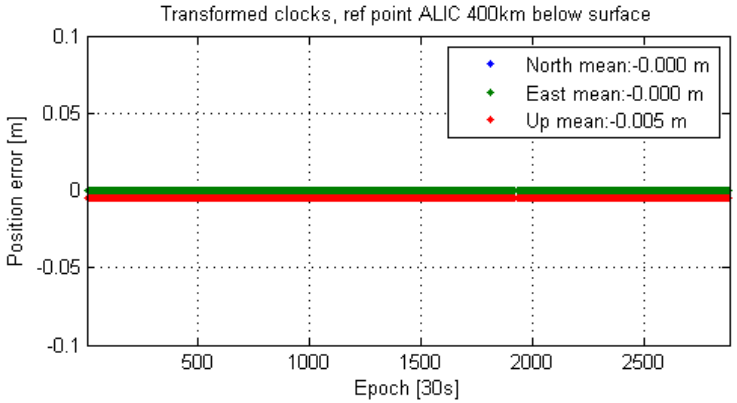




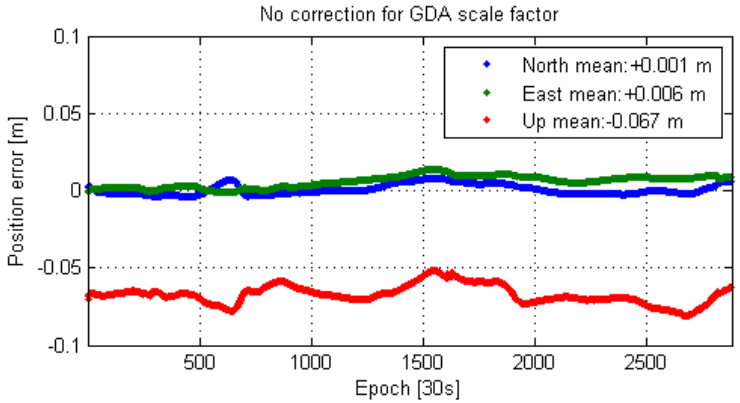


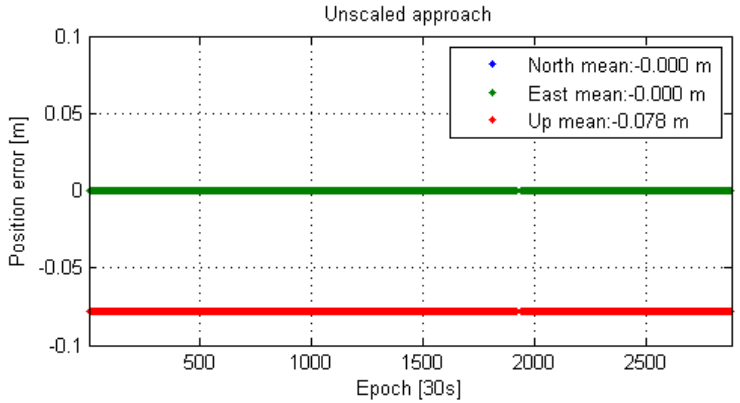


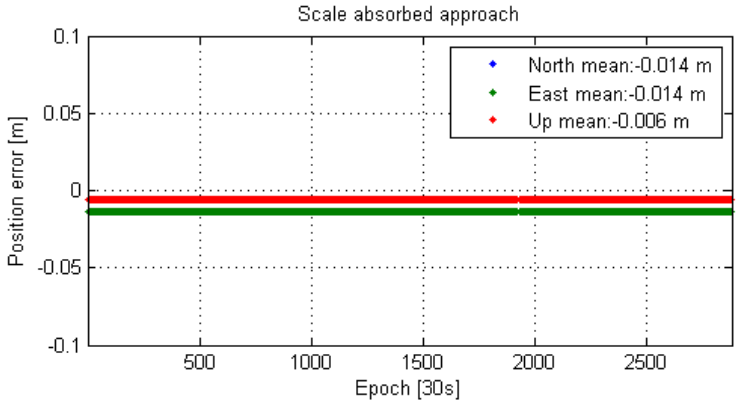


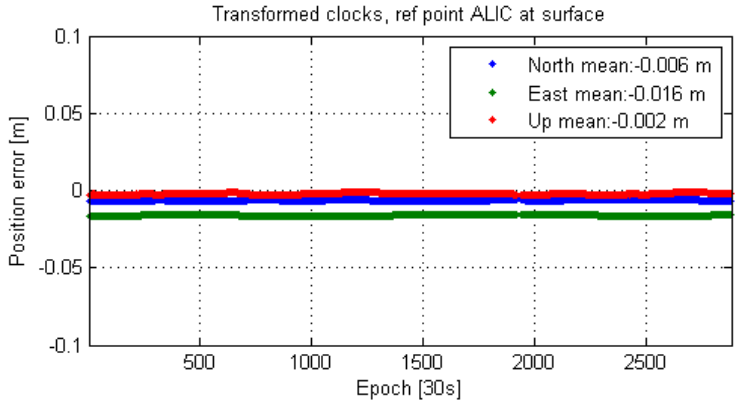


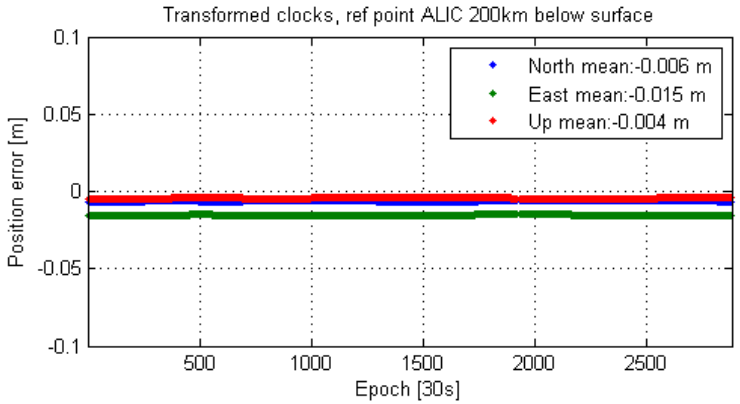
Orbit and clock transformation

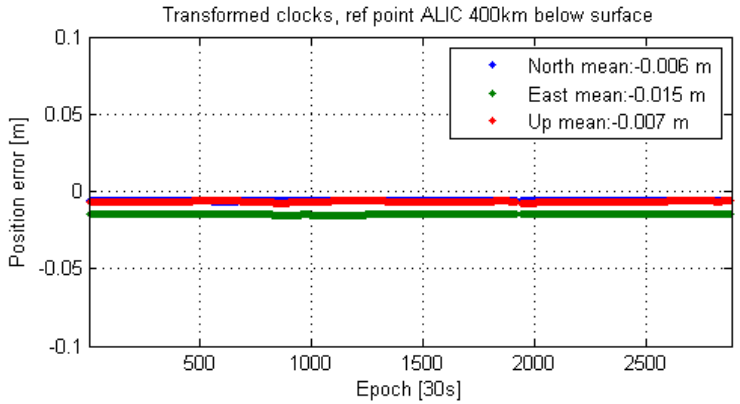




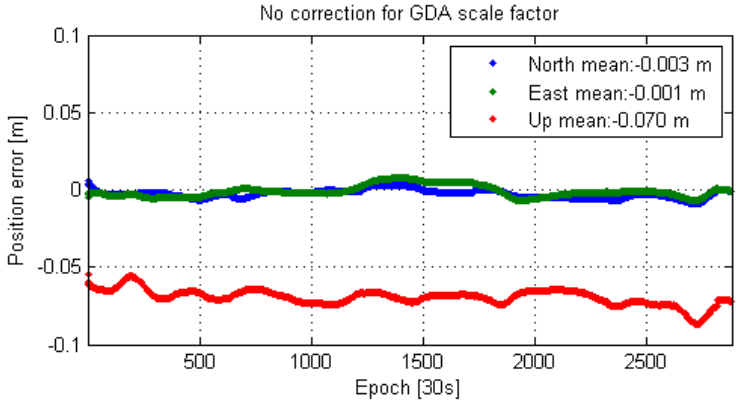


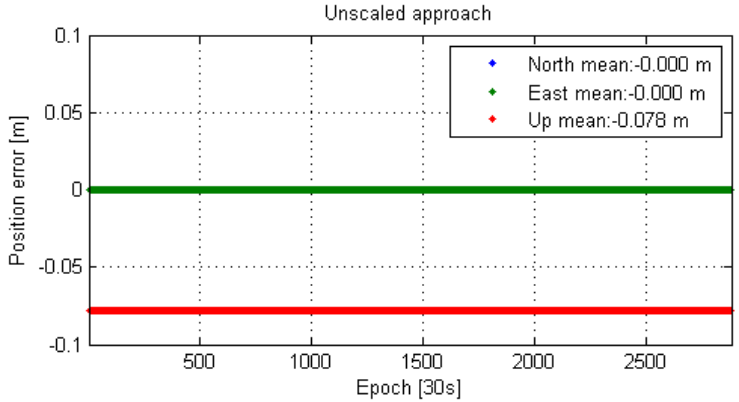


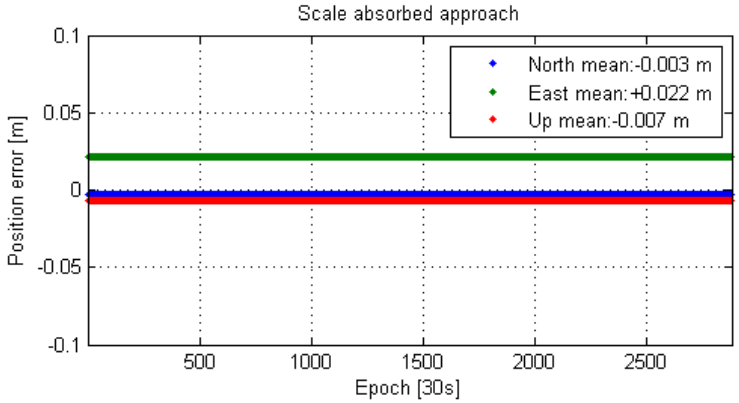


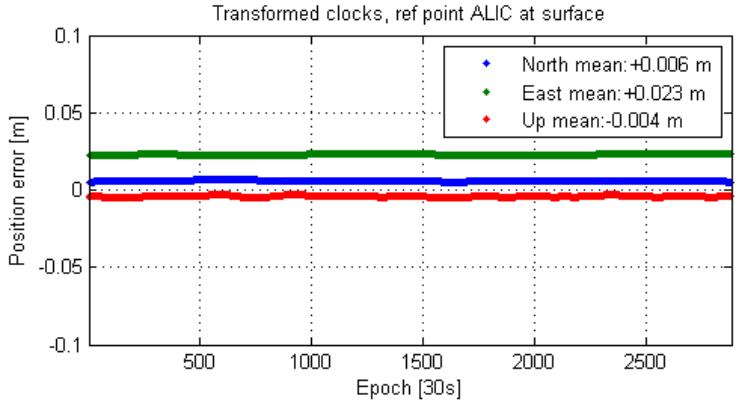


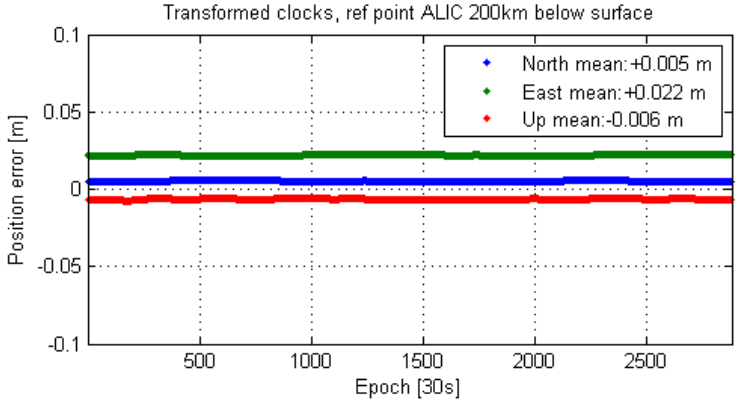
Orbit and clock transformation

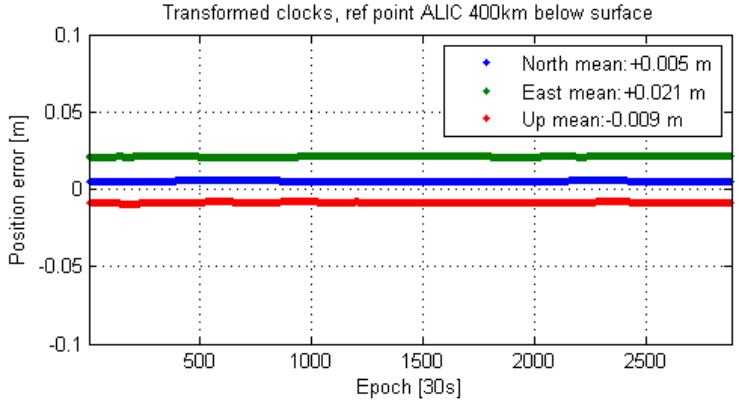












Orbit and clock transformation

3.1 Coordinate Transformations

Some of the above listed streams refer to regional or national coordinate reference systems. The following table presents links to NTRIP Broadcasters providing access to such streams.

Resourses Supporting Regional Reference Frames

Reference Frame	Coverage	Caster URL	Port	APC Stream	System	Agency Link
ETRF 2000	Europe	www.euref-ip.net	80 & 2101	EUREF01 EUREF02	GPS GPS & GLONASS	BKG
GDA 94	Australia	192.104.43.25:2101	2101	GDA9401 GDA9402	GPS GPS & GLONASS	GA
NAD 83	North America	cddis-caster.gsfc.nasa.gov	80	NAD9301 NAD8302	GPS GPS & GLONASS	CDDIS
SIRGAS 95	South America	200.3.123.65:2101	2001	SIRGAS9501 SIRGAS9502	GPS GPS & GLONASS	UNR
SIRGAS 2000	Brazil	gps-ntrip.ibge.gov.br:2101	2001	SIRGAS200001 SIRGAS200002	GPS GPS & GLONASS	IBGE

The following Helmert transformation parameters are used in this context for transformations from ITRF2008/IGS08.

Helmert Transformation Parameters for Transformation to Regional Systems

Regional System	Tx, Ty, Tz (m)	dTx, dTy, dTz (m/y)	Rx, Ry, Rz (mas)	dRx, dRy, dRz (mas/y)	S (10**-9) dS (10**-9/y)	T0 for Rates
ETRF2000	0.0541 0.0502 -0.0538	-0.0002 0.0001 -0.0018	0.891 5.390 -8.712	0.081 0.490 -0.792	0.40 0.08	2000.0
NAD83	0.9963 -1.9024 -0.5219	0.0005 -0.0006 -0.0013	-25.915 -9.426 -11.599	-0.067 0.757 0.051	0.78 -0.10	1997.0
GDA94	-0.08468 -0.01942 0.03201	0.00142 0.00134 0.00090	0.4254 -2.2578 -2.4015	-1.5461 -1.1820 -1.1551	9.710 0.109	1994.0
SIRGAS2000	0.0020 0.0041 0.0039	- - -	0.17 -0.03 0.07	- - -	- -	no rates
SIRGAS95	0.0077 0.0058 -0.0138	- - -	0.00 0.00 -0.03	- - -	1.57 -	no rates

References:

RTCM MSM

- End of January Multiple-Signal-Messages (MSM) accepted by RTCM SC-104
- Issue was phasecenteralignment
- Feb, 1, 2013: new RTCM standard RTCM10403.2
- Available for GPS, GLO, GAL

  1071-1077, 1081-1087, 1091-1097
- To be defined for BDS, QZS, SBAS

  1101-1107, 1111-1117, 1121-1127
- Problem to introduce correct header lines “SYS / PHASE SHIFT” in RINEX files derived from streams (no info in streams)

Other efforts

- **New BNC version 2.8 published (March, 13, EUREF mail 6858)**
  - **Including RTCM MSM**
  - **Correcting clocks for scale factor in regional transformations**
  - **Concatenation of Galileo NAV files**
- **IGS RT web pages developed**

→ finally, a link to the regional transformations is implemented

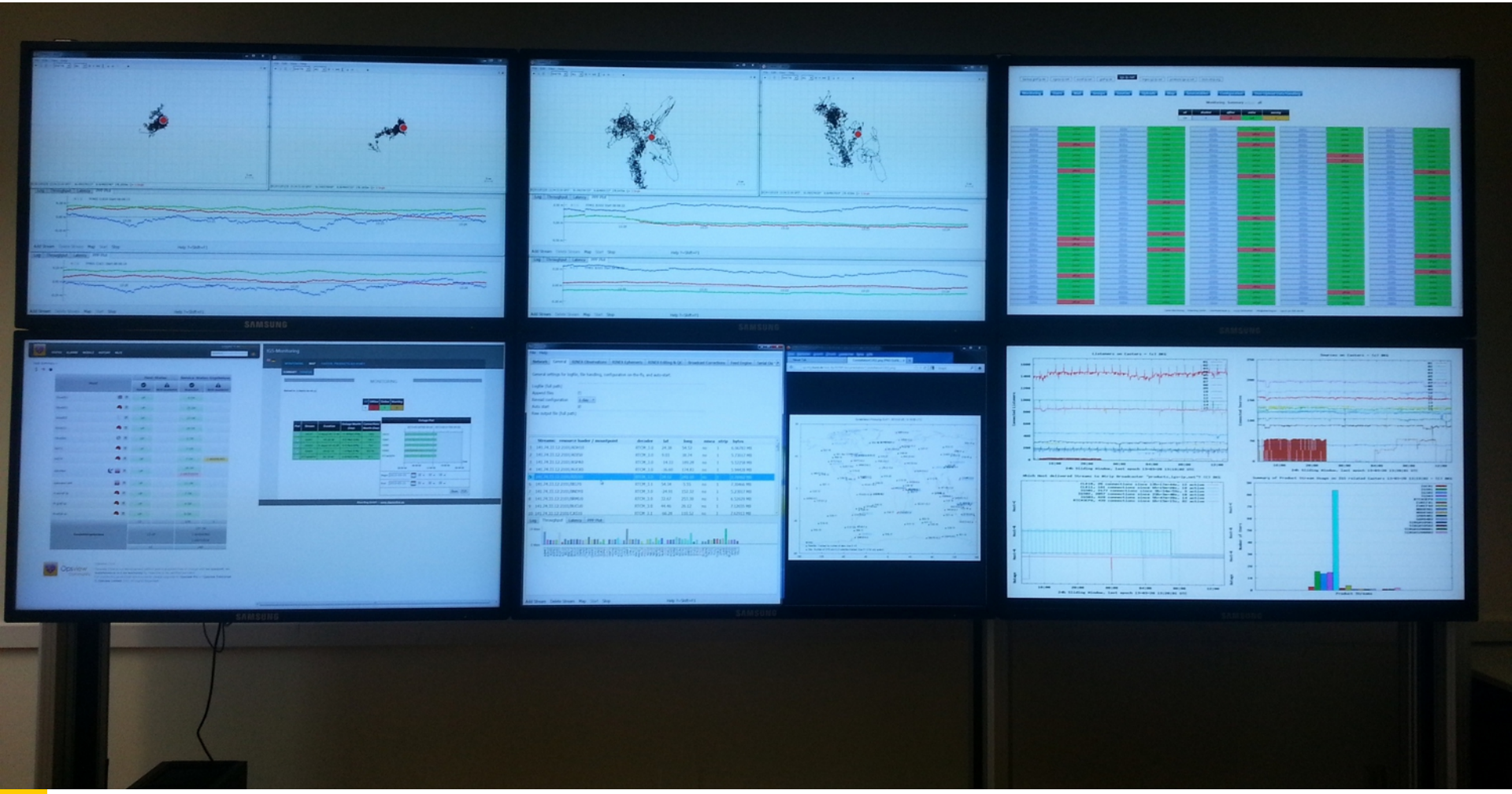
- ~ 52 stations included in caster mgex.igs-ip.net
- 20 in in Europe
- 5 EPN (BRST, BRUX, M0SE, (OBE4), POTS, TLSE)
- 9 co-located with EPN stations
- BRST7: C, E, G, R, S RNX3: G, S, R, E, C
- BRUX7: C, E, G, R RNX3: G, E, R, C
- M0SE7: E, G, R, S RNX3: G, R, E, S
- OBE47: C, E, G, J, R, S RNX3: E, G, R
- POTS7: E, G, R RNX3: E, G, R
- TLSE7: E, G, R, S RNX3: E, G, R, S

EPN RT Monitoring at BKG

EPN RT Monitoring at BKG

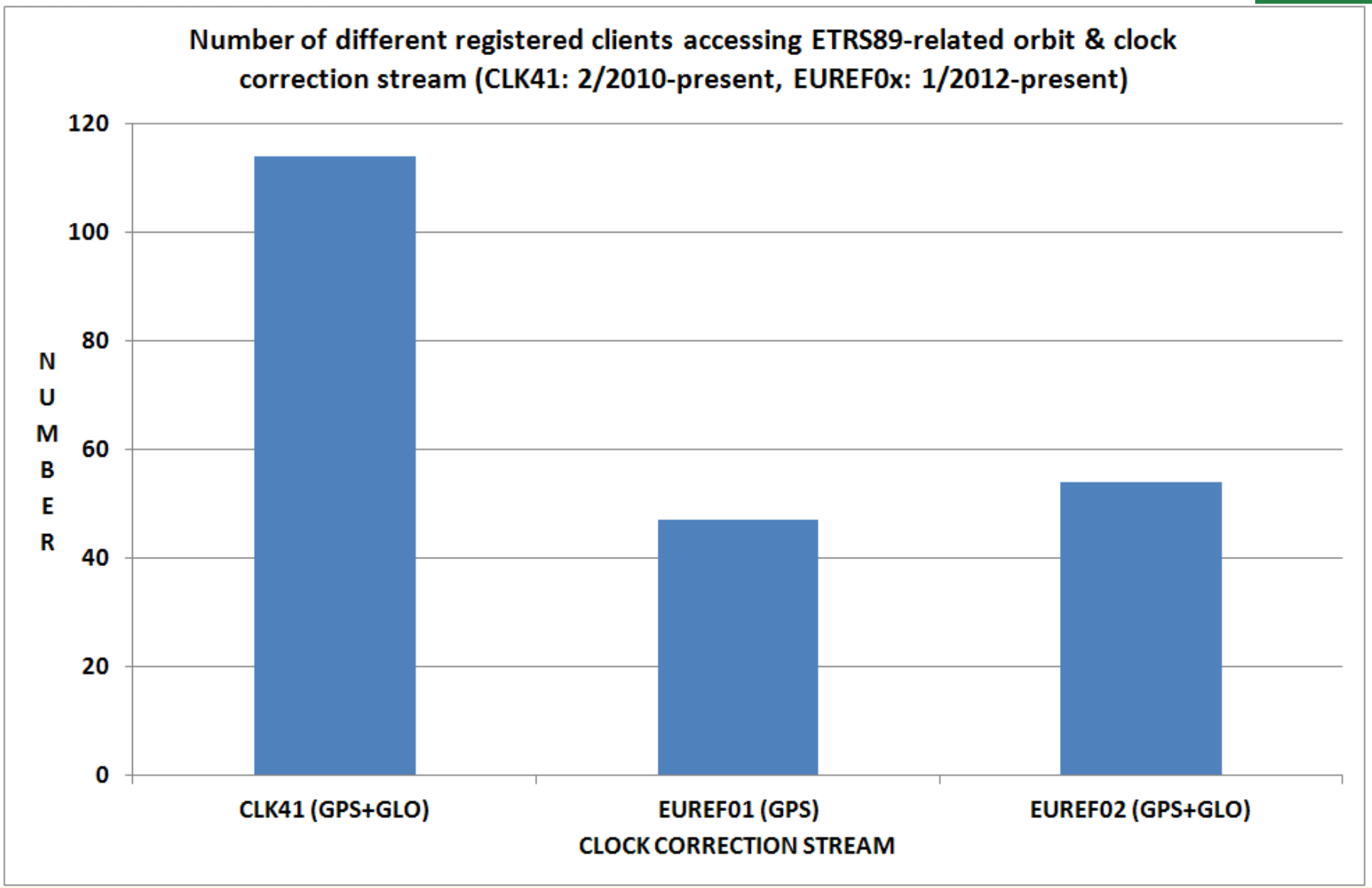
EPN RT Monitoring at BKG

EPN RT Monitoring at BKG

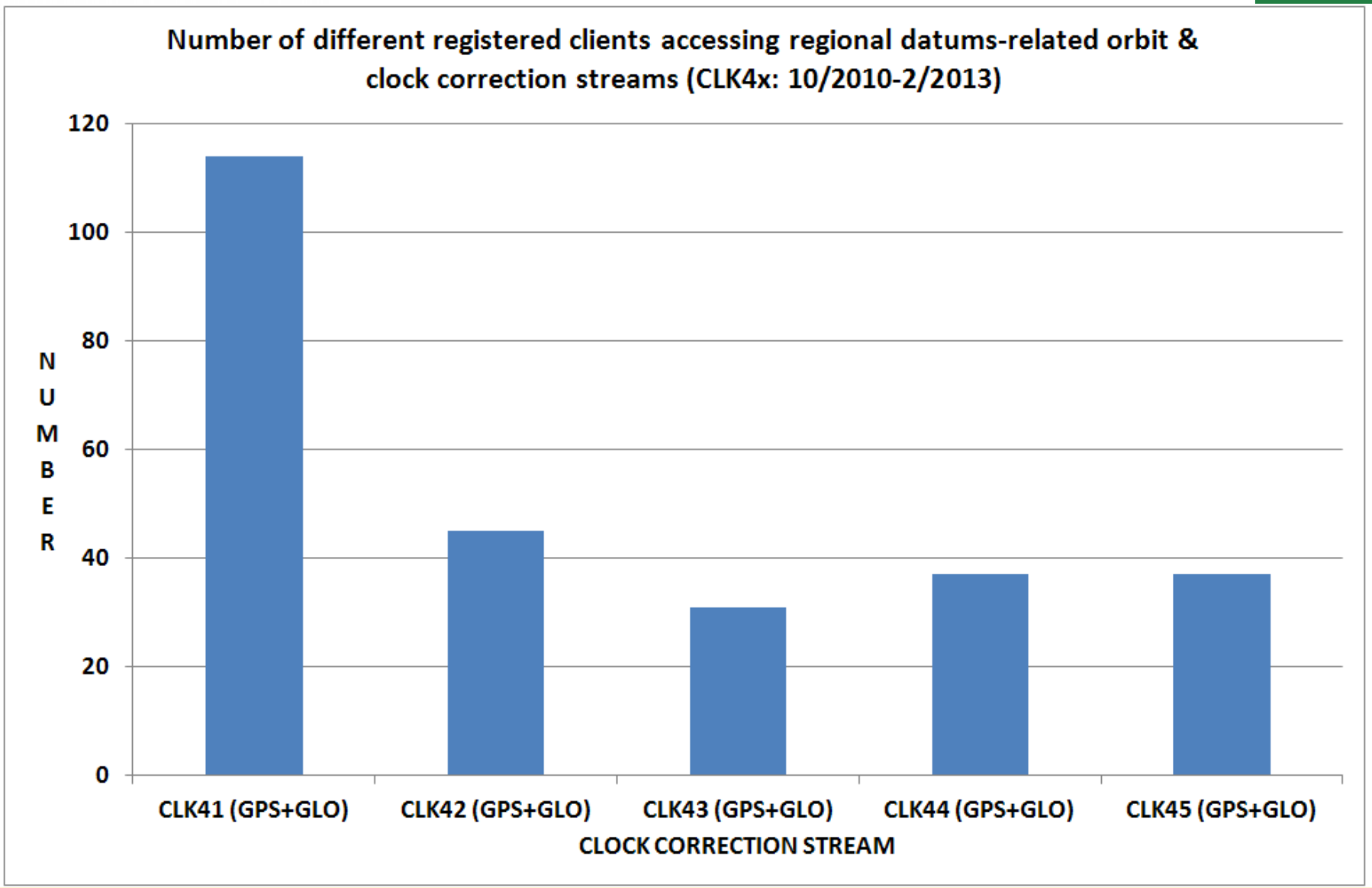


→http://igs.bkg.bund.de/ntrip/workload

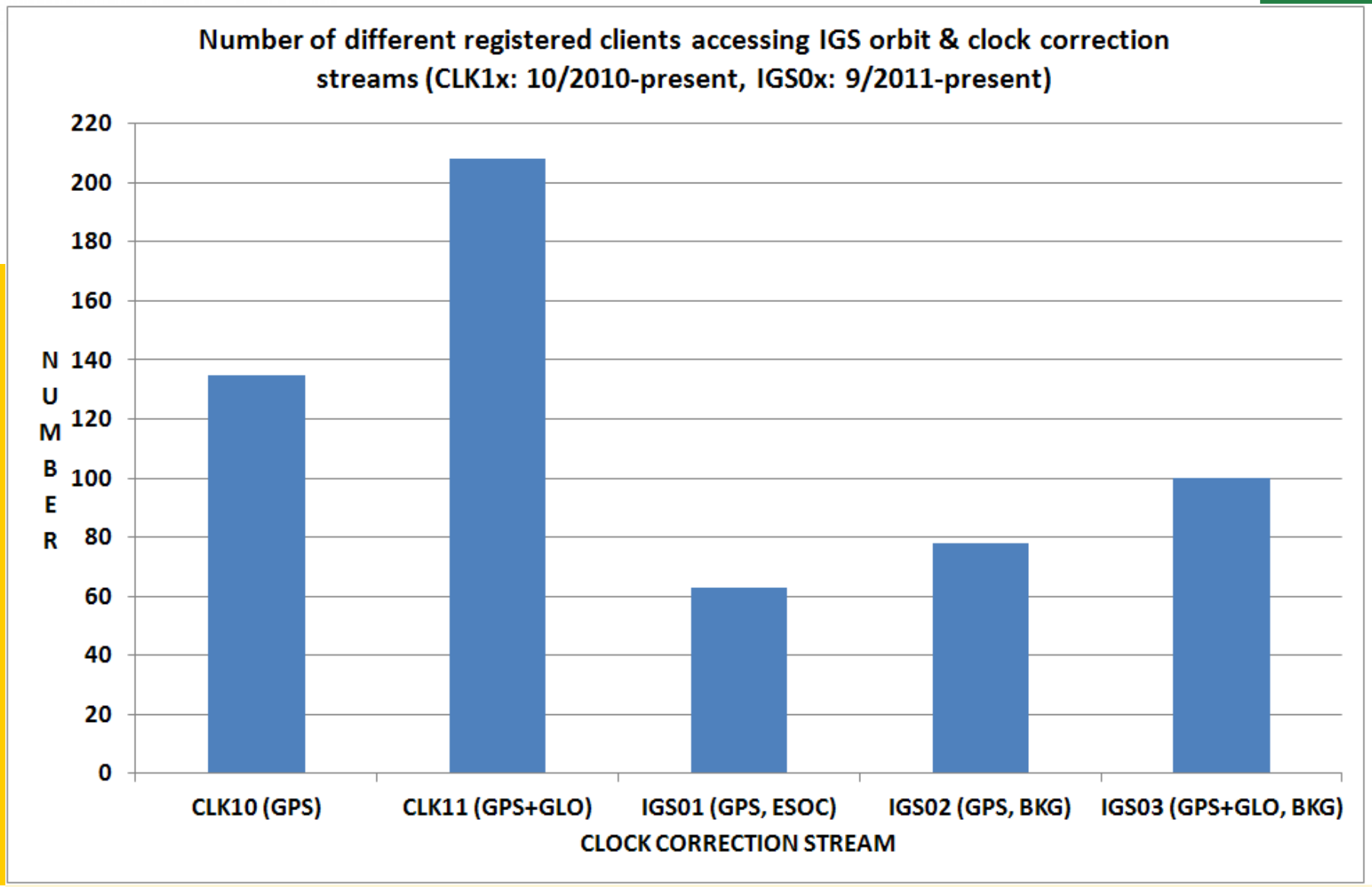
Statistics on RT products



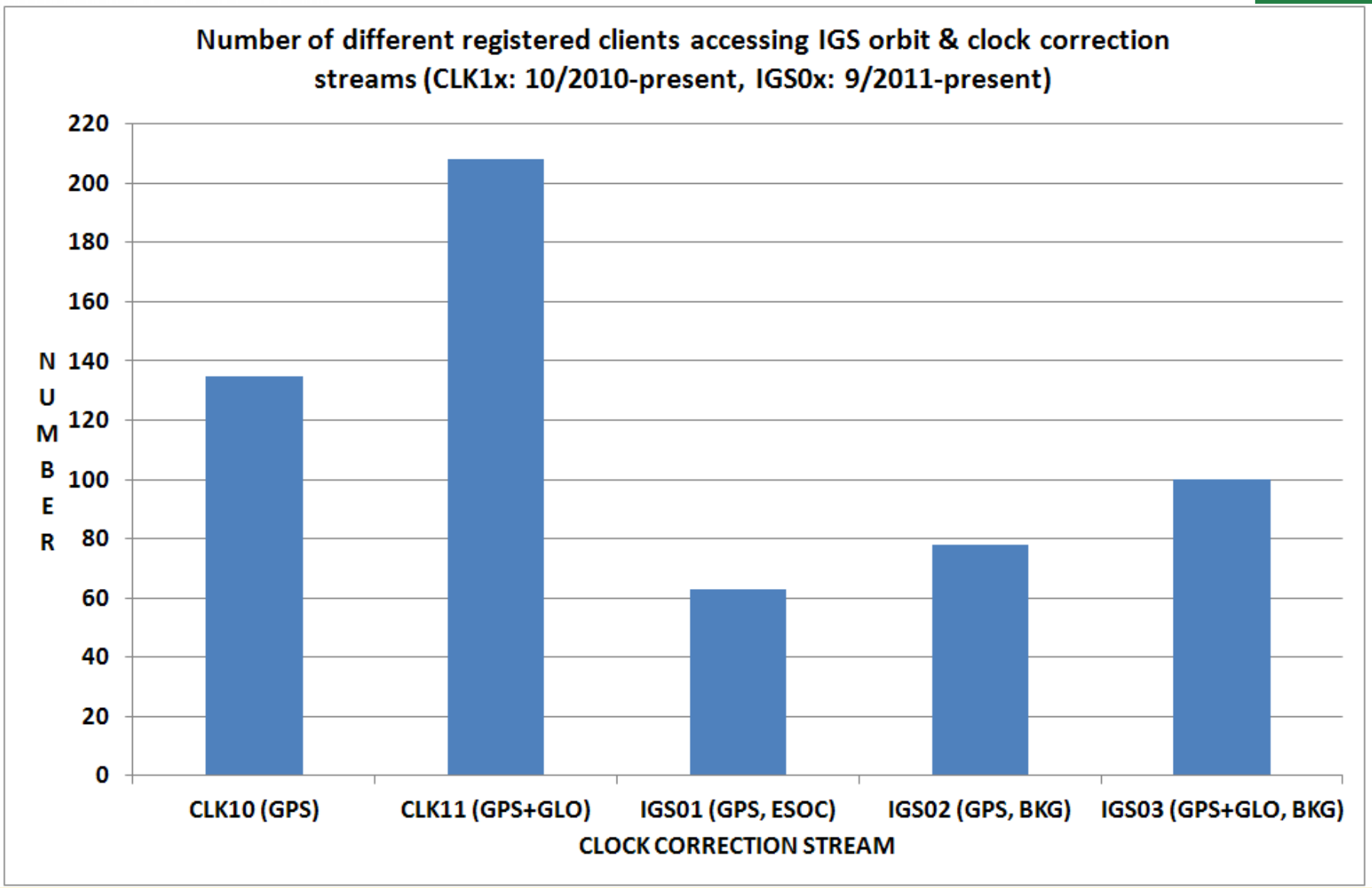
Statistics on RT products



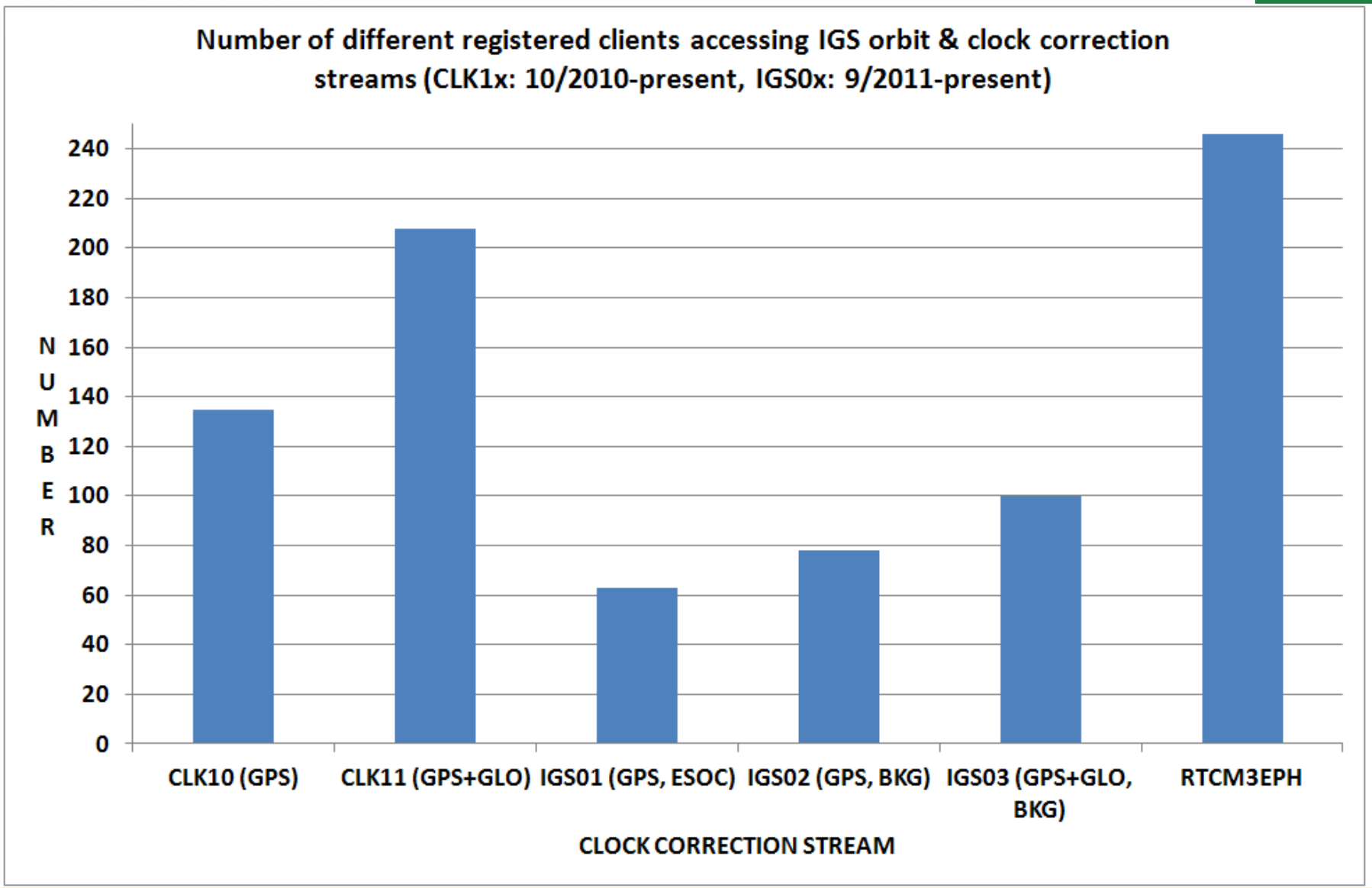
Statistics on RT products



Statistics on RT products



Statistics on RT products



EPN RT Monitoring at BKG

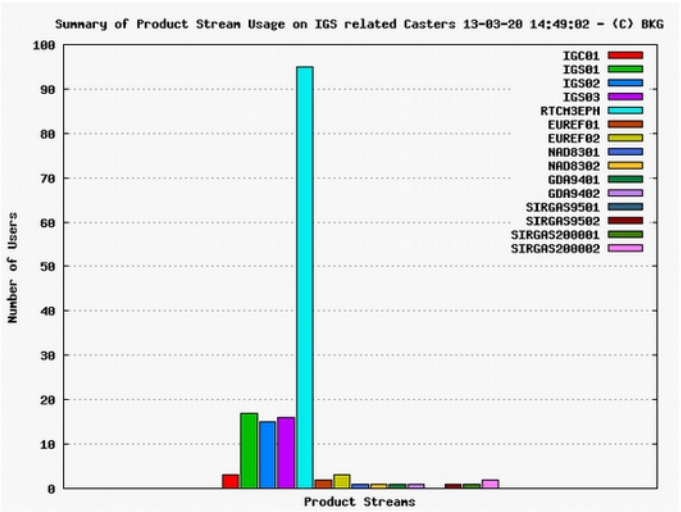
GNSS Data Center - Mozilla Firefox

Datei Bearbeiten Ansicht Chronik Lesezeichen Extras Hilfe

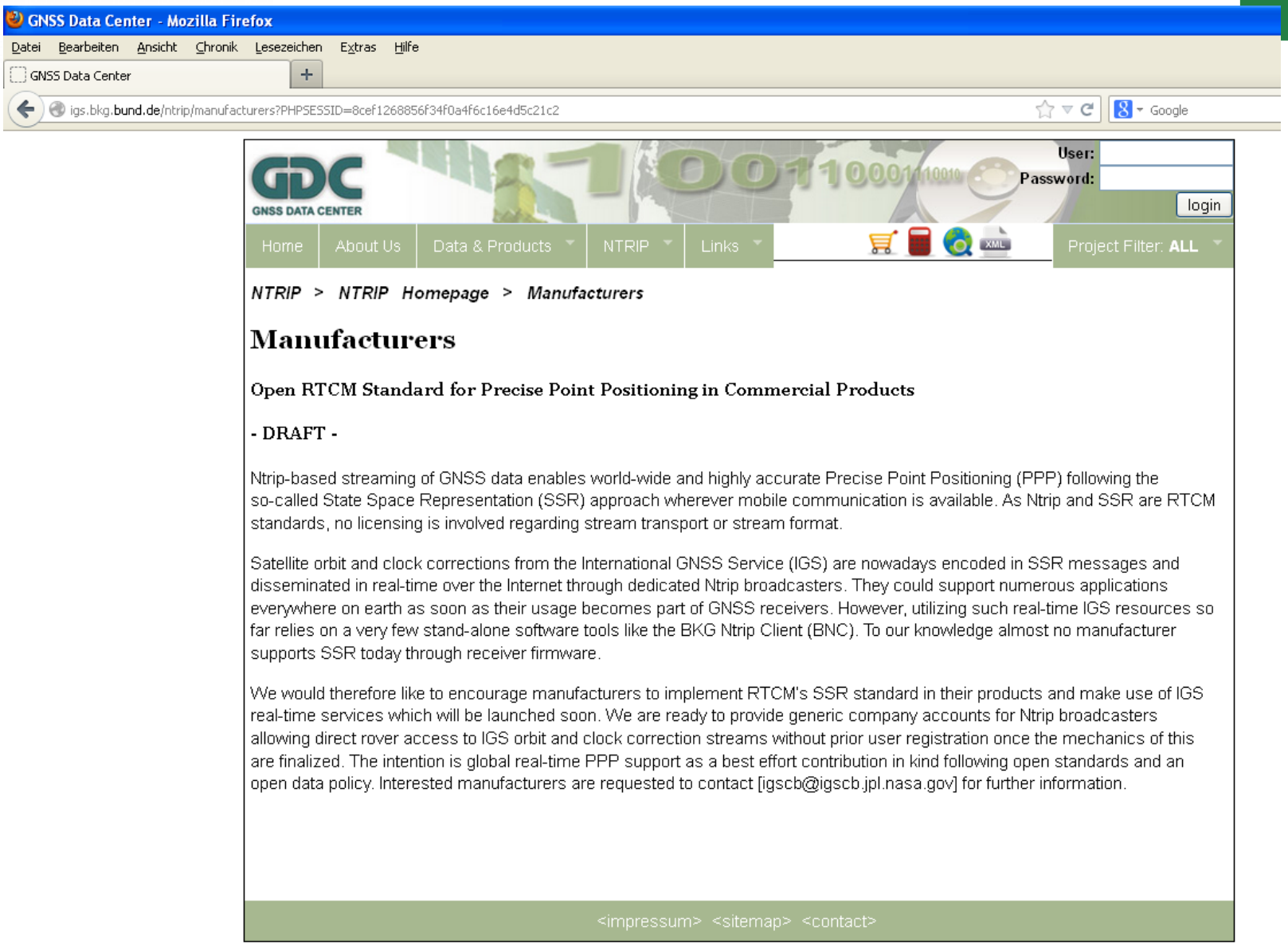
GNSS Data Center

igs.bkg.bund.de/ntrip/workload?PHPSESSID=9b5e2f20c9a719c9340ce48c91738ba3

minutes.



Line	Network	Institution	Country	URL:Port
01	IGS	BKG	Germany	www.igs-ip.net:2101
02	IGS	Wuhan	China	ntrip.gnsslab.cn:2101
03	IGS	GA	Australia	192.104.43.25:2101
04	IGS	GFZ	Germany	139.17.3.112:4080
05	IGS	GMV	Spain	igs-ip.gmv.com:2101
06	IGS	IGSCB	USA	rt.igs.org:2101
07	IGS	CNES	France	178.33.109.250:2101
08	IGS	BKG	Germany	products.igs-ip.net:2101
09	EUREF	BKG	Germany	www.euref-ip.net:2101
10	EUREF	ASI	Italy	euref-ip.asi.it:2101
11	EUREF	ROB	Belgium	www.euref-ip.be:2101
12	MGEX	BKG	Germany	mgex.igs-ip.net:2101
13	IGS	CDDIS	USA	cddis-caster.gsfc.nasa.gov:80
14	SIRGAS	UNR	Argentina	200.3.123.65:2101
15	IGS	IGSCB	USA	igscb.jpl.nasa.gov:2101


GNSS Data Center - Mozilla Firefox
Datei Bearbeiten Ansicht Chronik Lesezeichen Extras Hilfe
GNSS Data Center
igs.bkg.bund.de/ntrip/manufacturers?PHPSESSID=8cef1268856f34f0a4f6c16e4d5c21c2
Google
GDC
GNSS DATA CENTER
User:
Password:
login
Home
About Us
Data & Products
NTRIP
Links
XML
Project Filter: ALL
NTRIP > NTRIP Homepage > Manufacturers
Manufacturers
Open RTCM Standard for Precise Point Positioning in Commercial Products
- DRAFT -
Ntrip-based streaming of GNSS data enables world-wide and highly accurate Precise Point Positioning (PPP) following the so-called State Space Representation (SSR) approach wherever mobile communication is available. As Ntrip and SSR are RTCM standards, no licensing is involved regarding stream transport or stream format.
Satellite orbit and clock corrections from the International GNSS Service (IGS) are nowadays encoded in SSR messages and disseminated in real-time over the Internet through dedicated Ntrip broadcasters. They could support numerous applications everywhere on earth as soon as their usage becomes part of GNSS receivers. However, utilizing such real-time IGS resources so far relies on a very few stand-alone software tools like the BKG Ntrip Client (BNC). To our knowledge almost no manufacturer supports SSR today through receiver firmware.
We would therefore like to encourage manufacturers to implement RTCM's SSR standard in their products and make use of IGS real-time services which will be launched soon. We are ready to provide generic company accounts for Ntrip broadcasters allowing direct rover access to IGS orbit and clock correction streams without prior user registration once the mechanics of this are finalized. The intention is global real-time PPP support as a best effort contribution in kind following open standards and an open data policy. Interested manufacturers are requested to contact [igscb@igscb.jpl.nasa.gov] for further information.
<impressum> <sitemap> <contact>