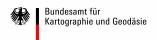


Using GNSS data in real-time for geodetic applications

W. Söhne¹⁾, A. Stürze¹⁾, L. Mervart²⁾, G. Weber¹⁾

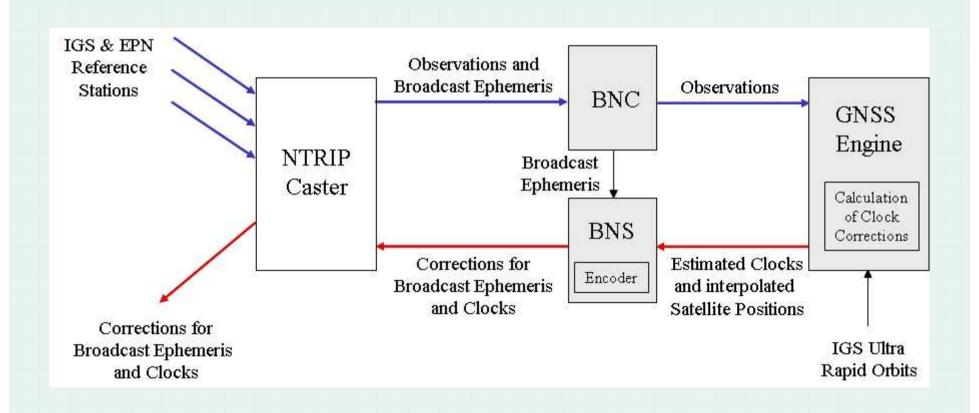
1)Federal Agency for Cartography and Geodesy, Frankfurt am Main, Germany

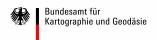
²⁾Technical University of Prague, Czech Republic



- > Real-time concept
 - BNS
 - BNC v1.5
- > Real-time applications
 - Single Point Positioning
 - Zenith Total Delay parameters
- > IGS-RT PP

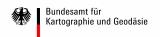
Orbit & clock correction concept



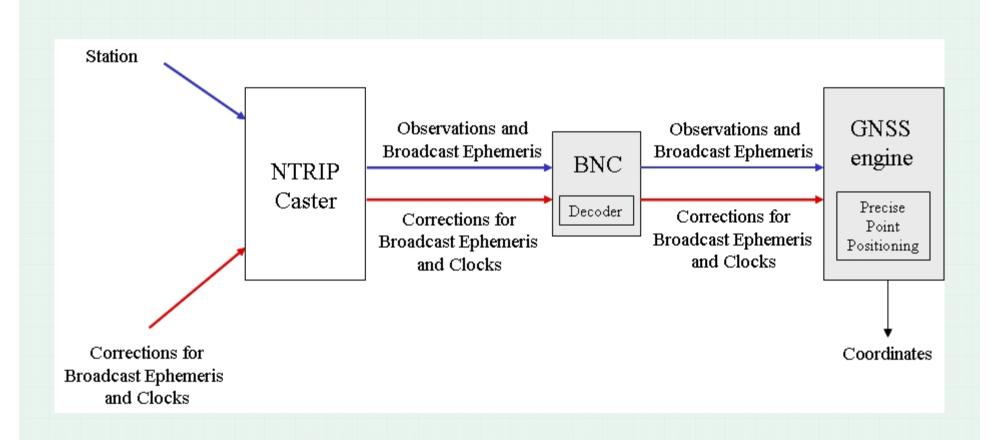


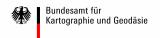
> Purpose

- Calculate differences between BRDC and IGU orbits in radial, along track and out-of-plane components
- Model orbit differences through polynomials of low degree
- Provide model-based estimations of corrections for BRDC orbits
- Calculate differences between BRDC clocks and improved IGU clocks
- Model clock differences
- Provide model-based estimations of corrections for BRDC clocks
- > First draft version since last week

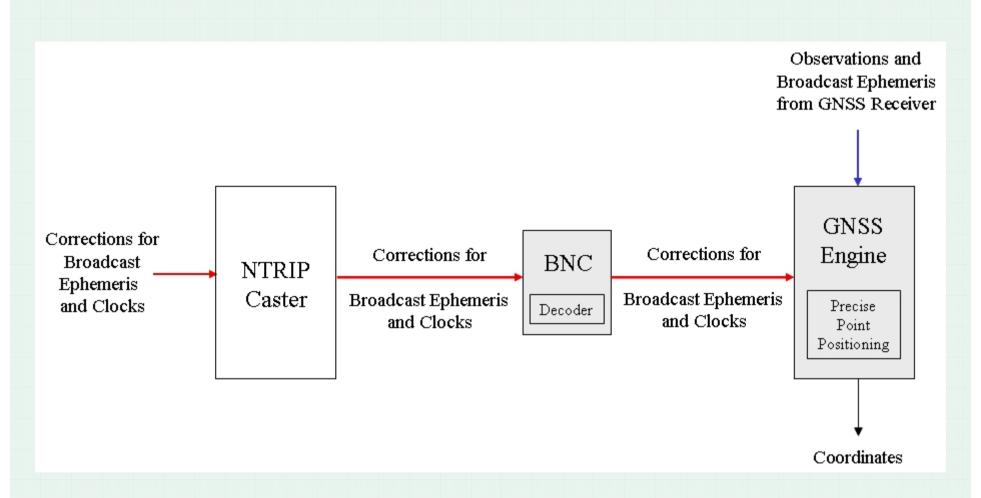


Orbit & clock correction concept

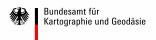




Orbit & clock correction concept

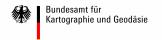


= state space representation, orbits & clocks, RTCM v3 messages



> Purpose

- GNSS data streams available through Ntrip
- Generation of high-rate RINEX OBS and NAV files
- Generation of EPH and synchronized OBS via port
- Monitoring of the performance of a real-time network
- ➤ New version 1.5
 - Available for download since last Friday

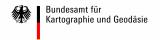


BKG Ntrip Client (BNC)

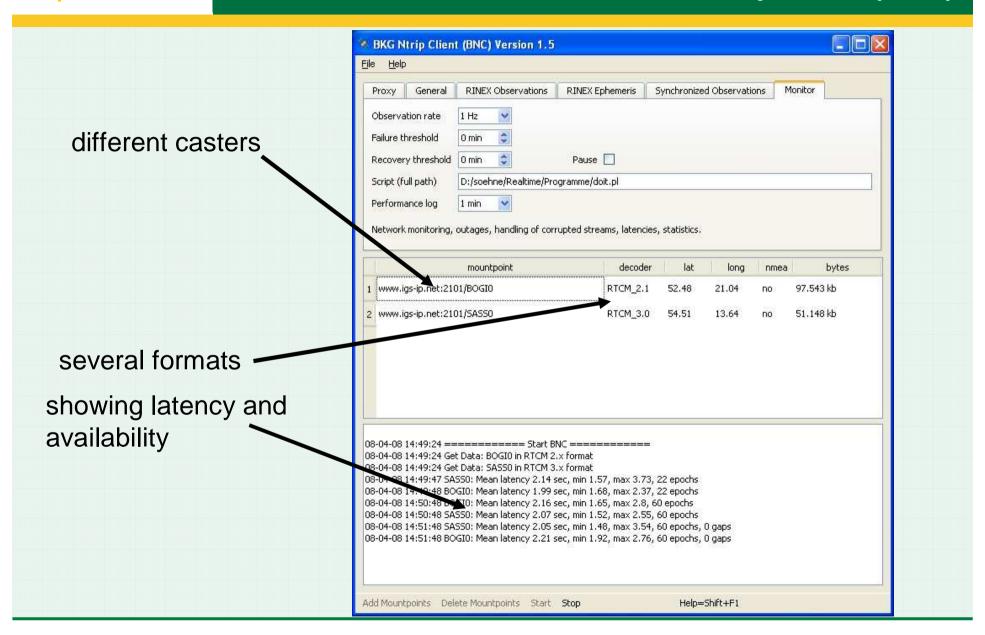
BKG Ntrip Client (BNC) Version 1.5 File Help Proxy General RINEX Observations RINEX Ephemeris Synchronized Observations Monitor Directory D:/soehne/Realtime/Programme/Daten Interval 1 min Port 2101 Version 3 selection using tabs Saving RINEX ephemeris files and ephemeris output through IP port. decoder lat bytes mountpoint long nmea 1 www.igs-ip.net;2101/ADIS1 RTCM_3.0 9.03 8.392 kb 38.74 generation of RINEX 2 www.igs-ip.net:2101/CONZ2 8.201 kb RTCM 3.0 -36.84286.98 3 www.igs-ip.net:2101/FFMJ2 RTCM_3,0 50.09 8.66 8.501 kb version 3 files possible 08-04-08 13:09:12 Get Data: DAEJU in RTCM 2.x format 08-04-08 13:09:12 Get Data: GOPE0 in RTCM 2.x format 08-04-08 13:09:12 Get Data: ZIM20 in RTCM 3.x format 08-04-08 13:09:12 Station GOPE0: old epoch 220164 thrown away 08-04-08 13:10:16 ========= Start BNC ========= 08-04-08 13:10:17 Get Data: ADISO in RTCM 3.x format 08-04-08 13:10:17 Get Data: ALICO in RTIGS format 08-04-08 13:10:17 Get Data: BOGIO in RTCM 2.x format 08-04-08 13:10:17 Get Data: DAEJO in RTCM 2.x format 08-04-08 13:10:17 Get Data: GOPE0 in RTCM 2.x format 08-04-08 13:10:17 Get Data: ZIM20 in RTCM 3.x format 08-04-08 13:13:37 ========= Start BNC ========= 08-04-08 13:13:38 Get Data: ADIS1 in RTCM 3.x format 08-04-08 13:13:38 Get Data: CONZ2 in RTCM 3.x format 08-04-08 13:13:38 Get Data: FFMJ2 in RTCM 3.x format

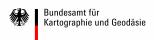
Add Mountpoints Delete Mountpoints Start Stop

Help=Shift+F1



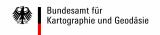
BKG Ntrip Client (BNC)



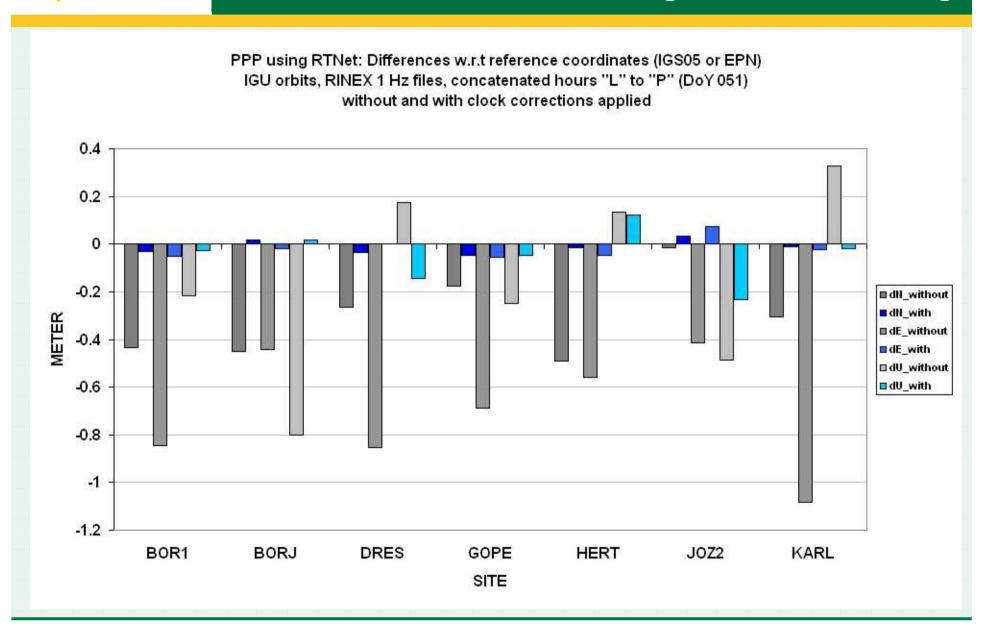


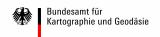
> RTNet

- By "GPS solutions" / L. Mervart
- Used for either clock correction and ZTD estimation (network solution) or coordinate estimation (SPP)
- Clock correction estimation successfully tested for Europe (GPS only, GPS+GLONASS), North America (~ 8 IGS stations) and Australia (~ 11 IGS and GA stations)

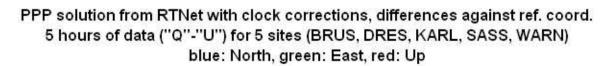


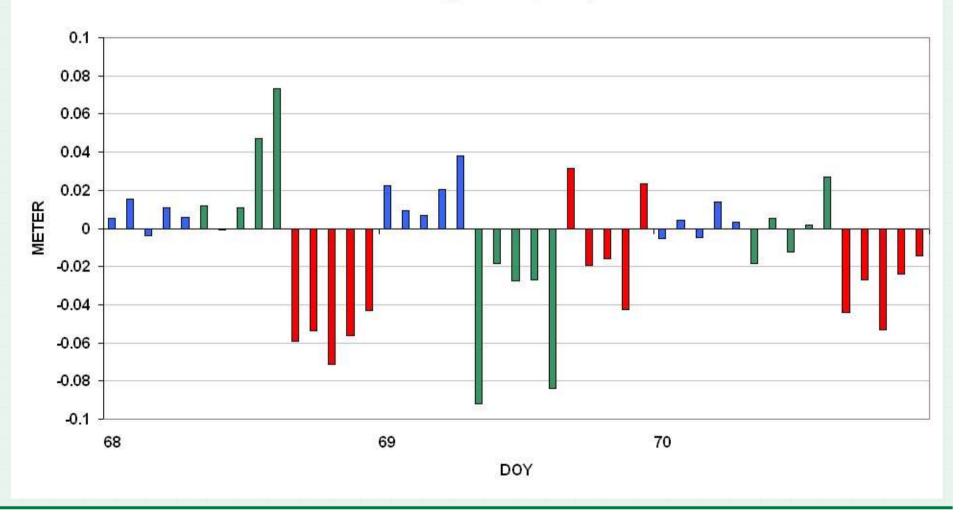
Single Point Positioning

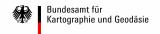




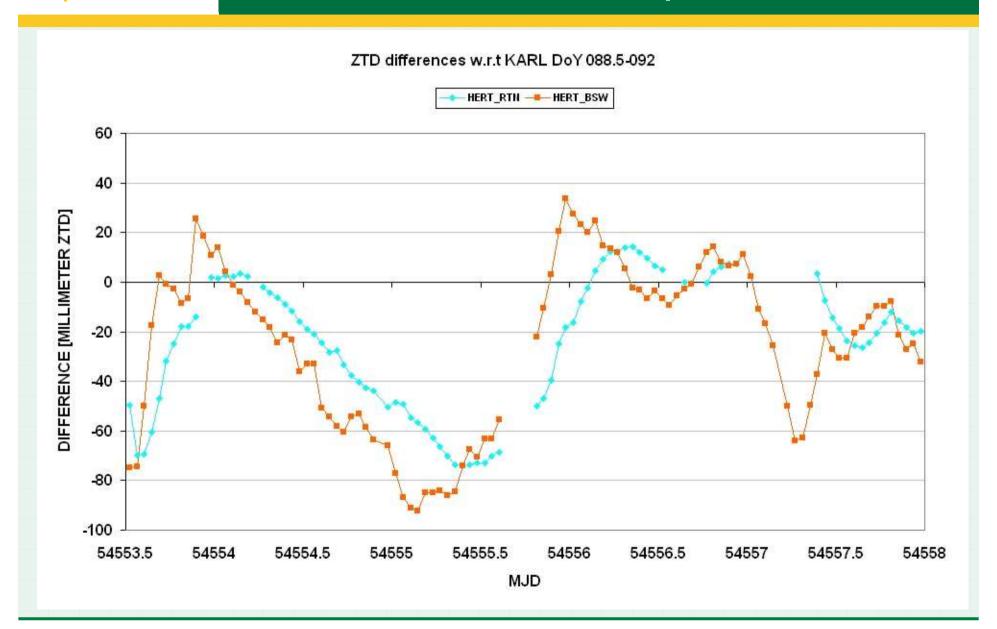
Single Point Positioning

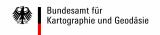




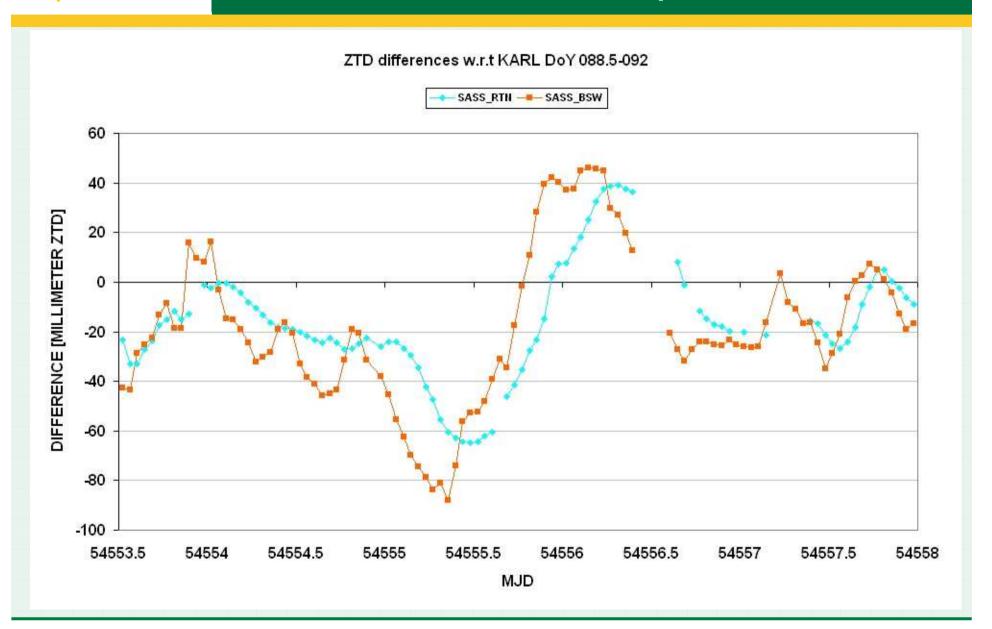


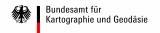
ZTD parameter estimation



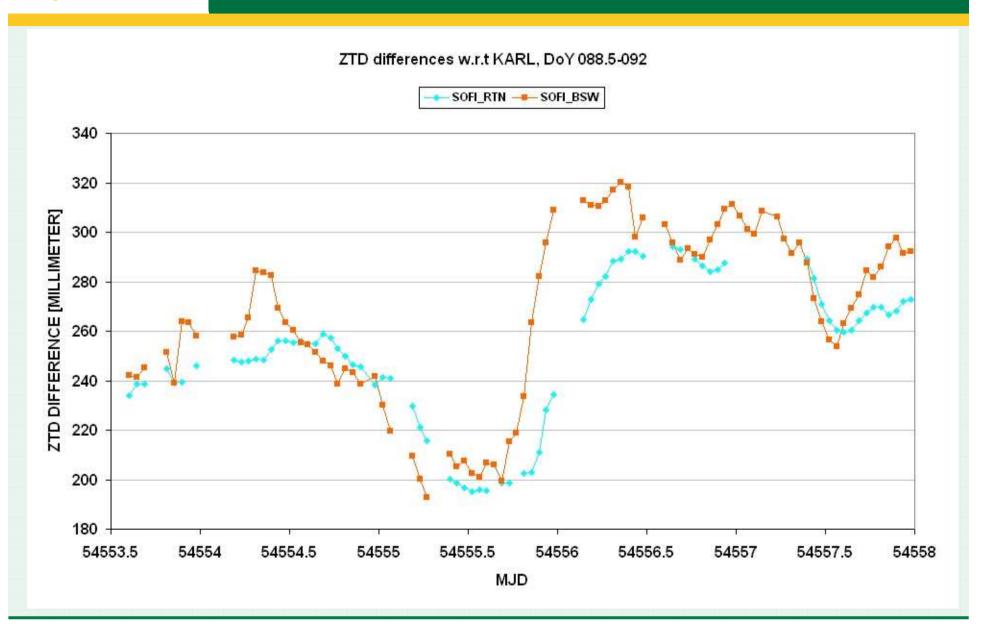


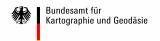
ZTD parameter estimation





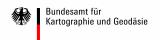
ZTD parameter estimation





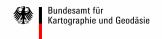
Real-time IGS Pilot Project (IGS-RT PP)

- > Key objectives (selection):
 - RT network
 - Generate RT products
 - Enhancement of (existing) IGS products
 - Investigation of standards and formats
- ➤ CfP in June 2007 (IGS mail 5616), see http://www.rtigs.net/pilot/index.php
- > 32 (26?) proposals until October 2007
- ➤ Decision in December 2007 to accept them all (IGS mail 5692)
- > "Go" in March 2008 (mail by M. Caissy to the participants)



Real-time IGS Pilot Project (IGS-RT PP)

- > Proposals to the individual categories
 - RT tracking stations: 82+ (69+ plus 13 "possibly")
 - RT data centers
 - RT data-file centers: 5
 - RT data/product distribution centers: 9
 - RT analysis centers: 7 (8)
 - RT associate analysis centers: 1
 - RT analysis center coordinator: 1 (L. Agrotis (ESOC))
 - RT network management & monitoring: 7
 - RT users: 13



Thank you for your attention!



Information & Downloads:

http://igs.bkg.bund.de

euref-ip@bkg.bund.de