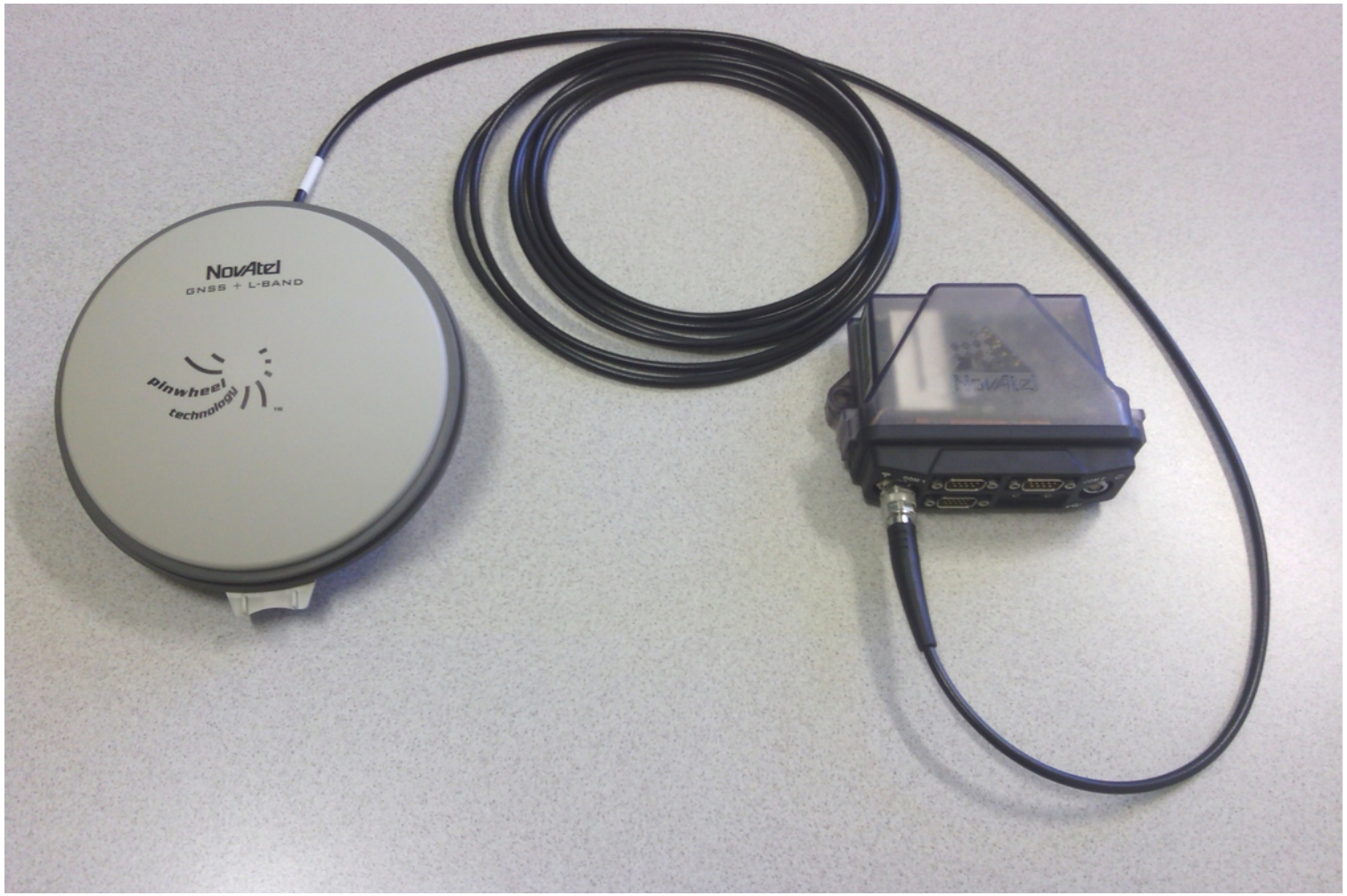
NovAtel SSR Test

Peter Neumaier, Wolfgang Söhne

- First commercial GNSS receiver on market supporting open standard SSR
- NovAtel Flex6 (OEM628 receiver board)
- Allowing usage of open standard satellite orbit and clock corrections for RTCM SSR level 1 messages
- Usage of manufacturer‘s own corrections seems to be straightforward
- Usage of external IGS (or EUREF) corrections possible but bit more complicated
- Same type of receiver available at LGN Hannover
- First results showed some issues wr.t. the used correction stream

TWG March 2014



A Precise Positioning Technology Company

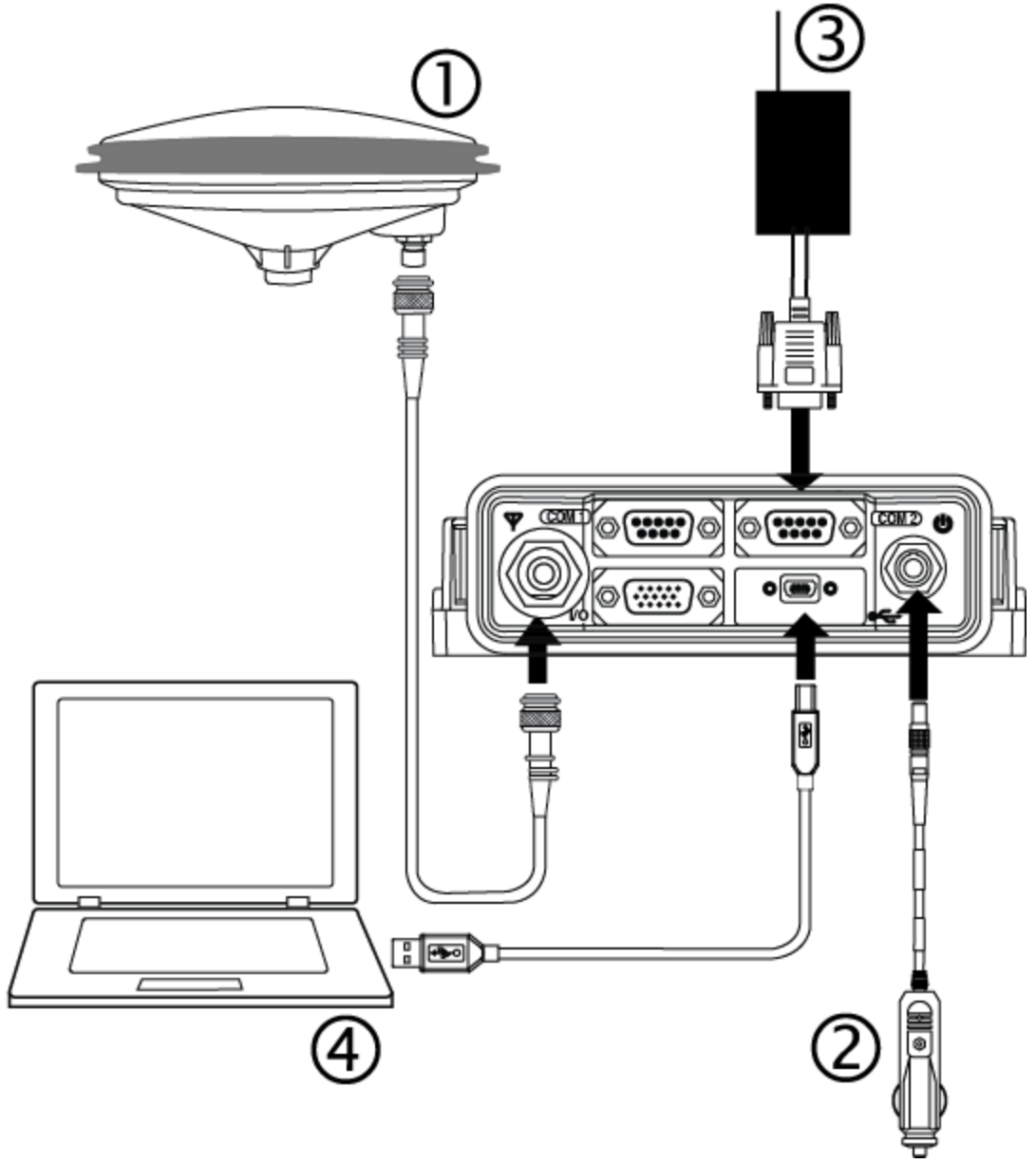
NovAtel FlexPak6

Features

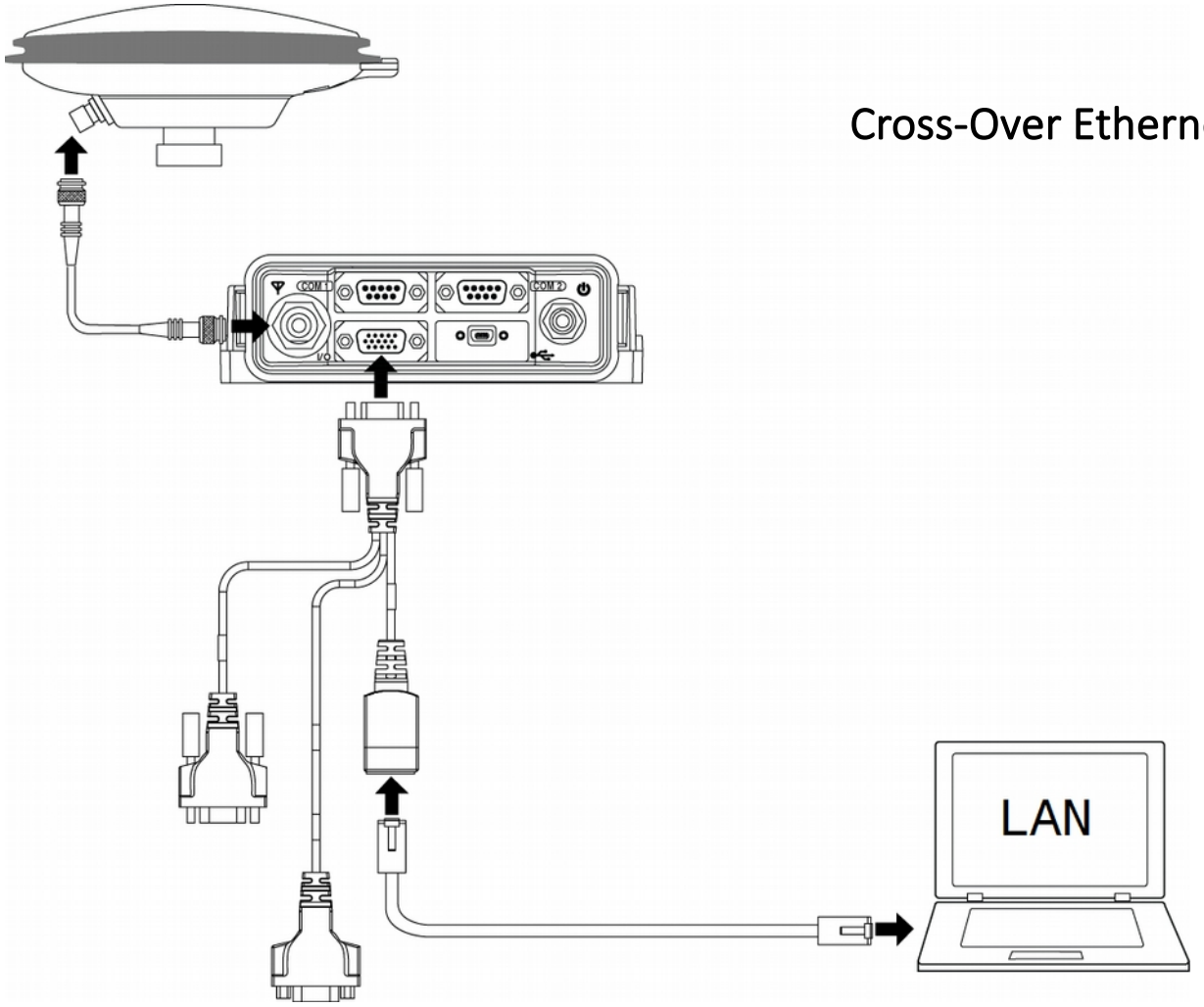
- OEM card OEM628
- Serial ports 2 DB9 connectors
- USB 2.0 Yes
- Ethernet Yes
- Strobe port DB-HD15 connector
- Input (DC) voltage +6 to +36 V
- L-Band differential corrections Yes (A subscription to an augmentation service, like OmniSTAR, is required)
- GPS + GLONASS positioning Yes
- GLIDE™ Yes
- ALIGN® Yes
- AdVance® RTK Yes
- RAIM Yes
- NTRIP Yes

Setup with Radio Device

1 Mount and connect a GNSS antenna
2 Connect a power supply (user supplied)
3 Connect a radio device to COM2 (user supplied)
4 Connect a computer to COM1 for setup and monitoring (user supplied)



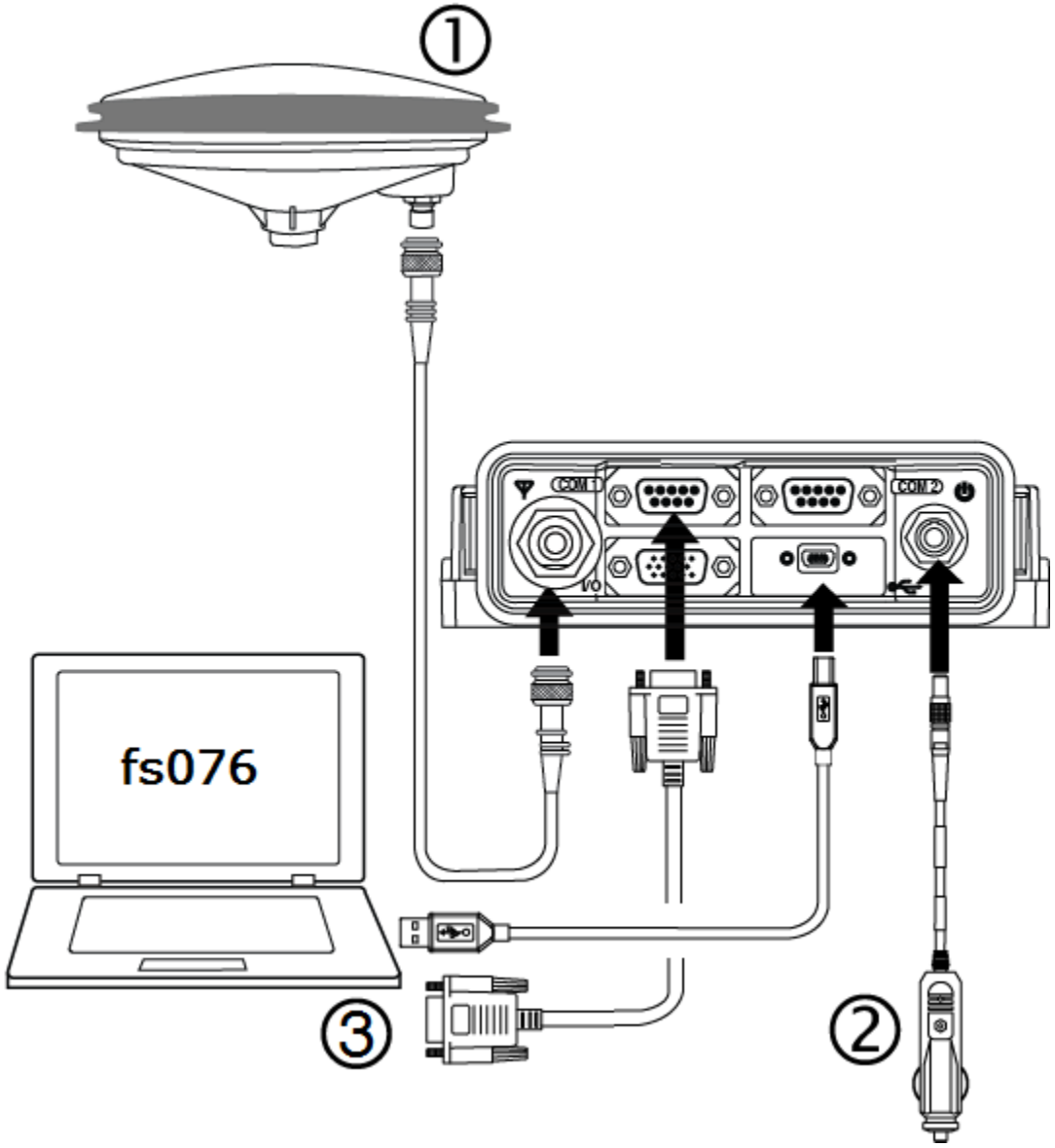
Cross-Over Ethernet Cable Configuration—FlexPak6



Setup in BKG

1 Mount and connect a GNSS antenna
2 Connect a power supply
3 Connect USB and COM1 ports to a computer for setup and monitoring

USB: setup and monitoring
COM1: RTCM3 orbit/clock corrections



NovAtel CORRECT ™ with PPP

Precise Point Positioning (PPP)

Solution for sub-decimetre applications

NovAtel CORRECT™ with TERRASTAR-D

Performance

- GPS+GLONASS solution
- 6 cm horizontal accuracy (95%)1

Delivery

- Satellite (L-Band) delivered solution
- Corrections delivered direct to end user

Business Model

- Subscription based—annual or monthly
- Hardware, firmware and subscription purchased through NovAtel
- Available for land, airborne and near shore applications

NovAtel CORRECT™ with PACE

Performance

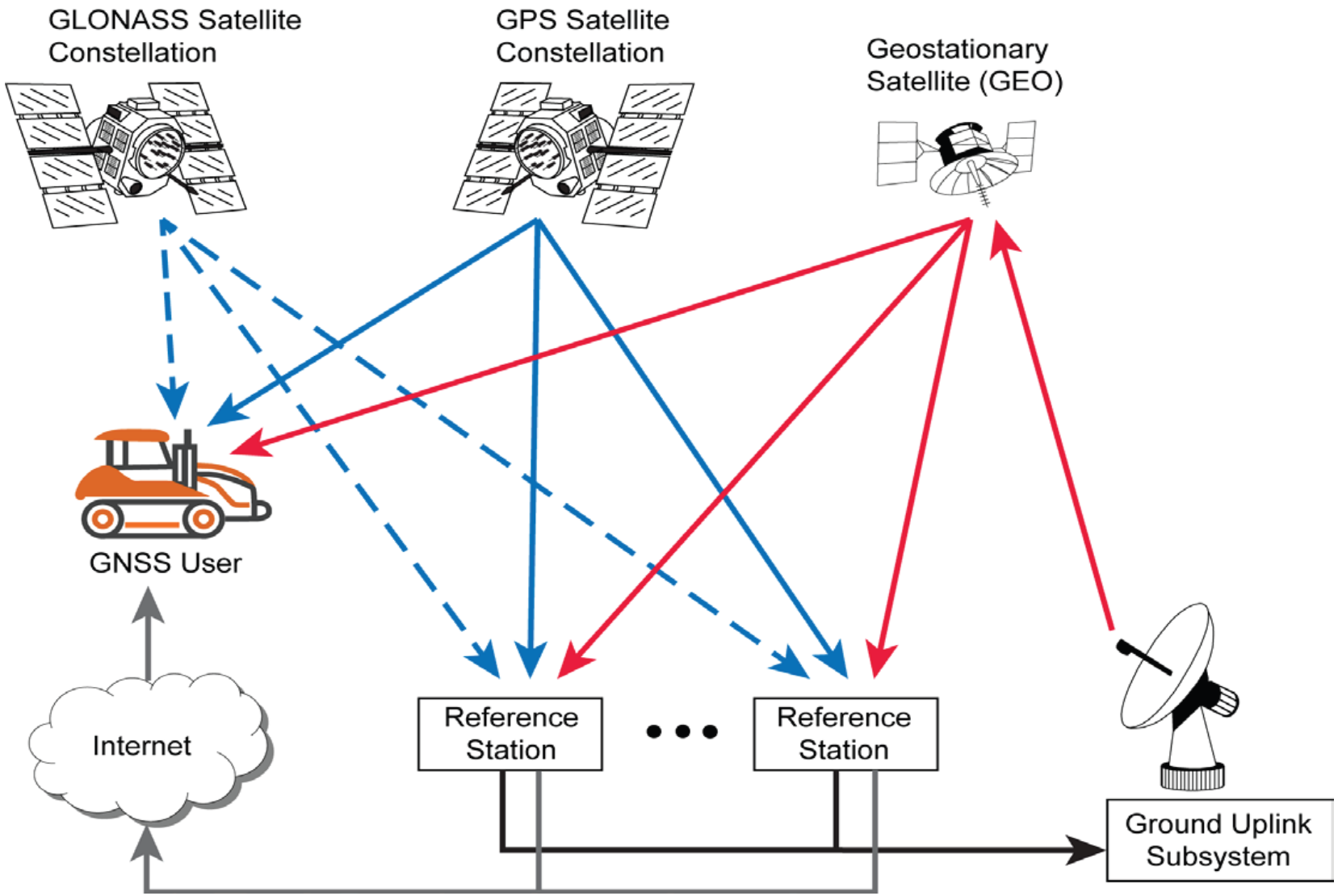
- GPS-only solution
- 15 cm horizontal accuracy (95%)1

Delivery

- Internet (NTRIP) delivered solution using NRCAN correction data2
- Customer distributes corrections to end user

Business Model

- Annual access fee
- Available for land applications only
- Select, large volume customers only3
- Supported on all OEM6 based products


GLONASS Satellite Constellation
GPS Satellite Constellation
Geostationary Satellite (GEO)
GNSS User
Internet
Reference Station
Reference Station
Ground Uplink Subsystem

NovAtel PPP Configuration

pppseed set 50.09050462129 8.66499584663 178.93 10.0 10.0 10.0

A bad seed might be rejected immediately if it fails the filter's internal integrity checks. In such a case, the command will be responded to accordingly. If the filter cannot validate the seed immediately it might operate with it for some period only for it to reject it later if it finds the seed was bad. In this case, the filter’s position will be reset, with a corresponding discontinuity in the PPP position.

pppconvergedcriteria horizontal_stddev 0.15

This command controls how the PPP filter determines if its PPPPOS solution has converged.

Factory Default: pppconvergedcriteria horizontal_stddev 0.20

HORIZONTOTAL_STDDEV / Use the total, 3D, standard deviation

HORIZONTAL_STDDEV / Use the horizontal, 2D, standard deviation

pppdynamics dynamic

This command configures the dynamics assumed by the PPP filter. AUTO detects the antenna dynamics and adapts filter operation accordingly. In most cases it is the best option. The automatic dynamics detection, however, may be fooled by very slow, ‘creeping’ motion, where the antenna consistently moves less than 2 cm/s. In such cases, the mode should explicitly be set to DYNAMIC.

AUTO / Automatically determines dynamics mode

STATIC / Static mode

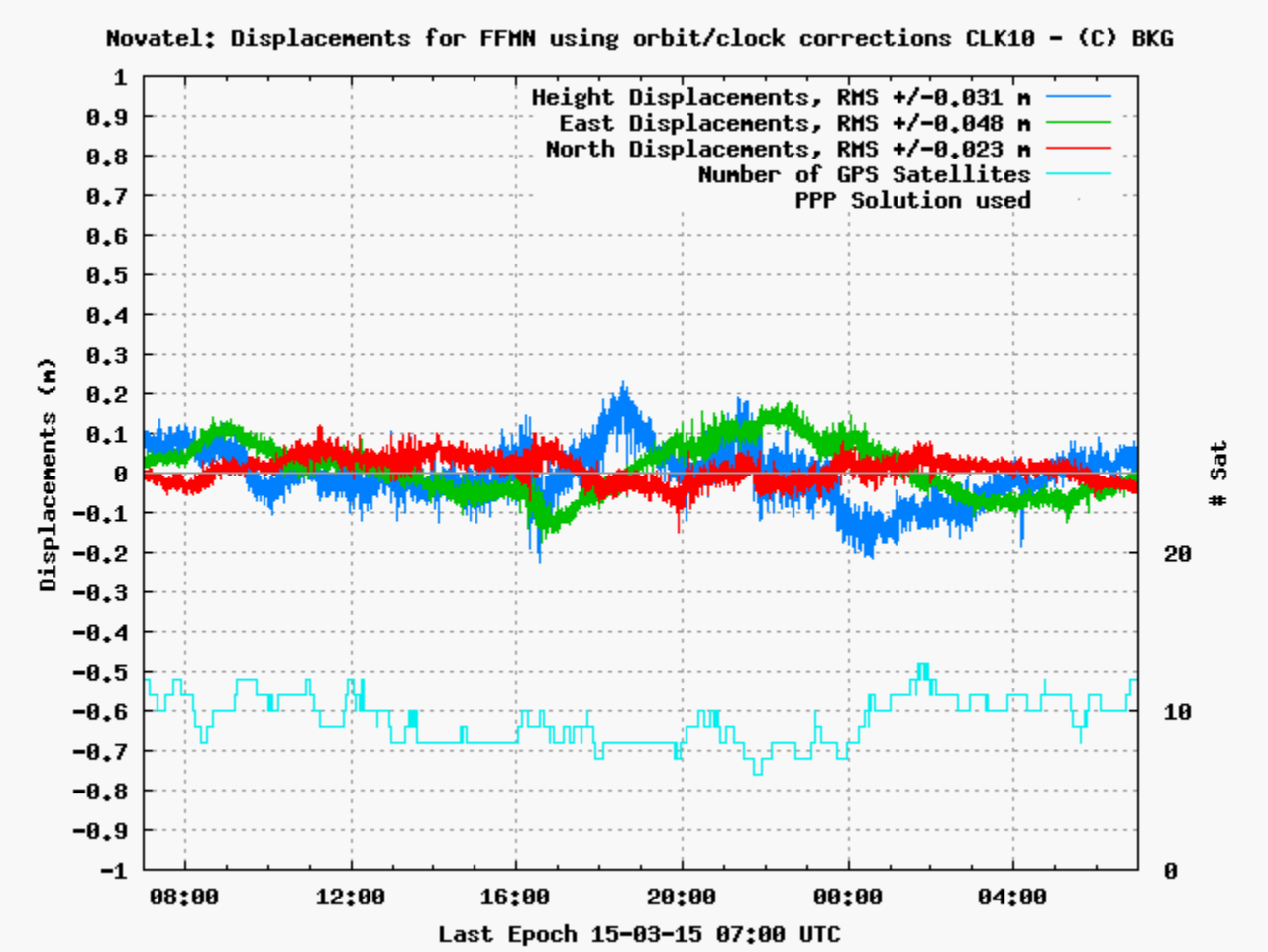
DYNAMIC / Dynamic mode

ppptimeout 60

Set the maximum age of the PPP corrections. Corrections older than the specified duration will not be applied to a receiver‘s observation, and uncorrected obervations will not be used in the filter.

Factory Default: ppptimeout 360

NovAtel: PPP displacements, 24 hours, CLK10 corrections used



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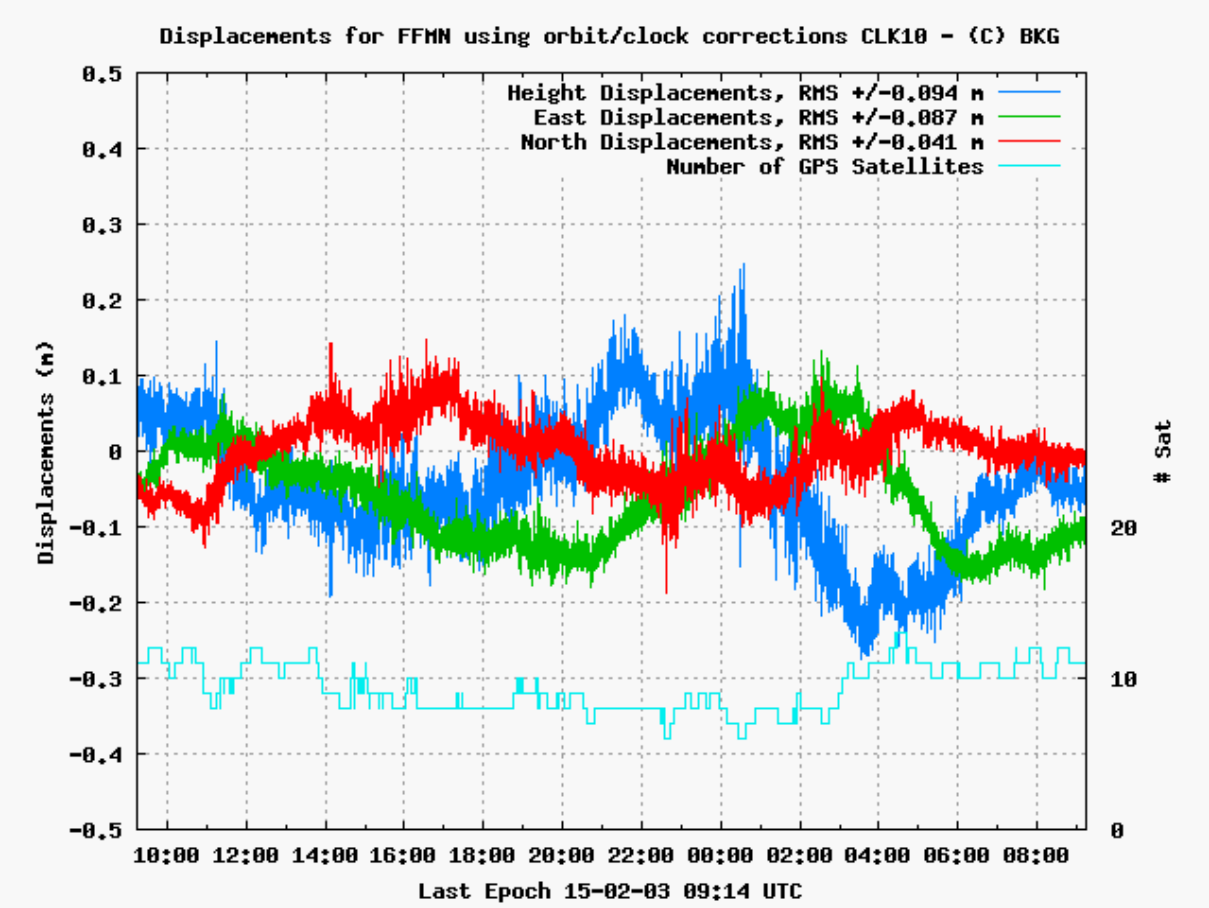

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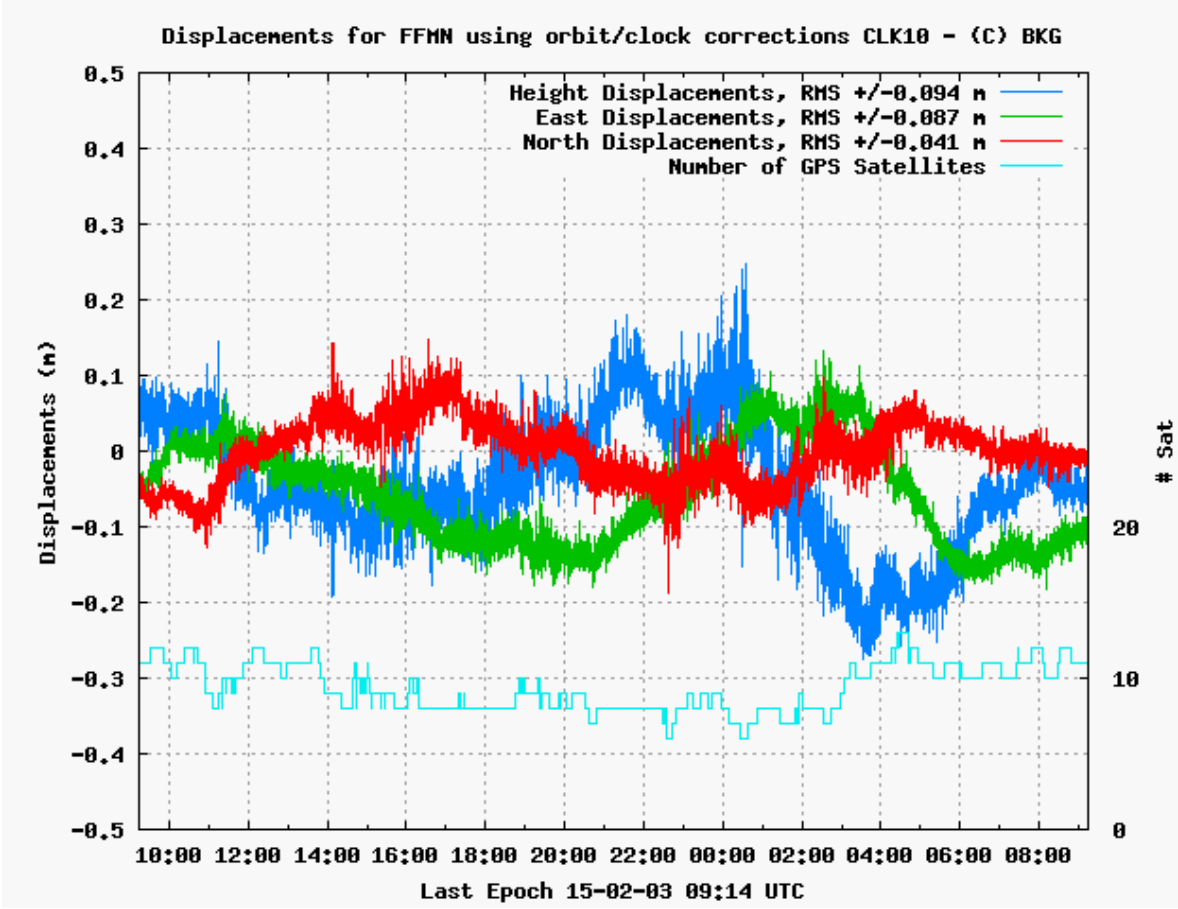
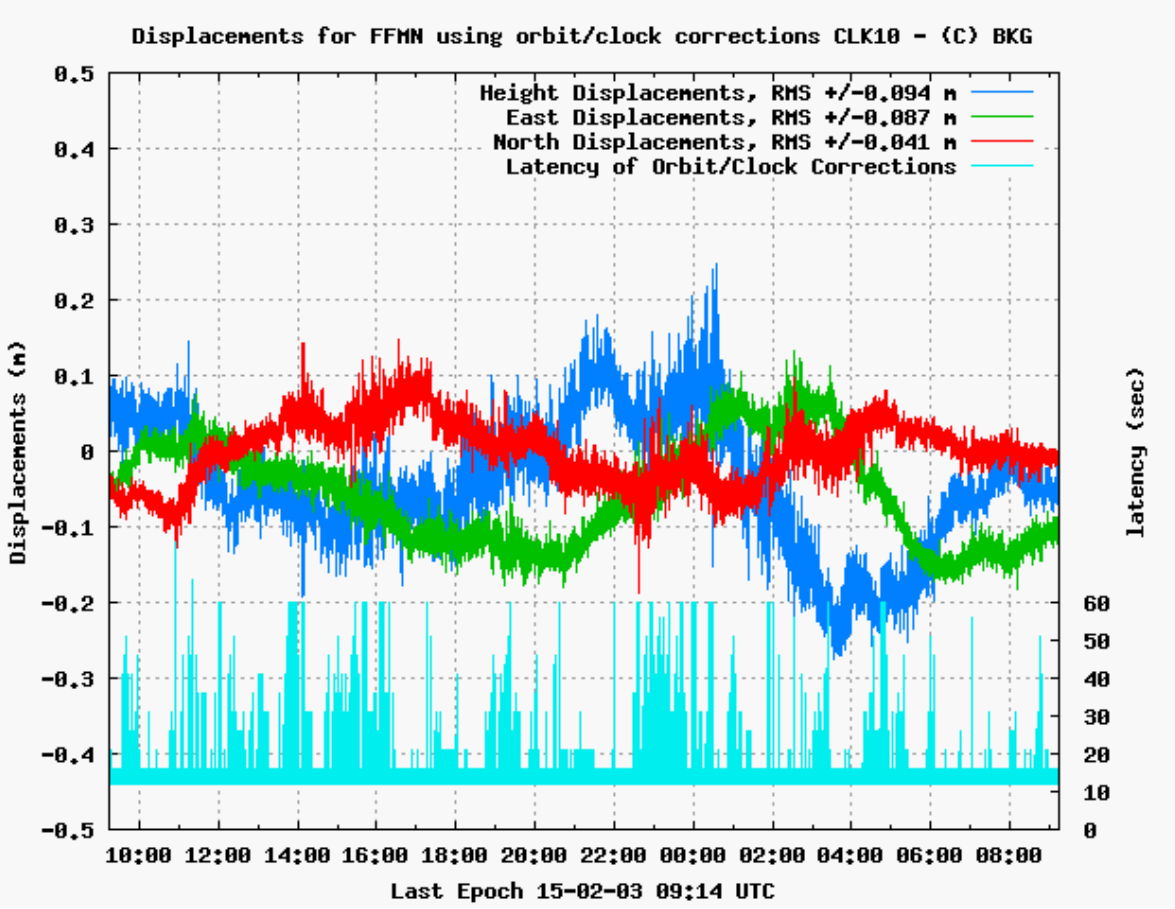
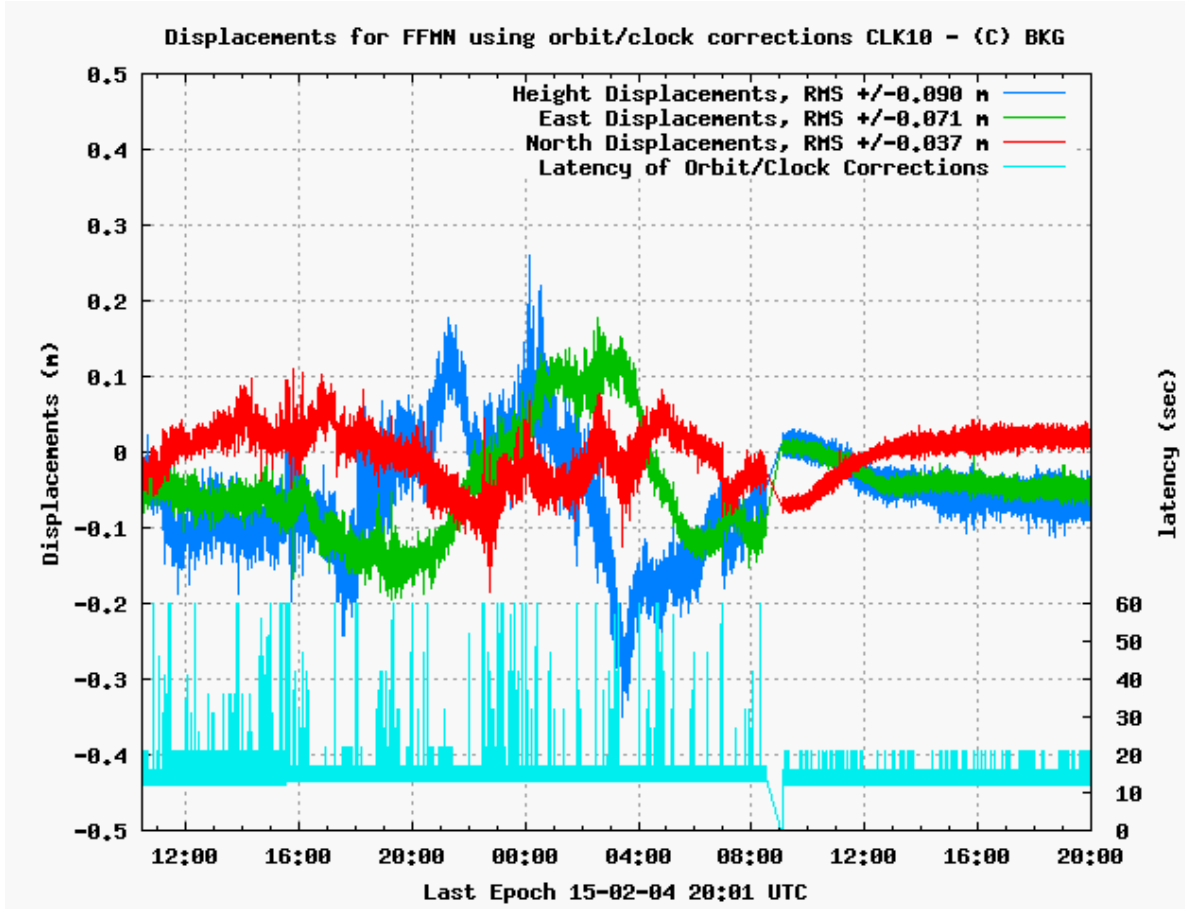
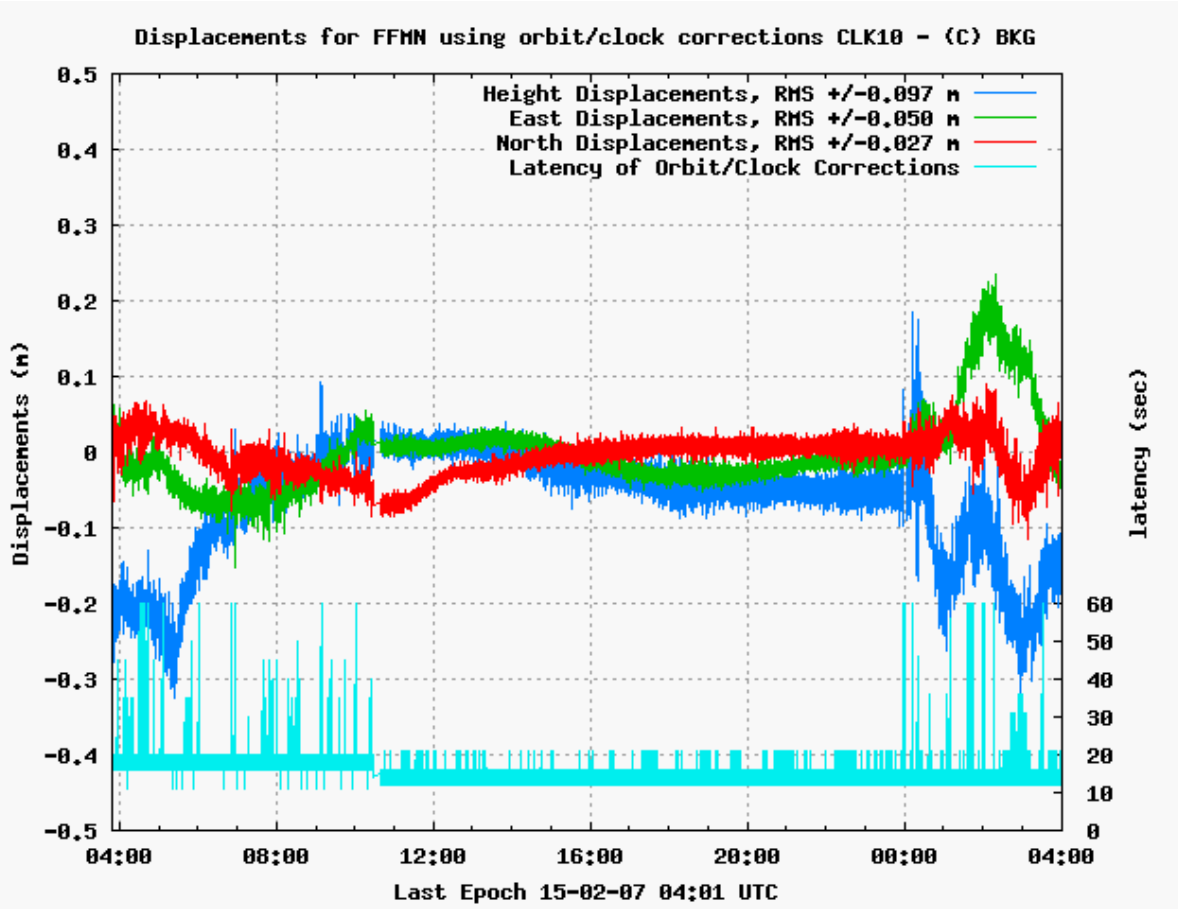




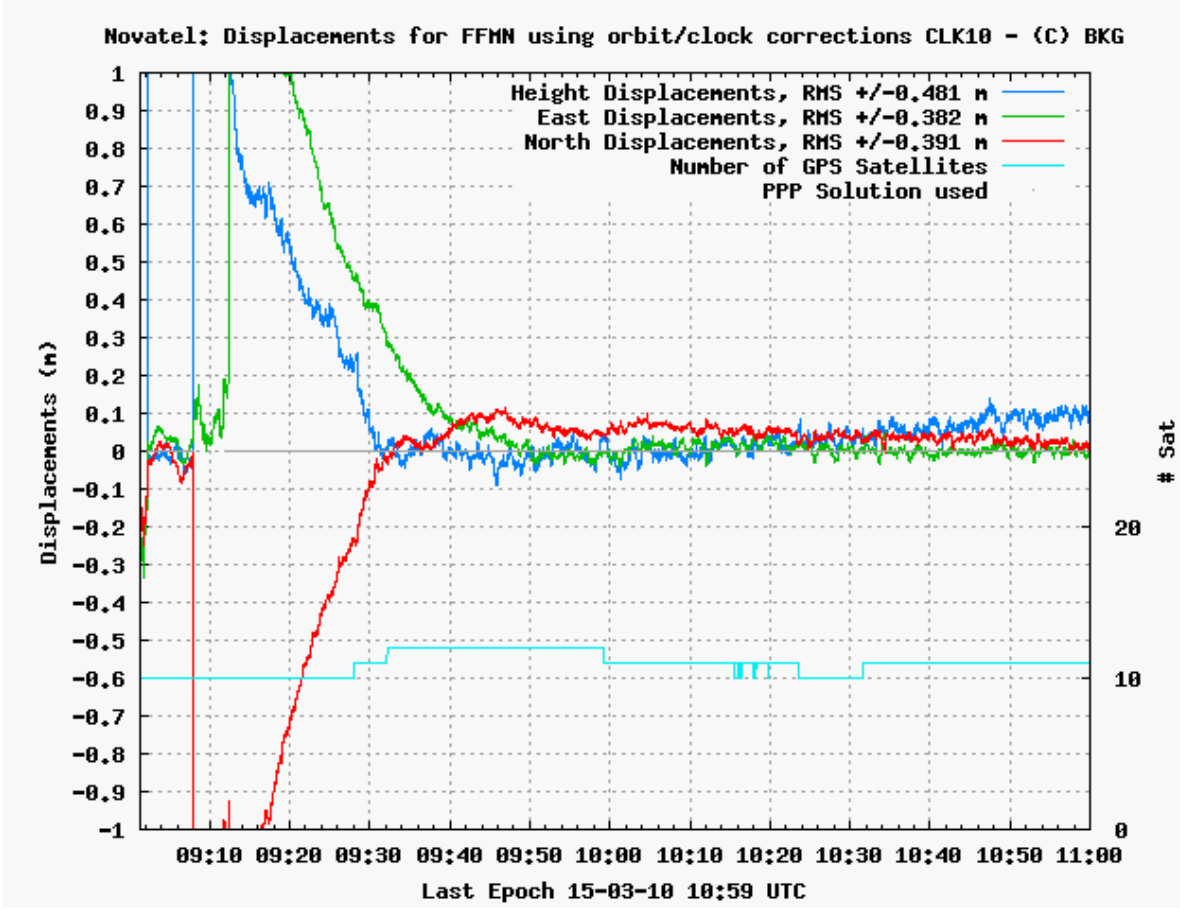
NovAtel: PPP displacements, 24 hours, CLK10 corrections used, PPPdynamics static, receiver reset

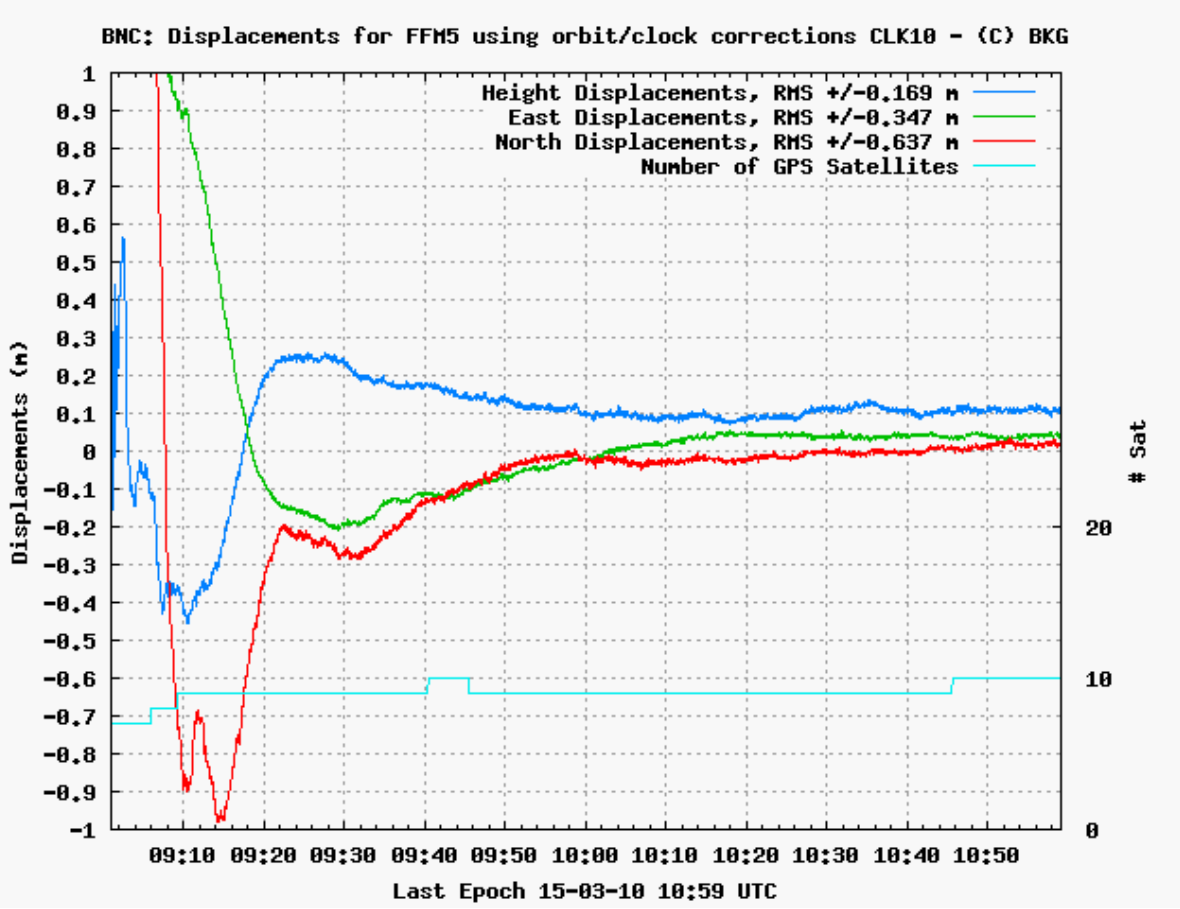




NovAtel vs. BNC: PPP displacements, 2 hours, CLK10 corrections used

BNC configuration: 10m XYZ-init, 100m XYZ-WhiteNoise





NovAtel vs. BNC: PPP displacements, 2 hours, CLK10 corrections used

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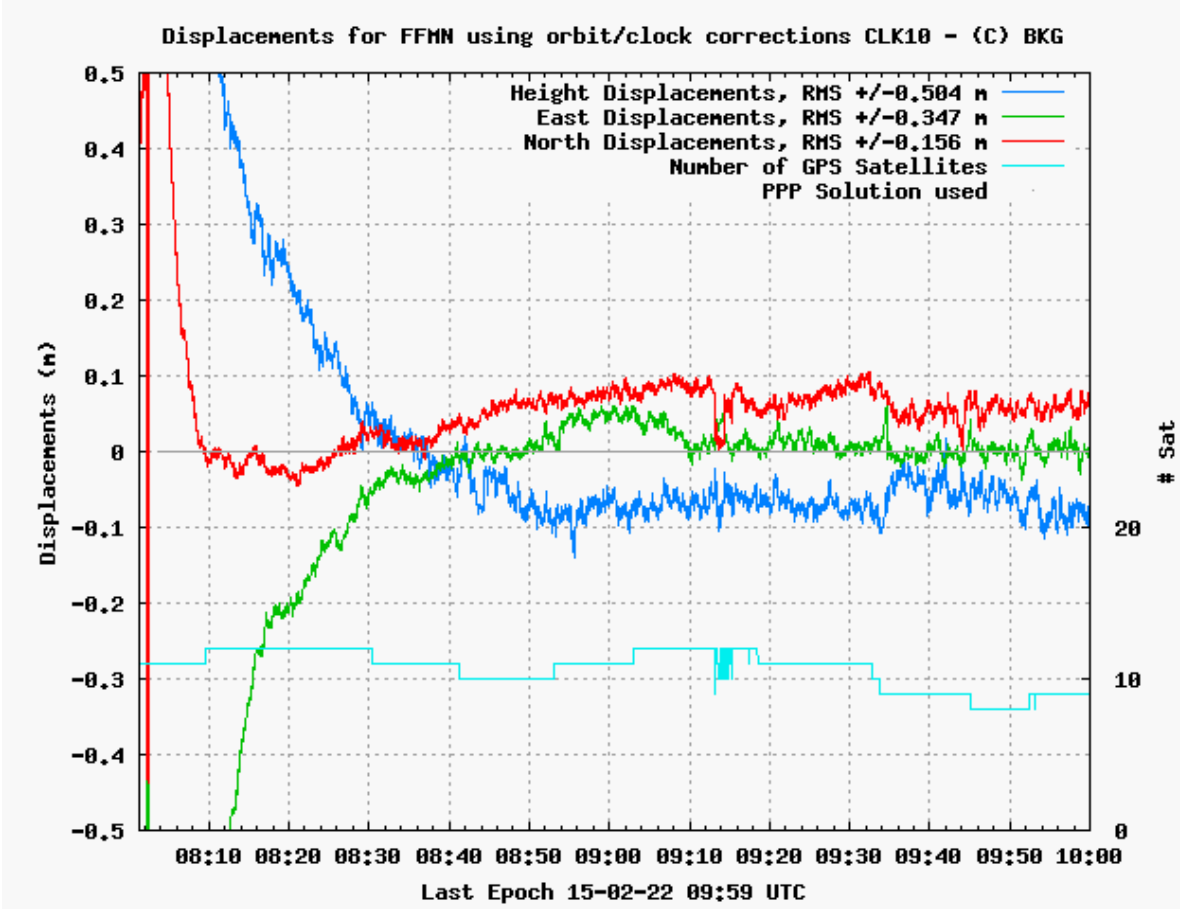
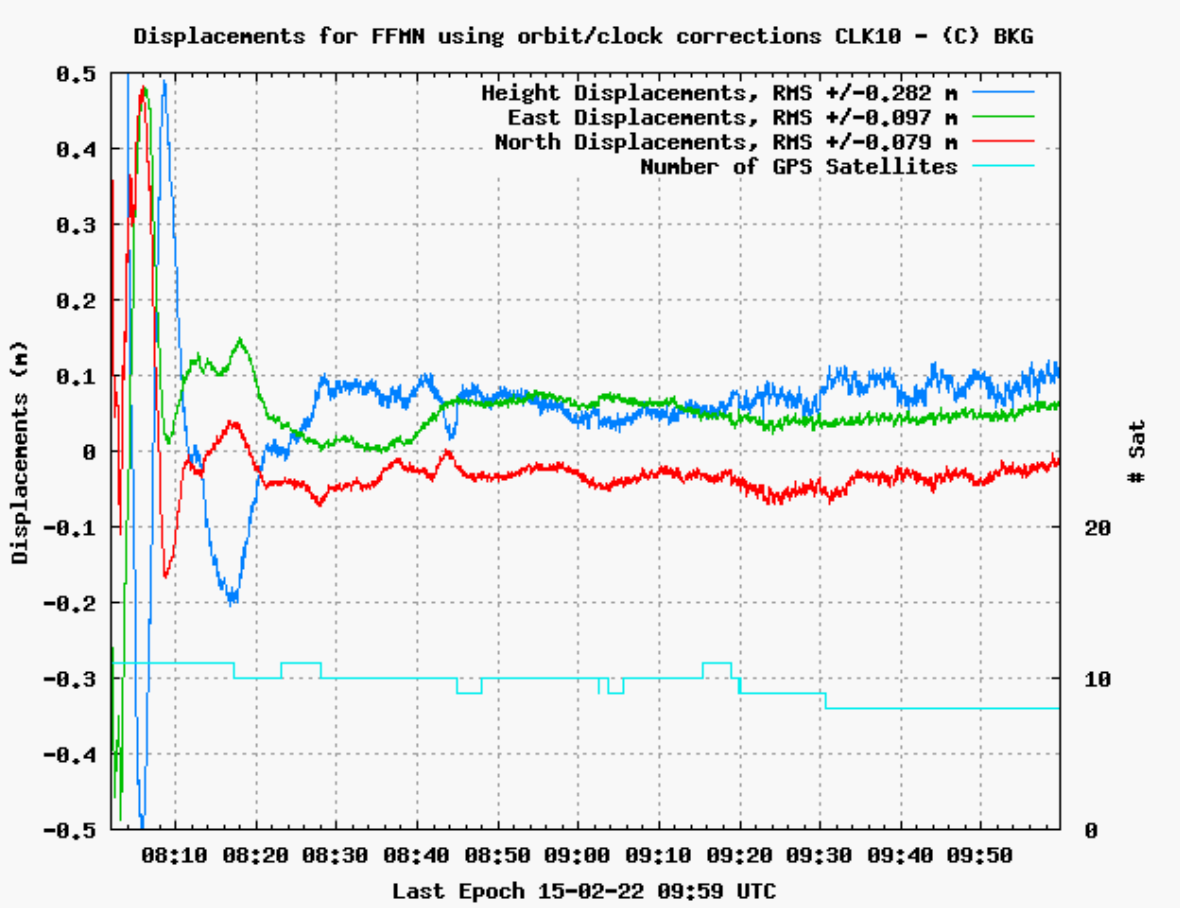
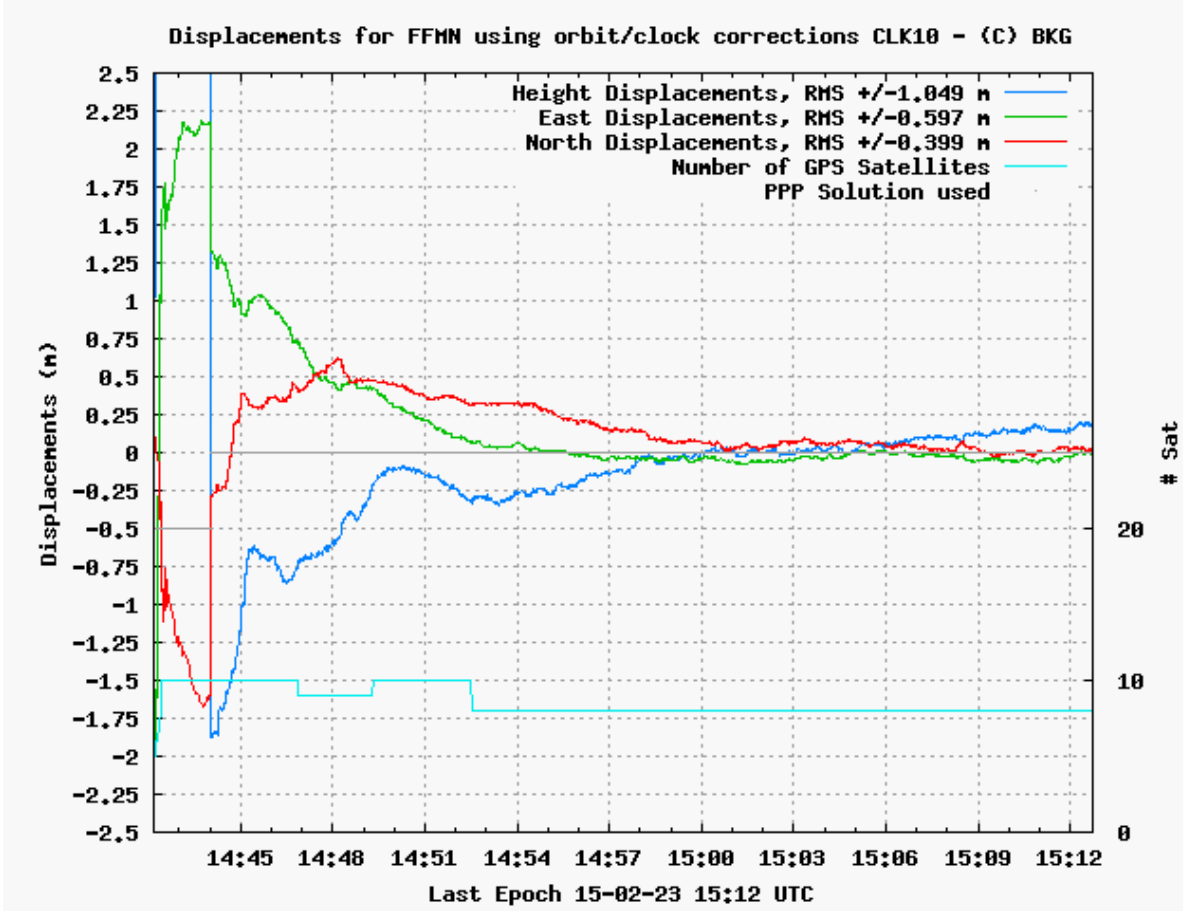
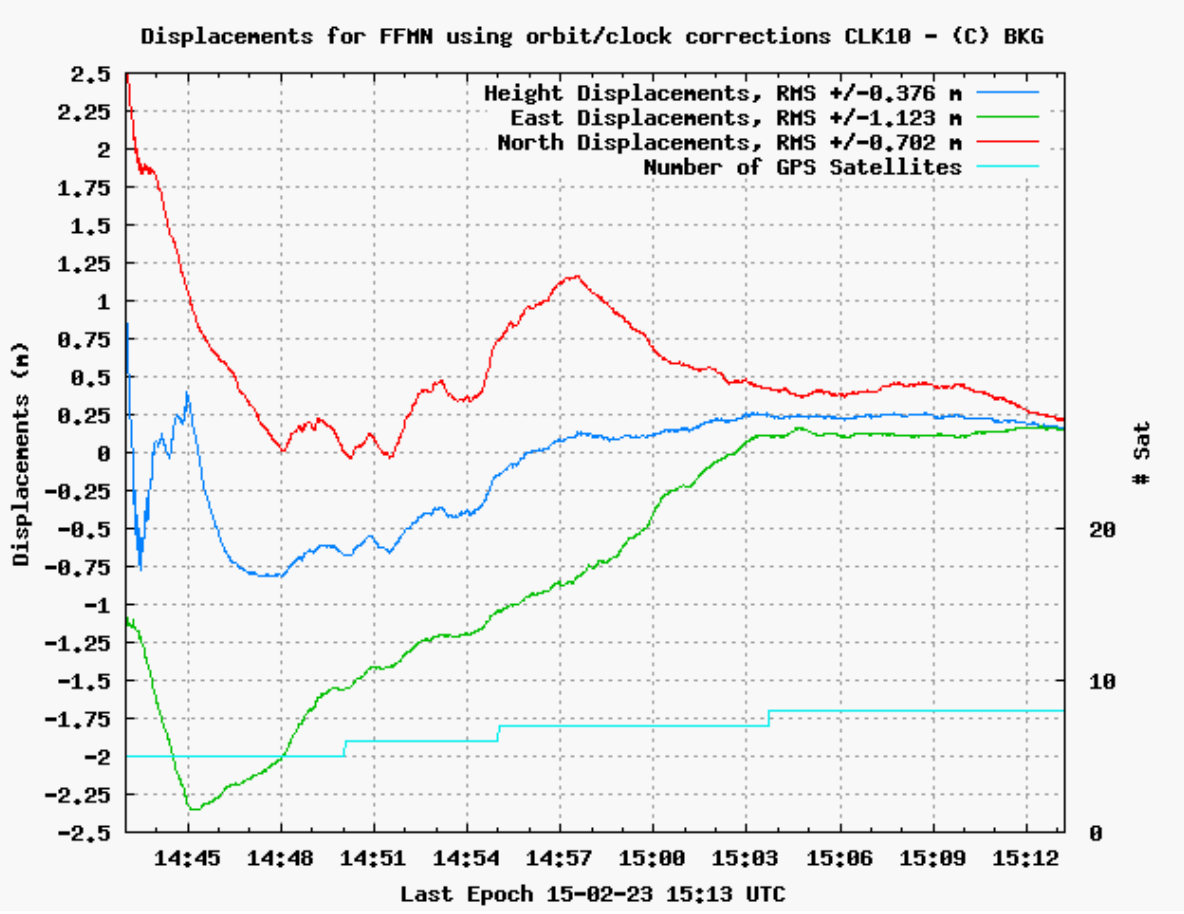
NovAtel: log bestpos





NovAtel vs. BNC: PPP displacements, CLK10 corrections used, no apriori coordinates used





NovAtel vs. BNC: PPP displacements, CLK10 corrections used, no apriori coordinates used