ECGN Station TRFB (Trafelberg) - its role within EPN and APOS

The Conrad Observatory/TRFB as a multi-purpose station meets requirements for the European Combined Geodetic Network (ECGN) combining various geodetic techniques like GNSS, levelling and gravity and contributes to the European Terrestrial Reference System 1989 (ETRS89) within the EUREF Permanent Network (EPN) as well as to the Austrian Positioning Service (APOS).

As an ECGN Station, TRFB is included in the EPN tracking station network and must fulfil strict requirements concerning the reception of GNSS satellite signals, the datastream, the equipment and monumentation (Fig. 1). Amongst other things the GNSS receiver/antenna must be known to the IGS (International GNSS Service) and the antenna+radome pair should have zenith and azimuth-dependent absolute calibration values. The core product of the EPN is the weekly coordinate estimates for the EPN tracking stations. These coordinates are outcome from the so-called "combined EPN solution" which is based on the subnetwork solutions submitted by the EPN Analysis Centres, e.g. OLG Graz. By stacking the weekly EPN solutions precise station coordinates/velocities, as well as information on the non-linear behaviour of the coordinates and their noise type is obtained. The raw (Figure 2) and cleaned coordinate times series shows how the site coordinates change with time. The coordinates and velocities of the EPN tracking sites are available with an accuracy of < 4 mm (horizontal) and < 10 mm (vertical) in e.g. the realization of ETRS89.

TRFB is also part of the APOS reference station network using GNSS satellite signals and operated by the Federal Office of Metrology and Surveying (BEV). Within a time interval of one second datastreams are transferred to the APOS processing center at the BEV - headquarter for further modelling. Being a real time positioning service (cm-accuracy) APOS is also used as a measuring tool for a wide range of applications. All APOS reference stations, incl. TRFB, represent the highest level of the ETRS89 realisation in Austria. Network processing and time series monitoring are done on a weekly basis within the AMON (Austrian Monitoring Network) – processing at the OLG Graz before it will be transmitted to the EPN as mentioned before.

Figure 1: EPN/APOS GNSS-Antenna on a stable pillar/ concrete block in front of the observatory.

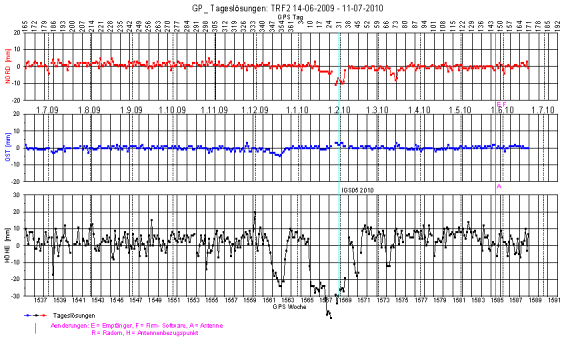

Figure 2: The smooth raw data time series of TRFB (14 June 2009 – 11 July 2010) nevertheless shows an antenna jump (up to > 3cm/1cm in height/attitude) due to obvious snowy weather in Dec. 2009, Jan. and Feb. 2010.

In addition to the GNSS- and network equipment on site the program “VisualGPS” was implemented for better visualization of the incoming GNSS-signals showing satellites and receiver infos, a skyplot, etc. .

References:

http://www.epncb.oma.be

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