National Report of Hungary on EUREF related activities in 1999 – 2000

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Permanent EUREF GPS station PENC

The PENC permanent IGS/EUREF station operated by the FOMI Satellite Geodetic Observatory is still the only one station in Hungary. The station is operational since 1996 and became one of the most stable EPN site, producing a smooth coordinate time series. The daily and hourly GPS data of PENC is regularly submitted to BKG data centre and it is processed by the CODE, GRAZ and WUT Analysis Centres. The Hungarian users may also access raw data via Internet.

The test assembly of a DGPS service, based on cellular telephone system had been prepared. Following the switchoff of the SA in May 2000 we stopped its further development.

The yearly stability monitoring of the permanent station pillar also had been continued using Mecometer measurements in a local control network. Since 1991 we could not detect any significant changes in the pillar position.

Our efforts to establish the Hungarian Active GPS Network were still not successful. A new plan with 10 stations nationwide had been elaborated and proposed for realisation. It is expected that in 2001 we can start the project with setting up 3 stations.

GPS equipment calibration

In Penc on the roof of the Observatory building, in the close vicinity of the permanent station pillar a GPS calibration network, consisting of 9 points have been installed. This local network already have been measured 3 times with 24-hours campaigns and the data were processed by GPSurvey and the Bernese software packages. The markers are also levelled twice per year and are measured by traditional EDM equipments in order to maintain its high accuracy. Starting in 2001 we are planning to perform here official GPS equipment calibration. This will encompass full-set calibrations including the receiver-antenna-software check, but we are prepared for specific calibrations as antennae phase center determination. This activity will be done in the frame of the K-GEO Accredited Calibration Laboratory. The accreditation is in progress.

EDM equipment calibrations

The K-GEO Laboratory incorporates the Gödöllő Standard Baseline, which was measured first in 1987 by the Finnish Geodetic Institute (FGI) using the famous Vaisala interferometric technique. The baseline was re-measured in 1999. The measurements of the two epochs are in excellent agreement, only some 0.01 mm difference was found between the measured distances of the underground marker of the 864 m baseline. This is one of the most stable baseline that the FGI ever determined. Following the accreditation procedure official EDM calibrations will be performed at the Gödöllő Standard Baseline in the frame of the K-GEO Laboratory.

Activities related to the Primary Vertical Leveling Network

International network connection measurements

The primary leveling control networks of Slovenia and Hungary at Redics and Austria and Hungary at Hegyeshalom were connected through junction lines. This enable to compute levelling closure errors between the networks of Slovenia-Austria-Hungary, and Slovenia-Croatia-Hungary.

Development of the Hungarian Leveling Network (EOMA)

In the western part of Hungary the 1st order leveling network was completed by 1977. The densification work has been started only nowadays. In 1999 a test measurement was performed in a portion of a selected line in order to investigate the necessity of the re-levelling of the 1st order network. The results are still under discussion.

In 2000 the densification of 3 half-polygons at the Croatian/ Slovenian border will be completed. The uniqueness of this work is that the 3rd order densification is performed using the GPS technique and the geoid according to the technology developed at the FOMI SGO (KENYERES, 1999). In this work more than 100 highly reliable GPS/leveling benchmarks have been determined. This was may be the world-premier of the GPS technique in leveling networks.

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GPS signal interference investigation

Radio frequency interference (RFI) may seriously affect the geodetic GPS applications. The FOMI SGO has been started a preliminary survey in 1998 to locate and identify interference sources in Hungary (BORZA-FEJES, 1999). We are collecting surveyor reports who are experiencing unexpected receiver failures As the first result of this activity we could reveal digital data transmitters of the Hungarian Telecommunication Company (MATAV), which are using frequencies very close to the GPS L2 band.

In 2000 we received a grant and we were able to buy a Spectral Analyzer equipment. This will be used for locating interference sources and examining of the RFI pattern of the future permanent station locations.

Status and development of the Hungarian Gravimetric Network

The connection of the new Hungarian Gravimetric Network (MGH-2000) to the UEGN had been further strengthened. New absolute gravimetric sites at Zalalövő and Penc had been established and measured. An existing absolute site at Nagyvázsony was also re-measured. A new connection

line between the Hungarian and Austrian (ÖSGN) gravimetric networks also had been measured.

The Hungarian Gravity Survey consists of more than 380 000 points, corresponding to approximately 4 points/km². As the point distribution is uneven in specific areas, where the database contains less than 1 point/km² additional densification measurements are being carried out. Since 1998 the height of the gravity survey points is being determined using a simplified GPS-heighting technology.

References

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