



National Report for Hungary

Status of EUREF related geodetic networks and recent activities in Hungary

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Development of a kinematic height reference frame (INGRIM)

- The ESA-funded INGRIM project aimed to modernise the geodetic height infrastructure in Hungary using GNSS and InSAR technologies.
- Main objective to overcome the limitations of the traditional height reference frame and to improve geodetic practice and scientific research.
- The test area is located in the southern part of Hungary, where 7 new IGRS stations have been installed.



- A new regional geoid solution was computed using the Radial Basis Functions approach.
- InSAR analysis of Sentinel-1 satellite data from 2015 to 2023 and the generation of a GNSS-based largescale velocity model were performed.
- A high-resolution velocity grid by combining GNSS and InSAR velocity data was created.
- The new deformation model and geoid solution were validated using GNSS measurements on over 50 levelling benchmarks.



Height differences between the leveled database and the GNSS campaign using the current official transformation solution (left) and the new kinematic approach (right).

Contribution to EUREF activities

EPN stations

EPN densification

SGO Analysis Centre

- 3 operated by SGO and 3 by the Budapest University of Technology and Economics.
- 5 equipped with multi-GNSS receivers and SPRN station will soon be Galileo
- Results up to 2237 GPSw were published in 2023.
- Once repro-3 data are available, the IGS20 based processing will begin.
- GNSS processing software upgraded (Bernese 5.4)
- EPN repro-3 completed
- The national level repro-3 is still ongoing.

compliant.



Hungarian EPN stations





EPND D2237 horizontal velocities



The #79 EPN stations assigned to SGO AC