MODERNISATION OF THE HUNGARIAN GEODEtic REFERENCE NETWORKS

AMBRUS KENYERES
FÖMI Satellite Geodetic Observatory

[ LONG AUTHOR LIST ]

ESRS Conference, Ljubljana 24 November 2010

REFERENCE NETWORKS

- **HORIZONTAL NETWORK**    **EOV**
  I. ; III.-IV. order - ~ 30 000 markers
  Decreased user interest / critical maintenance capacity
  SELECTIVE MAINTENANCE / LEGAL ACTS ARE PREPARED

- **VERTICAL NETWORK**    **EOMA**
  I.-III. order - ~50000 benchmarks
  RE-LEVELLING IS IN PROGRESS

- **GNSS**    **GNSSnet.hu**
  ETRS89

- **NETWORK INTEGRATION**
  **INGA:** horizontal, vertical, GNSS, gravimetric networks
- ~50000 BENCHMARKS
- I.-III. ORDER
- NORMAL HEIGHT SYSTEM
- DATUM: KRONSTADT

LAST MEASUREMENTS: 1975-78 (only 1\textsuperscript{st} order!)
RE-LEVELLING OF THE 1ST ORDER PART: 2007-20??
RELATION TO EVRS2007
  - KEEP THE NATIONAL DATUM AND STANDARDS
  - NATIONAL DATUM POINT: NADAP (one out of the 13 EVRS2007 datum points)
  - TWO PARALLEL SOLUTIONS ARE PLANNED:
    - EVRS COMPATIBLE for science and EC
    - EOMA compatible for the practice
PREPARATIONS FOR THE FUTURE:
  - GNSS : creation of the height reference surface
  - InSAR : estimation of the height variation rate
VERTICAL NETWORK - EOMA

- LAST MEASUREMENTS: 1975-78 (only 1st order!)
- RE-LEVELLING OF THE 1ST ORDER PART: 2007-20??
- RELATION TO EVRS2007
  - KEEP THE NATIONAL DATUM AND STANDARDS
  - NATIONAL DATUM POINT: NADAP (one out of the 13 EVRS2007 datum points)
  - TWO PARALEL SOLUTIONS ARE PLANNED:
    - EVRS COMPATIBLE for science and EC
    - EOMA compatible for the practice
- PREPARATIONS FOR THE FUTURE:
  - GNSS : creation of the height reference surface
  - InSAR : estimation of the height variation rate

REFERENCE NETWORKS

- HORIZONTAL NETWORK EOV
  I. ; III.-IV. order - ~ 30 000 markers
  Decreased user interest / critical maintenance capacity
  SELECTIVE MAINTENANCE / LEGAL ACTS ARE PREPARED

- VERTICAL NETWORK EOMA
  I.-III.order - ~50000 benchmarks
  RE-LEVELLING IS IN PROGRESS

- GNSS GNSSnet.hu
  ETRS89

- NETWORK INTEGRATION
  INGA: horizontal, vertical, GNSS, gravimetric networks
GNSSnet.hu: FACTS and STATISTICS

- 35 HUNGARIAN + 19 FOREIGN STATIONS (BILATERAL AGREEMENTS ON DATA EXCHANGE)
- 50 GNSS CAPABLE
- NETWORKING SOFTWARE: GEO++ GNSMART
- >660 USER/COMPANY and >900 USER NAMES
- SIMULTANEOUS USERS: >70 AS AVERAGE
- 75GB ANNUAL DATA DOWNLOAD
- 99.7% SERVICE AVAILABILITY IN 2010 JAN.-OCT.
- IDENTIFICATION AND APPROACH OF NEW USER GROUPS
GNSSnet.hu: SERVICE MONITORING

- NEW REALIZATION IN 2007  [ ETRF2000(R05) ]
- CROSSBORDER COMPATIBILITY OF REALTIME SERVICES (EUPOS STANDARDS AND DATA EXCHANGE)
- DAILY MONITORING OF THE STATIONS USING BERNES SW TO CHECK AND KEEP UP-TO-DATE THE ETRS89 COORDINATES
REFERENCE NETWORKS

- **HORIZONTAL NETWORK** EOV
  I., II., III., IV. order - ~ 30 000 markers
  Decreased user interest / critical maintenance capacity
  SELECTIVE MAINTENANCE / LEGAL ACTS ARE PREPARED

- **VERTICAL NETWORK** EOMA
  I.-III. order - ~50000 benchmarks
  RE-LEVELLING IS IN PROGRESS

- **GNSS** GNSSnet.hu
  ETRS89

- **NETWORK INTEGRATION**
  INGA: horizontal, vertical, GNSS, gravimetric networks

INTEGRATION OF THE GEODETIC REFERENCE NETWORKS

- **HIGH QUALITY MAINTENANCE OF THE GEODETIC REFERENCE FRAMES USING REDUCED NUMBER OF SITES**
- **HORIZONTAL, VERTICAL, GNSS AND GRAVITY FRAMES**
- **PRIMARILY BASED ON SELECTED EOMA BENCHMARKS,**
- **GNSS MEASUREMENTS PARALLEL WITH THE RE-LEVELLING CAMPAIGN,**
- **~1000 BENCHMARKS COVERING HUNGARY**
- **INCREASED PHYSICAL AND LEGAL PROTECTION,**
- **DERIVE THE GNSS HEIGHT REFERENCE SURFACE**