

4th EUPOS Meeting

REPORT OF SLOVENIA

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(SURVEYING AND MAPPING AUTHORITY OF THE REPUBLIC OF SLOVENIA, LJUBLJANA)

Bratislava, 21–22 November 2017

PRESENTATION TOPICS:

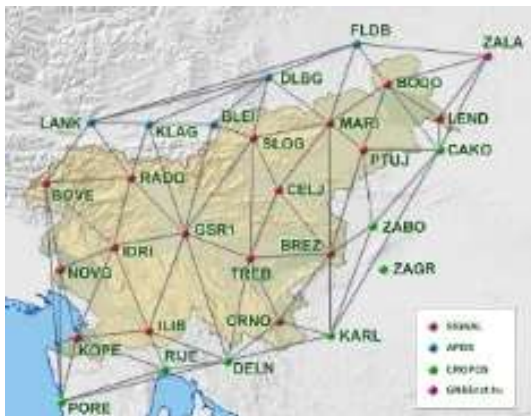
SIGNAL network (Slovenian GBAS Network)

National Combined Geodetic Network (0.order network)

“EUREF Slovenia 2016” GNSS Campaign

SIGNAL NETWORK

- Slovenian network of **16** continuously operating GNSS stations
- One EPN station (GSR1)
- SW: Trimble Pivot + Alberding QC
- HW: 8 Trimble + 8 Leica stations
- 0 Galileo stations
- New 2017: redundancy system (Trimble)



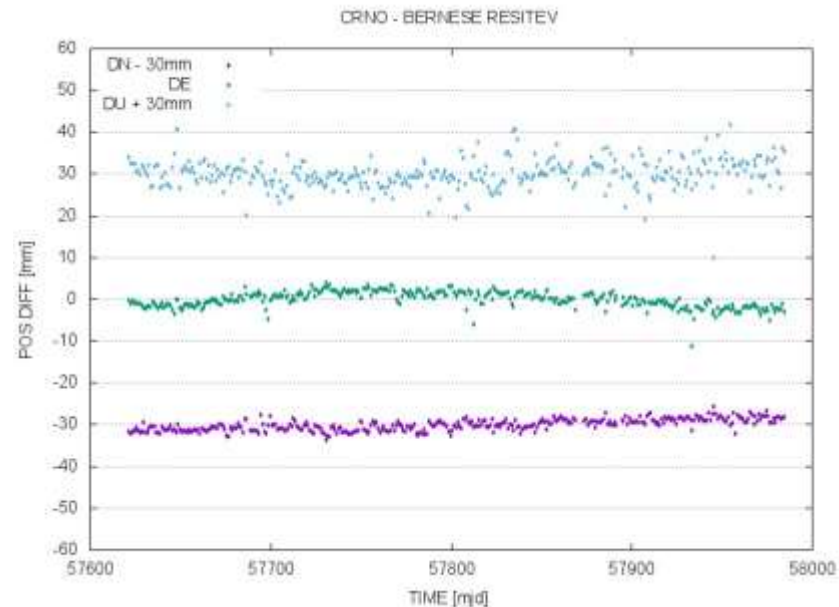
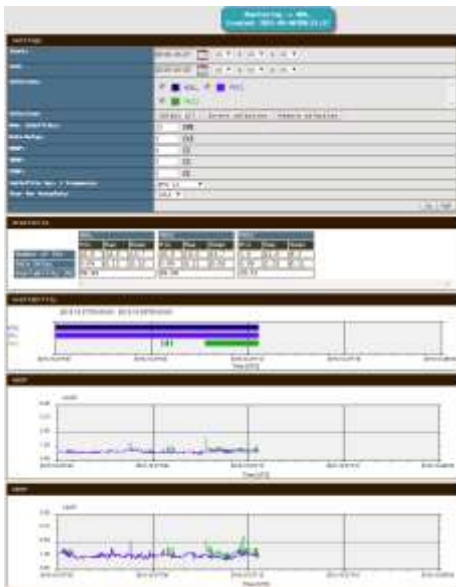
SIGNAL NETWORK

- Nr. users: ~250–300 (Nr. does not increase/decrease)
- Price: RTCM per month = 65€ (1 year contract)
- per month = 85 € (1 month contract)
- per usage = 1,2 €/day + 0,12 €/min (RTCM or RINEX)
- Decline of CSD modem connections, increase of MAC protocol
- New guidelines for user are preparing (2018), focus on cadastral measurements (renewal from yr.2007)



Quality monitoring:

- monitoring provided by the control software
(Alberding QC – Integrity monitoring, check data-flow)
(Trimble Pivot – rover integrity 1 station)
- analysis of time series (2 solutions: Bernese, PPP)
- NEW network of control points based on field measurements
(quality control of RTK services ~45 points, 50% in pairs)



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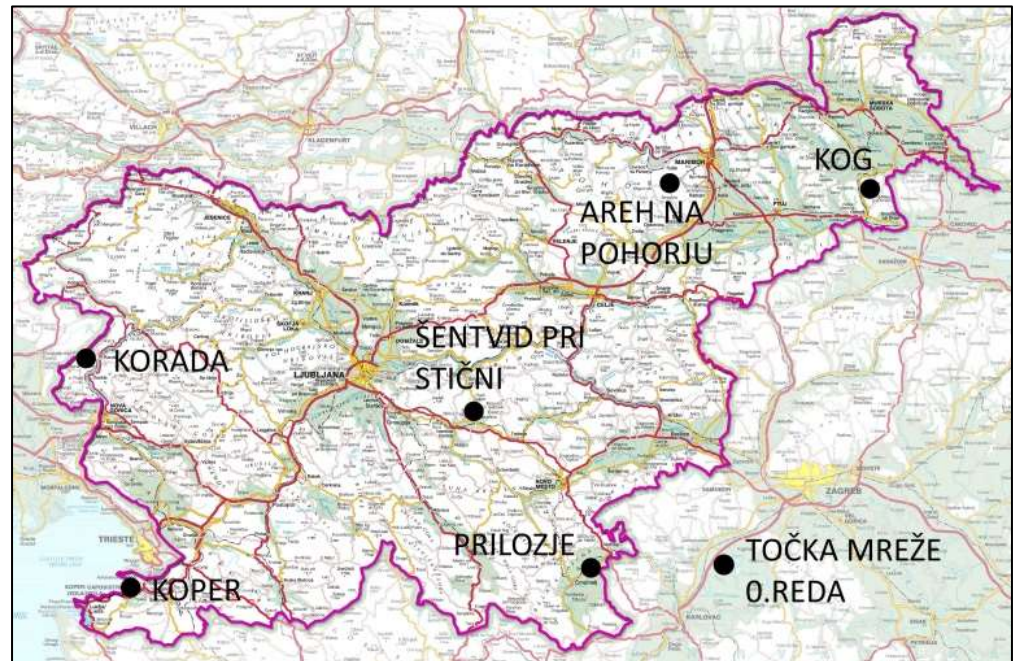
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NATIONAL COMBINED GEODETIC NETWORK

NEW: Operational since 1st January 2016

- 6 network sites with distances of ~100 km
- Local analytical centre is being established to produce daily solutions for all Slovenian permanent GNSS stations
- No data stream for users
- Will be proposed to be included to EPN



NATIONAL COMBINED GEODETIC NETWORK

- 6 sites with 10 continuously operating GNSS stations:
 - 4 double (twin) stations
 - 2 single stations
- collocated:
 - 1 tide-gauge station with normal benchmark
 - 1 absolute gravity point
 - 1 seismological station
 - 1 former 1st order triangulation network station
- high-quality monumentation (up to 20 m long piles)
- local ties (4 additional points on each site, submillimetre level)
- absolute individual antenna calibration (Geo++)
- meteo stations, tilt-meters
- HW: Leica GNSS equipment
- SW: Alberding GNSS status sw

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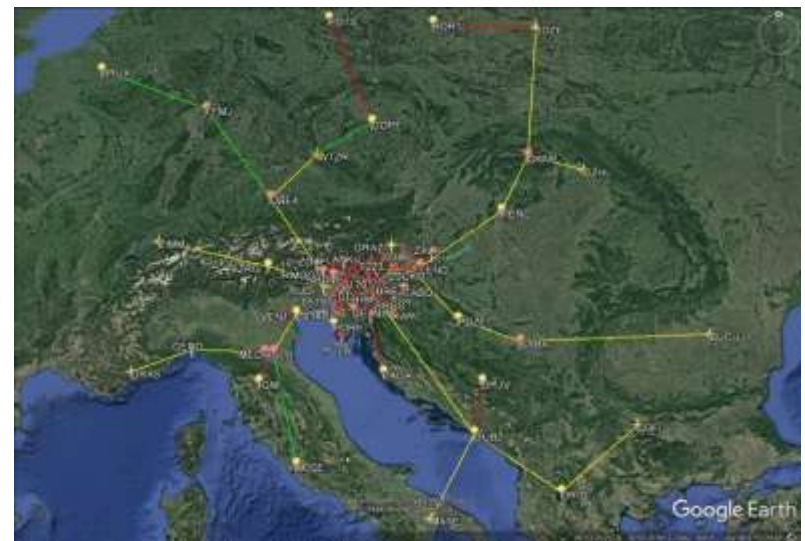
Main goals:

- connecting all 1st order networks (Hz, V, Grav) on identical points
- determination of high-quality velocity field
- future national geodetic datum realization
- supporting other CORS networks (fixing, quality control)
- calibration of surveying equipment and measurement techniques
- supporting interdisciplinary research (meteorology, geodynamics, seismology, sea level rise etc.)

TERRESTRIAL REFERENCE FRAME

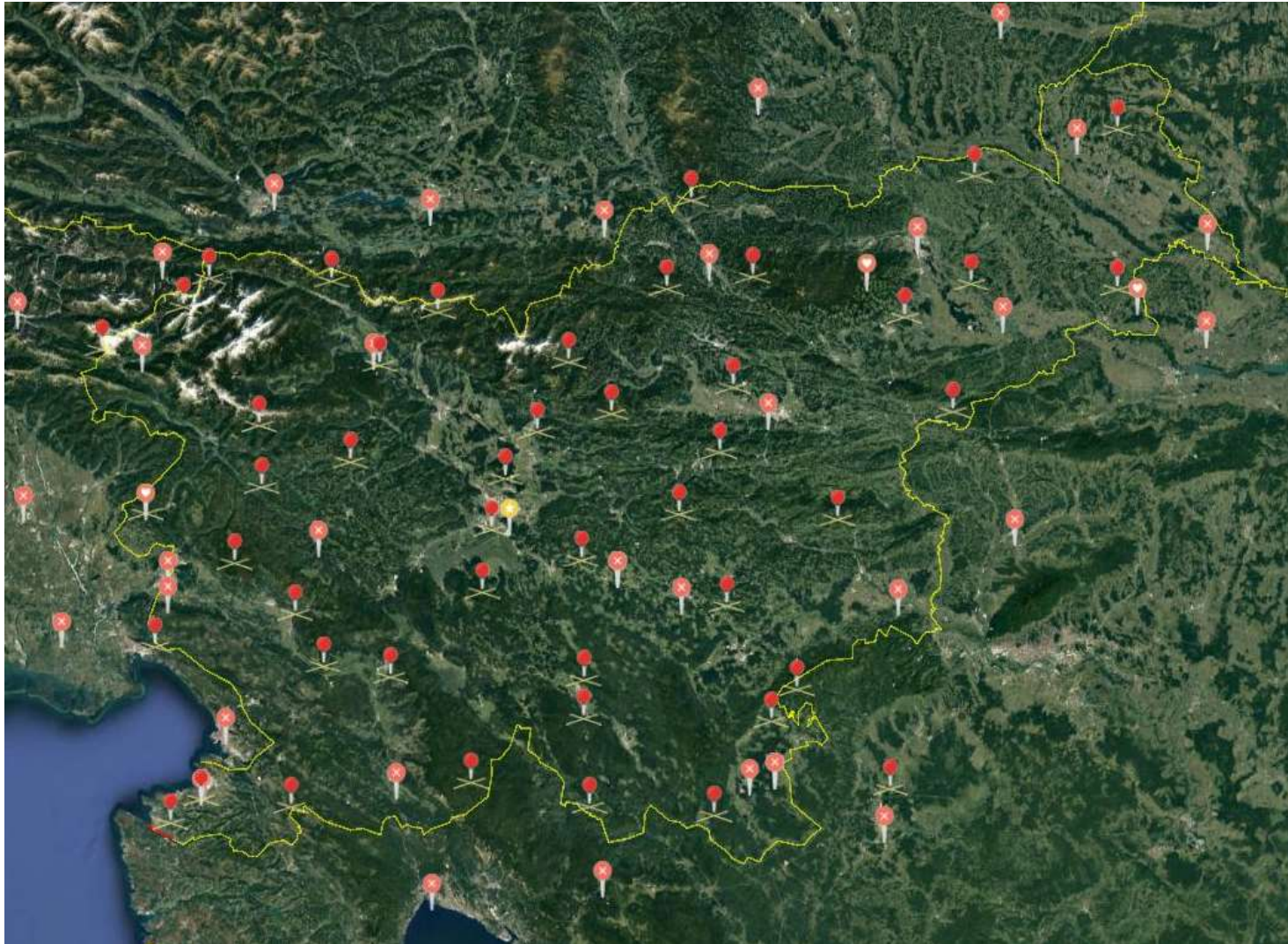
“EUREF Slovenia 2016” GNSS Campaign

- Conducted between 22 August 2016 and 10 November 2016
- 80 consecutive daily sessions with the mean epoch of 2016.75
- 46 passive GNSS sites occupied for at least 72 hours
- 23 Slovenian continuously operating reference stations
- 51 other (IGS, EPN, APOS, CROPOS ...) reference stations



TERRESTRIAL REFERENCE FRAME

“EUREF Slovenia 2016” GNSS Campaign: Sites Occupied



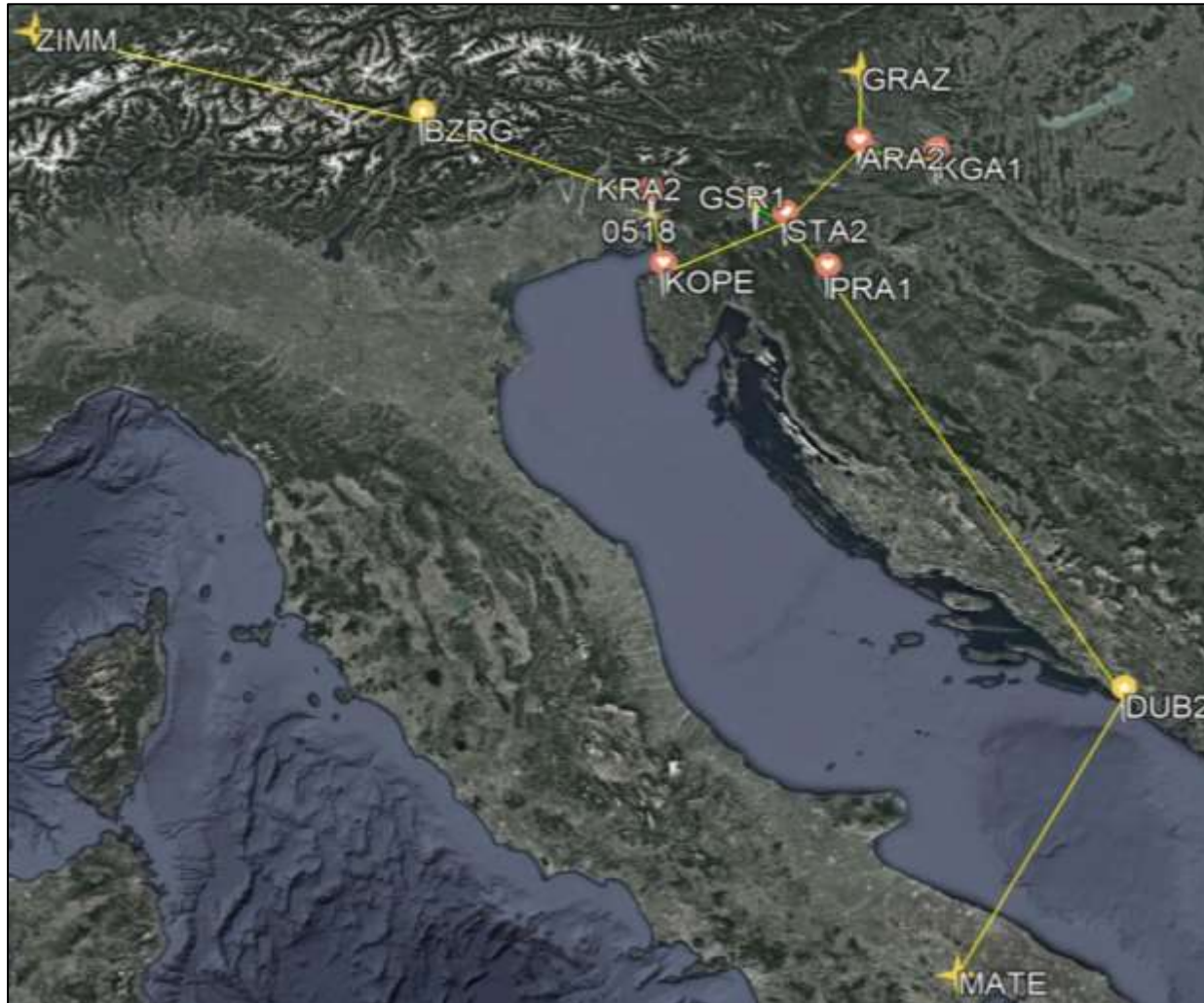
TERRESTRIAL REFERENCE FRAME

“EUREF Slovenia 2016” GNSS Campaign: Fiducial Stations



TERRESTRIAL REFERENCE FRAME

**“EUREF Slovenia 2016” GNSS Campaign: Test Network
(to Analyse Various Computation Strategies)**



TERRESTRIAL REFERENCE FRAME

“EUREF Slovenia 2016” GNSS Campaign: Open Issues

- Implementation of Absolute Individual Antenna Calibrations
- Upgrade of Bernese GNSS Software 5.2 to ITRF2014
- Comparison of results of computations in ITRF2008 (IGb08) and ITRF2014
- Comparison with current Slovenian realization of ETRS89 (from EUREF GPS Campaigns in 1994, 1995 & 1996)
- Final decision of the computation strategy for the new realization of ETRS89

TERRESTRIAL REFERENCE FRAME

“EUREF Slovenia 2016” GNSS Campaign: Further Steps

- Analysis of differences between:
 - new realization of ETRS89 (D17, epoch 2016.75) and
 - current realization (D96, epoch 1995.55)
- Decision on how to implement the results (new solution):
 - Keeping the current realization (if no significant changes)
 - New static terrestrial datum (need for transformation of spatial data sets)
 - Change to semi-kinematic terrestrial datum (need for creation and implementation of a national deformation model)

Thank you for your attention