National Report of Greece

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Outline

1. Establishment of HEPOS
2. HTRS07: Realization of ETRS89 in Greece
3. National GPS Campaign
4. Computation of Coordinate Transformation Model

1. Establishment of HEPOS

HEPOS

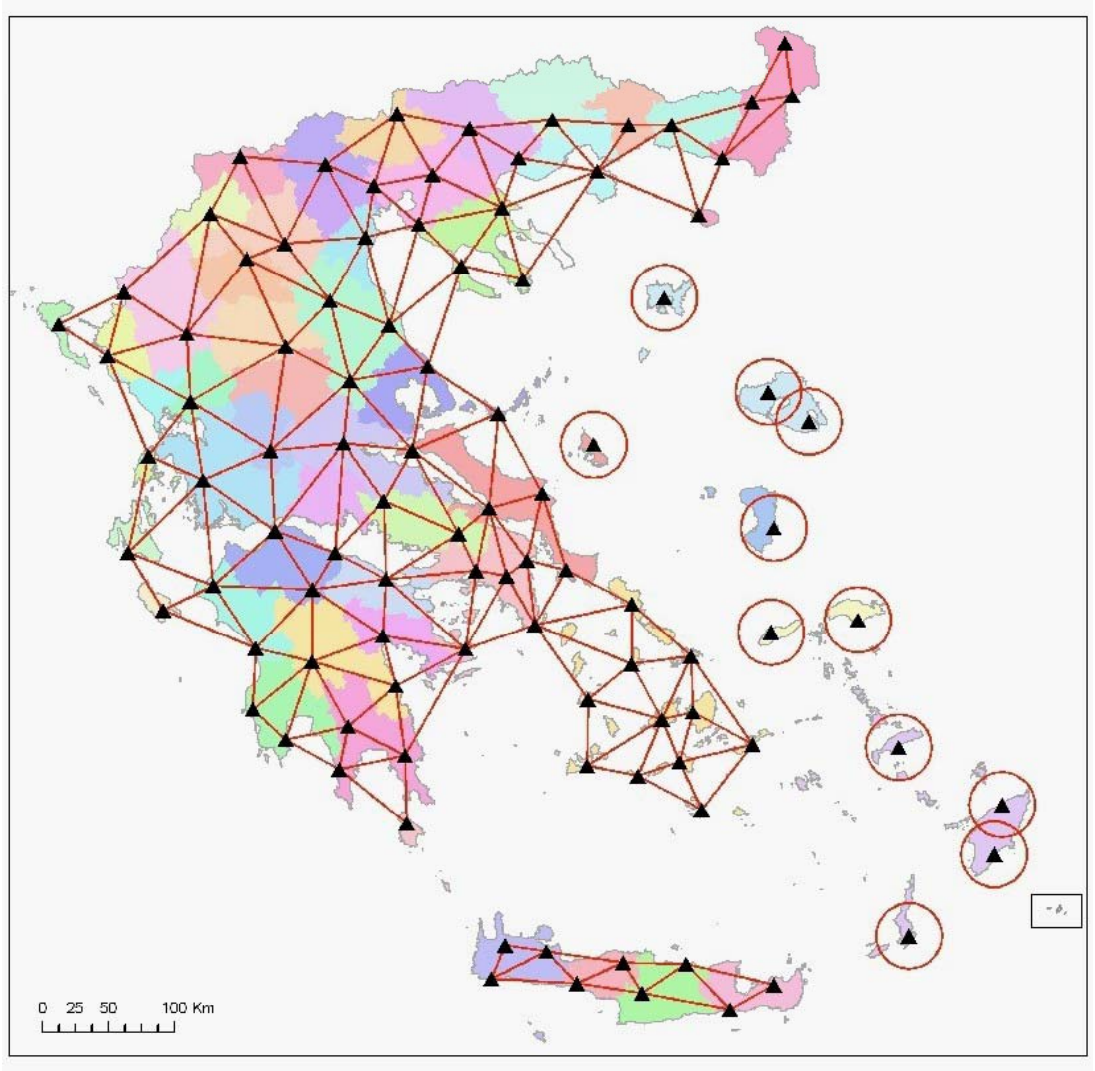
HEllenic POsitioning System

- HEPOS is part of the Program for the modernization of the Hellenic Cadastre
- System owner & operator: Ktimatologio S.A. (Hellenic Cadastre)
- System establishment co-funded by the EU

1. Establishment of HEPOS

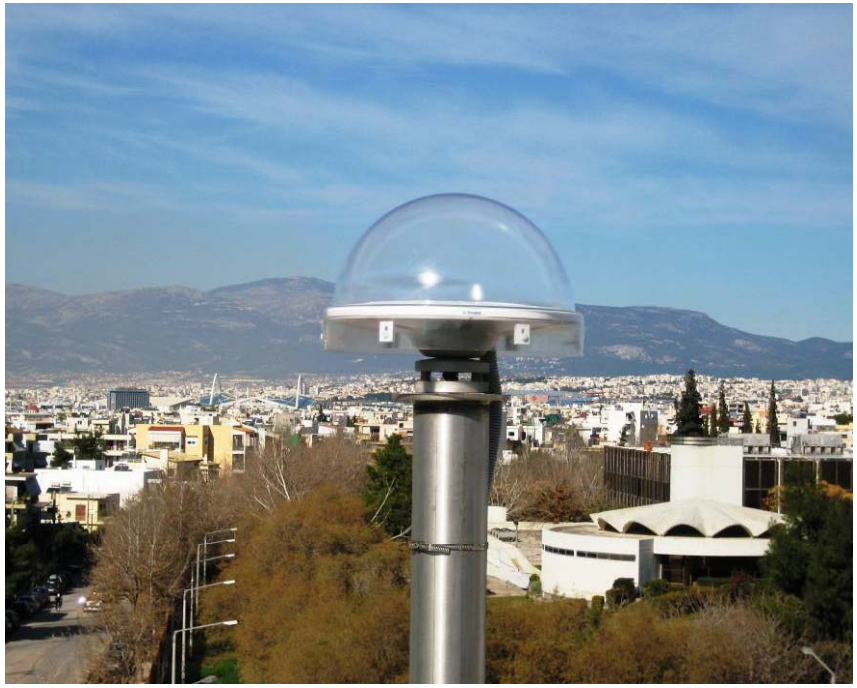
98 Reference stations:

- **87 supporting network- based techniques (VRS - FKP - MAC)**
- **11 for Single- base positioning**



1. Establishment of HEPOS

Examples of Reference Stations of HEPOS



1. Establishment of HEPOS

Examples of Reference Stations of HEPOS

1. Establishment of HEPOS

Services offered by HEPOS

APPLICATION	SERVICE	DATA FORMAT
Post Processing (www.hepos.gr)	**RS data**	**RINEX, CRINEX**
	VRS data	**RINEX, CRINEX**
Real Time (GSM & GPRS supported)	**Network RTK: VRS**	**RTCM 2.3** **RTCM 3.0** **RTCM 3.1** **CMR+**
	Network RTK: FKP	
	Network RTK: MAC	
	Single Base RTK	
	Network DGPS	**RTCM 2.3**
	Single Base DGPS	**RTCM 2.3**

2. HTRS07: Realization of ETRS89 in Greece

- HTRS07: Hellenic Terrestrial Reference System of 2007
- HTRS07: is realized by the 98 Reference Stations of HEPOS
- The coordinates of the 98 Reference Stations are computed in ETRF2005 epoch 2007.5
- The transformation from ITRF2005 to ETRF2005 did not strictly follow the EUREF-Memo (Boucher & Altamimi), due to the considerably different coordinate velocities of the stations throughout the country, as can be seen in next slide
- Instead, the offsets DX DY DZ for EPN station AUT1 were used for the transformation from ITRF2005 to ETRF2005

2. HTRS07: Realization of ETRS89 in Greece

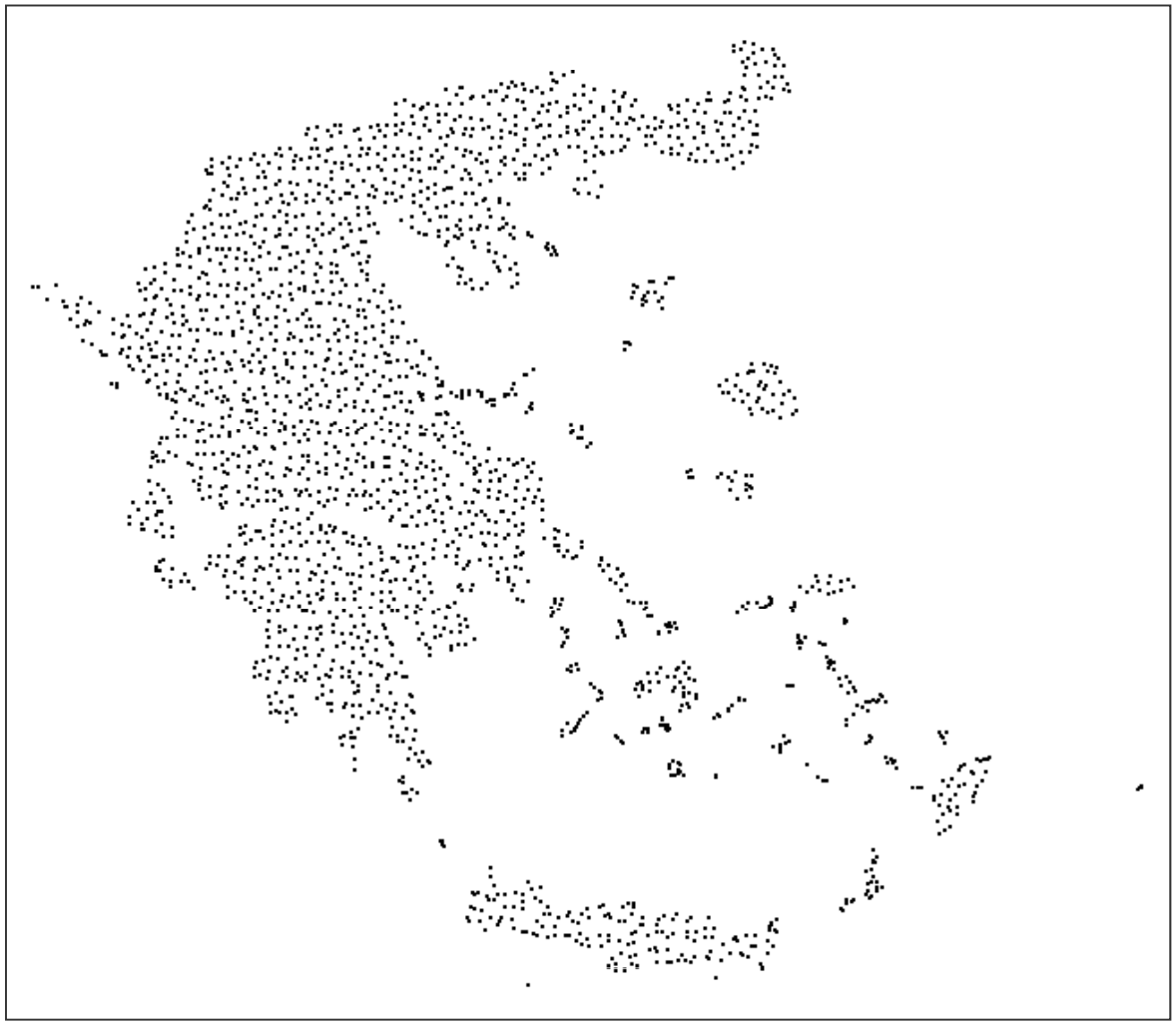
- **Coordinate velocities in Greece are 1 to 2 orders of magnitude bigger than those in Central Europe**
- **Coordinate velocities vary strongly throughout Greece**

EPN STATION	VX_{EPN} (m/y)	VY_{EPN} (m/y)	VZ_{EPN} (m/y)	$\|V\|_{EPN}$ (m/y)
WTZR	0.0001	0.0003	0.0006	0.0007
GRAZ	-0.0003	0.0007	0.0008	0.0011
KOSG	0.0005	0.0003	0.0011	0.0012
AUT1	**0.0049**	**0.0033**	**-0.0079**	**0.0099**
NOA1	**0.0125**	**-0.0118**	**-0.0211**	**0.0272**
TUC2	**0.0196**	**-0.0096**	**-0.0208**	**0.0301**

3. National GPS Campaign

2470 trigonometric points were measured in 2007 with GPS for the computation of a transformation model between HTRS07 and the national CRS (HGRS87).

- Minimum observation time: 1 hour
- Additional requirements for PDOP values
- Elev. Mask: 15^{o}
- Same type of receivers & antennas



3. National GPS Campaign

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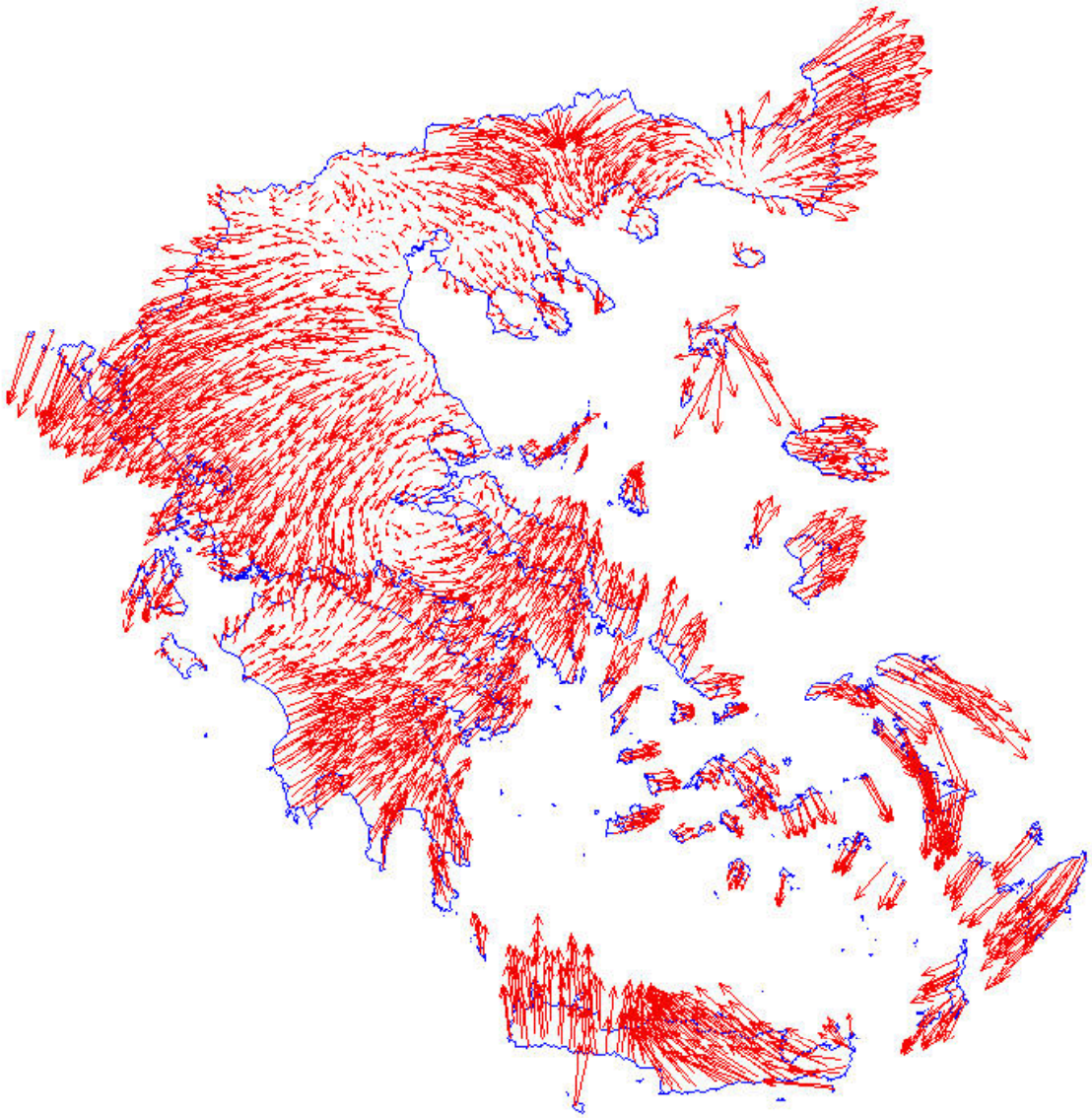
Residuals of a 7-parameter Helmert transformation between HTRS07 and HGRS87 (max. residual ~2.5m).



4. Coordinate Transformation Model

- **A transformation model is computed for the bidirectional transformation between HTRS07 and HGRS87**
- **The model is based on the combined use of:**
  - **a 7-parameter Helmert Transformations**
  - **grid corrections**
- **The overall accuracy of the model is about 8 cm (RMS) country-wide**
- **The model is realized by**
  - **free software, which is available at www.hepos.gr**
  - **implementations in commercial geodetic software and GNSS receivers** (KTIMATOLOGIO S.A. supplied to all interested manufacturers the full information required for the implementation)

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