



FIG Working Week 2012

Rome, Italy 6–10 May

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Determination of Astro-Geodetic Vertical Deflections using Digital Zenith Camera System in Istanbul, Turkey

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Outline

- Digital Zenith Camera Systems (DZCSs)
- Geoid Determination Studies In Turkey
- Contribution to Current Models with Astro-geodetic Data
- Observation Method And Instrumentation
- DZCS of Turkey

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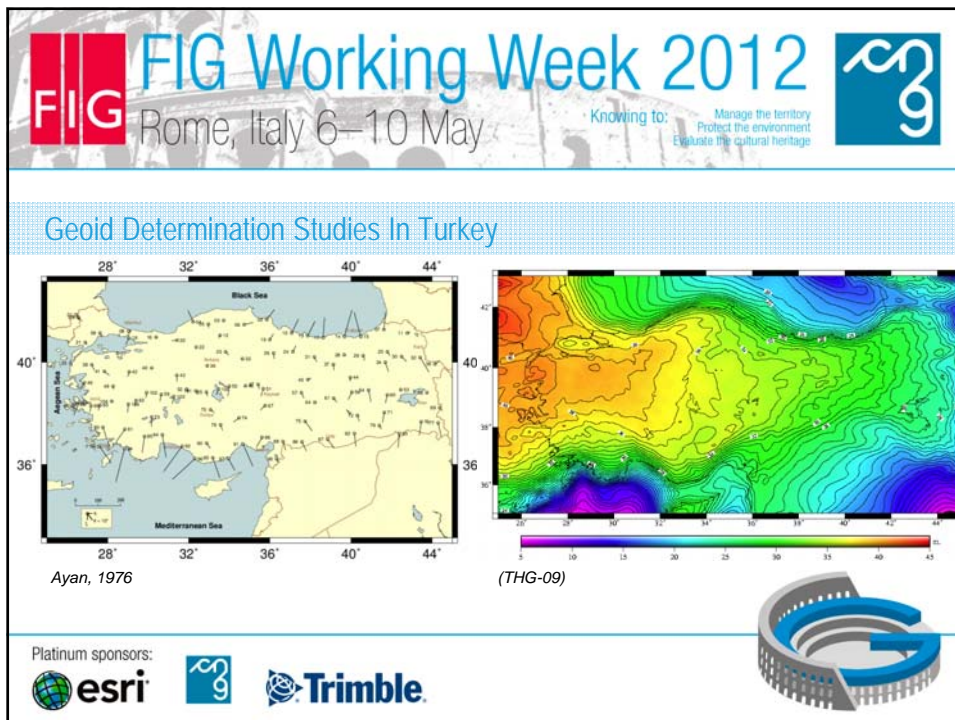
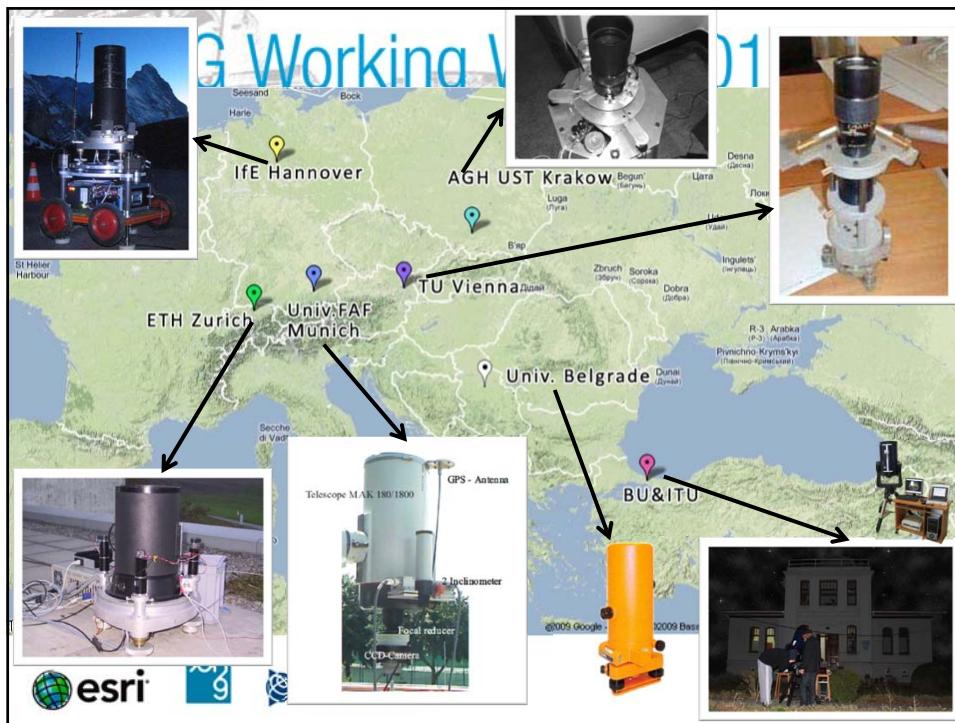




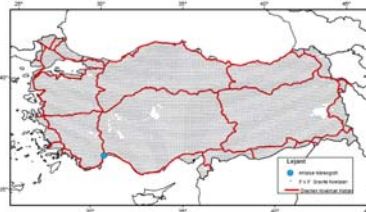
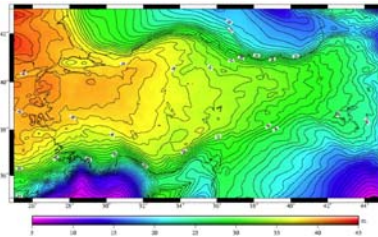
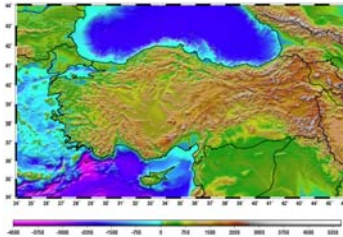
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Contribution to Current Models With Astro-geodetic Data



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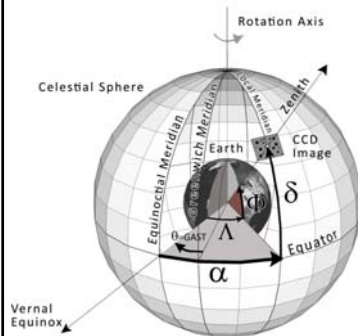
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Observation Method And Instrumentation



$$\Phi = \delta \quad \Lambda = \alpha - \text{GAST}$$

$$\xi_0 = \varphi - B \text{ (North - South)}$$

$$\eta_0 = (\lambda - L) \cos \varphi \text{ (East - West)}$$

$$\theta_0 = \sqrt{\xi_0^2 + \eta_0^2}$$

$$\varepsilon_0 = \xi_0 \cos \alpha + \eta_0 \sin \alpha$$

$$\Delta N = ds \frac{\varepsilon_0}{\rho}$$

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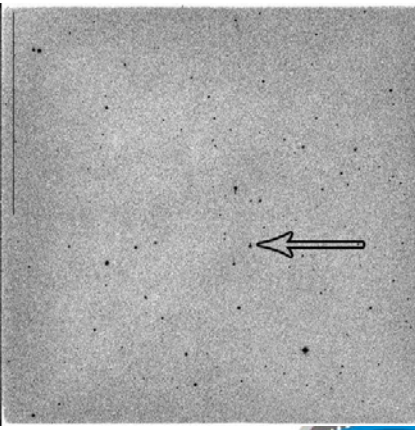
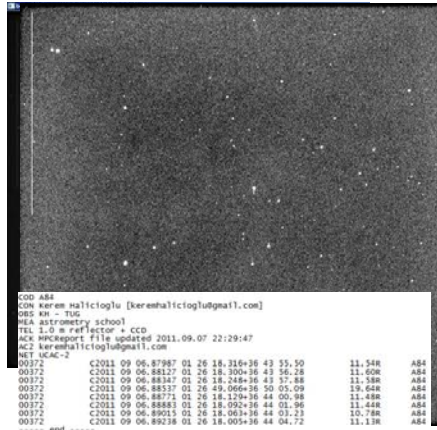




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00372 C2011 09 06.87987 01 26 18.316+36 43 55.50 11.54R AB4
00372 C2011 09 06.88137 01 26 18.300+36 43 56.18 11.50R AB4
00372 C2011 09 06.88347 01 26 18.248+36 43 57.88 11.58R AB4
00372 C2011 09 06.88537 01 26 18.248+36 50 07.09 19.64R AB4
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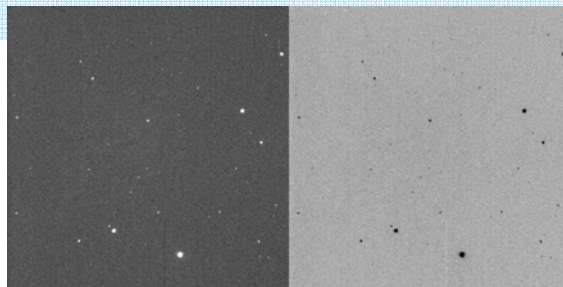
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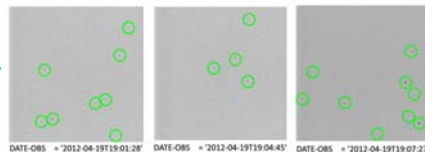
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Hipparcos
Tycho-2
UCAC/2/3?
GSC 1.1
GSC 2
USNO-A
USNO-B



- UCAC2 star catalog
- 0,2 sn exposure
- 3"x0,007sn
- Point like shape of stars



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DZCS of Turkey

- 8" Meade LX200GPS telescope, 14,0-16.5 mag, system control, focusing (f/-distorsions)
- Pixel size $>9 \times 9 \mu\text{m}$, QE $>$ high, FWC $>$ 20K-30K, TTL trigger CCD
- Leica Nivel 210 tiltmeters (0.001 rad \sim 0,2")
- GPS time, geodetic coordinates 1PPSOut
- Star Catalogs, UCAC2/3, GSC
- Image Processing Software

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The aim of this project

- VD data from DZCSs can be integrated to different techniques for improved solutions.
- Astrogeodetic Geoid
- As an independent technique – Astrogeodesy – Validation purposes
- Determine Medium-Wave effects of Geoid
- 6-10 / 1000 km² VD Astro points (100-500 gravimetry) \rightarrow cm Astro-geoid (*Gerstbach*)
- Contribution to heighth modernization studies in Turkey

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Acknowledgements

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