



**Kandidat**

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**Master-Thesis (Jahr: 2011)**

Computation and Quality Assessment of Datum-Transformation and Geoid Databases as Basic Components of the Geodetic Infrastructure (GIPS) for the GNSS-Positioning Service of Brazil

**Referent**

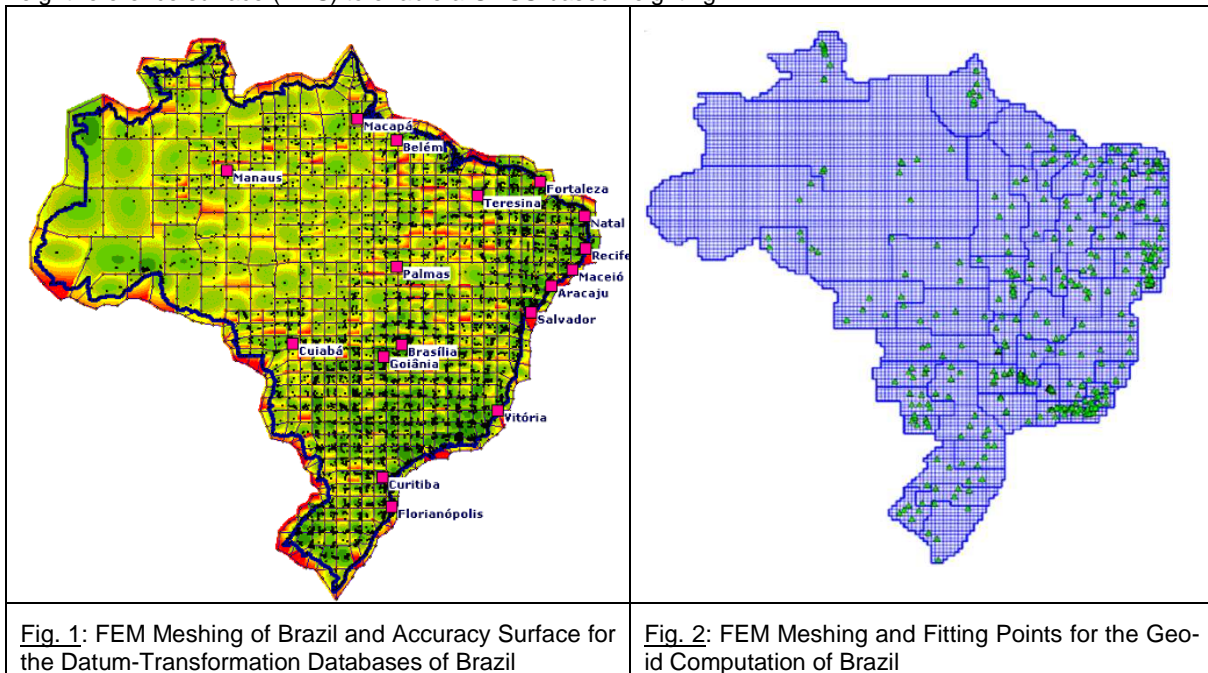
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**Keywords**

Geodetic Infrastructure, GNSS-Positioning Service Brazil, Geoid-Computation, Datum-transformation, SIRGAS

**Summary**

The worldwide ongoing process of the establishment of high precise DGNSS-positioning services and respective GNSS-reference station networks, which are related to the globally GNSS-consistent ITRF and ITRF-derivatives (e.g. SIRGAS in Brazil), implies the replacement of the georeferencing in the old independent classical national reference frames by an ITRF-related one. Accordingly the new age of GNSS-positioning services - as interdisciplinary tool with a broad and growing spectrum of precise satellite positioning, navigation, mobile GIS and mobile IT applications – requires the establishment and maintenance of a geodetic infrastructure for GNSS positioning services (GIPS). These concern the datum-transformation databases (fig 1) to transform horizontal positions (B,L) between the ITRF, and the classical terrestrial frames, and the computation of the geoid (fig. 2) as a physical height reference surface (HRS) to enable a GNSS-based heighting.



The GIPS developments for Brazil in the frame of the masterthesis took place as a cooperation project of the Faculty of Geomatics of the Karlsruhe University of Applied Sciences (HSKA) and the Instituto Brasileiro de Geografia e Estatística (IBGE), Rio de Janeiro. The data of identical points is provided by the (IBGE) and is exclusively used within that project, the computed databases belong to IBGE. Objectives of the Masterthesis were

- Description of the new ITRF-based and the classical horizontal and vertical frames at Brazil.
- Description of the applied FEM transformation concepts for plane and height and the related mathematical models applied for the GIPS establishment for Brazil.
- Determination of the databases for the different historical classical datum-systems in Brazil based on the fitting points (B,L,h)-SIRGAS and (B,L,H)-classical provided by IBGE.
- Determination of the DFHRS-based geoid for Brazil using the fitting point information (B,L,h|H) provided by the IGBE.
- Quality assessment and visualization of all GIPS computation results.
- Set up the computed databases as reference transformation for RTCM trafo messages.