

International Gravity Field Service (IGFS)

<http://www.igfs.net>



Chairman: Rene Forsberg (Denmark)

Director of the Central Bureau: Steve Kenyon (USA)

Overview

The International Gravity Field Service (IGFS) is an “umbrella service”, coordinating the gravity-related services under the International Association of Geodesy (IAG). The primary purpose of the IGFS is - in addition to the service coordination - to represent gravity field geodesy more unified in relation to other parts of geodesy, notably in connection with the IAG project GGOS – Global Geodetic Observing System.

Current structure of the IGFS

The following service entities are presently active under the IGFS umbrella:

- International Gravimetric Bureau (BGI) – *director S. Bonvalot, France*,
<http://bgi.omp.obs-mip.fr>
- International Geoid Service (IGeS) – *director R. Barzaghi, Italy*,
<http://www.iges.polimi.it>
- International Center for Earth Tides (ICET) – *director J. P. Barriot, Tahiti*,
<http://www.astro.oma.be/ICET/index.html>
- International Center for Global Earth Model (ICGEM) – *director F. Barthelmes, Germany*, <http://icgem.gfz-potsdam.de/ICGEM/>
- International Digital Elevation Model Service (IDEMS) – *director P. Berry, UK*,
<http://www.cse.dmu.ac.uk/EAPRS/iag/index.html>

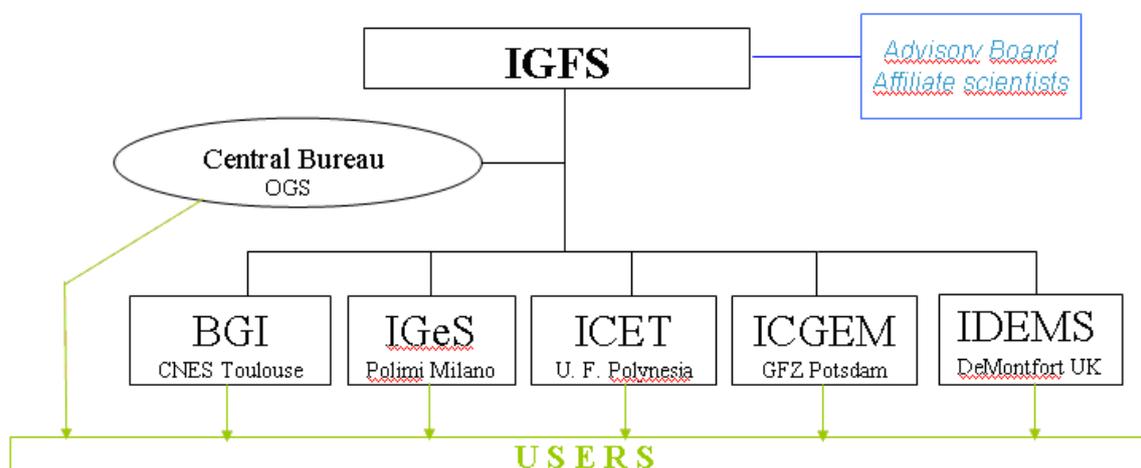
The IGFS *Central Bureau*, under the leadership of *Prof. I. Marson* and *Dr. F. Coren*, is currently being implemented at the OGS (L' Istituto Nazionale di Oceanografia e di Geofisica Sperimentale,), Trieste, Italy, after a successful open bid process. The kick-off for the CB preparations was held in Trieste on March 29, 2011.

In addition the Geodesy and Geophysics Department at National Geospatial-Intelligence Agency (NGA, *chief geodesist S. Kenyon*), serve a special role as an IGFS Technical Center, interacting both with the IGFS services and directly with the scientific community, supplementing especially BGI and IGeS activities in terms of collecting and disseminating gravity and geoid data. The activities of the IGFS is governed by an Advisory Board, consisting of the service directors, IAG representatives (*Y. Fukuda, M. Sideris*) and two members of the IGFS affiliates (*S. Bettadpur and H. Denker*).

In the period 2007-11 the IGFS has had two working groups:

- 1) *Working Group on Absolute Gravimetry – H. Wilmes, BKG, Germany*
- 2) *Working Group on Evaluation of Global Earth Gravity Models – J. Huang, NRCan, Canada*

The working groups have 1) coordinated international absolute gravity measurements, including the establishment of standards and a new data base, and 2) set up independent comparisons and validation activities of global spherical harmonic models, notably the ultra-high resolution EGM08 model of the US National Geospatial-Intelligence Agency.



Structure of the IGFS

Activities 2007-11

IGFS has during the period focussed its activities on service coordination, arrangement of scientific meetings, and the participation in the establishment of GGOS. Since the IGFS do not distribute data per se, only a rudimental web site has been maintained, and mainly with formal administrative contents.

A strategy workshop and retreat was held in connection with the GGOS retreat in Bertinoro, Italy, March 2008. This workshop pointed out the need of a more active IGFS, both on the coordination level, and the general outreach. The workshop also identified service activities needing attention, such as establishing a global absolute fundamental gravimetry network, implementing a global vertical datum, making joint satellite gravity field “standard” solutions, the need for conventions and standardization of gravity field products, and establishing a general one-stop portal for non-gravity field specialists, linking to the relevant gravity field services.

To implement the actions, a call was issued through IAG for agencies or universities wishing to host a new IGFS Central Bureau. After some first-round delays, the call was re-issued in spring 2010, and the CB awarded in Sept 2010 to OGS, Trieste, Italy, a major geophysical-oceanographic research organization. The CB is currently initiating its services, with first step being the development of a new IGFS web site, and the subsequent tasks including

- The design and realization of global absolute and superconducting gravimetry
- networks for GGOS and regional densifications
- The facilitation and coordination of regional gravity field determination and data
- exchange projects in order to improve medium to short wavelengths (e.g. Arctic and Antarctica)
- The definition and realization a global vertical datum

- The evaluation and calibration of satellite-derived temporal gravity field variations as well as the improvement of processing of satellite data
- Public outreach on the Earth's gravity field by
 - Organizing meetings and schools on gravity, geoid and related geophysics
 - Making software and tutorials for gravity and geoid analysis available.
 - Establishing and maintaining a web site with links to IGFS Centres

The IGFS participated in the scientific program planning for the “Gravity, Geoid and Earth Observation” meeting in Chania, Greece, June 2008. More than 200 scientists participated in this symposium. The 2nd IGFS gravity field symposium was held in Fairbanks, Alaska, Sept 2009. More than 80 scientists participated in this event. A 3rd symposium is currently being planned in Venice, 2012, as one of the actions of the new CB.

On the coordination side, the IGFS has actively helped in providing information on data sources for the new geopotential reference model EGM08, released by the US NGA (IGFS Technical Centre) in 2008, as well as provided an independent evaluation on pre-release models through the evaluation working group. The EGM08 will serve as a de facto standard for global gravity field and geoid information for a foreseeable future, and also indirectly provides a practical definition of a global vertical datum (to be defined by a dedicated working group under the IAG). A special task has been the improvement and activity coordination of the polar gravity fields, both in the Arctic and Antarctica, in the latter case closely related to the SCAR/IAG special work group on the Antarctic Geoid (M. Scheinert).

Other main activities carried out together with the services include

- Joint bulletin: Newton’s Bulletin – joint electronic journal of the BGI and IGeS.
- Geoid schools: New IGeS Geoid School successfully held in Como, Italy and St. Petersburg, Russia (Sept 2008 and June 2010). The IGFS has also been represented in numerous GGOS-related directing board meetings.

Meetings of the IGFS advisory board was held at the IAG 2007 General Assembly in Perugia, as well as at the IGFS Retreat, held in Bertinoro, Italy, March 24-25, 2008, and during the 2nd IGFS Meeting, Fairbanks, Alaska, Sept. 2010.