

SEMINAR REPORT

Technical Seminar on Reference Frames in Practice (RFIP)

Christchurch, New Zealand

1 – 2 May 2016

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The RFIPⁱ this year brings together the geometric and physical components of reference frames, and includes the effects of geodynamics to datums. Select experts from different organizations at the forefront of geodesy shared their insights on a wide array of topics related to this year's theme, including:

- 3D reference frames/datums
- vertical reference frames
- using deformation models
- relationships between global and local datums
- datum unification
- tools for geodetic computations
- future reference frames

Case studies of national and global datums from around the world were also presented, including Japan, USA, New Zealand, Australia and Pacific Islands. Brief case studies were presented by the UN-ICG supported delegates from the Philippines, Poland, Fiji and Nepal.

The seminar topics were a good mix of theoretical concepts and practical applications that gave a holistic view of reference frames. The case studies provided valuable and clear guidance on how to adopt a dynamic datum, including some practical tips for implementers who are planning to, or are in the process of modernizing their datums.

Some of the highlights of the discussion during the open forum, as well as significant learning made by the participant are as follows:

1. *On the importance of reference frames*

Mr. Graeme Blick of Land Information New Zealand (LINZ) referred to geodetic reference frames as “the infrastructure for infrastructure” given that all developmental works rely on the availability of an accurate, reliable and accessible geodetic framework. He emphasized the importance of conveying this message to political masters for them to appreciate how critical the geodetic infrastructure is to the daily lives of people.

Dr. John Dawson of Geoscience Australia (GA) likewise highlighted the importance of geodetic infrastructures as they underpin all geospatial information which in turn is a key enabler for decision makers to support sustainable development goals.

2. *On the UN GA Resolution on Global Geodetic Reference Frame (GGRF) for Sustainable Development*

Dr. Dawson said that the passage of the resolution raises the profile of GGRF, and that the UN resolution can be used to encourage governments and funding bodies to invest in geodetic infrastructures. He hopes that this provides an avenue for developing nations to catch up to developed countries.

Ms. Ruth Neilan of the International GNSS Service (IGS) also noted that the said resolution was unanimously approved by the General Assembly with only positive statements coming from the members, which, based on the comments from people at the UN, is a rare occurrence.

3. *On the case studies*

The case studies showed that for developing countries, the need to capacitate local implementers on modern geodetic reference frames remains high, and that their physical geodetic infrastructures need to be strengthened. The presentations also highlighted the importance of international cooperation, as with the support from developed nations, particularly through knowledge sharing and funding support, developing countries are slowly making headway into their datum modernization.

For developed countries, there is a consensus in adopting a kinematic datum, datum unification, and connection to international reference frames. Much focus is also given to modeling secular and non-secular deformations. There is a concerted effort to increase the accuracy of geoid models as it provides the link between the geometric and physical datums.

4. *On geodetic standards*

Mr. Larry Hothem of the International Organization for Standardization (ISO) said that the organization's current strategic direction is to support the UN-GGIM and the GGRF resolution so they are now in the process of revising and developing standards to align them to the resolution. He added that modern geodetic reference frames i.e. dynamic datums and geoid-based vertical datums, present a challenge as it requires numerous changes to the existing standards. Mr. Hothem encouraged the increased participation of its members in the development of standards, particularly for geodetic applications.

Dr. Craig Roberts of the University of New South Wales (UNSW) asked if there is a global policing body to ensure strict implementation and compliance to standards. It was pointed out that some countries/organizations have already included these standards in their specifications so this helps in its promotion and adoption.

5. *On the tools for geodetic computations*

The demonstration by GA and LINZ on some practical tools for geodetic computations such as the SNAP, RTKLib and SINEX Manipulation software, was a welcome addition to the seminar. This is particularly helpful for developing

countries that have limited resources to procure the needed software or develop one of their own.

The seminar dinner organized on day 1 of the RFIP seminar was a good way to build rapport among the participants and speakers. It also provided an informal venue to further form contacts/networks as well as discuss pending issues and concerns on reference frames and other matters.

Attendance to the RFIP seminar was very helpful as it was an opportunity to learn the latest developments on reference frames, as well as touch base with experts who were able to provide valuable inputs to the modernization of the Philippine geodetic reference system (PGRS) initiative of NAMRIA.



ⁱ The RFIP seminar series aims to provide a forum for the exchange of knowledge and experiences on the operational aspects and practical issues related to reference frames, and pushes for international cooperation on the realization and improvement of reference frames. This year, the seminar is organized by the International Federation of Surveyors (FIG), the International Association of Geodesy (IAG), the International Committee on Global Navigation Satellite Systems (ICG), and the United Nations Initiative on Global Geospatial Information Management – Asia Pacific (UN-GGIM-AP) and the New Zealand Institute of Surveyors (NZIS) with support from Land Information New Zealand (LINZ), Leica Geosystems, and Trimble.