



Reference Frame in Practice Seminar - Kobe, Japan

Introduction

The Reference Frames in Practice (RFIP) series has been in operation since May 2012 and this year's seminar was convened in Kobe (Japan) on 29-30 July 2017. The seminar venue was the Kobe Chamber of Commerce - Port Island, and was hosted by GSI - Geospatial Information Authority of Japan. A special thanks to Mr. Basara Miyahara and his team at GSI for their great hospitality.

The seminar was organised by GSI, IAG (International Association of Geodesy), FIG (International Federation of Surveyors), UN Global Geospatial Information Management for Asia and the Pacific (UN-GGIM-AP), ICG (International Committee on GNSS) and JFS (Japan Federation of Surveyors). The financial sponsors of this event were RIPRO, Nikon-Trimble, Leica Geosystems, and PASCO. Acknowledgement and appreciation to the ICG as they provided financial travel assistance to four delegates from Bangladesh, Fiji, Philippines and Tonga to attend this seminar.

The Seminar

Like previous seminars this RFIP was well attended. It attracted 68 delegates from 19 different countries. From a program perspective, there were 21 quality presentations which included 4 presentations from the event sponsors who provided a manufacturers perspective on the issues and challenges relating to geodetic reference frames.

The seminar's objective was to provide fundamental geodetic reference frame background, concepts and examine the associated data and analysis techniques, each with a focus on practical implementation and application. To open the proceedings, the President of the UN GGIM-AP Dr. Hiroshi Murakami and IAG Chair Commission 1 Prof. Geoffrey Blewitt provided the delegation with welcoming wishes and opening remarks. The key note messages delivered were –

- The importance of geodetic reference frame data and infrastructure with respect to decision and policy making for disaster or emergency response risk management and mitigation.

- The value of collaboration and sharing of information, knowledge, and experiences amongst professional organisations, government agencies, academia and countries in general, in relation to measuring / monitoring the dynamics of the earth, datum modernisation and deformation modelling.

The list of presentations delivered over the 2 days were –

- **Prof. Geoffrey Blewitt: Geodetic Reference Frame Theory**
Overview – Provision of fundamental theory with respect to global velocity field determination; the importance of sourcing and sharing GNSS geodetic data with an emphasis on the potential benefits to participating countries from a scientific, economic and social perspective.
- **Dr. John Dawson: Global to Regional to National: A practical approach to improving access to the ITRF**
Overview - Approaches for accessing the International Terrestrial Reference Frame (ITRF); key elements of the Asia Pacific Reference Frame (APREF) initiative were discussed; and illustrated Australia's approach to APREF to update and modernize its national datum.
- **Dr. A.B. Wijanarto: Semi-Dynamic Datum of Indonesia**
Overview – Highlighted the realization and implementation of the new Indonesian semi-dynamic datum and the vertical datum (geoid); included information on the status, problems and constraints in establishing this new datum in a relatively vast maritime archipelago of Indonesia, with relatively dynamic geodynamic and tectonic setting.
- **Dr. Matt Amos: Development of Geoid Based Vertical Datums, A New Zealand Perspective**
Overview - The development of New Zealand's vertical datum as a case study to show how geoid based datums can be practically developed and implemented in an incremental and cost-effective way that meets the needs of the end users.
- **Mr. Kevin Kelly: Vertical Reference Frame and GIS**
Overview – Demonstrated in a GIS environment the management of vertical reference frame data, vertical datums and transformations between them; and vertical transformation of surveying and mapping datasets. It also summarised two IAG services: International DEM Service (IDEMS) as a source of vertical surface data and the International Service for the Geoid (ISG) repository for worldwide local and regional geoid models.

- **Ms. Ruth Neilan: International GNSS Service (IGS) at IAG**
Overview - The latest developments of the International GNSS Service (IGS), from Multi-GNSS to Real-Time and access to reference frame through GNSS; the status and role of IGS from an observational basis; the GNSS Performance Monitoring IGMA-IGS joint trial project (with UNOOSA-ICG); timing via GNSS; and other services linked to geodetic reference frame determination.
- **Ms. Sharafat Gadimova: International Committee on GNSS (ICG) at UN**
Overview – the role and functions of the International Committee on Global Navigation Satellite Systems (ICG), which included the meeting activities of GNSS providers, other key members / stakeholders and the four working groups.
- **Mr. Robert Sarib: FIG Asia Pacific Capacity Development Network**
Overview – a reflection on the activities and capacity development challenges being faced by geospatial organisations in Asia and the Pacific; what action can be taken to combat the social, technical, economic and environmental trends that affect not only Datum Modernisation but also capacity development of surveyors.
- **Prof. Manabu Hashimoto: Crustal deformation modelling theory and examples**
Overview - Theory of measurements and modelling of displacements of the Earth's surface with space geodetic techniques such as GNSS and InSAR; used recent earthquakes and volcanic eruptions in Japan to demonstrate practical application of measured displacements, mechanical models and dislocation theory.
- **Mr. Basara Miyahara: Case study of Japan**
Overview – Provided insight into the implementation of the GEONET GNSS CORS network and SAR interferometry to demonstrate monitoring and modelling of crustal deformation in Japan; used recent earthquakes in Japan to show the deformation models that have been developed for both consecutive crustal deformation and co-seismic displacements.
- **Dr. Chris Crook: Case study of New Zealand**
Overview - Using the 2016 Kaikoura Earthquake in the South Island of New Zealand, the presentation explained how the deformation was incorporated into the New Zealand Geodetic Datum 2000; included the observations used, the modelling technique, and how the model is integrated into the datum as a "patch".

- **Mr. Satoshi Kawamoto: GNSS analysis software “GSLIB” for utilizing Multi-GNSS data**

Overview – a review of the “GSLIB” GNSS analysis software developed by GSI; its capability to manage / reduce the systematic biases in multi GNSS data; the software is a fork of the open-source “RTKLIB” software.

- **Dr. John LaBrecque: The promise and challenges of accurate low latency GNSS for environmental monitoring and response.**

Overview – From a GGOS perspective, examined how high rate multi- GNSS networks can support improved coastal warning of tsunamis induced by earthquakes, volcanic eruptions, severe weather and other catastrophic events.

- **Country Reports –**

- Mr. Ronaldo Gatchalian: Modernisation of the Philippine Geodetic Reference System
- Mr. Ganesh Chandra Roy: Geodetic Reference frame in Bangladesh
- Mr. Viliami Folau: Tonga’s Geodetic Infrastructure
- Mr. Asakaia Tabuabisataki: Fiji Geodetic Network

- **Sponsors Presentations**

- Mr. Neil Ashcroft: Delivering GNSS Products to End Users (Leica Geosystems)
- Mr. Kengo Okada: Recycled Stake Marker and Smart Information Marker (RIPRO)
- Mr. Masaki Miyasaka: Introduction of PASCO Corporation
- Mr. Masayuki Kanzaki: Introduction of Nikon Trimble

To review all of the presentations please navigate to websites –

http://www.fig.net/resources/proceedings/2017/2017_07_refframe_japan.asp

Summary of Discussions

After the completion of each presentation an opportunity was provided to question or comment on the presentation. A forum after the seminar proceedings was also convened to allow delegates to express additional remarks with respect to the seminar or extra comments to each presenter. The following is a summary of the discussions and highlights –

- Delegates of the seminar expressed the need for the RFIP seminars to have another dimension to its current format. For example to provide specific “operational or hands on” training on specific geodetic applications or techniques such as deformation modelling or geo-hazard management. Unfortunately organisations such as FIG and UN GGIM AP do not have the resources to perform such activities; however there are members or agencies within these networks that can provide

such specific services. It was then suggested that FIG and UN GGIM AP representatives could facilitate this activity by connecting potential training providers and the parties who require assistance. It was then further recommended that several agencies or countries work collaboratively on this so as to utilise resources more effectively and avoid duplication of effort.

- It was noted by the organisers that several countries have made progress on modernising their geospatial / geodetic infrastructure and have also leveraged support from the UN GGRF resolution. For example the endorsement of geodetic strategies and business plans, the development of GNSS CORS infrastructure, the derivation of geoid models and understanding the relationship between different height systems, financial support from donor agencies for geodetic activities, and overall better approach and management of geospatial and geodetic data.
- It was generally agreed that the next RFIP should be on the role and contribution of geodetic data and infrastructure in disaster or emergency response management, and environmental and geo-hazards monitoring. Also, that this seminar should target the attendance of decision makers or senior representatives.
- It is apparent that there is a need for more sharing of knowledge and experiences amongst agencies and countries in the region with respect to geodesy. Participating countries need to communicate / engage with each other to explore opportunities and methods to achieve this.
- Several presenters indicated that accessing and sharing geodetic data is a pathway for assisting agencies or countries to develop geospatial information related initiatives or policies such as those for disaster or emergency response programs.
- There was general consensus that the discussion on accessing and sharing geodetic needs to be re-vitalised, even though each agency or country may have differing opinions or policies on this subject.
- It was suggested that geodetic data holders have a regional / community responsibility to share or provide access to such data, especially in times of disasters or response to emergencies or catastrophic events.
- It was noted by the seminar delegates that there will be a UN GGIM AP and FIG meeting on geodetic data accessing and sharing in Kumamoto, Japan on 16 October 2017. All UN member countries are urged to participate.

Photo Gallery



To review the photos of the RFIP seminar please navigate to website – http://www.fig.net/images/conference/2017_07_refframe_japan.asp