



United Nations Involvement in Geodesy

Dr. Daniel R. Roman UN Subcommittee on Geodesy

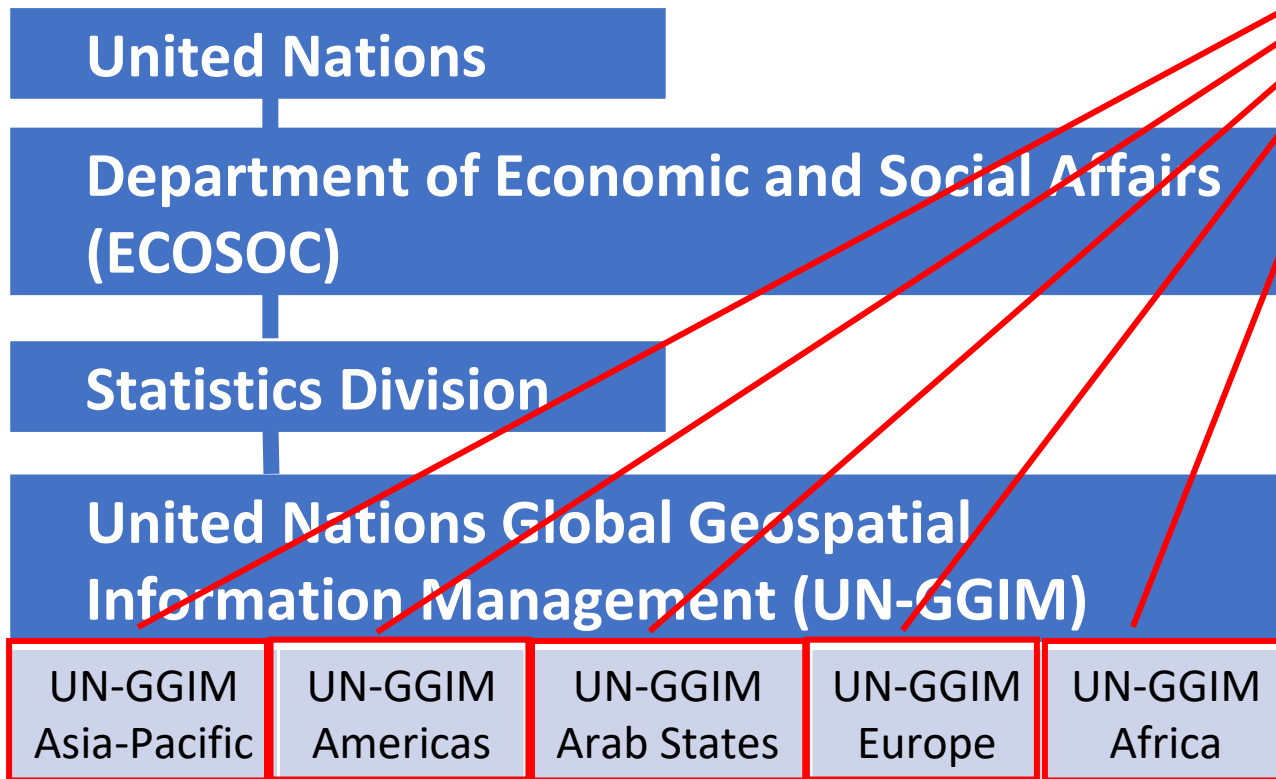


Two primary areas discussed

- United Nations committee of experts on Global Geospatial Information Management (UN-GGIM)
- *Comité de Expertos de las Naciones Unidas sobre la Gestión de la Información Geoespacial Mundial*

- International Committee on Global Navigation Satellite Systems
- *Comité Internacional de Sistemas Mundiales de Navegación por Satélite*

UN-GGIM Structure



- SubCommittee on Geodesy (UN SCoG)
- EG on Land Administration and Management
- EG on the Integration of Statistical and Geospatial Information
- WG on Development of a Statement of Shared Principles for the Management of Geospatial Information
- WG on Trends in National Institutional Arrangements in Geospatial Information Management
- WG on Geospatial Information and Services for Disasters
- WG on Global Fundamental Geospatial Data Themes
- WG on Legal and Policy Frameworks for Geospatial Information Management
- WG on Marine Geospatial Information

- Argentina: Federico Arpe
- Canada: Calvin Klatt
- Costa Rica: Álvaro Álvarez
- Jamaica: Nolan Aikens
- Mexico: Francisco Parra
- United States: Daniel Roman
- Uruguay: Juan Croquis

- **UN-GGIM adopted the GGRF – all Nations agreed to use a common reference frame, standards and practices. That obligation to adopt the GGRF passed through to the Regional Committees (RCs).**
- **The UN-SCoG is tasked with implementing the GGRF globally.**
- ***UN-GGIM adoptó el GGRF: todas las naciones acordaron utilizar un marco de referencia, estándares y prácticas comunes. Esa obligación de adoptar el GGRF pasó a los Comités Regionales (CR).***
- ***El SCoG de la ONU tiene la tarea de implementar el GGRF a nivel mundial.***



Reference Frames in Practice

UN-GGIM Sub-Committee on Geodesy: Components of the GGRF





United Nations Economic and Social Council & UN-GGIM

- UN-GGIM leads development of global geospatial information to address key global challenges.
- It provides a forum to liaise and coordinate among Member States, and between Member States and international organizations.
 - 2011/24 – ECOSOC establishes UN-GGIM as apex intergovernmental mechanism
 - 2016/27 – ECOSOC increased the mandate of UN-GGIM for coordination
 - 2022/24 – ECOSOC requested UN-GGIM focus on **SDG's and IGIF**
- UN-GGIM lidera el desarrollo de información geoespacial global para abordar desafíos globales clave.
- Proporciona un foro para el enlace y la coordinación entre los Estados miembros y entre los Estados miembros y las organizaciones internacionales.
 - 2011/24 – ECOSOC establece UN-GGIM como mecanismo intergubernamental principal
 - 2016/27 – ECOSOC aumentó el mandato de UN-GGIM para la coordinación
 - 2022/24 – ECOSOC solicitó a UN-GGIM centrarse en los **ODS y IGIF**

The 2030 Agenda for Sustainable Development

- Adopted in 2015
- Overarching principle that no one should be left behind
- 17 Sustainable Development Goals (SDGs) are highly dependent on geospatial information and enabling technologies



- *Adoptado en 2015*
- *Principio general de que nadie debe quedarse atrás*
- *17 Los Objetivos de Desarrollo Sostenible (ODS) dependen en gran medida de la información geoespacial y las tecnologías habilitadoras*

Integrated Geospatial Information Framework (IGIF)

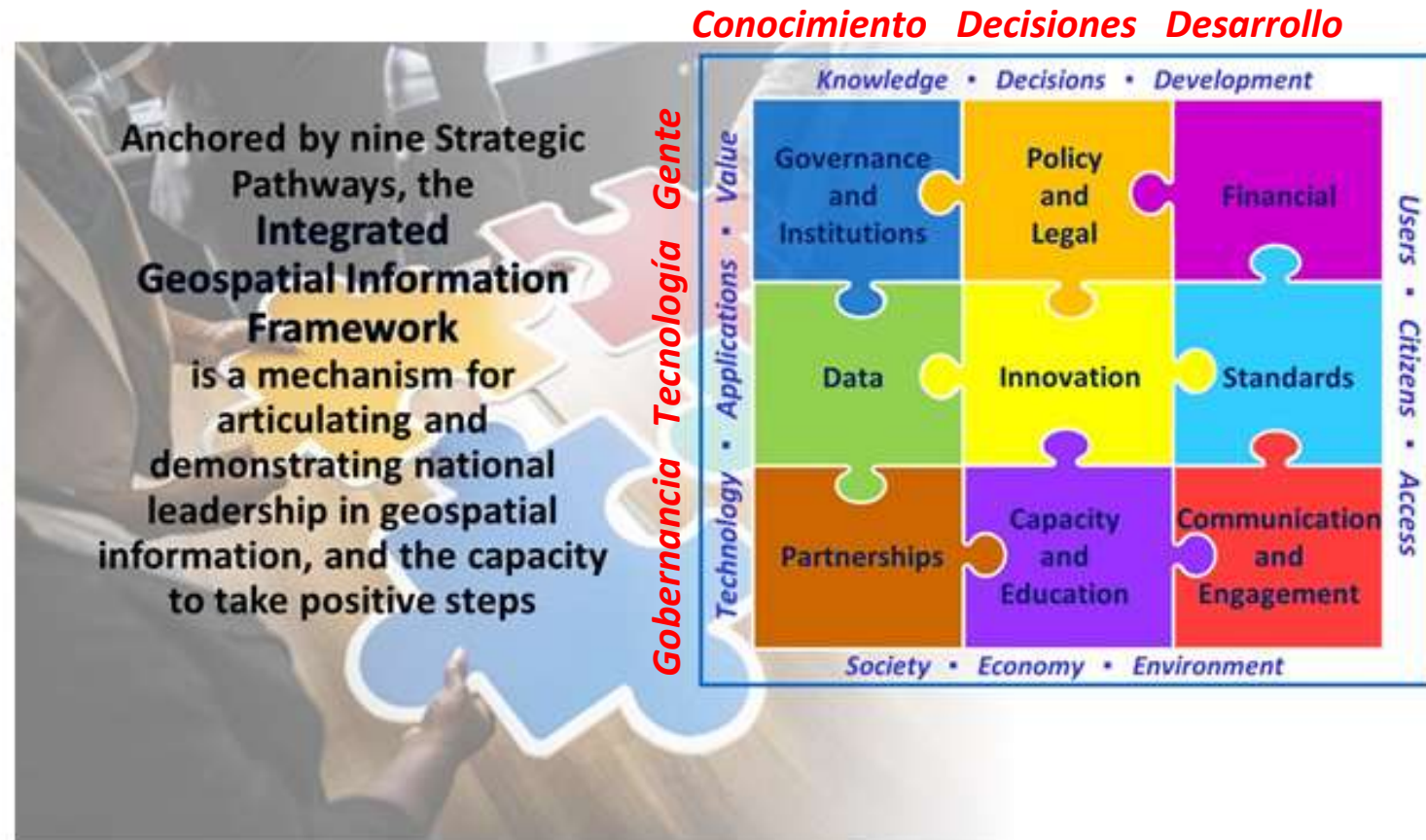
IGIF is in three parts

1. Overarching strategic framework
2. Implementation Guide
3. Country-level Action Plan
=> can be funded by World Bank

IGIF tien tres partes

1. Marco estratégico general
2. Guía de implementación
3. Plan de acción a nivel de país
=> puede ser financiado por el Banco Mundial

<https://ggim.un.org/IGIF/>



GNSS: Global Navigation Satellite Systems

• *Global Constellations*

- Global Positioning System (GPS, 24+3) of the United States
- Global'naya Navigatsionnaya Sputnikovaya Sistema (GLONASS, 24+) of the Russian Federation
- GALILEO (24+3) of the European Union
- BeiDou Navigation Satellite System (BDS, 27+3IGSO+5GEO) of China



Regional Constellations

- Indian Regional Navigation System/"Navigation with Indian constellation" (NavIC, 7) of India
- The Quasi-Zenith Satellite System (QZSS, 4+3) of Japan

ICG Providers' Forum

A venue for **coordination and cooperation** to improve overall service provision

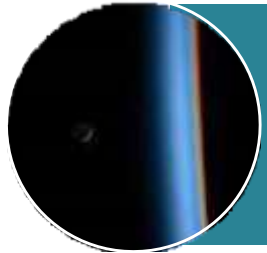
Un lugar para la **coordinación** y la **cooperación** para mejorar la prestación general de servicios



ICG: International Committee on GNSS

- Established in 2005, ICG represents a unique combination of GNSS service providers and major user groups that seek to encourage **interoperability and compatibility** among the various satellite systems
- ICG is an **important vehicle** in the multi-lateral arena, as satellite-based positioning, navigation and timing becomes more and more a **genuine multinational cooperative venture**
- **UNOOSA** serves as the **Executive Secretariat** of ICG
- Membership: 13 Members and 21 International Organizations
- Annual meetings: ICG-15 meeting in Vienna (2021), ICG-16 meeting in Abu Dhabi

UNOOSA: Supporting Member States



Capacity Builder: UNOOSA provides access to cutting edge space-data and information and builds capacity to use such data to accelerate sustainable development

Capacitación: UNOOSA brinda acceso a información y datos espaciales de vanguardia y crea capacidad para usar dichos datos para acelerar el desarrollo sostenible.



Convener: UNOOSA facilitates international cooperation among UN Member States to develop new space policy

Coordinador: UNOOSA facilita la cooperación internacional entre los Estados miembros de la ONU para desarrollar una nueva política espacial



Gateway: UNOOSA - the sole UN agency dedicated to space affairs - coordinates UN activities using space-related technology to support sustainable

Gateway: UNOOSA, la única agencia de la ONU dedicada a los asuntos espaciales, coordina las actividades de la ONU utilizando tecnología relacionada con el espacio para apoyar el desarrollo sostenible.



ICG: Working Groups

Systems, Signals and Services (USA & RF) - *Sistemas, Señales y Servicios (USA & RF):*

Compatibility and interoperability, encouraging development of complimentary systems; and Exchange information on systems and service provision plans, spectrum protection

Enhancement of GNSS Performance, New Services and Capabilities (India, China & ESA):

Mejora del rendimiento de GNSS, nuevos servicios y capacidades (India, China y ESA):

System enhancements (multipath, integrity, interference, etc.) to meet future needs, interoperable GNSS Space Service Volume, space weather

Information Dissemination and Capacity Building (UNOOSA) - *Difusión de Información y Desarrollo de Capacidades (UNOOSA):* Training/workshops, promoting scientific applications, outreach

Reference Frames, Timing and Applications (IAG, IGS & FIG) - *Marcos de referencia, tiempo y aplicaciones (IAG, IGS y FIG):* Monitoring and reference station networks, timing issues



ICG: Working Groups Activities

GNSS Interference and Spectrum Protection

- Interference Detection and Mitigation (IDM) Workshops
- Closely monitoring ITU/WRC proposals and regulations related to Radionavigation Satellite Service (RNSS) spectrum
- Spectrum Protection Educational Seminars: Focusing on the importance of protecting GNSS spectrum
 - Recommendation adopted at ICG-14 (2019) to develop a booklet – in progress

Interferencia GNSS y protección del espectro

- Talleres de Detección y Mitigación de Interferencias (IDM)
- Vigilancia estrecha de las propuestas y reglamentos de la UIT/CMR relacionados con el espectro del Servicio de Radionavegación por Satélite (RNSS)
- Seminarios educativos sobre protección del espectro: Centrándose en la importancia de proteger el espectro GNSS
 - Recomendación adoptada en ICG-14 (2019) para desarrollar un folleto – en progreso



ICG: Working Groups Activities (cont.)

Interoperability and Service Standards

- Performance Standard Template
 - An updated version 2.0 of the Performance Standard Guidelines document:
<https://www.unoosa.org/oosa/en/ourwork/icg/working-groups/s/PSindex.html>
- International GNSS Monitoring and Assessment (IGMA)
 - Joint Trial Project with IGS: to demonstrate the benefits of consolidated system products
- Interoperable Time – Focus on System Time Offsets

Interoperabilidad y Estándares de Servicio

- Plantilla estándar de rendimiento
 - Una versión 2.0 actualizada del documento Directrices del Estándar:
<https://www.unoosa.org/oosa/en/ourwork/icg/working-groups/s/PSindex.html>
- Supervisión y evaluación del GNSS internacional (IGMA)
 - Proyecto de prueba conjunto con IGS: para demostrar los beneficios de los productos del sistema consolidado
- Tiempo interoperable: enfoque en las compensaciones de tiempo del sistema



ICG: Working Groups Activities (cont.)

Space Service Volume: *Earth's Next Navigation Utility/Volumen del servicio espacial: la próxima utilidad de navegación de la Tierra*

- Technical discussions and outreach efforts continue - focused on benefits of an interoperable SSV & development of space-based user equipment: <https://www.unoosa.org/oosa/en/ourwork/icg/working-groups/s/PSindex.html>
- Video (*Co-sponsored by NASA and National Coordination Office for PNT*)
<https://www.unoosa.org/oosa/en/ourwork/icg/documents/videos.html>

Orbital Debris and Orbital De-confliction/*Desechos orbitales y eliminación de conflictos orbitales*

- Report from IADC provided to ICG on debris guidelines for MEO/IGSO satellites

Precise Point Positioning (PPP) Interoperability task force/*Grupo de trabajo de interoperabilidad de posicionamiento de punto preciso (PPP)*

A template for collecting information from service providers on the characteristics of their PPP services



Capacity Building

Regional Workshops/training on GNSS applications Talleres regionales/capacitación sobre aplicaciones GNSS

- Reinforce the exchange of information between countries and scale up the capacities in the regions for pursuing the application of GNSS solutions
- **Expert meeting, 5 – 9 December 2022, Vienna**
 - Updated knowledge on GNSS operation/applications
 - GNSS in geodesy and reference frames
 - Describe the science of Space Weather
 - Ionospheric/Space Weather research with GNSS
- **Space weather monitoring using low-cost GNSS receiver systems**
 - Develop prototype systems exploring possibilities for low-cost receiver systems use for space weather monitoring
- Reforzar el intercambio de información entre países y fortalecer las capacidades en las regiones para continuar con la aplicación de soluciones GNSS
- **Reunión de expertos, 5 a 9 de diciembre de 2022, Viena**
 - Conocimiento actualizado sobre operación/aplicaciones GNSS
 - GNSS en geodesia y marcos de referencia
 - Describir la ciencia del clima espacial.
 - Investigación ionosférica/climática espacial con GNSS
 - **Monitoreo del clima espacial utilizando sistemas receptores GNSS de bajo costo**
 - Desarrollar prototipos de sistemas que exploren las posibilidades de uso de sistemas receptores de bajo costo para el monitoreo del clima espacial

FIG/IGM-Chile Technical Seminar

Reference Frames in Practice



The screenshot shows the UNOOSA website page for the ICG. At the top, there is the UNOOSA logo and name, followed by a navigation menu with items like 'About Us', 'Our Work', 'Benefits of Space', etc. The main content area is titled 'International Committee on Global Navigation Satellite Systems (ICG)' and includes a 'MISSION STATEMENT' and a 'VISION STATEMENT'. To the right of the text is the ICG logo. A sidebar on the right contains a 'Our Work' menu with links to 'Secretariat of COPUOS', 'Programme on Space Applications', 'UN-SPIDER', 'ICG', 'UN-Space', 'Space Law', 'Topics', and 'Photo Gallery'. The 'ICG' section in the sidebar lists various sub-topics like 'Members', 'Providers Forum', 'Working Groups', etc.

WWW.UNOOSA.ORG

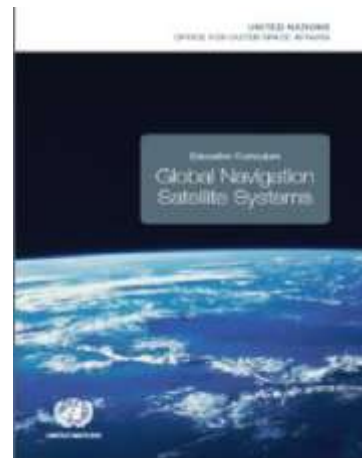
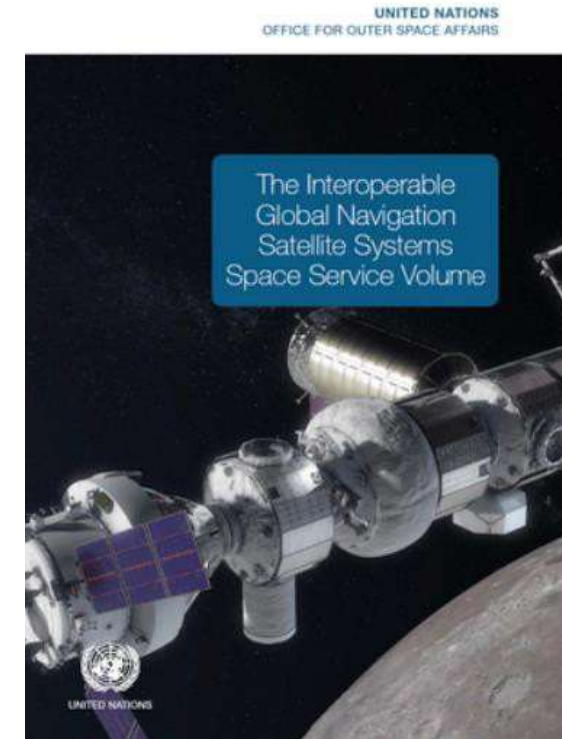
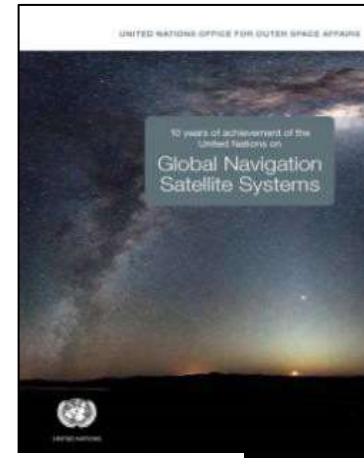
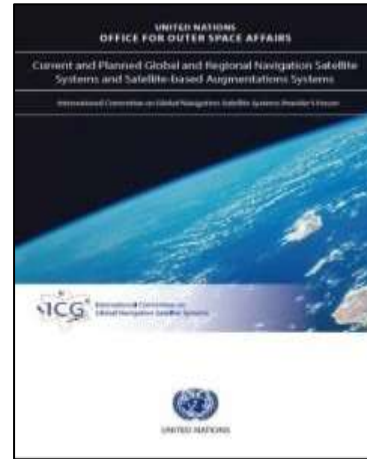
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FIG/IGM-Chile Technical Seminar

Reference Frames in Practice



Publications





Summary

- UN GGIM focuses on broader geospatial issues
 - Intergovernmental organization
 - Agreements between Nations
 - Governance focus on geodesy and surveying
 - UN-ICG coordinates GNSS
 - UN-OOSA focuses on Capacity Development
- UN GGIM se enfoca en temas geoespaciales más amplios organización
 - Intergubernamental
 - Acuerdos entre Naciones
 - Enfoque de gobernanza en geodesia y topografía
 - ONU-ICG coordina GNSS
 - ONU-OOSA se centra en el desarrollo de capacidades