



UN-GGCE International Workshop on the Integration of Terrestrial, Maritime, Built and Cadastral Domains

“Joining Land and Sea”

2 – 5 December 2024
Badan Informasi Geospasial
Bogor, Indonesia

Concept Note and Draft Provisional Agenda

Purpose of the workshop

The 2030 Agenda for Sustainable Development, adopted by all United Nations members in 2015, created 17 world Sustainable Development Goals (SDGs). These goals address global challenges, including poverty, inequality, climate change, environmental degradation, peace, and justice. Each goal has specific targets and indicators to measure progress. Key to measuring progress and achieving the SDGs requires integration across terrestrial, maritime, built and cadastral domains. For example,

- SDG 6: Clean Water Sanitation: Ensuring availability and sustainability management of water and sanitation for all.
- SDG 11: Sustainable Cities and Communities: Making cities inclusive, safe, resilient, and sustainable.
- SDG 13: Climate Action. Taking urgent action to combat climate change and its impacts.
- SDG 14: Life Below Water. Conserving and sustainably using the oceans, seas, and marine resources.

These environmental challenges threaten ecosystems, economies, and communities, necessitating urgent, coordinated action. This workshop will bring representatives from Member States around the world to answer the challenging questions, such as,

- Is the sea level rising on our coastline?
- Are land levels changing on our coastline?
- How does flooding or tsunami inundation impact the built environment of freshwater aquifers?
- Are storm surge models accurate?
- How do climate changes impact our coastal ecosystems and population centres?

Important questions such as these can only be answered by land, marine, and geodesy experts working together. For more information on the types of application this supports, please see **Annex A**.



These questions can only be answered by experts in land, marine and geodesy working together. To assist Member States to answer these questions, the United Nations Global Geodetic Centre of Excellence (UN-GGCE) is coordinating a workshop in collaboration with the Badan Informasi Geospasial (Geospatial Information Agency; BIG) in Bogor, Indonesia on joining land and sea data. This workshop will be held from 2-5 December 2024 at Novotel Bogor Golf Resort and Convention Center, Bogor, Indonesia, and is designed to address the practical challenges, share and exchange knowledge, information and experience, and provide guidance for Member State representatives.

Background

In the thirteenth session of the United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM), both the UN-GGIM Expert Group on Land Administration and Management (EG-LAM) and Working Group on Marine Geospatial Information (WG-MGI) were encouraged by Member States to collaborate on the integration of terrestrial, maritime, built and cadastral domains. Since then, the groups have worked together through several in-person and online meetings to better understand user problems and identify possible solutions.

The UN-GGCE will bring together experts from the WG-MGI, EG-LAM, UN-GGIM Subcommittee on Geodesy and International Hydrographic Organization (IHO) to assist Member States with the integration of terrestrial, maritime, built and cadastral domains including the technical complexities related to the land-sea interface.

Draft Provisional Agenda

Monday 2 December	Day 1 – Workshop Panel Session Location: Novotel Bogor Golf Resort & Convention Center
8.30 – 9.00 am	Arrival and registration
9.00 – 9.20 am	Opening The official opening session UN-GGCE International Workshop on the Integration of Terrestrial, Maritime, Built and Cadastral Domains – “Joining Land and Sea” includes welcoming remarks from the host country and the UN-GGCE. <ol style="list-style-type: none"> 1. Welcoming remarks by: <ol style="list-style-type: none"> a) Nicholas Brown (Head of Office, UN-GGCE) b) Muh Aris Marfai (Chairman of the Badan Informasi Geospasial) 2. Gift delivery - Chairman of BIG to Head of Office, UN-GGCE 3. Photo session - All participants
9.20 – 10.30 am	1st Session: Introduction and Setting the Scene Moderator: Tandang Yuliadi (Directorate for Thematic Mapping, BIG) <ol style="list-style-type: none"> 1. The importances of integration of land and sea: a case study of Indonesia [9.20 – 9.35] <i>Antonius Bambang Wijanarto (Deputy Chair of Thematic Geospatial Information, BIG)</i>





	<p>2. Taking action to address climate change and natural disasters as seen by the UN-GGIM Working Group on Marine Geospatial Information [9.40 – 9.55 am] <i>Parry Oei (Chair of the Working Group on Marine Geospatial Information)</i></p> <p>3. Problem as seen by the UN-GGIM Expert Group on Land Administration and Management [10.00 – 10.15 am] <i>Victor Khoo (Chair of the Expert Group on Land Administration and Management)</i></p> <p>Discussion [10.15 – 10.30]</p>
10.30 – 11.00 am	Morning Break
11.00 – 12.30 pm	<p>2nd Session: Exploring Case Studies Around the Globe</p> <p>Moderator: Nicholas Brown (Head of Office, UN-GGCE)</p> <ol style="list-style-type: none"> Pacific geodetic and sea level monitoring project [11.00 – 11.15 am] <i>Andrick Lal (Secretariat of the Pacific Community, Fiji)</i> Integrating land and sea for spatial planning in coastal area: a case study of Indonesia [11.20 – 11.35 am] <i>Virgo Eresta Jaya (Director General, Surveying and Mapping of Ministry of Agrarian Affairs and Spatial Planning/National Land Agency, Indonesia)</i> Philippines case study [11.40 am– 11.55 am] <i>Charisma Victoria de la Cruz-Cayapan (Engineer, National Mapping and Resource Information Authority)</i> Sea level rise and land subsidence monitoring in Indonesia [12.00 – 12.15 pm] <i>Bayu Triyogo Widyantoro (Act. Director, Directorate of Geospatial Reference System, BIG)</i> <p>Discussion [12.20 – 12.30 pm]</p>
12.30 – 1.30 pm	Lunch Break
1.30 – 3.30 pm	<p>3rd Session: Joining Land and Sea using the geoid</p> <p>Chair: Nicholas Brown (Head of Office, UN-GGCE) [1.30 – 2.00 pm]</p> <ul style="list-style-type: none"> Introduction to geometric heights and physical heights How geometric heights and physical heights are measured How to convert between geometric and physical heights What is the geoid? How the geoid can join land and sea <p><i>Nicholas Brown (Head of Office, UN-GGCE)</i></p> <ol style="list-style-type: none"> The New Zealand Joining Land and Sea Project [2.00 – 2.30 pm] <i>Nic Donnelly (Geodetic Surveyor for Land Information New Zealand)</i>





	<p>2. Joining land and sea: The Indonesian Digital Elevation Model (DEM) [2.30 – 2.45 pm] <i>Ibnu Sofian (Deputy Chair of Infrastructure of Geospatial Information, BIG)</i></p> <p>3. Realizing a single vertical reference system in archipelago country [2.45 – 3.00 pm] <i>Leni Sophia Heliani (Universitas Gadjah Mada, Indonesia)</i></p> <p>Discussion [3.00 – 3.30 pm]</p>
3.30 – 4.00 pm	Afternoon Break
4.00 – 5.00 pm	<p>4th Session: Summary and discussion</p> <p>Moderator: Nicholas Brown (Head of Office, UN-GGCE)</p> <ul style="list-style-type: none"> • Open discussion on: <ul style="list-style-type: none"> ○ Joining land and sea projects from other parts of the world ○ Useful examples noted today which could be used by other countries ○ Lessons learned from countries ○ Tools, products or guidance material which would be helpful for countries
7.00 – 9.00 pm	<p>Group Dinner at Hotel</p> <p>Indonesian culinary and traditional performances & entertainment.</p>
Tuesday 3 December	Day 2 – Workshop Panel Session Location: Novotel Bogor Golf Resort & Convention Center
8.30 – 9.00 am	Arrival and registration
9.00 – 10.30 am	<p>5th Session: Challenges and Issues</p> <p>Moderator: Mr. Victor Khoo (Chair of the Expert Group on Land Administration and Management)</p> <ol style="list-style-type: none"> 1. USA challenges in joining land and sea [9.00 – 9.15 am] <i>Dan Roman (The National Geodetic Survey, USA)</i> 2. How Australia overcome challenges to create seamless national scale topobathy surface [9.20 – 9.35 am] <i>Matthew Ellis (Geoscience Australia)</i> 3. How Japan COULD join land and sea data [9.40 – 9.55 am] <i>Basara Miyahara (UN-GGIM AP Working Group on Geodetic Reference Frame)</i> 4. Challenges & issue in developing tsunami model: a case study in Indonesia [10.00 – 10.15 am] <i>Weniza (Head, Division of Early Warning Tsunami, Meteorological, Climatological, and Geophysical Agency, Indonesia)</i>





	Discussion [10.20 – 10.30 am]
10.30 – 11.00 am	Morning Break
11.00 – 12.30 pm	<p>3rd Session: Standards, Polices and Legal</p> <p>Moderator: Mr. Parry Oei</p> <ol style="list-style-type: none"> Standards considerations for Member States [11.00 – 11.15 am] <i>Dan Roman (The National Geodetic Survey, USA)</i> The national regulation for the integration of land and sea: a case of Indonesia [11.20 – 11.35 am] <i>Moh. Arief Syafi'i (Deputy Chair of Basic Geospatial Information, BIG)</i> Joining Land and Sea: Implications under a Law of the Sea Perspective [11.40 – 11.55 am] <i>Ilaria Tani (Adjunct Professor of International Law of the Sea, Universitia degli Studi di Milano-Bicocca)</i> <p>Discussion [12.00 – 12.30 pm]</p>
12.30 – 2.00 pm	Lunch Break
2.00 – 3.30 pm	<p>7th Session: Geoid and Sea Level Modelling</p> <p>Moderator: Khafid (Director, Directorate of Boundary Mapping and Geographical Names, BIG)</p> <ol style="list-style-type: none"> Australian geoid models [2.00 – 2.15 pm] <i>Anna Riddell (Geoscience Australia)</i> The Indonesian geoid model development [2.20 – 2.35 pm] <i>Dudy Darmawan Wijaya (Institut Teknologi Bandung, Indonesia)</i> Sea level model development [2.40 – 2.55 pm] <i>Masanao Sumiyoshi (IHO)</i> The Indonesian tidal model development [3.00 – 3.15 pm] <i>Wiwin Windupranata (Institut Teknologi Bandung, BIG)</i> <p>Discussion [3.20 – 3.30 pm]</p>
3.30 – 4.00 pm	Afternoon Tea
4.00 – 4.40 pm	<p>8th Session: Advancing Geodesy for Coastal Protection</p> <p>Moderator: Evert Mulder (Geomatics Manager, Geodesy & National Mapping, Singapore Land Authority)</p> <ol style="list-style-type: none"> Geodetic Infrastructure and Procedures for Vertical Land Motion and Sea Level Rise Monitoring: Current Capabilities in the Netherlands, Singapore, and Indonesia – by <i>Alex Lăpădat (Mathematical Geodesy & Positioning group, TU Delft, NL)</i>



	<ol style="list-style-type: none"> 2. Joining Land and Sea using the Global Navigation Satellite System (GNSS) – by <i>Dr Feng Lujia (The Earth Observatory of Singapore, NTU, SG)</i> 3. Gathering and using data in Singapore for inter-tidal flood models – datums, models and resolution - by <i>Dr Ooi Seng Keat (Tropical Marine Science Institute, NUS, SG)</i>
6.30 – 7.00 pm	Mobilization to Grand Garden Café & Resto, Bogor Botanical Garden (by invitation only)
7.00 – 9.00 pm	Group Dinner at Grand Garden Café & Resto, Bogor Botanical Garden
Wednesday 4 December	Day 3 – Technical Visit Location: BIG office, Mangrove Ecotourism Centre, Old City of Jakarta and Bandar Djakarta
8.00 – 9.00 am	Arrival and registration
9.00 – 9.30 am	Mobilization to Badan Informasi Geospasial (BIG)
9.30 – 11.00 am	<p>9th Session: Technical visit to BIG office</p> <p>Tour leader: Teguh Fayakun Alif (Directorate of Geospatial Reference System, BIG)</p> <ol style="list-style-type: none"> 1) Welcoming remarks and presentation [9.30 – 10.15 am] Venue: Ballroom of BIG <p><i>Belinda Arunarwati Margono (Principal Secretary, Badan Informasi Geospasial)</i> <i>Bayu Triyogo (Act. Director, Directorate of Geospatial Reference Systems, BIG)</i></p> <ol style="list-style-type: none"> 2) Technical visit to Geodetic Processing Centre of BIG [10.15 – 11.00 am] <p>Venue: Directorate of Geospatial Reference System (DSRG), BIG</p>
11.00 – 12.30 am	Mobilization to Mangrove Ecotourism Center “Taman Wisata Alam Mangrove Angke Kapuk”
12.30 – 02.00 pm	Lunch Break
2.00 – 5.00 pm	<p>10th Session: City tour to Jakarta</p> <p>Tour leader: Teguh Fayakun Alif (Directorate of Geospatial Reference System, BIG)</p> <ol style="list-style-type: none"> 1) Area 1: Mangrove Ecotourism Center “Taman Wisata Alam Mangrove Angke Kapuk” [2.00 – 3.30 pm] <i>Planting mangrove</i> 2) Area 2: Old city of Jakarta [3.30 – 5.00 pm] <i>Tour “Batavia en Omstreken” including land subsidence monument</i>
5.00 – 8.00 pm	Dinner at Bandar Djakarta Restaurant, Ancol, Jakarta



8.00 – 9.30 pm	Mobilization to Hotel
Thursday 5 December	Day 4 – Closing Ceremony Location: Novotel Bogor Golf Resort & Convention Center
8.30 – 9.00 am	Arrival and registration
9.00 – 10.30 am	Summary and next steps Chair: Antonius Bambang Wijanarto (President, UN-GGIM AP) <ul style="list-style-type: none"> Proposed geodesy additions to Framework for Effective Land Administration (FELA) and Integrated Geospatial Information Framework-Hydro (IGIF-H). Discussion on future collaboration Discussion on other tools or products to assist countries Discussion on a framework for practical guidance on integrating land and sea data.
10.30 – 11.00 am	Morning Tea
11.00 – 12.00 am	Closing ceremony <ol style="list-style-type: none"> Closing statement <i>Nicholas Brown (Head of Office, UN-GGCE)</i> Closing remarks <i>Antonius Bambang Wijanarto (President, UN-GGIM AP)</i>
12.00 – 2.00 pm	Lunch & gathering
Friday 6 December	Day 5 - Departure of participants
6.00 – 12.00 pm	Check out hotel

Participation

The workshop is an in-person meeting for Member States.

Some participants from Member States will have their travel and per diem costs paid for by the UN-GGCE. These participants will be contacted by the UN-GGCE. All other participants will be required to pay for their own travel and per diem costs.

All participants and observers are responsible for their own local logistics, accommodation arrangements, and related expenditures.

All participants and observers are responsible for their entry into Indonesia including necessary visa and travel insurance as applicable.



Registration

All invited members, participants, and observers must confirm and register their attendance by email to Walaa Allahham (email: walaa.allahham@un.org) as soon as possible, latest by **Monday 14 October 2024**. This is necessary to facilitate any requirements of security and grounds pass into the Badan Informasi Geospasial and around.

Organizers

The workshop is organized by the Badan Informasi Geospasial, Indonesia, a member of the United Nations Global Geodetic Centre of Excellence (UN-GGCE) at the Badan Informasi Geospasial, Bogor Indonesia.

Language

The workshop will be conducted in English only.

Meeting Venue

The workshop will be held at the Novotel Bogor Golf Resort & Convention Center and Badan Informasi Geospasial.

Logistical Information

A separate logistical information note will be made available after the issuance of this Concept Note.

Health and Safety

The workshop will adopt protocols in line with local and international standards.

Points of Contact

For local arrangements, logistics, and information:

Yudith Octora
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For administrative matters and meeting arrangements:

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Annex A: Examples of the need to Join Land and Sea data

The integration of land and sea data and geospatial information into a unified geodetic reference framework represents a critical advancement in understanding and addressing environmental challenges such as sea level rise, land level changes, flooding, tsunamis, storm surges, and the broader impacts of climate change on coastal ecosystems and population centers. This approach offers a comprehensive perspective that enhances predictive capabilities, informs policymaking, and supports sustainable development.

Sea level rise

Sea level rise, driven by climate change, poses significant threats to coastal areas worldwide. Traditional sea level monitoring methods, which often rely on isolated tide gauges, provide limited spatial coverage. By integrating satellite altimetry with terrestrial data, a unified geodetic framework allows for precise monitoring of sea level changes across vast regions. This integration facilitates the development of accurate models that predict future sea level trends, enabling governments and communities to implement effective mitigation and adaptation strategies.

Land level change

Land level changes, including subsidence and uplift, are critical factors in coastal dynamics. These changes can result from natural processes such as tectonic activity, or human activities like groundwater extraction. A single geodetic reference framework that combines terrestrial and marine data provides a comprehensive view of these vertical land movements. High-resolution GNSS (Global Navigation Satellite System) data, combined with InSAR (Interferometric Synthetic Aperture Radar) techniques, enable precise measurements of land level changes. Understanding these dynamics is essential for assessing flood risk, designing infrastructure, and planning urban development in coastal areas.

Impact of flooding and tsunami

Flooding and tsunamis are catastrophic events that can cause widespread devastation in coastal regions. Accurate prediction and assessment of these events require detailed geospatial information. Integrating bathymetric data (underwater topography) with terrestrial elevation models within a unified geodetic framework enhances the accuracy of flood and tsunami models. This integration allows for the simulation of water movement and the assessment of potential impact zones, improving early warning systems and disaster preparedness. Furthermore, it supports the design of resilient infrastructure and effective evacuation plans.

Storm surge model



Storm surges, often associated with tropical cyclones and hurricanes, are a major threat to coastal communities. The ability to predict storm surge heights and their inland penetration is crucial for minimizing damage and protecting lives. A unified geodetic reference framework that incorporates meteorological data, oceanographic measurements, and coastal topography can significantly improve storm surge models. These enhanced models provide more accurate forecasts, enabling timely and informed decision-making by emergency services and local authorities.

Impact of climate change on coastal ecosystems and population centres

Climate change exerts profound effects on coastal ecosystems and population centers. Rising temperatures, altered precipitation patterns, and increased storm intensity threaten biodiversity, food security, and human settlements. A holistic understanding of these impacts requires the integration of diverse data sources. Combining land and marine data within a single geodetic framework facilitates the analysis of ecosystem health, land use changes, and population dynamics. This integrated approach supports the development of adaptive management strategies that balance ecological preservation with socio-economic development.

Technological advancements and data integration

Advancements in geospatial technologies, including remote sensing, GNSS, and GIS (Geographic Information Systems), have made it possible to integrate diverse datasets into a cohesive geodetic framework. Satellite missions such as Sentinel-1 and Jason-3 provide high-resolution data on sea level, land movements, and atmospheric conditions. Coupled with ground-based measurements from GNSS stations and tide gauges, these technologies offer a robust foundation for a unified reference system. The use of cloud computing and big data analytics further enhances the capacity to process and analyze large volumes of geospatial data, facilitating real-time monitoring and decision-making.

Policy implications and stakeholder engagement

Implementing a unified geodetic reference framework necessitates collaboration among multiple stakeholders, including government agencies, scientific institutions, and local communities. Policymakers must prioritize developing and maintaining this framework to ensure its effectiveness in addressing coastal challenges. Engaging stakeholders in the data collection and analysis process fosters a sense of ownership and encourages the adoption of evidence-based policies. Furthermore, international cooperation is essential for addressing transboundary issues and sharing best practices.

Integrating land and marine data and geospatial information into a single geodetic reference framework is pivotal for addressing the multifaceted challenges posed by sea level rise, land level changes, flooding, tsunamis, storm surges, and climate change. This comprehensive approach enhances predictive capabilities, informs policymaking, and supports sustainable development. By leveraging technological advancements and fostering stakeholder collaboration, we can build resilient coastal communities and protect vital ecosystems for future generations.