Report to the 47th General Assembly
FIG Working Week 2024, Accra, Ghana

FIG Commission 4 - Hydrography

Report of Activities 2023-2024

1. General

Commission 4 supports for all aspects of the Hydrographic Surveying profession including, but not limited to promotion of hydrographic education, training and continuing professional development, review and update of standards and guidelines, blue surveying and hydrospatial data management, and climate change and its adaptation. There are five (05) Working Groups under Commission 4 for the term of 2023-2026.

2. Working Groups

2.1 WG 4.1 - Hydrographic Standards and Guidelines.

In 2023, FIG Working Group 4.1 embarked on several initiatives aimed at improving the integrity of hydrographic data products. Key highlights from the year's activities include;

Support and feedback on Adoption of Bathymetric Attributed Grid (BAG) as an OGC Standard: A significant focus of the group's efforts centered on advocating for the use of open standards for the collection and dissemination of hydrographic data sets. The working group has closely followed the updated Bathymetry Attributed Grid (BAG) library release and progress of the adoption of BAG as an Open Geospatial Consortium (OGC) data standard. Gathering feedback from stakeholders, the Working Group provided input and comment to the Open Navigation Surface Working Group (ONSWG) into the benefits and practical implications of BAG optional layer implementations and digital signing methodologies. This advocacy is aimed at improving data interoperability and enhancing the accessibility, usability and assurance of bathymetric information across a diverse range of applications.

Redundant data processing guideline: The working group has approval to prepare a new guideline for processing redundant data. The content of this new guideline will depend somewhat on the OGC BAG adoption, as a key output of redundant data processing techniques is a coherent bathymetric surface. The working group has received offers of support by several surveyors to assist with the development of this guideline in due course.

2.2 WG 4.2– Sustainable Oceans and Hydrography.

The Working Group 4.2 seeks to promote and engage with international government and non-governmental organisations to increase the understanding and awareness of the importance of the marine and ocean areas. There are several formal project planning tools and a further area to develop with the use of a formal standardised tool to identify the benefits and outcomes of Hydrographic related projects across the broader socio-economic and regional communities. Not just the entity that may have applied to undertake some works. Mean time WG 4.2 is representing the IBSC sessions and developing a methodology to quantify the carbon foot printing of the hydrographic data.

2.3 WG 4.3– Mapping the Plastic.

The Working Group 4.3, has developed a world-leading solution to accurately map and classify floating plastic and land based plastic waste. Deep learning algorithms distinguish and classify plastic waste from surrounding litter/debris classes from UAV orthophotos and multi-spectral images enabling near real time identification of plastic debris as small as 1 cm^2 in area.

The WG 4.3's focus on last year has been on education, raising awareness, securing funding and refining our solution. Through our relationship with Australia's Commonwealth Scientific and Industrial Research Organization (CSIRO) Marine Debris Research Team, a trial of our system was organised in Hobart, Tasmania. The objective was to compare our solution with their conventional beach survey methodology by surveying a series of locations previously surveyed by CSIRO around Hobart and comparing results. Funding was secured by a grant from the FIG Foundation to undertake the trial, which, unfortunately, was cancelled due to CSIRO's competing work commitments. Instead, we were invited to participate in a plastics survey CSIRO's Marine Debris Team undertook along the Hau River in Can Tho in Vietnam's southern Mekong Delta region with Vietnam's Ministry of Natural Resources and Environment (MONRE). We were unable to participate due to problems importing a UAV into the country and gaining consent for UAV operations in the area. Although disappointing, we learned a valuable lesson and in future will source (suitably spec'd) UAV's and pilots locally. MONRE has recognised the usefulness of our solution however, and we have been invited to participate in a large plastics survey being undertaking in the Red River Delta in the north of Vietnam in November, subject to funding.

Meantime, some work is underway in Ghana and Sri Lanka to map plastic waste 'hotspot areas' by students from the University of Mines and Technology, Ghana, and Sabaragamuwa University of Sri Lanka. The data is being processed via our on-line portal and the results will be presented at the Ghana working Week in May. Prior to the start of the Working Week we will be meeting the Ghanaian Minister for the Environment, Science, Technology and Innovation and MESTI staff to present the survey results and discuss how our solution can assist their work in this area. We will also be meeting other government agencies, academic institutions and interested groups in Accra

to discuss/demonstrate our work and its local application. In recognition of her outstanding research work and to secure funding for our ongoing work, Gordana has been nominated for an 'Earthshot' prize. We are yet to hear the outcome of their deliberations.

2.4 WG 4.4– Hydrospatial Domain and Marine Administration.

The FIG Working Group 4.4 on Hydrospatial and Marine Administration recognizes the pressing need for efficient management strategies in marine environments to ensure sustainable development and environmental preservation. With the increasing significance of hydrography in serving the growing blue economy, there arises a need for an expanded role, transitioning from simple hydrographic data to complex hydrospatial information capable of multidimensional analysis and evidence-based decision-making. The working group acknowledges the importance of hydrospatial data management and marine administration in achieving sustainable development goals, marine conservation, and promoting blue economy initiatives.

Throughout the year, the working group has been actively engaged in various initiatives aimed at advancing hydrospatial data management and marine administration. Through collaboration, innovation, and advocacy efforts, the working group endeavors to address the challenges and opportunities in these domains. One significant event was the participation of WG 4.4 in Geo Connect Asia 2024 held on 6-7 March 2024 in Marina Bay Sands, Singapore. Dr. M.D.E.K. Gunathilaka, Dr. Kelvin Tang Kang Wee, and Mr. Danis Hains were invited to present and join panel discussions. This provided an excellent opportunity for the working group to showcase our efforts, exchange ideas, and establish collaborations with other organizations.

2.5 WG 4.5– Climate Change Induced Sea Level Rise and Adaptation.

This is a new working group established with the current work plan 2023-2026 and closely working with the FIG YSN and CCTF. During the past year the WG has fine-tuned their scope and started some initial work related to the following aspects;

- Review of existing practices, tools and techniques to monitor and analyse sea level rise and associated issues.
- Identify existing, and further develop best practice, tools and capacity related to the quantification and analysis of climate change consequences such as mean sea level (MSL), local/regional relative sea level rise estimation and coastal inundation.
- Support multidisciplinary collaboration between surveying, geospatial sciences, hydrography and oceanography.

The working group is working on establishing regional capacity development workshops on Climate Change induced sea level rise and adaptation.

3. Cooperation

The Working Group 4.1 members participated in several Commission 4 activities, including the provision of input for the UN-GGIM IGIF-Hydro framework release, and occasional meetings of the FIG Standards Network, including further outreach to build awareness of commission 4 as an interested party to several standards that are monitored by the Standards Network, from hydrographic specific standards, to ISO and other standards related to peripheral survey disciplines and measurement processes, certification of testers, and other data transfer schemes. Further, Commission 4 represents FIG in the International Board on Standards of Competence for Hydrographic Surveyors and Nautical Cartographers (IBSC) and working closely with the other sister organizations such as International Hydrographic Organization (IHO).

4. Events

Commission 4 officers attended number of events and occasions in various parts of the world representing FIG during the past year. Through attendance in workshops, webinars and participation in global conferences, the working group continues to foster dialogue and knowledge exchange around emerging issues in the practice of hydrography, and the impact of these issues on hydrospatial domain.

The annual International Federation of Hydrographic Societies was organized by the Italian Hydrographic Society in Genoa, Italy from November 7-9, 2023. Three members of the FIG Commission 4, Tanja Dufek, Gordon Johnston and Denis Hains, attended the event and promoted the FIG in the poster area. Tanja made a technical presentation on “Exploration of hydrothermal venting sites and sulphide deposits using deep-towed multi-beam echo sounder data”, while Gordon as FIG member on the FIG/IHO/ICA International Board on Standards of Competence for Hydrographic Surveyors and Nautical Cartographers (IBSC) had strategically networked with many participants; Denis presented a Keynote Address on “Citizen Hydrospatial Sciences”, on “The Nippon Foundation-GEBCO, Seabed 2030”, and also chaired a technical session.

Further, the working group 4.1 will be represented by Denis Hains during the Canadian Hydrographic Conference in May, which will include Denis' attendance at the final meeting of the ONSWG prior to the conclusion of the OGC standard adoption process. FIG will have two agenda items at this meeting related to reference implementation standardisation concerning optional data layers, and the restoration of digital signing capability to assure products prepared and delivered in using BAG format. This is important advocacy, as BAG is presently the only open surface format built specifically to represent key hydrographic information, and its broad adoption will improve access to hydrospatial data in a number of ways.

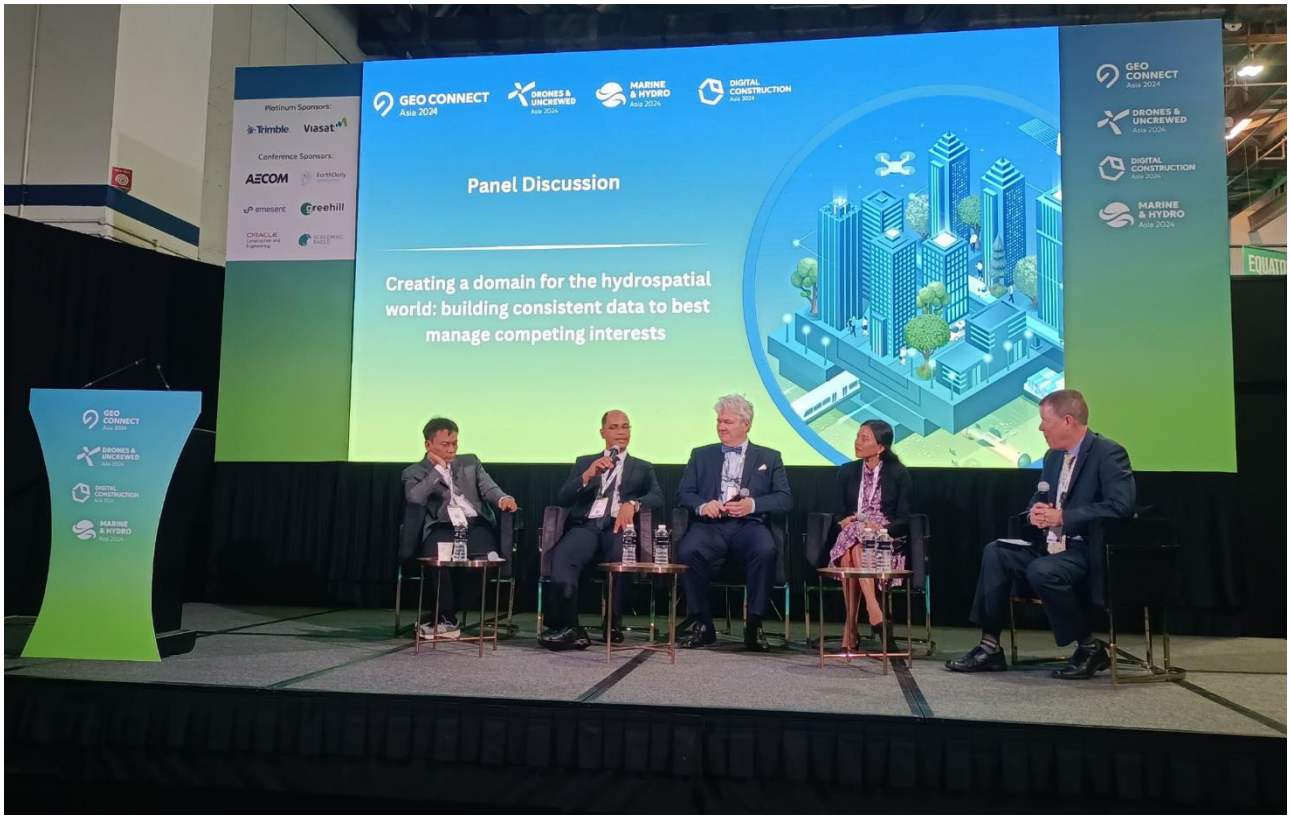
5. Communication and publications

WG 4.3 chair presented the work of the Mapping the Plastics working group to the Young Surveyors, the Blue Economy session, the FIG Foundation and informally at the Orlando Working Week. One of the consequences has been invitations to Gordana and him to join the newly formed Climate Compass Task Force as foundation leadership members. A joint mapping the Plastic presentation was given as part of CCTF online seminar (02) held in November 2023.

Further, the commission chair, Dr. Gunathilaka represented the WG4.5 in an online seminar "Regionally Relevant Case Studies Showing Opportunities and Gaps for Surveying & Climate", organized by the FIG Climate Compass Task Force on 20th February 2024. There, he made a presentation on 'Sri Lanka's Nationally Determined Contributions (NDCs) related to the Paris Agreement and contributions that we can make as surveyors in realizing them and some challenges associated with it' and followed by a 3 hours panel discussion.

6. Other highlights

WG 4.4 participated in Geo Connect Asia 2024 on 6-7 March 2024 in Marina Bay Sands, Singapore. Dr. M.D.E.K. Gunathilaka, Dr. Kelvin Tang Kang Wee, and Mr. Danis Hains were invited to join the presentation session and panel discussions. It provided opportunities for the WG 4.4 to showcase the work of the working group, exchange ideas with peers, and establish collaborations with other organizations. Besides that, the discussion also focused on the latest advanced technologies to assist in the collection of marine data to improve decision-making. In the search for a better understanding of the hydrospatial dynamics between land and ocean opportunities via satellites and drones to ROVs and autonomous vehicles, mapping-based solutions can now be supported by AI and robotics to track changes and predict future behavior. There, two panel discussions were held; "Creating a Domain for the Hydrospatial World: building consistent data to best manage competing interests" and "Applying New Technologies to Build a Hydrospatial Universe". Discussions focused on developing policies and best practices for hydrospatial data exchange and management, as well as leveraging advanced technologies for improved decision-making in marine environments.


GEO CONNECT Asia 2024
DRONES & UNCREWED Asia 2024
MARINE & HYDRO Asia 2024
DIGITAL CONSTRUCTION Asia 2024
Panel Discussion
Creating a domain for the hydrospatial world: building consistent data to best manage competing interests
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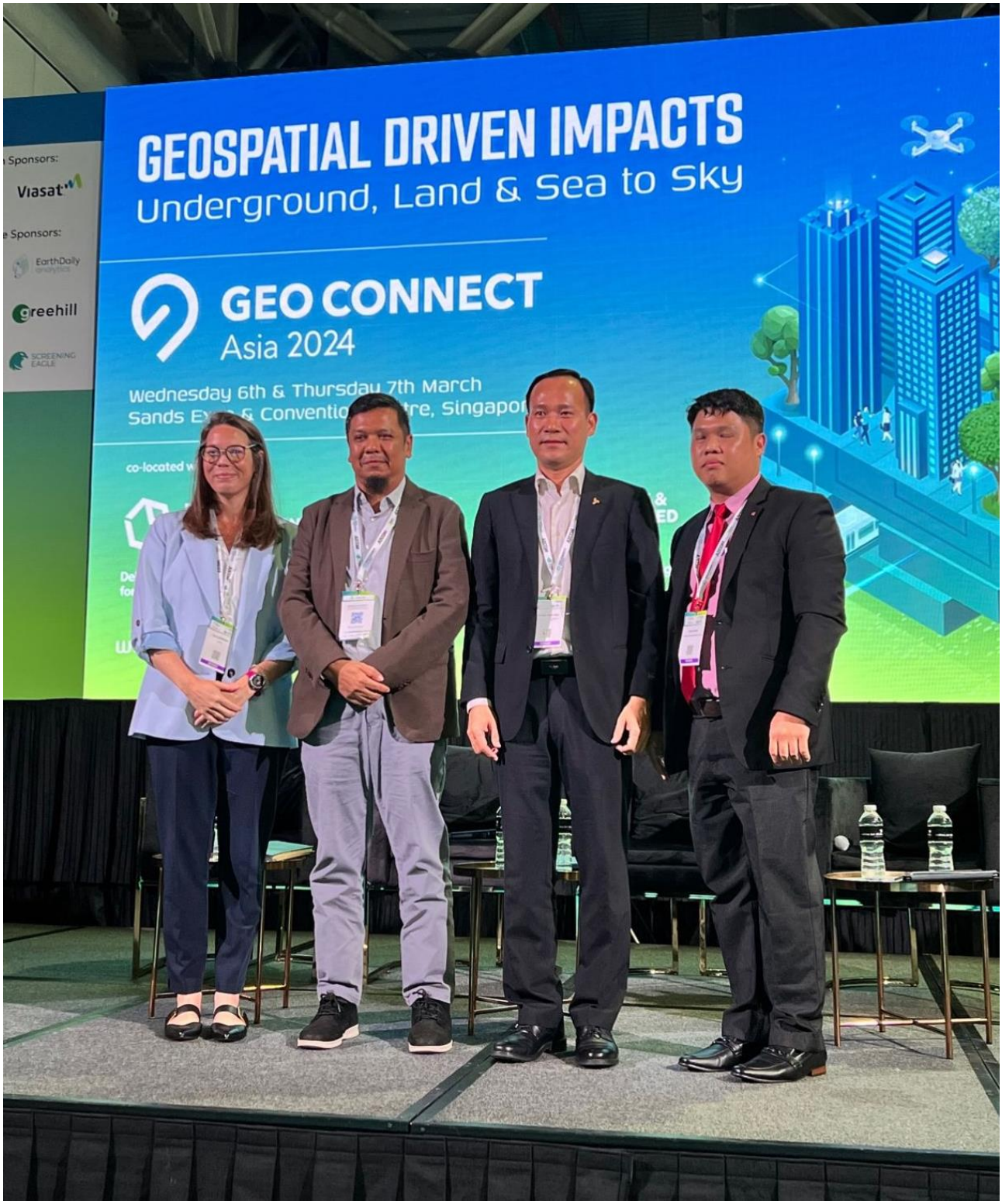
GEOSPATIAL DRIVEN IMPACTS
Underground, Land & Sea to Sky
GEO CONNECT
Asia 2024
Wednesday 6th & Thursday 7th March
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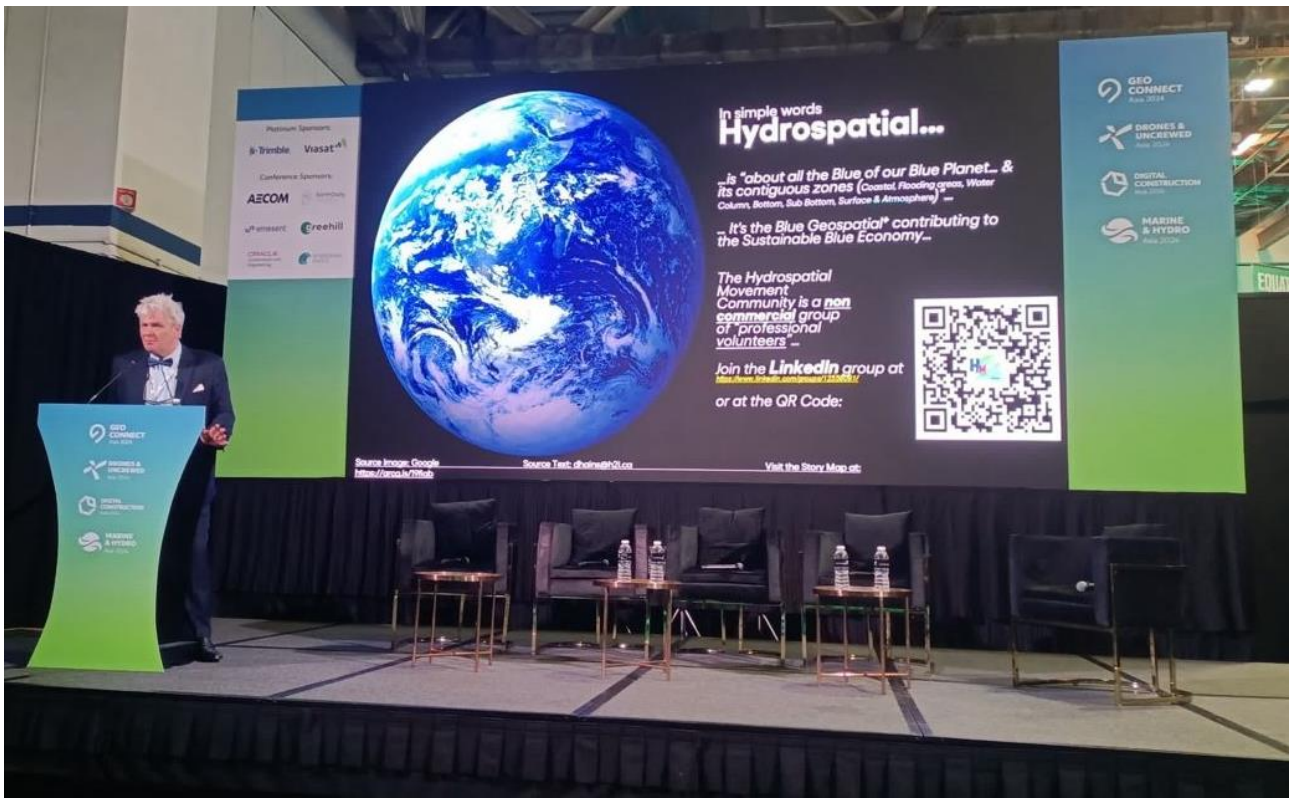
SCREENING EAGLE



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Chair- FIG Commission 4
March 2024