

Report to the General Assembly FIG e-Working Week 2021

FIG Commission 4 - Hydrography

Report of Activities 2020_21

1. General

Altogether there are four (4) Working Groups for Commission 4 as listed below:

- a) WG 4.1 – Standards and Guidelines for Hydrography
- b) WG 4.2 – Blue Growth & UN Sustainable Development Goal 14
- c) WG 4.3 – Mapping the Plactic
- d) WG 4.4 – Marine Development and Administration

2. Working Groups

2.1 WG 4.1 – Standards and Guidelines for Hydrography

The new Chair of this WG 4.1 is Mr. Geoff Lawes. He took over from Mr. Neil Hewitt in November 2020 because Mr. Neil Hewitt took on the role as SSSI Hydro Commission Chair.

The Chair is a member on the HSPT working group for the review of IHO S-44 and has been include on all correspondence for the review of this document. This involved the review and comment on IHO S-44 update. In September 2020, IHO published the 6th edition of the IHO Standards for Hydrographic Surveys.

The work of the International Board on the Standards of Competence for Hydrographic Surveyors and Nautical Cartographers (IBSC) meets annually to both review submissions from academic and naval institutions. The ten Board members are distributed worldwide so the only practical way to review and maintain the course submissions and the Standards involves a two-week annual Board meeting plus the inter-sessional reviews of some 16-18 courses. Last year, the meeting was held at Cartagena de Indias, Colombia from 9 March to 20 March 2020. FIG Commission 4 is represented by four (4) members: Mr. Gordon Johnston (United Kingdom), Mr. Adam Greenland (New Zealand), Mr. Sobri Syawie (Indonesia) and a new FIG member to the Board, Prof. Dr. Harald Sternberg (Germany). This year, the IBSC meeting will be conducted via VTC from 19 April to 30 April 2021.

2.2 WG 4.2 – Blue Growth & UN Sustainable Development Goal 14

In the last year very little has been completed due to the impact of the Pandemic on the events and potential work related activities. The existing WG that concerns itself with the Blue Economy and the UN SDG 14 in relation to our oceans has maintain a networking activity with numerous webinars and virtual meetings.

Dialogue with the UN-GGIM experts to enable the Commission 4 SME's on the Marine Geospatial theme has been established and it remains now to work with the FIG President's office to secure routine involvement and inclusion on the UN-GGIM Working Group on Marine Geospatial Information.

One notable success for the Commission 4 WG was to lead the creation of an Atlantic Mapping Roadmap or vision statement.

The Vision Statement arises from the activities of the Atlantic Seabed Mapping International Work Group (also known as the AORA Seabed Mapping Working Group), conducted through the Atlantic Ocean Research Alliance (AORA) between Canada, the European Union and the United States of America. The progress and vision towards achieving a baseline seabed and habitat map of the Atlantic Ocean, was presented at the All Atlantic Ocean Research Forum, 6-7 February, 2020, in Brussels, Belgium in support of the Atlantic Ocean Research Alliance in connection with the Galway Statement (Canada, EU & USA are signatories).

The roadmap, published by the Marine Institute Ireland can be downloaded from here: <https://oar.marine.ie/handle/10793/1596>

Looking forward there are tentative plans being made for face to face events, including Hydro '21 in Cork Ireland as well as possible Atlantic Mapping work Group meeting and Blue Economy events.

2.3 WG 4.3 – Mapping the Plastic (Joint Commission 4 and Young Surveyors Network)

Millions of tonnes of plastic waste end up in our oceans every year and constitutes an environmental problem of global proportions with hugely significant negative impacts. Most plastic is not biodegradable and over time breaks down to microplastics, thereby exacerbating the problem.

Rivers are a significant enabler of the plastic ending up in the world's oceans. The UN Environment Programme (UNEP) estimates that just ten major river systems carry more than 80% of the plastic waste that ends up in the Earth's oceans,

The lack of a means to analyse the spatial and temporal extent and quantum of plastic waste at specific 'hot spot' locations, or on a regional or global level and the tools for ongoing monitoring is a significant obstacle to eradicating plastic waste from waterways.

Working Group 4.3, a joint Commission 4 and Young Surveyors Network undertaking, is FIG's response to this overwhelming plastics problem. Our objective is to enable the accurate mapping of plastic waste within waterways and provide regulators with reliable spatial information with which to identify unsustainable waste disposal practices, infrastructure shortcomings and inform robust land use controls with the goal of eradicating the dumping plastic waste into rivers.

Remote sensing data from satellites, airborne platforms and UAV's available in different spatial, spectral and temporal resolutions has the potential to provide long-term qualitative and quantitative assessment and monitoring of plastic pollution at specific 'hot spots'. Assessment of the spatial extent

and variability of plastic is possible due to the unique spectral signature of polymers in the near-infrared part of the electromagnetic spectrum.

Research by members of WG 4.3 at universities in Bosnia and Herzegovina and Serbia has resulted in the development of algorithms to distinguish plastics from surrounding litter/debris classes using remote sensing techniques that enable identification of plastic debris in water down to 1 cm² in area.

Partnerships and Work to Date

The (anti) plastics ‘movement’ world-wide is concerned/angry, highly motivated and growing rapidly. The problem is huge, if not overwhelming, and one of the things WG 4.3 has learned is that forming alliances with groups within the plastics and wider environmental movement is the most effective way to directly influence positive outcomes. It also enables us to understand where and how we as spatial professionals can contribute most effectively.

Trimble has very kindly donated hardware and software to assist with field survey work in ‘hot spot’ areas, which will be used to augment UAV remote sensing data. Young Surveyors Network volunteers will be involved with plastics surveys where possible, although it is recognised that field work will not be happening for some time.

Relationships with GreenHub, a dynamic environmental Vietnamese NGO, and Australia’s Commonwealth Scientific and Industrial Research Organisation (CSIRO) were formed at the 2019 FIG Working Week in Hanoi and, despite Covid, have endured, as has the relationship formed with the Aotearoa Plastic Pollution Alliance (APPA) in New Zealand.

WG 4.3/Surveying+Spatial New Zealand involvement with the NZ Marine Geospatial Information Working Group has resulted in plastic waste being added as a database input of the national MGI inventory.

In May 2020 WG 4.3 and Greenhub submitted a proposal for the Plastics Monitoring in Vietnam Rivers Pilot Study to the World Bank and the Ministry of Natural Resources and Environment of Vietnam. This project is a pilot study of plastic pollution assessment using UAV/remote sensing techniques.

Our bid was unsuccessful however, I have approached one of the successful tenderers, the German Research Centre for Artificial Intelligence (DFKI), to offer to co-develop strategies, field procedures and data processing models for mapping plastic in waterways applicable for this study and other ‘hot spot’ locations. We may need FIG and in particular President Rudolf Staiger’s assistance with our efforts to become involved in this project.

2.4 WG 4.4 – Marine Development and Administration

The management of good governance of marine space administration has been debated since at least the 2000s. An extensive literature and research report, it is hardly surprising that this marine space is under serious threat from a myriad of overlapping and conflicting interests, where the evidence of change is compelling and manifest. Therefore it is imperative to manage, administer and govern the coastal zone in a considerable, sustainable and structural manner as well as to protect and nurture the

environment we live in. Failure to do so may have disastrous consequences for future generations. This includes polishing the management system, particularly the governance of marine space administrative to support marine rights. Marine space administration and management can help to improve our governance and information systems on coastal and marine areas.

The intention of the establishment of Working Group 4.4 is to assist the development of institutional policy and framework as well as the development of conceptual, technical standards, guidelines and practice. WG 4.4 will provide the necessary guideline of land and sea governance for marine cadastre and marine administration. Marine managed areas, in the widest sense, are geographic areas designed to protect or manage resources within the marine environment. Any agency that has jurisdiction in the marine environment can create marine managed areas. Framework of marine development and administration comprise of institutional, technical and socio-economic components. The entities of the framework will include custodian, implementers, technical support and data centre, policy, stakeholder, facilitator and source of human capital. This framework is applicable and can be adopted by any country.

The one of above mentioned framework is expressed in KL GeoHydro 2020 conference (7-8 December, Malaysia). WG 4.4 has presented a paper that intended to highlight the roles of hydrographer on managing and administering the marine environment using multicriteria decision analysis. The challenge of marine development and Administration in the 21st century is concluded. Hydrographer should be able to adopt the potential of Industrial Revolution 4.0 and emerging drivers, explore the new potential sectors that required marine spatial literacy & proficiency and empower new knowledge in data science and data analytic towards transformation of data provider to analytic provider.

3. Cooperation

Cooperation with IHO in developing S-44. This is completed with the publication of the IHO Standards for Hydrographic Surveys (S-44), 6th edition, September 2020.

Cooperation with IBSC: A good summary of the work of the IBSC is included in the 2018 IHR, International Hydrographic Review published paper,
<https://journals.lib.unb.ca/index.php/ihr/article/view/26298/1882519051>

Capacity Development: The Commission 4 maintain a seat on the Capacity Development Forum that includes the IHO, IALA, WMO, IOC, IAEA, and IMO. It meets once a year in Europe and reviews potential opportunities to collaborate on possible development projects and campaigns.

Pre-collaboration between ASEAN educational institution (Malaysia and Indonesia) and non-government organisation such as World Wide Fund for Nature (WWF) on marine administration and marine space management is a promising opportunity towards the development and implementation of marine cadastre and marine administration framework to all other members in FIG.

4. Conferences

Chair of WG4.4, Abdullah Hisam Omar has given a presentation at the KL GeoHydro 2020, 7-8 December 2020. The title of his speech is “Marine Administration: Role of Hydrographer on Multi-Criteria Marine Spatial Risk Assessment”.

Commission 4 Chair, Mohd Razali Mahmud has given a presentation at the KL GeoHydro 2020, 7-8 December 2020. The title of his speech is “Realisation of the Challenges in Fulfilling the Hydrographic Prospects due to Covid-19”.

5. Publications

Chair of WG4.3, Simon Ironside has had two Mapping the Plastic articles published in professional magazines; Geoconnexion and Survey & Spatial New Zealand in December 2019 and January 2020 respectively.

The following are two (2) articles published in GIM International and International Hydrographic Review (IHR) on the work of FIG Commission 4:

- a) Contribution of Hydrography towards Sustainable Water Management (M. R. Mahmud, N. Hewitt, G. Johnston, S. Ironside, A. H. Omar), May 2020, GIM International.
- b) FIG Commission 4: Hydrography Work Plan (2019-2022) and Commission Activities (M. R. Mahmud, N. Hewitt, G. Johnston, S. Ironside, A. H. Omar), November 2020, International Hydrographic Review.

6. Event Hosted by FIG Commission 4

FIG Commission 4, The Association of Authorised Land Surveyors Malaysia (PEJUTA) and Universiti Teknologi Malaysia (UTM) organised the KL GeoHydro 2020 Conference on 7-8 December 2020. The event was held via online platform. The Commission 4 Chair and the Chair of Working Group 4.4 attended and presented in the Conference.

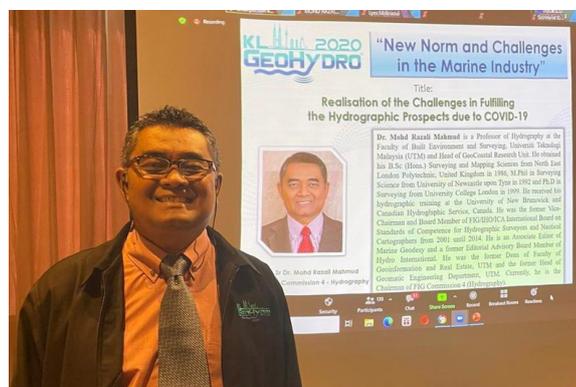


Figure 1: Speech by the Commission 4 Chair at KL GeoHydro 2020,



Figure 2: Speech by the Chair of Working Group 4.4 at KL GeoHydro 2020



Figure 3: Committee members comprising of FIG Commission 4, PEJUTA and UTM.

Mohd Razali Mahmud
 Commission 4 Chair
 21 April 2021