



PROGRAMME & ABSTRACT BOOK

“New Norm and Challenges in the Marine Industry”

Webinar

7 & 8
DECEMBER
2020

Organisers:



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UNIVERSITI TEKNOLOGI MALAYSIA



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International Federation of Surveyors
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VISION

Surveying is a modern profession acting worldwide for a better infrastructure for our society and planet earth. The International Federation of Surveyors (FIG) wants to keep, and even improve, its role as the premier non-governmental organisation that represents the interests of surveyors worldwide.

MISSION OF FIG COMMISSION 4 - HYDROGRAPHY

- *Promote the aim and objectives of FIG to hydrographers through the active involvement of national delegates from member associations and other interested parties in the activities of the commission.*
- *Foster closer links with all sister organisations currently active within the global hydrographic community.*
- *Develop guidelines and standards that will assist hydrographers in the provision of their services.*
- *Disseminate information relevant to the profession through participation in international meetings, conferences and committees.*

OBJECTIVES OF THE KL GEOHYDRO 2020

- *To review current trends in hydrographic education, practice, research and development.*
- *To provide an exposure to the practicing hydrographers and land surveyors into the current research, tools and practices in marine industry.*
- *To provide the research community a forum for exposing them to the problems of the practical applications of marine industry.*
- *To encourage the exchange of practical hydrographic technologies and experiences.*
- *To provide a forum for the discussion of innovative applications of offshore industry.*

UPCOMING EVENT



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Message from the
**Deputy Vice-Chancellor
(Development)**
Universiti Teknologi Malaysia



Prof. Ts. Dr. Mohd Hamdan Ahmad
Deputy Vice-Chancellor (Development)
Universiti Teknologi Malaysia

I wish to convey my gratitude to the organising committee for giving me the opportunity to express a few words in conjunction with the “KL GeoHydro 2020”. I hope the theme of this international webinar conference “New Norm and Challenges in the Marine Industry” will serve as a platform for the marine community to work together and synergise efforts in generating more interesting research ideas and novel approaches under the current coronavirus pandemic.

Now is the tough times for the marine community. More than ever before, there is a real need for activities to be as efficient as possible. But for companies that leverage innovative technology to maximise investments, low costs, and mitigate risk, the opportunities are endless. During this challenging time, the need for sharing and disseminating knowledge, whether about technology, strategy or cost-reducing standardisation initiatives is paramount.

I am pleased to welcome speakers and participants of this international event jointly organised by Universiti Teknologi Malaysia, the Association of Authorised Land Surveyors Malaysia and the International Federation of Surveyors with the support from the Department of Survey and Mapping Malaysia, National Hydrographic Centre and Land Surveyors Board Malaysia. It is hoped that this conference will achieve its objectives, providing the platform for exchange of knowledge, ideas and experiences relating to the global challenges in the marine industry.

Finally, may I wish all speakers and participants a fruitful discussion ahead and hope the event will end with resounding success.

Thank you.



Message from the **Vice-President of PEJUTA**



Sr Dr. Noordin Ahmad
*Vice-President of the Association of Authorised
Land Surveyors Malaysia (PEJUTA)*

On behalf of the Association of Authorised Land Surveyors Malaysia (PEJUTA), it is my great pleasure to welcome all participants to the KL GeoHydro 2020. Despite the challenges faced due to COVID-19 we are pleased to have the conference in the new norm.

The interest and cooperation received from both the local and international speakers are very much appreciated. The vastness and the diversity of the papers have proven that "GeoHydro" is still an ever-interesting areas to explore, manage and discover. It is hope that this event will serve as a forum for participants to cooperate in developing this unique sector.

To all participants, we do hope that you will take this opportunity to listen to the different experiences shared in this conference ranging from technology, education, professional contribution, management and R&D. We do hope you will find this conference beneficial for your career, help to expand your knowledge and improve your understanding in achieving successful life.

Thank you.



Message from the Chairman of KL GeoHydro 2020



Prof. Sr Dr. Mohd Razali Mahmud
Chairman of KL GeoHydro 2020

On behalf of the organising committee, I would like to welcome everyone to this occasion of "KL GeoHydro 2020".

KL GeoHydro 2020 is jointly organised by the International Federation of Surveyors (FIG), through its Commission 4, together with Universiti Teknologi Malaysia (UTM) and the Association of Authorised Land Surveyors Malaysia (PEJUTA). The event is supported by the Department of Survey and Mapping Malaysia (JUPEM), National Hydrographic Centre (PHN) and Land Surveyors Board Malaysia (LJT). The theme of the conference "New Norm and Challenges in the Marine Industry" has been chosen to reflect on the global pandemic and the challenges so that delegates can intellectually address this issue to the marine industry.

I am very grateful with the cooperation and support provided by the various government agencies, institutions and private companies to this event. The sea and oceans are always in a dynamic state thereby posing a lot of issues and challenges in the process of data collection or the various human activities in the marine industry. The coastal state and marine community are therefore not exempted from the challenges. This forum is one of many steps that we can take to learn from each other and work together to address problems and challenges faced by the marine community in Malaysia.

I wish to express my profound appreciation to the distinguished speakers, sponsors and participants for their support and involvement in ensuring a successful organisation of this event.

Last but not least, I would like to thank all members of the organising committee for their countless and tireless effort to ensure the success of KL GeoHydro 2020.

Thank you.



Programme KL GeoHydro 2020

Day 1: 7 December 2020 (Monday)

Welcoming Session and Opening Ceremony:

- 0900 – 0905 Opening of KL GeoHydro 2020
- 0905 – 0915 Welcoming Speech by the Chairman of the Organising Committee
Prof. Sr Dr. Mohd Razali Mahmud
- 0915 – 0930 Conference Officiation by the Deputy Vice-Chancellor
(Development)
Universiti Teknologi Malaysia
Prof. Ts. Dr. Mohd Hamdan Ahmad

Session 1 (Keynote)

Chairperson: Prof. Sr Dr. Mohd Razali Mahmud (UTM/FIG)

- 0930 – 1000 **K1** Keynote Address
Prof. Dato' Dr. Nor Aieni Mokhtar (Malaysia)
Vice-Chancellor of Universiti Malaysia Terengganu
Embracing New Norm and Challenges in the Marine Industry
- 1000 – 1030 **K2** Keynote Address
Rear Admiral Dato' Hanafiah Hassan (Malaysia)
Director General of Hydrography
National Hydrographic Centre
Royal Malaysian Navy
Hydrography – Enabling Autonomous Technologies
- 1030 – 1040 **Break**

Session 2

Chairperson: Sr Dr. Mohd Farid Mohd Ariff (UTM)

- 1040 – 1100 **2A** **Captain (Retired) Brian Cannon (United States of America)**
Director of the University of Southern Mississippi's
Hydrographic Science Research Centre, USA
Hydrographic Training in the Time of COVID-19



- 1100 – 1120 **2B** **Prof. Sr Dr. Mohd Razali Mahmud (Malaysia)**
Chair, FIG Commission 4 (Hydrography)
Universiti Teknologi Malaysia
Realisation of the Challenges in Fulfilling the Hydrographic Prospects due to COVID-19
- 1120 – 1140 **2C** **Assoc. Prof. Dr. rer. nat. Poerbandono (Indonesia)**
Faculty of Earth Sciences and Technology
Institut Teknologi Bandung (ITB), Indonesia
Brief Review of Satellite-derived Bathymetry and the Demand of Guidelines in Quality Assurance
- 1140 – 1150 **Break**

Session 3

Chairperson: Sr Shahrudin Musa (PEJUTA)

- 1150 – 1210 **3A** **First Admiral Dr. Najhan Md Said (Malaysia)**
Senior Director of Hydrography
National Hydrographic Centre, Royal Malaysian Navy
NHC Seabed 2050 Project: The Initiatives in Enlightening the Hydrographic Surveying Services in Post-Pandemic Era
- 1210 – 1230 **3B** **Sr Tham Siew Kee (Malaysia)**
Principal of Geomatics Operation
PETRONAS Carigali Sdn. Bhd.
Safe Vessel Navigation with Client-Specific Electronic Navigational Chart (ENC)
- 1230 – 1250 **3C** **Sr Safaruddin Kamaruddin (Malaysia)**
Director
Total Hydrographic Solutions
(THS) Geoscience
COVID-19: Where is Hydrography Headed?
- 1250 – 1400 **Break**

Session 4 (Keynote)

Chairperson: Sr Dr. Noordin Ahmad (PEJUTA)

- 1400 – 1430 **K3** Keynote Address
Dato' Sr Dr. Azhari Mohamed (Malaysia)
Director General of Survey and Mapping Malaysia
Department of Survey and Mapping Malaysia
Peta Baru Malaysia 1979 - After Four Decades of its Publication



1430 – 1500 **K4** Keynote Address
Gs. Azlikamil Napiah (Malaysia)
 Director General of Malaysian Space Agency (MYSA)
Space Technology for Hydrogeology Exploration

1500 – 1510 **Break**

Session 5

Chairperson: Sr Dr. Abd Wahid Rasib (UTM)

1510 – 1530 **5A** **Mr. Jonathan Ong (Singapore)**
 Regional Sales Manager
 South East Asia, Planet Asia Pte. Ltd.
To See the Sea: Planet Value for Enhanced Maritime Domain Awareness

1530 – 1550 **5B** **Mr. Mirza Hamza (Malaysia)**
 Technical Director
 Hidrokinetik Technologies Sdn. Bhd.
Offshore Mining Exploration using Unmanned Systems

1550 – 1610 **5C** **Dr. Isa Adekunle Hamid-Mosaku (Nigeria)**
 Senior Lecturer in Surveying and Geoinformatics
 University of Lagos, Nigeria
Is it an era of Multiple Disruptions or Interdisciplinary Cohesions? Addressing the 'Decade 2030' for Food Security in the Face of the New Normal

End of Day 1

Day 2: 8 December 2020 (Tuesday)

Session 6

Chairperson: Sr Dr. Muhammad Imzan Hassan (UTM)

0900 – 0920 **6A** **Prof. Dr. Omar Yaakob (Malaysia)**
 Marine Technology Centre
 Universiti Teknologi Malaysia
Prospects and Challenges of Ocean Renewable Energy in Malaysia

0920 – 0940 **6B** **Abdullah Sulaiman, P.geol (Malaysia)**
 Director of the Department of Mineral and Geoscience
 Malaysia (JMG) Kedah/Perlis/Pulau Pinang
Deep Seabed Mining: Is Malaysia Ready?



- 0940 – 1000 **6C** **Dr. Mohd Fazrul Hisam Abd Aziz (Malaysia)**
Senior Lecturer
Faculty of Fisheries and Food Science
Universiti Malaysia Terengganu
Utilisation of Acoustic Imaging for Sustainable Fisheries and Fishing Operational
- 1000 – 1020 **6D** **Lt. Cdr. (Retired) Salim Kasim RMN (Malaysia)**
Vice-President
Maritime Strategic Association of Malaysia (MASTRA)
Challenges in Technology Development and Management - for Localising Content in Ship's Lifecycle
- 1020 – 1030 **Break**

Session 7

Chairperson: Sr Dr. Abdullah Hisam Omar (UTM)

- 1030 – 1050 **7A** **Mr. Matt Holland (Canada)**
Sales Manager, Asia/Pacific Teledyne CARIS
The New Norm of AI and Cloud Technologies to Address Challenges in the Marine Industry
- 1050 – 1110 **7B** **Sr Dr. Rozaimi Che Hasan (Malaysia)**
Senior Lecturer
Razak School of Engineering and Advanced Technology
Universiti Teknologi Malaysia
Elevating Hydrographic Data for Conservation of Marine Protected Area (MPA) in Malaysia
- 1110 – 1130 **7C** **Ir. Ts. Dr. Mohamad Hidayat Jamal (Malaysia)**
Senior Lecturer
Centre for Coastal and Ocean Engineering
Universiti Teknologi Malaysia
The Importance of Hydrographic Survey to River and Coastal Engineering Work: An Overview
- 1130 – 1140 **Break**

Session 8

Chairperson: Sr Dr. Ami Hassan Md Din (UTM)

- 1140 – 1200 **8A** **Ir. Arman Mokhtar (Malaysia)**
Senior Civil Engineer
Department of Irrigation and Drainage Malaysia (DID)
Coastal Project Monitoring using Digital Camera with Airborne Facility (DID Experience and Lessons Learned)



- 1200 – 1220 **8B** ***Sr Dr. Abdullah Hisam Omar (Malaysia)***
Chair of Working Group 4.4 (Marine Development and Administration)
Universiti Teknologi Malaysia
Marine Administration: Role of Hydrographer on Multi-Criteria Marine Spatial Risk Assessment
- 1220 – 1240 **8C** ***Sr Mohd Hanifa K. Abd Hamid (Malaysia)***
Exco Member
Association of Authorised Land Surveyors Malaysia (PEJUTA)
Pandemic Opportunism in South China Sea - Can it be "Vaccinated"?
- 1240 – 1300 **8D** ***Sr Dr. Abd Wahid Rasib (Malaysia)***
Senior Lecturer
Faculty of Built Environment and Surveying
Universiti Teknologi Malaysia
Professional Hydrography Programmes under the Recognition of FIG/IHO/ICA at Universiti Teknologi Malaysia: Current Status and Development

1300 – 1400 **Break**

Session 9

Chairperson: *Sr Dr. Khairulnizam M. Idris (UTM)*

- 1400 – 1420 **9A** ***Sr Dr. Muhammad Imzan Hassan (Malaysia)***
Senior Lecturer
Faculty of Built Environment and Surveying
Universiti Teknologi Malaysia
Marine Cadastre within Land Administration
- 1420 – 1440 **9B** ***Mr. Ku Kassim Ku Yaacob (Malaysia)***
Senior Researcher
Fisheries Research Institute of Malaysia
Fisheries towards 2030: Issues and Challenges
- 1440 – 1500 **9C** ***Dr. M.D.E.K. Gunathilaka (Sri Lanka)***
Senior Lecturer
Faculty of Geomatics
Sabaragamuwa University of Sri Lanka
An Analysis of Tidal Asymmetry around Sri Lankan Coastline
- 1500 – 1520 Closing of the Conference by the Vice-President of the Association of Authorised Land Surveyors Malaysia (PEJUTA)
Sr Dr. Noordin Ahmad



KL GeoHydro 2020

ORGANISING COMMITTEE

Chairman

Prof. Sr Dr. Mohd Razali Mahmud (UTM/FIG)

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Keynote SPEAKERS:

K1 **Prof. Dato' Dr. Nor Aieni Mokhtar (Malaysia)**
Vice-Chancellor of Universiti Malaysia Terengganu
Embracing New Norm and Challenges in the Marine Industry



K2 **Rear Admiral Dato' Hanafiah Hassan (Malaysia)**
Director General of Hydrography
National Hydrographic Centre
Royal Malaysian Navy
Hydrography - Enabling Autonomous Technologies



K3 **Dato' Sr Dr. Azhari Mohamed (Malaysia)**
Director General of Survey and Mapping Malaysia
Department of Survey and Mapping Malaysia
Peta Baru Malaysia 1979 - After Four Decades of its Publication



K4 **Gs. Azlikamil Napih (Malaysia)**
Director General of Malaysian Space Agency (MYSA)
Space Technology for Hydrogeology Exploration



Invited **SPEAKERS:**

- **2A** **Captain (Retired) Brian Connon (United States of America)**
Director of the University of Southern Mississippi's
Hydrographic Science Research Centre, USA
- **2B** **Prof. Sr Dr. Mohd Razali Mahmud (Malaysia)**
Chair, FIG Commission 4 (Hydrography)
Universiti Teknologi Malaysia
- **2C** **Assoc. Prof. Dr. rer. nat. Poerbando (Indonesia)**
Faculty of Earth Sciences and Technology
Institut Teknologi Bandung (ITB), Indonesia
- **3A** **First Admiral Dr. Najhan Md Said (Malaysia)**
Senior Director of Hydrography
National Hydrographic Centre
Royal Malaysian Navy
- **3B** **Sr Tham Siew Kee (Malaysia)**
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Senior Lecturer in Surveying and Geoinformatics
University of Lagos, Nigeria
- **6A** **Prof. Dr. Omar Yaakob (Malaysia)**
Marine Technology Centre
Universiti Teknologi Malaysia
- **6B** **Abdullah Sulaiman, P.geol (Malaysia)**
Director of the Department of Mineral and Geoscience Malaysia
(JMG) Kedah/Perlis/Pulau Pinang



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Faculty of Fisheries and Food Science
Universiti Malaysia Terengganu
- **6D** ***Lt. Cdr. (Retired) Salim Kasim RMN (Malaysia)***
Vice-President
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- **7A** ***Mr. Matt Holland (Canada)***
Sales Manager
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Senior Lecturer
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Universiti Teknologi Malaysia
- **7C** ***Ir. Ts. Dr. Mohamad Hidayat Jamal (Malaysia)***
Senior Lecturer
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Universiti Teknologi Malaysia
- **8A** ***Ir. Arman Mokhtar (Malaysia)***
Senior Civil Engineer
Department of Irrigation and Drainage Malaysia (DID)
Coastal Project Monitoring using Digital Camera with Airborne
Facility (DID Experience and Lessons Learned)
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Chair of Working Group 4.4 (Marine Development and
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Faculty of Built Environment and Surveying
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- **9B** ***Mr. Ku Kassim Ku Yaacob (Malaysia)***
Senior Researcher
Fisheries Research Institute of Malaysia
- **9C** ***Dr. M.D.E.K. Gunathilaka (Sri Lanka)***
Senior Lecturer
Faculty of Geomatics
Sabaragamuwa University of Sri Lanka



Keynote SPEAKER SESSION 1

**K1**

Prof. Dato' Dr. Nor Aieni Mokhtar
Vice-Chancellor of Universiti Malaysia Terengganu
noraieni@umt.edu.my

Embracing New Norm and Challenges in the Marine Industry

Abstract

What is the future for the global marine industry at the time when nations are faced with the unprecedented COVID-19 Pandemics? The impact of Lockdowns and Movement Control Orders at the same time when countries are experiencing massive health risks, unemployment, economic contraction with supply and demand in flux? The new normal has pushed remote access to education and markets looking for new opportunities under the drastically changed conditions. How would governments handle this situation whilst keeping the UN Conventions and call for Environmental Sustainable Development Goals in Check? The era of digitalization is being attested to meet the needs for online delivery of education, training and research and business growth. This presentation will address the challenges, impact to oil and gas, transport, port management and shipping, tourism, fisheries and also demand for big data science and analytics for information management. The industrial perception and understanding on sustainability policy in blue economy, green technology and artificial intelligence infrastructure that supports research innovations towards effective collaboration to create new growth. Capacity building programs for marine talents and some ideas and examples will be shared based on oceanographic and maritime studies from Universiti Malaysia Terengganu.

Keywords : Current Trends, Education, Research, Marine industry, Innovations, Technologies, Pandemic COVID-19



Keynote SPEAKER SESSION 1



K2

Rear Admiral Dato' Hanafiah Hassan (Malaysia)

Director General of Hydrography
National Hydrographic Centre Royal Malaysian Navy
hanafiah.hassan@navy.mil.my

Hydrography – Enabling Autonomous Technologies

Abstract

Hydrographic information is not restricted only for the safety of navigation; but as for mapping purposes, it acts as a background map to understand more about place orientation and relationship. A wide range of related hydrographic data is now crucial in supporting essential decisions. These data and associated skills are very similar to those used to support navigation safety. The customer base for hydrographic products and their use is changing rapidly, either through the evolution of navigation requirements or through the extension of other needs for marine data. Hydrographic data is collected using various state-of-the-art gadgets, including satellite positioning systems and different types of depth measuring systems from using hand lead line, single beam echo sounder (SBES), and multibeam echosounder (MBES). The International Hydrographic Organization (IHO) and its members celebrate World Hydrography Day every year on June 21. This year's theme, 'Hydrography enabling autonomous technologies' is sparking the focus on new developments revealing new data on our sea-beds. The running year theme, 'Enabling Autonomous Technologies' primarily underpins the use of innovation in attaining precision and accuracy in the field of hydrography. Autonomous technologies are nothing new. Unmanned and autonomous systems are already occupying the sky, and developments have also seen them take to water bodies in recent years. Mariners have been using methods such as autopilots for decades. More recently, unmanned vessels such as wave gliders have been helping make advances in ocean sciences. We are, however, witnessing increasing levels of autonomy and more widespread applications. While adopting a new norm and global pandemic COVID-19, using the autonomous application is the ultimate decision to ensure our safety.

Keywords: Hydrography, Autonomous, Navigation



Keynote SPEAKER SESSION 4

**K3****Dato' Sr Dr. Azhari Mohamed (Malaysia)**Director General of Survey and Mapping Malaysia
Department of Survey and Mapping Malaysia
azhari@jupem.gov.my

Peta Baru Malaysia 1979 - After Four Decades of its Publication

Abstract

Peta Baru Malaysia 1979 (PBM 1979) was declared by the Minister of Land Development and Regional Development through Government Gazette No. 5745 on 21 December 1979. After more than four (4) decades of its publication, this map has not been updated although there are maritime boundary agreements between Malaysia with neighbouring countries that have been finalised during this period. Until now, PBM 1979 still remains the official map of the country depicting the territorial sea and the continental shelf boundary of Malaysia apart from being used in maritime boundary negotiations between Malaysia and neighbouring countries. The Malaysian Cabinet which convened on 8 May 2019, among others, agreed that PBM 1979 to be updated from time to time by including maritime boundary lines between Malaysia and neighbouring countries for any segment that has been finalised, in addition, agreed that the country's new map depicting the maritime waters will only be published once all issues regarding baseline and maritime boundaries are resolved. In relation to the decision, PBM 1979 was updated considering the finalised maritime boundaries information as well as Government decisions related to sovereignty in the country's waters. This paper aims to highlight the amendments implemented in accordance with the instructions of the Cabinet above. In addition, it also highlighted the initiative to transform the coordinates of the international maritime boundary points into the WGS 1984 Datum for the use of the law enforcement agencies.

Keywords: PBM 1979, Government Gazette No. 5745, Maritime Boundary, WGS 1984 Datum



Keynote SPEAKER SESSION 4

**K4****Gs. Azlikamil Napiah (Malaysia)**

Director General of Malaysian Space Agency (MYSA)

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Space Technology for Hydrogeology Exploration

Abstract

Space exploration has produced the space technology and applications which cover various aspect of people's live. Space technology are used in many aspects of live such as communications, broadcast, internet networks, mapping, vehicle navigation system, weather forecast, country security and sovereignty and contribute towards generating economy through its data, technology and applications including identification of groundwater potential zone. Several studies have shown that integration of remote sensing and Geographical Information System (GIS) were able to identify groundwater potential zone in more accurate, faster and cost effective. Integrated approach of remote sensing and GIS is proven to be a useful tool in producing groundwater potential map. Due to the importance and widespread use of space technology, it has been regarded as a strategic asset of a nation. In line with the aspiration for the country to become a scientific nation for socio-economic transformation and inclusive growth, activities in remote sensing especially in relation with research, development, commercialisation and innovation especially in hydrogeology exploration continues to be carried out and will enable the space technology to contribute to economy and wellbeing of the country.

Keywords: Remote Sensing, Geographical Information System (GIS), hydrogeology



Invited SPEAKER SESSION 2



2A

Captain (Retired) Brian Connon (United States of America)
Director of the University of Southern Mississippi's
Hydrographic Science Research Centre
brian.connon@usm.edu

Hydrographic Training in the Time of COVID-19

Abstract

This presentation explores the impact of the 2020 global pandemic on hydrographic training and education programs. A number of issues will be reviewed, including restrictions on in person instruction, implications to field work, virtual learning challenges, and unique solutions to meet IHO requirements. Specific examples of mitigation efforts will be presented from universities, government agencies, and industry. Despite the complications of the pandemic, the experiences of these programs, along with many others around the world, will undoubtedly change the delivery of hydrographic training and education moving forward. As always, hydrographers adapt to the changing environment and finish the task at hand!

Keywords: Hydrography, Education, Training, Pandemic, Virtual.



Invited SPEAKER SESSION 2



2B

Prof. Sr Dr. Mohd Razali Mahmud
Chair, FIG Commission 4 (Hydrography)
Faculty of Built Environment and Surveying, Universiti Teknologi Malaysia
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Realisation of the Challenges in Fulfilling the Hydrographic Prospects Due to COVID-19

Abstract

Until February 2020, the prospects of hydrography are enormous. With the COVID-19 pandemic, major changes had to be made in implementing the hydrographic services. The same challenges are faced by Commission 4 in fulfilling its work plan. Commission 4 is one of the ten commissions in the International Federation of Surveyors (FIG). Altogether, there are four working groups in Commission 4 with the Commission's work plan was presented at the FIG General Assembly in Hanoi, Vietnam in April 2019. For the year 2019 until the beginning of 2020, FIG Commission 4 through its four working groups has been actively implementing their respective commitments through physical face-to-face meetings and forum activities. The activities focus on representing FIG at several events and forums to gain insights to grow in general and to present and deliver FIG works. Through all its working groups, Commission 4 has been actively involved in implementing its policy by working in close cooperation with the relevant organisations and institutions. Commission 4 is committed with the continuous collaboration between educational institution, non-government organisation and the Young Surveyors Network in research and development, community engagement and the realisation of United Nations Sustainable Development Goal 14 (UN SDG 14).

Keywords: Hydrographic Prospects, Work Plan, Working Groups



Invited SPEAKER SESSION 2



2C

Assoc. Prof. Dr. rer. nat. Poerbandono (Indonesia)

Faculty of Earth Sciences and Technology
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Brief Review of Satellite-derived Bathymetry and the Demand of Guidelines in Quality Assurance

Poerbandono¹, Thomas Heege² and Oke Dwiyanana Pribadi³

¹Institut Teknologi Bandung

²EOMAP GmbH & Co KG

³Pusat Hidrografi dan Oseanografi TNI-AL

Abstract

The purpose of this presentation is to report our work on the exploration of the growing attention of satellite-derived bathymetry in Indonesia with a specific interest in quality assurance. During the latest three years, internet resources on satellite derived-bathymetry have continually doubled compared to the two previous trienniums. These internet resources become our primary working materials, from which, organization, evaluation, and identification of patterns and trends in the subject matter are carried out. From these materials, it is found that there have been numerous tests and applications of algorithms for generating bathymetry from optical satellite imagery. In particular, the general workflow of such tests seems to indicate coherence. However, the use of imagery, the applied techniques, and the claimed accuracy of the corresponding results do vary. To this end, the very recent and contributing application has been the inclusion of satellite-derived bathymetry product for delineating shallow area in a published nautical chart. From these various results of tests and applications, broad approach for assuring the quality of satellite-derived bathymetry product is proposed. This includes the fundamental knowledge of bathymetry and optical imaging as well as the standardized workflow that involves image acquisition, processing, and validation.

Keywords: *Satellite-Derived Bathymetry, Quality Assurance*



Invited SPEAKER SESSION 3



3A

First Admiral Dr. Najhan Md Said (Malaysia)
Senior Director of Hydrography
National Hydrographic Centre, Royal Malaysian Navy
najhan@navy.mil.my

NHC Seabed 2050 Project: The Initiatives in Enlightening the Hydrographic Surveying Services in Post-Pandemic Era

Abstract

The novel coronavirus (COVID-19) pandemic has overturned the present in many ways worldwide. With the negative rise in crude oil prices, the economic growth, mainly oil-producing countries such as Malaysia getting sluggish and the trend will continue declining. Logically, the domestic hydrographic surveying industry is hardly affected. Nevertheless, the marine domain challenges such as climate change, protection of marine resources, and coastal zone expansion will never stop instead continue demanding more details of hydrographic and oceanographic information. As the national authority, National Hydrographic Centre (NHC) need to be more creative and innovative to boost the local hydrographic industry to play a more efficient, effective and essential role in supporting NHC in governing the marine environment and resources. Therefore, NHC is responding to this demand by initiates the Seabed 2050 project. The Seabed 2050 project aims to map the entire Malaysian maritime zones seafloor with multibeam data by the year of 2050. Undoubtedly, knowing the depth and shape of the seafloor is fundamental for understanding the nation's primary source of wealth and supporting the nation's blue economy. Various initiatives are created under the realm of this Seabed 2050 project, which not only involves NHC but also directly benefits the local hydrographic industry. This paper will comprehensively deliberate all initiatives created under the Seabed 2050 project. It will also illuminate the rationale and challenges as the national authority in enlightening the future of the hydrographic services in the post-pandemic era.

Keywords: National Hydrographic Centre (NHC), Hydrographic Surveying, Seabed 2050 Project



Invited SPEAKER SESSION 3



3B

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Safe Vessel Navigation with Client-Specific Electronic Navigational Chart (ENC)

Abstract

Standard Electronic Navigational Charts (ENC) and/or printed Navigational Charts (NC) published by Hydrographic Offices, (i.e. the MAL Charts published by Malaysia National Hydrography Centre/Pusat Hidrografi Nagara Malaysia (PHN)), Admiralty Charts published by United Kingdom Hydrography Office (UKHO), NOAA Navigation Charts published by National Oceanic & Atmospheric Administration of United States of America and etc.), contain navigational data and information necessary for safe vessels navigation. For security and safety reasons, Oil & Gas (O&G) fields are classified as restricted areas for merchant shipping, fishing and aquaculture activities. Details of the O&G fields and the accuracy of the field structures, the intra- and inter-fields and export pipelines' position are reduced deliberately. While these may be limited to small chart scales, published NCs and ENCs cannot satisfy the needs of the mariners, who are chartered by O&G Operators, to navigate and work safely in the O&G fields. Instead, large scale field structures layout paper charts produced by O&G offshore surveyors are provided to mariners, if offshore surveyors and the survey integrated navigation system are not mobilized onto the work or supply vessels. The field structures and geo hazard are normally charted on O&G Operators' specified Geodetic Datum and Conformal-typed Grid Projection that usually do not adhere to International Hydrographic Organization (IHO) S-52, S-57, S-58, S-63, and S-100 Standards. The use of non-IHO standard navigational charts might have attributed to some maritime incidents that caused damages to not only O&G fields' structures and facilities but submarine tele-communication cables and worst, the environment. Formulating an initiative to improve safe vessels navigation in O&G fields, Geomatics Department of PETRONAS Carigali Sdn. Bhd. (PCSB) are evaluating an option to enable specific ENC on PCSB's chartered vessels that operate within specific oil and gas fields, with the main objective to provide accurate field structures and facilities layouts, with other supporting data e.g. geo hazard, in the format that can be directly loaded into the vessels' Electronic Chart Display and Information System (ECDIS). To begin with, Geomatics departments intent to conduct a pilot test whereby the use of the PCSB-specific ENC (PCSB-ENC) will be tested by the mariners, offshore installation marine controllers and coordinators, vessels tracking, logistics and command centre controllers, field surveyors, structural engineers, etc. Taking full advantages of the IHO Standards on security and format, the PCSB-ENC will apply all the data security require and seamless large data accessibility with minimum specifications of the ECDIS as well as the survey integrated navigation system if applicable. It is anticipated that PCSB-ENC will contribute greatly in safe, effective and efficient O&G fields exploration, development, maintenance, and surveillance which includes foreign vessels intrusion monitoring.

Keywords: Electronic Navigational Charts (ENC), Vessel Navigation, International Hydrographic Organization (IHO)



Invited SPEAKER SESSION 3



3C

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COVID-19: Where is Hydrography Headed?

Abstract

COVID-19 pandemic unfolds across the world, threatening lives and upsetting the world economy. However, lives must go on. It's also not only had a great impact on human activity and environment, but also on hydrography. Among others, travelling to and from the worksite is logistically challenged, health and insurance sector know better. Hence HSE'cally challenged. Mapping the water body, on the surface, on the seabed and in between for the depth, position, time and other metadata, layers upon layers for specific purposes for us to benefit the waters. These data, in specific format, being shared and manipulated in various ways for making further decisions upon decisions, over the time for good, competitive and fast solutions. These data have to be acquired, processed, manipulated, reported and archived in specific specifications and standards. So, it can be used many times. All of these have costs and risks to consider. Competently challenged. Technology is not only changing the way hydrography is performed but also evolve. Computer (and software), telecommunication, and sensors competitively evolved; better, modular, powerful, smarter, affordable and autonomous. Its all about innovation and dream to be better. Technologically challenged. The hydrographic industry is providing the results of these technology integration. Results are getting bigger, from the field to graphic to digital, and now spatial (x, y, z, t, metadata) as standard in hydrography. Spatially big data challenged. These challenges during this pandemic, requires continuous learning process (academic, hands-on, skill & competency), thus training is required in every hierarchy of the organisation, from the roots to the top in order to stay relevant. All of these require time and financial investment in order to deliver the same expected specifications and standards. Real time unmanned or autonomous acquisition and real time data processing are the way to go, providing the expected standards competently in timely and cost effectively manner.

Keywords: Hydrography, Pandemic, Pandemic COVID-19, Hydrographic Industry



Invited SPEAKER SESSION 5



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5A

To See the Sea: Planet Value for Enhanced Maritime Domain Awareness

Abstract

Maritime activity is one of the most difficult domains for officials to track, creating a need for innovative solutions to obtain only the most accurate, near real-time data for more informed decision-making. Planet's Ship Detection and Maritime Monitoring solutions offer daily coverage of the Earth's oceans, seas, and ports. Leverage our high-cadence, broad-area imaging capabilities to identify vessels and objects, detect maritime movement, validate AIS feeds, and uncover activity in uncharted and open water areas.

Keywords: Maritime, USV, Offshore Mining



Invited SPEAKER SESSION 5



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5B

Offshore Mining Exploration using Unmanned Systems

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Abstract

The rapid advancement in marine science and technology has resulted in vast opportunities for exploration not only in oil and gas but also other potential high value minerals such as Rare Earth Elements (REE) which is made up of 17 different elements with various geochemical properties. This rapid technological development with the availability of low-cost processors and satellite communications has enabled mariners to leverage by being able to acquire big marine data at real-time. As a result, maritime robotics such as Unmanned Surface Vessel (USV) equipped with Artificial Intelligence (AI) obstacle avoidance has made it possible for people venture into the vast oceans without the fear of safety. Also, the execution of complex and challenging missions at sea has proved to be more effective in negating the element of human error due to fatigue. Unmanned or Autonomous systems also prove to be a force multiplier in mapping the seabed which covers more than 70% of the Earth's surface. This setup provides not only big data to cover various parameters via sonar technology but also at sub decimetre position accuracy with the aid of differential global navigation satellite system (DGNSS). On the same note, the application of AI has also diversified with the development of Internet of Things (IoT) sensors which include but not limited to LiDAR, 360 cameras with object detection, thermal sensors and other marine sensor arrays. Hence, in-situ mapping for exploration can be minimally manned and data can be accessed and evaluated at near real-time remotely in the comfort of the office. Therefore, decision making can be made instantly and swiftly given that the data is readily available for any subject experts to evaluate. In conclusion, from a theoretical and practical standpoint, with the inverse relationship between technology and cost makes it possible for unmanned systems not be used only for exploration but also mining extraction in the near future.

Keywords: Unmanned Surface Vessel, Offshore Exploration, Unmanned, REE, Maritime Robotics, USV, Offshore Mining



Invited SPEAKER SESSION 5



5C

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Is it an era of Multiple Disruptions or Interdisciplinary Cohesions? Addressing the 'Decade 2030' for Food Security in the Face of the New Normal

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Abstract

The COVID-19 pandemic and the consequent critical uncertainties of events around the globe as witnessed in the year 2020 have brought about casualties that humanity is yet to face. Moreover, this year preceded the UN declaration of Decade 2021- 2030 as the decade of ocean science for sustainable development that is geared towards a fostered and optimum utilization of abundant ocean resources; of which food security is one of the desired outcomes for the decade. However, the global unpreparedness to the pandemic, fear of new waves and its duration, combined with its effect on economies from local to global, as well as the impacts of climate change, have further made varied interruptions to diverse human activities in the environment. In this paper, trends of the pandemic itself are examined, as it affects almost all humanity, and with respect to the case of food security in the context of the Decade 2030. To achieve this, interdisciplinary approaches must be envisaged towards a cohesive campaign that the Decade declaration epitomized, with clear climate change adaptation and resilience plans, economic stimulus, and recovery measures so that the distractions caused by the pandemic can be reduced at the early stage of the Decade, such that the gains of sustainable ocean resources will be strengthened to ensure adequate food security at the individual, national, and international levels.

Keywords: COVID-19, Decade 2030, Maritime Activities, Food Security, Marine Information System



Invited SPEAKER SESSION 6



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6A

Prospects and Challenges of Ocean Renewable Energy in Malaysia

Abstract

The declining availability of traditional sources of energy and the harmful effects of fossil fuel have spurred the development of various forms of renewable energy. Ocean Renewable Energy (ORE) technology is relatively new. Energy can be harnessed from the temperature difference between the cold bottom and warm surface water (OTEC), the tidal range fluctuations, tidal streams flow, ocean waves and the salinity gradient between salty and fresh water. The present ORE development in Malaysia is mainly focussed on resource assessment and development of laboratory and small-scale prototypes of various devices. This presentation provides a review of the Malaysian ORE resources as well as R&D works undertaken by various organisations in Malaysia in developing this new frontier. The speaker will also share some research works being carried out at Universiti Teknologi Malaysia in developing small scale ocean waves and tidal current devices. Whilst most proponents of ORE tend to paint an exaggerated positive view of ORE, this presentation will give a more realistic look at its future prospect in solving energy needs. Based on presently available data on the resources as well as current state of the art of the technology, it will provide an honest assessment of the challenges in making ORE as a contributor to the national renewable energy requirements. Among others, it will describe the low availability of resources, and limitations posed by many practical and technical hurdles in harnessing the energy potential.

Keywords: Ocean Renewable Energy, Prospects and Challenges, Resource Assessment, Ocean Waves, Tidal Currents



Invited SPEAKER SESSION 6



6B

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Deep Seabed Mining: Is Malaysia Ready?

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Abstract

The deep seabed minerals, which include mainly polymetallic sulphides, manganese nodules and cobalt crusts mostly occur in deep waters beyond the national jurisdiction as non-living natural resources of the seabed. The occurrence of these different types of mineral resources is principally controlled by the geology and bathymetry of the seabed areas. The recognition of the need to explore the deep seabed for its mineral potentials was an important concession made to accommodate economic activities in areas beyond national jurisdiction and allow the benefits to be shared by all. Given the present demand for minerals, this foresight is proving to be important as shown by the growing interests among many countries to obtain concession for deep seabed mining areas. The United Nations Convention on the Law of the Sea (UNCLOS) 1982 under Article 136 has stated that the 'Area' i.e. deep seabed area beyond national jurisdiction as the common heritage of mankind and that all the resources "are vested in mankind" as a whole, on whose behalf the International Seabed Authority (ISA) shall act. Malaysia ratified UNCLOS on 14th October 1996 and in relation to deep seabed mining, Malaysia signed Part XI concerning "The Area" on deep seabed mining on 2nd August 1994. Although there has yet to be any Malaysian involvement in deep seabed mining activities until now, there are pressing needs to venture into this industry in the future with the rising demand for strategic minerals such as REEs as new emerged mineral commodities and also alternative to traditional mineral resources from land. However, many issues need to be resolved before Malaysia can consider venturing in deep seabed mining activities. These issues include the policy, legal aspects, environmental impact, technology, capital and return to investment. Therefore, a special committee which comprises of government agencies, universities, industries, and stakeholders should be established to discuss and put forward the deep seabed mining agenda to be considered by the policy maker.

Keywords: Deep Seabed, International Seabed Authority (ISA), Bathymetry



Invited SPEAKER SESSION 6



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6C

Utilisation of Acoustic Imaging for Sustainable Fisheries and Fishing Operational

Abstract

The fishery sector has for decades been playing an important role as a major supplier of animal protein to the Malaysian population. The experiences indicate that the growth of the fishing sector stimulates the development and employment in related industries which contribute to the total economic growth of Malaysia. In 2017, total fishery production of the country amounted to 1.7 million tonnes, including close to 1.5 million tonnes from capture and 0.2 million tonnes from aquaculture. At present, Malaysia is one of the major producers of marine products, ranking 16th in the world in terms of fish caught from captured fisheries (1.5 million metric tonnes worth RM10.8 billion) and the 6th in ASEAN. It should be noted here that the small-scale fisheries are important worldwide contributing more than 25% of global marine landings (Food and Agriculture Organization of the United Nations, 2020), accounting for about 50% of the landings used as human food, and employing for 90% of the world's fishermen. However, the current problem in marine fisheries faced by small-scale fishermen in coastal zone are focused on locating potential fishing ground and captured matured fishes. Moreover, recently fishing gears used by artisanal fishermen still inefficient and capturing more by catch rather than target species. In order to catch matured and targeted species, fish imaging from echosounder are very crucial. The real time of image analysis based on acoustic imaging are more accurate compare to satellite image that can only penetrate surface area. All the images are recorded and can be analysed based on their Target Strength (TS). Fish TS is valuable information and it varies between species and individual. Based on the recorded TS also, biomass and stock of fish can be identified in targeted area. Fish movement and factor that influenced their migration can also be analysed. All the information can be given to artisanal fishermen, so that they will catch targeted species, marketable size and valuable species. This information is also vital to predict fisheries movement and reduce non targeted species. Interpretation of fish imaging are crucial for capturing target species and locating potential fishing ground. After locating potential fishing ground based on species, potential new designation of fishing gear can be implemented for sustainable fisheries.

Keywords: Acoustic Imaging, Sustainable Fisheries, Fishing Operational



Invited SPEAKER SESSION 6



6D

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Challenges in Technology Development & Management : for Localising Content in Ship's Lifecycle

Abstract

Local Content was defined as elements incorporated in the design and construction in shipbuilding project that ensures transfer of technology through Direct Offset and Indirect Offset programs. However benefits on level of knowledge and skill acquired were not measurable by the end of the project. Local technological benefit need to be assessed from early involvement and good understanding of the platform and system design, equipment design and operation, proper methodology of dismantling and assembly, installation and subsequent protocol for adequate testing and system trials. Local technological participation ought to be involved at every stage of Ship Construction, Operation and Repair Engineering (SCORE) phases of a ship, starting from 'Early Involvement' in Structural Design and System Integration, planning and sequencing the Ship's Construction schedule, and subsequently the In-Service-Support throughout the operational phase of a ship, until she goes for Refurbishment, Modernization or finally decommissioning. The System Work Breakdown Structure (SWBS) provide a thorough check-list for every aspects needing crucial attention during Design, Construction and Operational phases of a ship's lifecycle. It identifies the ultimate role of a ship that is to deliver its Unique Payload, on top and above the vessels capability to Float and Move Safely according to the desired performance. Technology acquired by Local Technologists and Technology Partners may only be achieved, sustained and upgraded by fulfilling several aspects of Technology Development and Technology Management processes. However, several constraints and bureaucracy as perceived amongst Ship owners, Ship operators and Ship repairers do hinder speedy advancement in fulfilling Self Reliance in Maritime Industry of Malaysia.

Keywords: Maritime Industry, Operation and Repair Engineering (SCORE), Ship's Lifecycle



Invited SPEAKER SESSION 7



7A

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The New Norm of AI and Cloud Technologies to Address Challenges in the Marine Industry

Abstract

Manual cleaning and classification of data collected by sonar and airborne bathymetric Lidar continues to be a time-consuming part of coastal and marine surveys. While modern mapping equipment can be used to rapidly collect high-resolution data there is typically some level of noise that needs to be removed to obtain quality mapping outputs and products. Through advancements in Artificial Intelligence (AI) we can now apply Deep Learning algorithms to 3D points to automatically classify erroneous points as "noise" and reduce manual cleaning effort by a factor of up to 10 times. By deploying the AI solutions as part of a cloud-based platform we can ensure data security while significantly reducing the time needed to go from data acquisition to final review, and without the need for additional high-end desktop hardware. Cloud technologies can also be leveraged to efficiently upload, host, manage and deliver the data after it is incorporated into a digital product or service, such as those defined under the IHO S-100 Universal Hydrographic Data Model. Using IHO S-100 products and services, and other open geospatial approaches we can provide data in a standardized way through cloud-based solutions. This approach can be used to dramatically shorten the period that it takes for new survey data to be used for decision support, improve safety of navigation, and enable data as part of Marine Spatial Data Infrastructure for sustainable use of the marine environment and economic growth.

Keywords: New Norm, Artificial Intelligence (AI), Cloud Technology, Marine Industry



Invited SPEAKER SESSION 7



7B

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Elevating Hydrographic Data for Conservation of Marine Protected Area (MPA) in Malaysia

Abstract

One of the targets of National Policy on Biological Biodiversity 2016-2025 is to manage and preserve coastal and marine habitats through Marine Protected Area (MPA). Alteration of seabed properties without long term planning can produce harm to marine life and subsequently destroy their habitats. Hydrographic dataset such as bathymetry acquired from multibeam echosounder is seen to provide accurate information about seabed profile which is undoubtedly useful to support this policy. However, bathymetry itself may not seem enough to explain marine habitat distribution and abundance, and therefore advanced technique or big data analytic approaches are required to extract habitat information from extensive volume hydrography data such as from acoustic data (i.e. multibeam echosounder). Here, the authors applied machine learning technique to hydrographic dataset such as bathymetry and backscatter from multibeam echosounder, coupled with ground truth observations to produce marine habitat map at one of marine parks in Malaysia. Machine learning is known to have the capability to generate a specific model from training data and use it for prediction of new set of data. The results show that the integration provides detail, spatially explicit habitat map where it explains the spatial distribution of essential classes such as areas with corals at the marine park. This habitat map has increased the value of hydrographic dataset and provide crucial information for conservation and monitoring purposes.

Keywords: Marine Protected Area (MPA), Hydrographic Data, Biological Biodiversity 2016-2025



Invited SPEAKER SESSION 7



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7C

The Importance of Hydrographic Survey to River and Coastal Engineering Work: An Overview

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Abstract

Malaysia is mostly surrounded by the sea either along the east or the west coast. Referring to the report of National Coastal Erosion Study 2015, the length of the Malaysia coastline is about 8840 km. Hence underwater mapping of the coast and ocean become essential. Hydrographic survey is to measure the depth and bottom configuration of water bodies to produce bathymetric chart that are mainly important for navigation and marine science. Hence, in river and coastal engineering study, bathymetry is very useful as its map underwater floor which later used in numerical or computer model and small-scaled physical model. This presentation shares the importance of bathymetry in river and coastal engineering work. Bathymetry or underwater topography is the main input parameter in a computer or numerical model. Other hydrography data such as tidal fluctuation and currents were also have it roles in the model. These data are used in simulating the hydrodynamics processes to study patterns such as tides, currents, waves, and morphological changes. This study is required to evaluate effect in any development project such as port, jetty, dredging and reclamation work. Apart from this, hazard or risk map can be produced from numerical model output due to tsunami, sea level rise (SLR) and extreme tides. This inundation hazard map may assist authority in planning phase of disaster risk reduction. Frequent updating the bathymetry is required for safe navigation and morphological change monitoring especially at the river mouth and coastal area where sediment transport is active. As a result, erosion and accretion may occur in these areas. Few examples of the used of hydrographic survey in river and coastal study or project will be presented. Therefore, creating awareness on the importance of hydrographic survey in engineering study is a need.

Keywords: Bathymetry, Hydrodynamics, Morphological Change, Sea Floor, Chart



Invited SPEAKER SESSION 8

8A



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Coastal Project Monitoring Using Digital Camera With Airborne Facility (DID Experience and Lessons Learned)

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Abstract

Coastal projects in Malaysia are commonly associated with some issues and problems related to monitoring of work progress in the surf zone and intertidal area. With recent aerial view technology using digital camera with airborne facility (i.e. drone), it is possible to monitor the overall view in coastal project area and provide better analysis for the construction. This paper describes a coastal monitoring technique specifically developed by the Department of Irrigation and Drainage (DID) to overcome and resolve several issues and problems in some coastal projects. The technique is quite effective in monitoring the coastal projects, thus providing better understanding, options and practical solution on site. This paper will also discuss the performance and challenges of this technique in Malaysia as well as lessons learned during the monitoring works.

Keywords: Coastal Projects, Aerial View Monitoring Technique, DID



Invited SPEAKER SESSION 8



8B

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Marine Administration: Role of Hydrographer on Multi-Criteria Marine Spatial Risk Assessment

Abstract

Marine administration is an integrated approach to the planning and management of coastal and marine environments to ensure their sustainable use and protection. Marine spatial planning (MSP) is a practical approach to establish a more rational organization of the use of marine space and the interactions between its uses, to balance demands for development with the need to protect marine ecosystems, social and economic objectives in an open and planned way. Traditionally, hydrographic data was used mainly for nautical charts. Hydrographic surveys are costly, and data should be used beyond navigation. Technological advances in processing hydrographic and oceanography datasets give a better understanding of our environment, which in turn opens new opportunities and directly supports the so-called blue economy. This paper highlights the roles of hydrographer towards the development of an integrated marine spatial plan which addresses the potentially conflicting spatial needs in coastal and marine area and providing a critical assessment of the marine and navigational issues associated with marine development plans.

Keywords: *Marine Administration, Marine Spatial Planning, Hydrographic Surveys*



Invited SPEAKER SESSION 8



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8C

Pandemic Opportunism in the South China Sea: Can it be “Vaccinated”?

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Abstract

By 2020, the rest of the world is unpredictably fronting a new norm as a consequence of the Coronavirus pandemic. An unseen enemy that to date has caused the losses of nearly 1.4 million people worldwide. In a time when the world is focused on the Coronavirus pandemic issue, China is still actively pursuing activities in the South China Sea. Back to 1960s and 1970s neighbouring countries such as Indonesia, Thailand, the Philippines, Vietnam, the Khmer Republic, 'Loconia' and the People's Republic of China (PRC) had made claims on the waters of the Southeast Asian region. Achievement and understanding were accomplished through negotiations between Malaysia, Indonesia and Thailand between 1969 to 1979 through several Treaties, Agreements and memorandum of understanding on the territorial sea and continental shelf boundary. In May 2009 subsequent to the Malaysia-Vietnam Joint Submission, the PRC through note verbal specified its claim to the South China Sea concluded a nine dashed line map while the Philippines claimed a geographical entity around the Spratly. In 2013, the Philippines filed a case against PRC to the Permanent Court of Arbitration (PCA) as legitimate in Article 287 of the United Nations Convention on the Law of the Sea (UNCLOS) even though the PRC refused to accept the arbitration process initiated by the Philippines. On July 2016, the PCA unanimously ruled that there was no legal basis for PRC to claim historic rights to resources within the sea areas falling within the 'nine-dash line' and ordered to stop all reclamation activities in the South China Sea. The PCA decision gave a relief and satisfaction to countries in the South China Sea region even though the PRC rejected the decision. On 12 December 2019, Malaysia submitted a partial submission for the remaining portion of the extended continental shelf in the South China Sea in accordance with the provisions of Article 76 of UNCLOS 1982 and as expected the PRC and the Philippines have objected to the submission. However, PRC's claim based on historic right has been criticized through verbal notes from other countries such as Indonesia, Vietnam and the United States and on 16 September 2020, the United Kingdom of Great Britain and Northern Ireland, Germany and France have submitted joint note verbal's asserting that the PRC's claim is not in accordance with international law and UNCLOS. Amid of pandemic against the Coronavirus, the conflict in the South China Sea now involves world powers and how the countries around the region will resolve the conflict by getting closer and not drive them further apart in reconciling their respective claims and legitimate interests. Are there any “vaccine” that can remedy the conflict of the South China Sea or it will be exposed to opportunist to spread the “pandemic”?

Keywords: South China Sea, UNCLOS, Pandemic, Dispute Settlement

Invited SPEAKER SESSION 8



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8D

Professional Hydrography Programmes under the Recognition of FIG/IHO/ICA at Universiti Teknologi Malaysia: Current Status and Development

Abd Wahid Rasib, Mohd Razali Mahmud, Ami Hassan Md Din, Khairulnizam M. Idris, Muhammad Imzan Hassan and Mohd Farid Mohd Ariff

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Universiti Teknologi Malaysia

Abstract

The Centre for Hydrographic Studies (CHS), Universiti Teknologi Malaysia has successfully graduated more than 500 candidates in hydrography professional programme accredited by the International Federation of Surveyors/ International Hydrographic Organization/ International Cartographic Association (FIG/IHO/ICA) for almost three decades. The good support from domestic expertise in different disciplines such as National Hydrographic Centre of the Royal Malaysian Navy, the programme is becoming more challenging and attractive due to the requirement of FIG/IHO/ICA and demand from the development of hydrographic survey. The syllabus has been upgraded according to the rapid advancement of technologies such as bathymetry mapping from satellite altimetry as well as integration of LiDAR technology and hydrographic sounding survey. Currently, four ongoing recognised programme of professional hydrography programmes have been conducted at UTM which are UTM Hydrographic Surveying I Programme (UTM HYDRO I - FIG/IHO/ICA Category B), UTM Hydrographic Surveying II Programme (UTM HYDRO II - FIG/IHO/ICA Category A), Hydrography and Marine Technology Programme (UTM HYDRO III - FIG/IHO/ICA Category A), and Marine Geospatial and Cartography Programme (FIG/IHO/ICA Category B). These programmes provide a very good impact towards the development of national hydrographic survey and marine science applications. Even though the programmes are struggling with the new norm scenario that is affected by COVID-19, the programmes have to be carried out accordingly through the online medium. However, this experience provides good awareness to CHS in which UTM has to be ready in any circumstances in order to fulfil the standards in producing the professional hydrographic surveyors and marine cartographers that are defined by the FIG/IHO/ICA International Board on Standards of Competence for Hydrographic Surveyors and Nautical Cartographers.

Keywords: Professional Hydrography Programme, Universiti Teknologi Malaysia, FIG/IHO/ICA



Invited SPEAKER SESSION 9



9A

Sr Dr. Muhammad Imzan Hassan (Malaysia)

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Marine Cadastre within Land Administration

Muhammad Imzan Hassan and Nor Ainn Alfatihah ZamzuriFaculty of Built Environment and Surveying
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Abstract

Cadastre was used to identify the dimension and position of the properties defined in legal documents. It consists of geometric description of the parcels that describing the interests and ownerships including the property's value. Cadastre plays an important role in land administration for state authorities and federal organization in term of land ownership (rights, restrictions and responsibilities). Meanwhile, cadastre in marine area is still quite unclear due to separate working systems between land and marine region. Coastal and maritime spaces with various uses regularly lead to overlapping rights issues in the water surface, water column and seabed as well as conflict in technical, legal and stakeholder management. Since some part of marine area is considered as land space, there were a few ideas have been proposed in managing marine area within land administration to overcome those issues. Current land standard data model that has been referred is Land Administration Domain Model (LADM). This standard has been proven relevant to 3D cadastre in land and marine environment. Some works discussed the probabilities of applying land administration practice into marine environment. Thus, this paper attempted to review on the possibilities of integrating marine cadastre within land practices.

Keywords: Marine Cadastre, Land Administration, 3D Cadastre



Invited SPEAKER SESSION 9



9B

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Fisheries towards 2030: Issues and Challenges

Abstract

In 2030, the population of Malaysia is expected to be at 38.1 mil. In order to fulfil the needs of the people for fish consumption, Malaysia DoF Malaysia identified issues and strategies. The administration of the fisheries sector in Malaysia is undertaken by the Department of Fisheries Malaysia. Amongst the issues and challenges are habitat degradation, pollution, climate change, overexploitation and illegal fishing. The development of fisheries sector needs to ensure that enough fish are available for the rakyat, fisheries are developed sustainably and can contribute significantly to the national economic. This paper describes some of the issues, challenges and strategies.

Keywords: Fisheries, Illegal Fishing, Habitat Degradation



Invited SPEAKER SESSION 9



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9C

An Analysis of Tidal Asymmetry around Sri Lankan Coastline

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²National Hydrographic Office

National Aquatic Resources Research and Development Agency Crow Island

Colombo 15, Sri Lanka

Abstract

Sri Lanka is a small island nation, about 65610 km², situated in the northern part of the Indian Ocean. The continental shelf of the country is narrowest around the southern part while it broadens to merge with the Indian continental shelf towards north and northeast along the Pork Strait. Tide around Sri Lanka is mixed semidiurnal type with an average spring tidal range of between 0.30 and 0.60 m. One of the significant characteristic about the tide around the country is, it exhibits nearly 1800 phase difference between tides in the North to East coast and South to North coast through West. This is a clear indication, that the tides around Sri Lanka is originated by two different amphidroms. With that trace of light, a comprehensive study is underway with the National Hydrographic Office of Sri Lanka. The objectives are to identify the locations of these two amphidroms in the Indian Ocean and also to identify the interaction regions of the two amphidroms. This paper summarises some of the initial findings of this study. First an initial study was carried out using the historical tidal data and OTIS regional tidal model. From the model simulation for the northern region, the meeting of the two amphidroms was identified along the Kayts Island. This was further validated by conducting first hand tidal data collection in the region. The observed tide at the Kayts Island was mainly diurnal type while the tides observed nearly 5 km from either sides of Kayts Island were semi-diurnal and having opposite phase. Further studies are underway to investigate the seasonal and long term variations of this meeting point and this information is very useful in tidal datum establishment for hydrographic applications as well as further densification of the tidal network around Sri Lanka.

Keywords: Tidal Amphidroms, Tidal Model, Hydrography





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Aim of the Programme

- To produce Hydrographic Surveyors that fulfill the Standards of Competence according to the S-5B Standards of the International Hydrographic Organisation.

Entry Requirement

- Diploma in Land Surveying / Geomatics Engineering / Civil Engineering / Computer Science / Naval Science or other related fields, OR
- Three (3) years working experiences in hydrographic surveying field "[to nominate at least one (1) professional reference]".

UTM Hydrographic Surveying II Programme (UTM HYDRO II) FIG/IHO/ICA Category A [JUNE 2021 - MAY 2022]

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- To produce Hydrographic Surveyors that fulfill the Standards of Competence according to the S-5A Standards of the International Hydrographic Organisation.

Entry Requirement

- Degree in Land Surveying / Geomatics Engineering / Civil Engineering / Computer Science / Naval Science or other related fields, OR
- Fully accredited Category B (FIG/IHO/ICA) certificate.

Hydrography and Marine Technology Programme (UTM HYDRO III) FIG/IHO/ICA Category A [JUNE 2021 - MAY 2022]

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Aim of the Programme

- To train and expose a hydrographic surveyor towards the development and market demand within the mapping and marine industry according to the S-5A Standards of the International Hydrographic Organisation.

Entry Requirement

- Degree in Land Surveying or Geomatics Engineering, AND
- Registered with the respective Land Surveyors Board Malaysia (LJT), The Association of Consulting Licensed Land Surveyors Sarawak (ACLS) and Sabah Surveyors Board (SAJUTA).

Marine Geospatial and Cartography Programme FIG/IHO/ICA Category B [28 JUNE 2021 - 30 DECEMBER 2021]

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Aim of the Programme

- To cater for professionals who are competence, creative and innovative as marine geospatial and cartographers according to the S-8B Standards of the International Hydrographic Organisation.

Entry Requirement

- Diploma in Land Surveying / Geomatics Engineering / Geoinformatics / Civil Engineering / Marine Technology / Computer Programming or other related fields.

UTM Hydrographic Surveying Programme Activities



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ABOUT PEJUTA

PEJUTA is a registered association of Licensed Land Surveyors (LLS) since 1979 which brings together practitioners in survey industries around Peninsular Malaysia. The membership of PEJUTA consists of Ordinary, Graduate, Corporate and Associates. It is also a platform for efforts towards bringing about enhancement of the knowledge and skill of its members and promotes awareness of surveying issues. It puts forward views of the members to the authorities and makes representation on strategic issues. In essence, PEJUTA is committed towards promoting sustainable management of the surveying services. Internationally, PEJUTA maintains linkages with related organisations abroad to establish networking in order to realise the industry's common universal goals.

VISION

A Dynamic and Agile Community of Surveying and Mapping Professionals comprising:

- A cohesive community of professionals with clarity of purpose, direction and accountability, unified in its agreement on strategic initiatives and priorities, armed with an unflinching discipline to follow through;
- Licensed Land Surveyors who demonstrate increasing ability to anticipate and adapt effectively to the future;
- An innovation-driven infrastructure that enhances access to comprehensive information through a wide range of technology and facilities

MISSION

To ensure that Licensed Land Surveyors are endowed with the chance of success to evolve from

'Vendor'-type service providers to those of 'Game Changers' who:

- provide the highest quality professional services;
- enjoy a high degree of confidence from the public in the Surveying and Mapping industry;
- demonstrate continuing trust and collaboration, strengthened partnerships, and increased understanding;
- seek to continuously improve communication between PEJUTA and its Members and amongst Members themselves;
- demonstrate unmatched knowledge, skills, and abilities in meeting the expectations of clients and consumers.

Contact us at :

PERSATUAN JURUUKUR TANAH BERTAULIAH MALAYSIA (PEJUTA)

ASSOCIATION OF AUTHORISED LAND SURVEYORS MALAYSIA

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NATIONAL HYDROGRAPHIC CENTRE



National Hydrographic Centre (formerly known as Hydrographic Department, Royal Malaysian Navy) was established in 1972 and responsible for all hydrographic matters in Malaysia. The Office also represents Malaysia in the International Hydrographic Organization (IHO) and as a focal point for matters with regards to Intergovernmental Oceanographic Commission (IOC).



VISION

To become a quality and credible hydrographic services provider.

MISSION

To facilitate the provision of adequate hydrographic information for marine navigation, national defence and development and other purposes.

PRESENT PLATFORMS

The current survey platform consists of KD Perantau and MV Dayang Sari. KD PERANTAU is the only hydrographic survey ship based in Lumut, Perak and MV Dayang Sari is a leasing ship under 2016-2019 Leasing Ship Contract. NHC also having two Survey Boats to conduct hydrographic tasks located in Sandakan, Sabah and Port Klang (NHC). All platforms are installed with digital data acquisition and processing system complete with the differential satellites positioning system.



MAL CHART SERIES

Malaysian Chart series (MAL) are published in conformation to IHO Standard and Specification. To date, 99 MAL Charts of various scales have been published and available for sale. They are produced in three different scales:

- Small Scale - 1 : 500,000 and smaller. General overview and for planning purposes
- Medium Scale - 1 : 50,000 – 1 : 500,000. Coastal series and navigational charts
- Large Scale - 1 : 50,000 and larger. Ports, harbours and approaches



ELECTRONIC NAVIGATIONAL CHART (ENC)

ENCs are published in conformation to the S-57 IHO Standard. To date, 109 ENCs covering Malaysian waters have published and available for sale through our appointed distributors. We are constantly keep our ENCs up-to-date with the latest notices to mariners.



PUBLICATIONS

Malaysia Tide Tables is one of the NHC nautical publication. The other publications are:

- Malaysia Tide Tables (Restricted Edition)
- Symbol and Abbreviations (MAL 1)
- Malaysia Chart Catalogue (MAL 2)
- Notices to Mariners





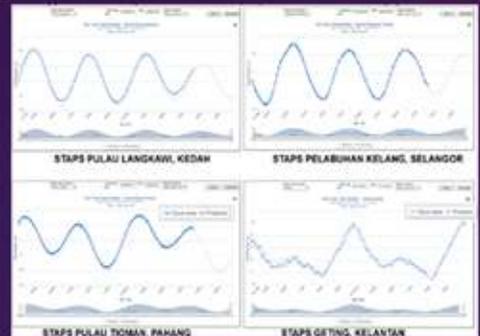
Stesen Tolok Air Pasang Surut (STAPS)



LOCATION OF TIDE GAUGE STATIONS IN MALAYSIA

ROLES OF JUPEM IN RELATION TO TIDAL OBSERVATION IN MALAYSIA

JUPEM has established 21 tide gauge stations (STAPS) along the coastal areas of Malaysia. These tidal stations observe tidal data continuously in order to determine the Mean Sea Level (MSL) for the Peninsular Malaysia Geodetic Vertical Datum (PMGVD).



TIDAL RECORD



PENINSULAR MALAYSIA
GEODETTIC VERTICAL DATUM
(PMGVD)



TIDAL OBSERVATION
RECORD AND
TIDAL PREDICTION BOOK



TIDE GAUGE STATION IN MIRI, SARAWAK

Continuous tidal observation for 18.6 years tidal cycle will enable accurate determination of the Mean Sea Level that will be beneficial for:

1. Determination of the Standard Datum for Precise Leveling Network (PLN).
2. Determination of the Zero Datum for Topographic Survey.
3. Record of Sea Level Rise
4. Prediction of Tidal, Flood and others Coastal / Sea Phenomenon.

STAPS OBJECTIVES

The main objectives of the STAPS to establishment are provide Sea Level Data, Mean Sea Level Data and to publish Tidal Observation Record and Tidal Prediction Book. These tidal information are useful for various parties such as:

1. Economy Sector (Fisheries, Aquamarine, and Recreation)
2. Development (Engineering, Hydrography, Precise Leveling Network)
3. Navigation, Port and Coastal (Safety and Navigation)
4. Climate Change and Natural Disaster (Tsunami, Flood, and Extreme Phenomenon)
5. Scientific Study (Monitoring of Sea Level Rise, Research and Education)





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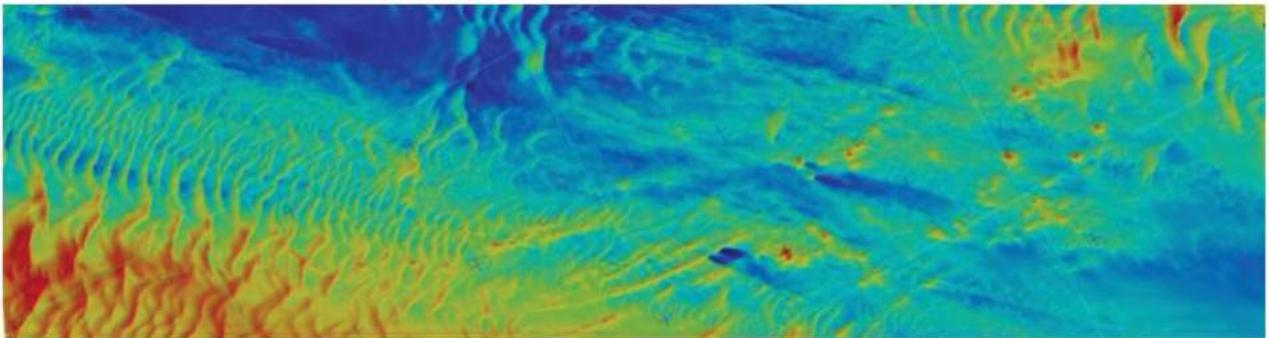
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