



KL 2023 GEOHYDRO[®]



"PROSPECTS AND TECHNOLOGICAL
DEVELOPMENT IN HYDROGRAPHY"

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PROGRAMME & ABSTRACT BOOK

28 FEBRUARY - 1 MARCH 2023

SHANGRI-LA KUALA LUMPUR
11 JALAN SULTAN ISMAIL, KUALA LUMPUR
50250 MALAYSIA

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"Prospects and Technological Development in
Hydrography"

SHANGRI-LA KUALA LUMPUR
11 JALAN SULTAN ISMAIL, KUALA LUMPUR
50250, MALAYSIA

Organised by:



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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 aims 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.

UPCOMING EVENT



OBJECTIVES OF THE KL GEOHYDRO 2023

- 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 industry.
- To provide the research community a forum for exposing them to the problems of the practical applications of maritime industry.
- To encourage the exchange of practical hydrographic technologies and experience.
- To provide a forum for the discussion of innovative applications of offshore industry.

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MESSAGE FROM THE MINISTER

I wish to convey my gratitude to the organising committee for allowing me to provide this message in conjunction with the Kuala Lumpur GeoHydro 2023 (KL GeoHydro 2023). The theme of this international conference, “Prospects and Technological Development in Hydrography” is extremely apt when one considers how crucial this field is to our general environment and hence, human existence.

I am confident that KL GeoHydro will grow from strength to strength as a premier forum. One hopes that it will serve as a platform for the hydrographic community to collaborate and synergise efforts in generating more exciting research and novel approaches in the field of hydrography for the benefit of the marine community.



It is with great pleasure therefore that I welcome the speakers, participants, and exhibitors of this event. The presence of so many experts in the field of hydrography and other related areas in this conference will contribute greatly towards the generation of new ideas and create better prospects for the marine industry after the challenges and dislocations of the global Covid-19 pandemic. Certainly, one is optimistic that the technological development of hydrography will continue to prosper in the new normal we are now in.

Issues that have now been acknowledged as common as well as global such as marine geodetic modernisation, maritime boundaries, marine cadastre, sea-level rise, satellite-derived bathymetry, and others must likewise be addressed through collective efforts. As such, the utilisation of hydrographic information in empowering marine knowledge for research development will be the way forward for the marine community and is in line with achieving the United Nations Sustainable Development Goal (SDG) 14.

I have no doubt that the participants will benefit immensely from the discussions and exchange of views on this subject to enhance their understanding of the issues and related problems. As such, the advent of KL GeoHydro 2023 is most timely and extremely significant. Moreover, it will also ideally contribute to the formation of impactful networking among its participants that will prove to be most beneficial over the years to come.

Best wishes therefore to all speakers and participants for a fruitful discussion ahead as well as for a resoundingly successful conference overall. To our friends who have joined us for KL GeoHydro 2023 from abroad, please also accept my warm welcome of “Selamat Datang” and may you have a pleasant stay in Malaysia.

YB NIK NAZMI NIK AHMAD

Minister of Natural Resources, Environment and Climate Change, Malaysia

MESSAGE FROM THE CHAIRMAN OF KL GEOHYDRO 2023



On behalf of the organising committee, I would like to welcome everyone to this occasion of "KL GeoHydro 2023 (Conference & Exhibition)".

KL GeoHydro 2023 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 is "Prospects and Technological Development in Hydrography" and has been chosen to reflect on the development of hydrography after the global pandemic and the challenges faced by the marine community so that delegates can intellectually address this issue in the marine industry.



I am very grateful for 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 of 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 and around the world.

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 2023.

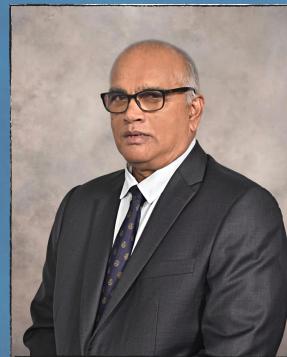
Thank you.

PROF. SR DR. MOHD RAZALI MAHMUD

Chairman of KL GeoHydro 2023

MESSAGE FROM THE PRESIDENT OF PEJUTA

I am glad to extend our gratitude to Allah S.W.T for enabling the Association of Authorised Land Surveyors Malaysia (PEJUTA) to collaborate on the organisation of the KL GeoHydro 2023 conference and exhibition. We extend a cordial welcome to all attendees.



KL GeoHydro 2023 has grown as a Southeast Asian branding event highlighting technology breakthroughs in the hydrographic and maritime industries, thanks to the collaboration between academic, private, and government sectors. Our hope is that this event will provide PEJUTA members and other industry stakeholders with an invaluable opportunity to contribute to the national and economic growth of the maritime and other water-related sectors. The success of KL GeoHydro 2023 has the potential to significantly influence economic growth and contribute to the Malaysian "blue economy."

We believe this conference will facilitate an environment for the attendees to broaden their horizons and exchange ideas that will contribute to the continued growth of the surveying and hydrography professions. We remain dedicated to ensuring that KL GeoHydro 2023 is a resounding success, and we eagerly anticipate the opportunities it will afford our industry.

We express our gratitude for the engagement and support of all participants.

Thank you.

Sr MOHD HANIFA K ABD HAMID
President of the Association of Authorised
Land Surveyors Malaysia (PEJUTA)

MESSAGE FROM THE CHAIR OF FIG COMMISSION 4

It is with great pleasure and honour that I welcome you all to the “KL GeoHydro 2023” to be held from 28 February to 1 March 2023 in Kuala Lumpur, Malaysia. In 2019, this event was started to bridge the cooperation between academia and industry as well as to provide the necessary exposure and understanding of the current practices of hydrography and dealing with various issues related to the hydrographic profession.



Since the beginning, the International Federation of Surveyors (FIG) being one of the organizers of this event and it's my pleasure to join this event as the Chair of the FIG Commission 4 (Hydrography). I am confident that this event will be a major event related to hydrography in this region for disseminating high-quality research outputs, networking, fostering interaction and exchanging ideas among professionals, researchers, and academia.

Finally, I would like to thank all the organizers and the sponsors for their dedication and contribution towards successfully organizing KL GeoHydro 2023. Further, I would like to express my gratitude to all the invitees, speakers and participants whose contribution has enlightened this event. I hope that you will enjoy the sessions by sharing the excitement of your findings and ideas.

Thank you.

DR. M.D.E.K. GUNATHILAKA
Chair of FIG Commission 4 (Hydrography)

PROGRAMME SCHEDULE

KL GeoHydro 2023

Day 1: 28 February 2023 (Tuesday)

Welcoming Session

0800 - 0900	Registration
0900 - 0905	Doa Recitation
0905 - 0925	Welcoming Speech by the Chairman of KL GeoHydro 2023 Prof. Sr Dr. Mohd Razali Mahmud
0925 - 1000	Opening of the Conference and Exhibition by the Director General of Hydrography, National Hydrographic Centre, Royal Malaysian Navy Rear Admiral Dato' Hanafiah Hassan
1000 - 1030	Tea and Coffee Break

Session 1

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

1030 - 1100	K1	Keynote Address Rear Admiral Dato' Hanafiah Hassan (Malaysia) Director General of Hydrography, National Hydrographic Centre, Royal Malaysian Navy <i>Potentials and Utilisation of Hydrographic Survey Technologies in Malaysia</i>
1105 - 1135	K2	Keynote Address Sr Hazri Hassan (Malaysia) Deputy Director General of Survey and Mapping II, Department of Survey and Mapping Malaysia (JUPEM) <i>Geomatics: A Paradigm Shift into Maritime Relevance</i>

1140 - 1210	K3	Keynote Address Gs. Azlikamil Napiah (Malaysia) Director General, Malaysian Space Agency (MYSA), Ministry of Science, Technology and Innovation <i>The Implementation of National Space Policy 2030 Agenda</i>
1215 - 1400		Lunch Break
	I1	Industry Talk at Sarawak Ballroom Industry Talk 1: AllTerra (M) Sdn Bhd by Mr. Muhammad Aizad Mohamad Anuar <i>Trimble CenterPoint® RTX Correction Services for Marine Application</i>
	I2	Industry Talk 2: Sea and Land Technologies Pte Ltd by Mr. Suneesh Nair <i>Acoustic Doppler Current Profiler</i>

Session 2

Chairperson: Sr Mohd Hanifa K Abd Hamid (PEJUTA)

1400 - 1430	K4	Keynote Address Dr. M.D.E.K. Gunathilaka (Sri Lanka) Chair of FIG Commission 4 (Hydrography) <i>Paris Agreement on Climate Change, Nationally Determined Contributions on Coastal Sector and Hydrography</i>
1435 - 1505	K5	Keynote Address Captain Mohamad Halim Ahmed (Malaysia) Director General of Marine, Malaysia Marine Department <i>Malaysia Marine Department Role in National Hydrography</i>

1510 - 1540	K6	Keynote Address Sr Dr. Khamarrul Azahari Razak (Malaysia) Director of Disaster Preparedness and Prevention Center, Malaysia-Japan International Institute of Technology, Universiti Teknologi Malaysia <i>Advancing Coastal Resilience and Maritime-Related Disaster Risk Reduction Strategies: A Transdisciplinary Approach</i>
1545 - 1600		Tea and Coffee Break

Session 3

Chairperson: Assoc. Prof. Sr Dr. Tajul Ariffin Musa (UTM)

1600 - 1625	3A	Captain Lukman Hanafiah Azamar Omar RMN (Malaysia) Director of Geospatial, National Hydrographic Centre, Royal Malaysian Navy <i>Malaysia Marine Spatial Data Infrastructure and Maritime Chart Services Product Development by National Hydrographic Centre</i>
1630 - 1655	3B	Prof. Ts. Dr. Mohd Fadzil Mohd Akhir (Malaysia) Director of Institute of Oceanography and Environment, Universiti Malaysia Terengganu <i>The Development of Malaysia Marine Data and Forecast System: Enhancing Usability and Impact</i>
1700 - 1725	3C	Mr. Mohd Amaruddin Azman (Malaysia) Geomatics Department, Geophysics Solutions, Geoscience Solutions Division, PETRONAS Carigali Sdn Bhd <i>Nearshore Pipeline Surveillance Survey by Unmanned Surface Vehicle Technology</i>

Gala Dinner

1930 - 2300

- KL GeoHydro 2023
- UTM HYDRO III FIG/IHO/ICA Category A (Batch 3) Graduation Ceremony
- Certification of Underground Utility Detection Survey (CUUDS) (Batch 8) Graduation Ceremony

Day 2 : 1 March 2023 (Wednesday)

Session 4

Chairperson: Assoc. Prof. Sr Dr. Abdullah Hisam Omar (UTM)

0900 - 0925 4A **Assoc. Prof. Sr Ts. Gs. Dr. Khairul Nizam Abdul Maulud (Malaysia)**

Department of Civil Engineering, Faculty of Engineering and Built Environment, Universiti Kebangsaan Malaysia

Assessment of Erosion and Hazard in the Coastal Areas due to Increasing the Sea Level

0930 - 0955 4B **Cdr Mohd Khairunie Mohammed RMN (Malaysia)**

Chief Meteorological Staff Officer, National Hydrographic Centre, Royal Malaysian Navy

Internal Waves

1000 - 1025 4C **Sr Ts. Mohd Nazri Masrom (Malaysia)**

Geomatics Department, Geophysics Solutions, Geoscience Solutions Division, PETRONAS Carigali Sdn Bhd

Structure Positioning by Real Time Subsea Visual Positioning Technology

1030 - 1100 Tea and Coffee Break

Session 5

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

1100 - 1125 5A **Mr. Mirza Iryawan Hamza (Singapore)**

Techical Director, Hidrokinetik Group

*Unmanned Surface Vessel for Coastal Seabed
and Sub-seabed Mapping*

1130 - 1155 5B **Lt Ts. Mohd Massuoadi Mohd Zukri RMN
(Malaysia)**

National Hydrographic Centre, Royal
Malaysian Navy

*Implementation of Hydrographic Field Survey
Practice for Hydrography Programmes*

1200 - 1225 5C **Assoc. Prof. Gs. Dr. Ahmad Fikri Abdullah
(Malaysia)**

Department of Biological and Agricultural
Engineering, Faculty of Engineering,
Universiti Putra Malaysia

*River Water Level Estimation from the
Surveillance Images*

1230 - 1400 Lunch Break

Industry Talk at Sarawak Ballroom

I3 Industry Talk 3:
IGS Network (M) Sdn Bhd
by **Mrs. Amy Ellyza Ghani**

Session 6

Chairperson: Dr. M.D.E.K. Gunathilaka (FIG)

1400 - 1425	6A	Mr. Johan Stam (Netherlands) Managing Director of Skilltrade BV <i>Continuous Developments in Education and Training</i>
1430 - 1455	6B	Mrs. Noraini Zulkipli (Malaysia) Geomatics Department, Geophysics Solutions, Geoscience Solutions Division, PETRONAS Carigali Sdn Bhd <i>Managing Fish Trap Compensation in Oil and Gas Industry: Challenges and Enhancement</i>
1500 - 1525	6C	Sr Dr. Norhadija Darwin (Malaysia) Department of Geoinformation, Faculty of Built Environment and Surveying, Universiti Teknologi Malaysia <i>Optimising Structural Characteristics based on Motion Parameter in Modifying Beach Volume Algorithm</i>
1530 - 1545		Tea and Coffee Break

Session 7

Chairperson: Sr Ahmad Wizan Mohd Thani (PEJUTA)

1545 - 1610 7A **Sr Dr. Ashraf Abdullah (Malaysia)**

Centre of Studies, Surveying Science & Geomatics, College of Built Environment, Universiti Teknologi MARA Perlis

Marine Alienation Procedures toward the Marine Cadastre Applications

1615 - 1640 7B **Mr. Dunstan Anthony Pereira (Malaysia)**

Research Officer, National Water Research Institute of Malaysia (NAHRIM)

Malaysia Nearshore Climate Change Monitoring Network

1645 - 1710 7C **Dr. Maged Marghany (Egypt)**

Director of Global Geoinformation Sdn Bhd

Genetic Algorithms, Ocean Dynamics and Remote Sensing Technology for Tracking MH370 Flight Debris

Closing Session

1715 - 1745 Award Giving and Closing Ceremony

Sr Mohd Hanifa K Abd Hamid

President of the Association of Authorised Land Surveyors Malaysia (PEJUTA)

EXHIBITION LAYOUT AND LIST OF EXHIBITORS



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(JUPEM)

P01

G01

G02

G03

G05

G06

G08

G10

B02

B03

B04

KL GeoHydro 2023

Organising Committee

Chairman

Prof. Sr Dr. Mohd Razali Mahmud (UTM)

Co-chairman

Sr Mohd Hanifa K Abd Hamid (PEJUTA)

Committee Members

Prof. Dr. Zulkepli Majid (UTM)

Assoc. Prof. Sr Dr. Abdullah Hisam Omar (UTM)

Assoc. Prof. Sr Dr. Ami Hassan Md Din (UTM)

Sr Dr. Khairulnizam M. Idris (UTM)

Sr Dr. Abd Wahid Rasib (UTM)

Sr Ts. Dr. Muhammad Imzan Hassan (UTM)

Sr Dr. Mohd Farid Mohd Ariff (UTM)

Sr Dr. Norhadija Darwin (UTM)

Sr Azhar Husain (PEJUTA)

Sr Md Rodi Ismail (PEJUTA)

Sr Isman Hussain (PEJUTA)

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Ms. Ainul Afifah Abdul Rahman (PEJUTA)

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Mr. Muhamad Asyraf Razli (PEJUTA)

Ms. Vivi Suhayu Suryadi (PEJUTA)

Ms. Nurul Awanis Rasdi (PEJUTA)

Ms. Hannie Salliana Salim (PEJUTA)

KEYNOTE SPEAKER (K1)



**Rear Admiral Dato' Hanafiah Hassan
(Malaysia)**

Potentials and Utilisation of Hydrographic Survey Technologies in Malaysia

Director General of Hydrography, National Hydrographic Centre, Royal Malaysian Navy

e-mail: hanafiah.hassan@navy.mil.my

Malaysia has a remarkable maritime history and is a blessed and prosperous maritime nation due to its natural resources and geographical location on the major sea routes, the Straits of Malacca and the South China Sea. The idea that Malaysia is a maritime nation must therefore be central to our strategic thinking because of its history, economic dependence, and strategic location. As a maritime nation, the maritime industry is at the core of a country's economic and social development. Hydrography today is not only about the safety of navigation but more than that. The shipping industry, coastal management, marine research, ocean exploration and exploitation, maritime boundaries and defence, etc., have also increased the demand for hydrographic services. Therefore, the involvement of all stakeholders within the hydrographic community is crucial to meet this demand. However, the hydrographic survey methods currently in use are limited due to limited coverage, difficulty in accessing shallow waters, manpower requirements and cost, making it difficult to conduct a comprehensive hydrographic survey. Over the years, many new technologies and techniques have been developed to address this pressing need. The idea is to survey the bathymetry using various latest technologies, including autonomous remote sensing, airborne LIDAR, and geographic information systems (GIS) for bathymetry mapping and its applications, which can benefit the global hydrographic community. The results of this hydrographic survey show that the technology on the market can meet survey standards and offers a number of benefits. Recent developments in survey technology now provide fast, flexible, efficient, and cost-effective solutions for mapping seabed morphology in extensive shallow water areas.

Keywords: Hydrographic Surveying Technologies, Maritime Industry, Bathymetry Mapping, Seabed Morphology

KEYNOTE SPEAKER (K2)



Sr Hazri Hassan (Malaysia)

Geomatics: A Paradigm Shift into Maritime Relevance

Deputy Director General of Survey and Mapping II, Department of Survey and Mapping Malaysia (JUPEM)

e-mail: hazri@jupem.gov.my

Malaysia is one of the ASEAN countries that are active in the development of the marine industry including coastal development, oil and gas industry, fishing, tourism and others. The development of Geospatial Data in marine industry is critical which it involves in various types of data includes seabed topography, mean sea level rise (MSL), meteorological and navigation studies especially in the context of state and international maritime boundaries; coastal zone management; and coastal resilience planning. In Malaysia, hydrographic information is gathered through government agencies such as the Department of Survey and Mapping Malaysia (JUPEM), National Hydrographic Centre (NHC), Malaysia Marine Department (MMD), Department of Irrigation and Drainage (DID) and National Water Research Institute of Malaysia (NAHRIM). However, these agencies have their own sources of authority and acts such as JUPEM bound by the National Land Code 1965. Therefore, expertise in the field of geomatics is required in order to meet the Geospatial Agenda of JUPEM 2025 with a theme of Socialising Geospatial for the Prosperity of the Country. Geospatial Development is not only creating digital data but also involving the development of standard hydrographic digital data, such as an Electronic Navigational Chart (ENC) and Geographic Information System (GIS), which is being developed by the International Hydrographic Organization (IHO) in creating uniformity of digital data that can be used by all users in the geospatial world. The development of standards is continuously expanding and it can even be developed towards Marine Information Modeling (MiM), which is the improvement of more details information from 3D to 8D which involves visualisation, time, cost, operation, sustainability and safety towards more complex information for each feature above the water until below the seabed. Under ISO/TC 211 definition of geomatics was "a discipline concerned with the collection, distribution, storage, analysis, processing, and presentation of geographic data or geographic information". Accordingly, geomatic exploitation in hydrographic activities is very necessary and as a community in developing undisputed quality in geomatic products. The professional competencies will contribute to the transformation and economic growth of the country.

Keywords: Department of Survey and Mapping Malaysia (JUPEM), Agenda Geospatial JUPEM 2025, International Hydrographic Organization (IHO), International Organization for Standardization (ISO)

KEYNOTE SPEAKER (K3)



Gs. Azlikamil Napiah (Malaysia)

The Implementation of National Space Policy 2030 Agenda

**Director General,
Malaysian Space Agency (MYSA),
Ministry of Science, Technology and
Innovation (MOSTI)**

e-mail: azli@mysa.gov.my

Malaysia has established the National Space Policy 2030 in 2017 to strengthen the implementation of the agenda of developing, expanding, and popularizing all areas of space technology including remote sensing technology to ensure the continuity of prosperity and progress of the country. The policy objectives are; to state the country's stand and objectives on mastering the space sector; to coordinate the country's space activities in an organised manner; to recognise the need for access to space capability; and to determine the direction of development of space sector in Malaysia. Space exploration has produced the space technology and applications which cover various aspect of people's live. Space technology is widely used and utilized by society in all aspects of life including communication networks, broadcasting, internet, mapping, navigation for transportation and weather forecasting. In line with strategic thrusts of the National Space Policy, Malaysia has developed a Malaysia Space Exploration 2030 Blueprint (Malaysia Space-X 2030) to create a comprehensive national space ecosystem. In line with the aspiration for the country to become a scientific nation for socio-economic transformation and inclusive growth, activities in space technology especially in relation with research, development, commercialisation and innovation continues to be carried out and will enable it to contribute to economy and wellbeing of the country towards Sustainable Development Goals (SDGs).

Keywords: National Space Policy 2030, SDGs, Space Technology

KEYNOTE SPEAKER (K4)



Dr. M.D.E.K. Gunathilaka (Sri Lanka)

Paris Agreement on Climate Change, Nationally Determined Contributions on Coastal Sector and Hydrography

Chair of FIG Commission 4 (Hydrography), International Federation of Surveyors

e-mail: erandakan@geo.sab.ac.lk

The consequences of green house gas (GHG) emission will influence on warm climate, rising sea levels, ocean acidification, coral bleaching, water scarcity and declining biodiversity, and many more. It is now obvious that the global warming is a fact and climate change is obvious with the very recent incidents we faced. The Paris Agreement is an international treaty on climate change adopted in 2015. This covers climate change mitigation, adaptation, and finance aspects in broadly. As of September 2022, 194 members of the united nations are parties to the agreement. According to the Paris Agreement GHG emissions should be reduced immediately and reach net-zero by 2050. For that, global warming to be maintained under 1.5 °C and emissions need to be cutdown by roughly 50% by the 2030. Further, each nation must define, plan and report on its contributions accordingly. However, Paris Agreement does not prescribe the exact nature of the nationally determined contributions (NDCs). At least, they should contain mitigation provisions, and may also contain initiates on adaptation, finance, technology transfer, capacity building and transparency. There, some of the challenging aspects on the coastal sector are lacking of long term tidal data for accurate local sea level rise (SLR) estimation and no accurate digital elevation models (DEMs) to simulate the inundation mapping for the coastal area. However, the satellite altimetry and high resolution satellite images are possible alternatives. Further, strong collaborations among the related national agencies such as national hydrographic office and national mapping agency are important and it is essential to establish national taskforces comprising with the experts representing all the relevant agencies to realize each of the NDCs. Also, to collaborate with regional and global agencies in exchanging the knowledge and best practices.

Keywords: Climate Change, Hydrography, Sea Level Rise, Paris Convention

KEYNOTE SPEAKER (K5)



Captain Mohamad Halim Ahmed (Malaysia)

Malaysia Marine Department Role in National Hydrography

**Director General of Marine,
Malaysia Marine Department**

e-mail: halim@marine.gov.my

Hydrography survey also known as underwater survey, is the method to determine the features of an underwater area. The main objective is to ensure that safety of navigation for shipping and marine activities within Malaysia Water. Malaysia Marine Department (MMD) is responsible in conducting and to perform the hydrography survey using our assets from time to time. The output of the survey is shared with maritime community to have an update information on underwater within their area. MMD affirmed that hydrography survey is one of the important elements to assist in spur the maritime economy by ensuring the ports is safe to be navigated by ships especially within gazetted port limits. Port activities such as ship to ship, bunkering, anchorage, jetty operation, and etc will generate more revenue as both port operator and client confident to perform its operation. MMD currently enhancing our technical staffs and assets with latest skill and technology as there is a demand for MMD to play a better role in hydrography. Recently, MMD have a Memorandum of Understanding (MoU) with Universiti Teknologi Malaysia (UTM) signed on year 2022. Higher level cooperation within domestic and international will be established to ensure that national hydrography for Malaysia will be made in much more structured manner.

Keywords: Safety of Navigation, Responsible, Maritime Community, Maritime Economy, Cooperation

KEYNOTE SPEAKER (K6)



Sr Dr. Khamarrul Azahari Razak (Malaysia)

Advancing Coastal Resilience and Maritime-related Disaster Risk Reduction Strategies: A Transdisciplinary Approach

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A number of climate-related disaster has increased about 83% globally over the last four decades, with 3 trillions economic losses and more than 4 billion affected people. Asia Pacific is known as the worlds' disaster prone region, which have recorded one life lost every 13 minutes. Malaysia is not an exception. Our national disaster induced human- and economic losses have reported more than 220% increment in comparison between the northeast monsoon, 2014/2015 and 2021/2022. Even so with significant number of new, emerging hazards, systemic risk, and compound disaster over industrialized, populated coastal, and vulnerable maritime environment. This session explores a multi-hazard and transdisciplinary approach for mainstreaming disaster risk reduction and resilience (DR3) strategy into coastal development planning and risk-informed decision making for maritime-related investment in Malaysia. This session also addresses the urgent needs and local demands for technological-based sociotechnical system enabled by collaborative foresight and disaster informatics to rejuvenate coastal- and maritime-related disaster risk reduction and resilience strategies in Malaysia. 614,000 km² of Malaysian Maritime Zone (MMZ) characterized by 561 islands and 60% of population live along the coast made it worth to explore. Interestingly, this session demonstrates modern and advanced geospatial technology beyond conventional surveying to support risk-informed decision making, ranging from navigational aids in the affected areas for damage analysis and post-disaster needs assessment to temporal changes in depth mapping for the disaster prone regions especially restricted navigational areas. A newly launched national framework for planning and development of coastal zone in Peninsular Malaysia and Federal Territory Labuan, known as the National Coastal Zone Physical Plan 2 (NCZPP-2) will be technically discussed. This study provides a new insight into a multi-tier risk-sensitive development strategy for addressing multi-hazards, multi-risk dimensions, and multi-sectoral stakeholders. Moreover, key recommendations of local DR3 strategy for Langkawi, the first Global Geopark in the Southeast Asia will be unveiled to enhance safety and security of 4 millions tourists and 110,000 populations, over future realized risk. It is an important step to co-design, co-develop, and co-implement risk-informed coastal- and maritime risk reduction strategies towards advancing climate resilience and Malaysia's aspirations as a "maritime nation" with zero climate disasters as promoted by the United Nations Office for Disaster Risk Reduction (UNDRR) in a changing climate.

Keywords: Multi-hazard Risk Mapping, Maritime-related Disaster Risk Reduction, Climate Resilience, National Coastal Zone Physical Plan 2 (NCZPP-2) & Disaster Informatics



SESSION 3

3A

Malaysia Marine Spatial Data Infrastructure and Maritime Chart Services Product development by National Hydrographic Centre

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Marine Spatial Data Infrastructure (MSDI) is the marine extension of Malaysia's terrestrial Spatial Data Infrastructure. It is a digital infrastructure that supports the finding, access, administration, dissemination, reuse, and preservation of hydrospatial data. MSDI provides timely access to data from public and private organisations of marine-related disciplines such as hydrography, oceanography, meteorology, and maritime economic sectors. Its applications include the safety of navigation, aquatic and marine activities, economic development, security and defence, scientific research, and the sustainability of marine ecosystems. As the Hydrographic Office for Malaysia, NHC is mandated under the Malaysia Geospatial Data Infrastructure programme to develop the National MSDI for maritime communities. NHC is the aptest among government agencies to provide and establish the national MSDI. However, the development is not without challenges and limitations. The greatest challenge is the willingness and readiness of agencies and organisations whose culture is complex and slows to adapt. According to the Manual of Hydrography C-10, each HO needs to develop MSDI and further support the development of S-100 for the maritime community. To date, there are 13 data categories and 60 sub-datasets outlined by NHC to develop National MSDI. The effort is supported through the collaboration of 24 government agencies, ministries and related departments. As of January 2023, a total of 35 sub-datasets out of 60 sub-datasets have been collected and populated in database by NHC through this collaboration. NHC aims to have all these sub-datasets successfully compiled in 2025. Lastly, demonstration on some of data which has been populated and has made use for service. The product such Maritime Chart Service (MCS) is one of the comprehensive online chart developed by NHC. MCS is an Electronic Navigational Chart developed through a web app and can be read through a web browser.

Keywords: MSDI, Electronic Navigational Chart, IHO S-100, Universal Hydrographic Data Model, Spatial Data Infrastructure



SESSION 3

3B

The Development of Malaysia Marine Data and Forecast System: Enhancing Usability and Impact

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One of the biggest challenges for Malaysian marine data users and the scientific community is the need for more data availability. In recent years, INOS has increased marine data from observations and modeling output. We developed our very first ocean forecast system and ocean modeling data output for 19 years to provide better comprehensive data availability. All this data is provided under one roof in the INOS marine portal database system as part of an effort to support national data repository needs. Our next challenge is to focus on how these data can be utilized and provide impact to the more extensive user. We start by imposing FAIR data principles to support stakeholders—representing academia, industry, and community. We follow an established FAIR data principles framework (Findable, Accessible, Interoperable, Reusable) endorsed by IOC-UNESCO. The intent is that these may act as a framework to enhance data reusability and provide more impact toward various needs in marine and maritime industries and the community.

Keywords: Ocean Data, Data Management, Ocean Forecast, Ocean Modeling, FAIR Data



SESSION 3

3C

Nearshore Pipeline Surveillance Survey by Unmanned Surface Vehicle Technology

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Unmanned Surface Vehicle (USV) technology is utilised for PETRONAS Carigali Sdn Bhd (PCSB) nearshore pipeline surveillance campaign in Sarawak water. The application of USV technology has ended industry practitioners long-search for a more sustainable and conclusive solution to multiple issues involving conventional nearshore survey boat. USV shallow draft design improves nearshore project overall efficiency and enabled the USV to go further inland thus acquiring data in the ultra-shallow transition zone that has never been able to be reached by conventional survey boat. The unmanned and autonomous technology adopted by USV introduces a safer work environment, minimises HSSE risks to manpower, equipment as well as to the environment. The USV is predominantly powered by lithium batteries with more than 24-hour operational capability supported by diesel-fuelled generators to extend its endurance, in-line with PETRONAS' mission to lower GHG emissions towards Net Zero carbon emissions by 2050. Typical hydrography and geophysical survey sensors are mounted on the USV such as Multibeam Echo Sounder (MBES), Sub Bottom Profiler (SBP) and Side Scan Sonar (SSS). The USV is also designed with capability to lower down Sound Velocity Profiler (SVP) autonomously which makes it perfect for nearshore survey environment. As safety is major concern, USV is equipped with safety features such as obstacles avoidance system comprises of typical marine radar and digital 360° camera enabling safe autonomous operations. This paper also discusses about the challenges faced during the operation that has never been recorded in previous similar papers and will highlight note-worthy lesson learned in term of operation, technical as well as project management for future USV application particularly in Malaysia water.

Keywords: Autonomous Technology, Unmanned Surface Vehicle , Nearshore Survey



SESSION 4

4A

Assessment of Erosion and Hazard in the Coastal Areas due to Increasing the Sea Level

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Sea level rise is often associated with climate change and global warming. The change in shoreline is a continuous process that occurs through various processes such as erosion, sedimentation, sea level rise, wave behaviour and land use. Coastal areas are already facing various risks due to increasing climate-related hazards that are likely to amplify with changing climate and make the households living in these areas even more vulnerable in terms of livelihoods and living conditions. The important assessment is to evaluate vulnerability mapping of the coastal areas due to increasing the water level by using an integrative external and internal framework. Primary data on relevant indicators for assessing vulnerability were collected from historically eroded critical coastal areas. The collected data were used to estimate a composite vulnerability index (VI). The vulnerability was classified according to four categories (low, moderate, high, very high) based on quarterly percentile distribution to evaluate the status. The findings showed that about 96% of households in Selangor coastal area had moderate exposure, and 4% had high exposure to climate change. Composite VI indicated that eight coastal areas (84% of households) are highly vulnerable and two coastal areas (16%) are moderately vulnerable to climate change. The high vulnerability was attributed to increased exposure to shoreline erosion, high-risk perception, limited income, weak housing structures and lack of financial capital. The variation in exposure, socio-economic characteristics and available capitals resulted in different degrees of vulnerability in Selangor coastal areas indicating the diversified need for proactive adaptation planning at the local level. Risk assessment analysis was established to identify the risk levels of coastal erosion hazards.

Keywords: Integrated Index, Climate-related Hazards, Sea Level Rise



SESSION 4

4B

Internal Waves

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KRI NANGGALA 402 incident in year 2021 signalled a new demand for National Hydrographic Centre in supporting the maritime operations, hydrographic surveying etc. The internal waves or solution waves was identified as a major factor of the incident. Based on satellite image analysis, it is highly likely that the South China Sea (SCS), Sulu Sea, and Celebes Sea contain internal waves because of their geographic location. Internal waves are the waves that go beneath the ocean's surface and convey heat, energy, and momentum. The internal waves in Malaysia's waters were observed to occur at areas of depth between 50m and 200m due to the transfer of wave energy and its geographical distribution, according to information obtained from numerous research institutions including the Second Institute of Oceanography (SIO). The existence of internal waves in SCS, Sulu Sea, and Celebes Sea is high due to the following factors:[1] The geographic position that is like a basin surrounded by continental and several islands and the depth of the gentle slope is suitable for the formation of internal waves. [2] Significant depth differences of 50m, 200m and >200m around the waters of Sarawak and Sabah that can produce horizontal waves. [3] The meeting between the SCS and the Sulu Sea, which is like a strait, allows acclimatization to occur and the waves will be of high intensity. A further study needs to be conduct in the area of interest purposely for supporting maritime operations and blue economy for the growth of the nation. Therefore, NHC has taken an initiative by establishing an Internal Wave Working Group which comprising expert in related government agency and universities objectively to study on internal wave phenomena in SCS, Sulu Sea, and Celebes Sea as well as to identify its prospect towards the nation.

Keywords: Internal Waves, Maritime Operations, Blue Economy, Internal Wave Working Group



SESSION 4

4C

Structure Positioning by Real Time Subsea Visual Positioning Technology

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Petroleum Nasional Berhad (PETRONAS) engineered, fabricated, and installed Offshore Wellhead Facilities (OWF) known as Platform A and Platform B, at more than 40m water depth with bridge link to the existing platforms, offshore Terengganu. The structures were designed by adopting a “Lego” building block concept for its simplicity in fabrication, transportation, and offshore installation. Despite its simplicity in structural engineering, each structure comprises of surface and subsea structures of which they need to be fitted and integrated perfectly to form a single platform. Therefore, precise survey, positioning and monitoring system were critical during the offshore installation phase so that all components (i.e., caisson pile, subsea template, guide sleeve, top sleeve and topside) were fitted and installed within the required tolerances to ensure engineering and structural integrity. Subsea navigation & positioning camera (Nav Cam) and Visual localization (V-LOC) (subsea visual positioning technology) was used to achieve the stringent subsea relative survey and positioning requirements, replacing the conventional surveying approaches which required the electronic and acoustic survey sensors to be deployed on the seabed and fitted on the surface and subsea structures. The method avoided the complex survey and positioning systems set-up that would consume longer installation and calibration time and pose greater HSSE risks and exposures during operation. The Nav Cam equipment was installed on the Remotely Operated Vehicle (ROV) which integrated with the survey-grade subsea fiber optic gyrocompass and motion sensor and interfaced with 4D Nav navigation system to achieve accurate and continuous subsea visual survey and positioning. The results demonstrated that the V-LOC subsea visual survey and positioning system achieved centimeter and 0.3° accuracy in relative surveying, while gaining operational cost benefits by reducing operational time and eliminating conventional field survey system installation and calibration from 48 hours to 2 hours. It also reduced HSSE risks by minimizing ROV diving and tasking operations, and improved situational awareness by real-time and continuous visual monitoring of subsea structures. This paper discusses the implementation of the visual localization (V-LOC) subsea visual positioning technology, including the technical capabilities and challenges during offshore operation, the perceived value creation, and technology experience that we can leverage on for other potential applications.

Keywords: Subsea, Monitoring, Real-time, Visual Positioning



SESSION 5

5A

Unmanned Surface Vessel for Coastal Seabed and Sub-seabed Mapping

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Unmanned Surface Vessel (USV) represents a part of the robotic evolution through engineering, providing user controls either via remote or autonomous. The major push factor in the utilisation of this technology in the marine environment are mainly cost effectiveness and personnel safety (HSE). This is more relevant in the management of a state's asset especially within the 3 nautical miles from shoreline which caters to range of diverse user ecosystem ranging from, but not limited to coastal protection, fisheries, subsea utilities (cables and pipelines), ports and coastal townships. The capital invested into these assets may turn into liabilities without proper planning and maintenance. Hence, this highlights the importance of bathymetric seabed and sub-seabed data. Moreover, yearly coastal erosion and flood problems measures can be better addressed with proper mitigations with the availability of complete coastal bathymetric and seismic data. The barriers to the acquisition of this data can be eliminated by the increased use of USVs to carry payloads such as multibeam and sub-bottom profilers to carry out mapping operations with minimal manning. Moreover, data which are acquired over network protocols which forms the basis of USV data transmission can be tunnelled directly into servers, hence, providing a source of data centralization for shared use by various agencies.

Keywords: USV, Coastal Mapping, Seabed, Bathymetry



SESSION 5

5B

Implementation of Hydrographic Field Survey Practice for Hydrography Programmes

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The National Hydrographic Centre (NHC) has recently taken up the role of providing the Hydrographic Field Survey as the Final Project for the course participants of the Hydrography program at the Universiti Teknologi Malaysia (UTM). This extensive final project, which is isolated from any practical activities conducted during the preceding program modules, adheres to the standards of the FIG/IHO/ICA International Boards on Standards of Competence for Hydrographic Surveyors and Cartographers (IBSC) S5A and S5B. The presentation will delve into the project's guidelines and examine its implementation to understand what is anticipated from students and stakeholders. The NHC project work specifications have been devised to impart practical knowledge to the students in the various aspects of hydrographic surveying fieldwork and the theories they should apply in different situations. The presentation will also outline the curriculum, which requires students to plan and execute the project from start to finish, encompassing all aspects of mobilization, data processing and reporting. The various tools and equipment utilized during hydrographic field surveys, their applications and the practical steps involved will also be discussed. Finally, the presentation will illustrate the learning outcomes of the fieldwork and its impact on the hydrography profession. This presentation will be of immense value to individuals with interest in the field of hydrography, as well as those seeking to comprehend the significance and best practices for conducting hydrographic field surveys.

Keywords: Hydrography, Field Survey, Hydrography Programmes, FIG/IHO/ICA, Category A, Category B



SESSION 5

5C

River Water Level Estimation from the Surveillance Images

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Surveillance technology has recently been suggested as a monitoring option for flood disasters. Currently, a telemetric system is been used in a flood monitoring system in Malaysia. However, data unavailability due to transmission or technical problems during flood events may cause interruptions and reduce the effectiveness of the system. In this work, an alternative flood monitoring system was proposed by extracting water information from surveillance images. The images were processed using deep learning semantic segmentation to extract water features. The intersection-over-union (IoU) metric was then used to assess the segmentation results, achieving almost 0.95. Then, the segmented image was coupled with predefined virtual markers with elevation information derived from light detection and ranging (LiDAR) to estimate river water levels and observe the water fluctuation. The proposed water level estimation was evaluated using Spearman's rank-order correlation coefficient and root-mean-square error (RMSE). The obtained correlation was 0.92, and the RMSE measured was 0.86 meters. Based on these findings, it can be concluded that the proposed work has high potential as an alternative monitoring system that can provide water-related information for flood management and related operations, serving as a complement to the currently used in-situ water level measurements.

Keywords: Deep Learning, LiDAR, Water Level, Water Segmentation, Flood Monitoring System



SESSION 6

6A

Continuous Developments in Education and Training

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To exchange the practical use of hydrography in The Netherlands for the CAT A students of PEJUTA we have proposed a week programme in October 2022. Just an example of training was offered to welcome 17 students and delegates of PEJUTA in The Netherlands. We have organized several in depth hydrographic lectures. The lectures were given at Simwave, a company active in operating comprehensive maritime simulation training centres equipped with simulators based on world-leading simulation technology of Kongsberg. They are training also Cruise liners officers who need to be certified every two years for all their international certificates. Complex marine projects are here simulated for catastrophes, safety, transportation and improve communications between all parties. See there website www.simwave.nl. The hydrographic lectures were presented by Mr John Loog one of the Skilltrade teachers who recently retired of the Dutch Royal Navy and specialized in Bathymetry and Side Scan Sonar. The first lecture included : Underwater Acoustics followed by the Multi-beam. The subjects were well received and we had some good discussions about the calibrations and use of the Multi-beam in shallow and deeper waters. Also vessel installation of the various hydrographic systems and sensors were presented. Mr Dick Mol, a Dutch specialist in recovery of historical finds at sea, added a different element to the programme: Marine Archaeology. His presentation is based on various finds concentrated at the North Sea. All students were pleased with this interesting subject. Between the lectures we arranged several workshops. We have taken the entire group to the new extension of the Port of Rotterdam Maasvlakte. A boat tour was arranged to visit the major berths at the entrance of the port. We visited our Dutch Coast Guard in Scheveningen – their base is to support hydrography for the entire Dutch sector of the North Sea. We visited their oil spill vessel and their sea going hydrography vessels including and explanation of their ROV and hydrographic systems. In Amsterdam we visited RelyOn Nutec a leading Safety training institute who offers all safety training including the latest for windmill parks, shipping and oil-and gas. This company is called MSTS Asia Sdn Bhd in Malaysia and based in Johore and Miri. Just recently a new training centre F2S based in Kuala Lumpur has opened their doors. Skilltrade works experienced specialists in the field and specialist companies to ensure that your training needs are met.

Keyword: About PEJUTA visit in 2022



SESSION 6

6B

Managing Fish Trap Compensation in Oil and Gas Industry: Challenges and Enhancement

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Marine activity such as fishing activities, marine traffics, sand mining and temporary and permanent features such as structure, marine park, fish aggregating devices, and fish trap has identified as sea obstruction in oil & gas offshore activities. In marine geophysical operation, any of sea obstacles should be identified. Fish trap scouting/survey is one of the processes in the marine geophysical surveys to identify fishing activity including all fish trap device which may impact to the operation. Often conflict between operators and fishermen occurred as both parties operate within the same vicinity. Every year, operators received significant number of report and claim from fisherman regarding the damages and loses of the fish trap due to geophysical operation. This resulted operator paying millions of ringgits to fisherman. Besides of this compensation, fishermen continuously accused operators not paying this compensation in time. PETRONAS facing a lot of challenges managing fish trap claim and has identify three issues; (1) Lack of evidence provides by fishermen as the missing or damages of fish trap was due to geophysical survey; (2) No standard mechanism to identify whether the damage or losses of fish trap because of the geophysical survey. (3) Process of either acceptance or rejection of claim was done manually. Starting in 2018, with the collaboration with other departments, PETRONAS have introduced a new process flow and requirements to improve efficiency in managing the compensation process and potential cost avoidance in future to come. PETRONAS also have developed an automation process for compensation analysis for data accuracy and consistency as man-hours saving with better efficiency. In addition to that, to bringing on data to the user faster and for sustainable technology as well as improve the project budget planning, Innovative Geospatial Portal (Portal for ArcGIS) and Dashboard for fish trap has been produced.

Keywords: Fish Trap, Compensation, Automation, Analysis



SESSION 6

6C

Optimising Structural Characteristics based on Motion Parameter in Modifying Beach Volume Algorithm

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Beach erosion occurs continuously along the shoreline due to the interaction of natural processes. The beach volume aspect is critical to represent the entire profile of beach evolution. Most advanced survey techniques are costly, requiring arduous control survey setup efforts to measure the beach volume. Unmanned Aerial Vehicle (UAV) systems have recently attracted interest in the mapping community, which provides similar products to aircraft systems and comes with Structure from Motion Multi-View Stereo (SfM-MVS) technology at a lower cost. This research is to invent an optimised volume determination method accurately using Unmanned Aerial Vehicle (UAV) photogrammetry mapping to minimise work time and perform less laborious beach mapping work for sustainable environment study. The UAV photogrammetric beach volume mappings were conducted mainly using non-optimal methods such as low altitude mapping, bundle amount of Ground Control Points (GCPs) distribution, and uncalibrated Ground Sample Distance (GSD). Then, this research discusses three points: first, the investigation of the camera calibrations, UAV altitudes, and GCPs distribution for optimised beach volume UAV mapping method. Secondly, the SfM-MVS photogrammetric volume formula is modified to develop an accurate and optimised beach volume mapping method. Thirdly, analysing the optimised beach volume mapping method produced. Various GCP distributions and UAV mapping altitude differences are the main part of this research. A robust statistical analysis was used to investigate the beach volume measurement trend and UAV mapping behaviour from various GCP distributions and different UAV altitude mapping. The research contributes to producing the beach volume algorithm to provide better accuracy than the existing formula. It may support monitoring and predicting future beach areas, which help safeguard the strategic economic seaside infrastructure, human safety, and environmental sustainability.

Keywords: UAV, Photogrammetry, Beach Volume, SfM



SESSION 7

7A

Marine Alienation Procedures toward the Marine Cadastre Applications

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An awareness of the significance of marine natural assets led to enhance competition for its management, the idea of marine cadastre and the need to create a marine regulatory scheme and a cadastre that underlying offshore rights, restriction, and responsibilities match its onshore became more conspicuous. In Malaysia, however, there is a lack of awareness of marine cadastre and coordination of marine ownership registration process that does not provide sufficient evidence to support the system, so the concept of marine cadastre cannot be supplied to multi-stakeholders in the marine industry. Based on current practice, focusing on marine administration always described in various ways such as Marine Cadastre (MC), Marine Spatial Data Infrastructure (MSDI) and Marine Spatial Planning (MSP). Basically, the understanding of marine administration especially in the application of marine spatial ownership and the application process is still unclear. This is because Malaysia still practices the land cadastre concept in its marine space up to three nautical miles from agreed estimated shoreline. The purpose of this paper is to produce a proposed marine ownership procedure which includes the 3R aspect approach in the concept of cadastre. Besides that, it also to evaluate the capabilities of the relevant spatial data and its collaborations in the marine environment to support marine cadastre geodatabase according to Malaysia's perspective. Several method used in generally for data collection using several type of instruments, suitable software on processing and make a focus group discussion to produce a resolutions related it. Observations on the application of the existing marine rights through the National Land Code in marine environment also examined together with the Malaysian marine legislation involved. The SPSS analysis also used to analyse the questionnaire to meet national standards and requirements in a systematic way to support the seamless procedure between land and marine ownership.

Keywords: Marine Cadastre, Marine Spatial, Marine Ownership, Geodatabase, Cadastre



SESSION 7

7B

Malaysia Nearshore Climate Change Monitoring Network

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As a maritime nation, Malaysia needs to closely observe its seas' physical conditions to address various environmental concerns, prepare for potential hazards, and collect primary information and data for climate change research. Malaysia Sea Level Rise (SLR) Monitoring Network initiated in 2016 by National Water Research Institute of Malaysia (NAHRIM) is a dedicated research goal to measure changes in sea levels over time. It typically involves a network of tidal gauges, satellite-based measurements, and in situ observations (Physical Oceanographic) at coastal locations. The primary objectives are to provide accurate and consistent data on sea level changes for scientific, coastal management and adaptation planning purposes. The data collected helps in understanding the causes of sea level rise, its impacts on coastal communities, and the development of effective strategies to mitigate these impacts. Climate change studies have become significant in recent decades as the nature of climate predicament excogitates rapidly. The traditional monsoonal month forecasted has deviate which react contrarily especially on the magnitudes and frequencies. Over the last few decades, Malaysia occasionally experiencing typhoon and storm surge occurrences until recently, the incumbent low-pressure atmosphere flocculated closer to the equator paving the typhoon and cyclones tracks closer to the equator. Series of typhoon a-like weather have been recorded since 2018 onwards e.g Tropical Storm Pabuk (2019) and series of deflected cyclone and typhoon deviate from Vietnam and the Philippines usual tracks. NAHRIM have successfully produce SLR rate potential for the year of 2020, 2040, 2060, 2080 and 2100 where requirement of primary ground data is pivotal. Prior to the presentiment, it is high time for Malaysia to scrutinized plan and framework to embark on long-term monitoring for climate drivers for Malaysia Hazard Preparedness framework. NAHRIM, under the purview of Ministry of Environment and Water (KASA) has initiated the effort which among the primary objective is to identify, analyse and recording the magnitudes changes, pattern and continuation of forcing origin and characteristics acting on Malaysia waters consistently over time and produced trajectories of sea level change, distinguished forcing domination by establishing long – term primary oceanographic datasets adequate for climate change research in Malaysia region. With the advancement of Artificial Intelligence (AI) being consolidated into Research & Development (R&D) practice whilst the finding will be more conveniently interpreted and user-friendly to disseminate.

Keywords: Climate Change, Sea Level Rise, Physical Oceanographic, Monitoring Network, NAHRIM



SESSION 7

7C

Genetic Algorithms, Ocean Dynamics, and Remote Sensing Technology for Tracking MH370 Flight Debris

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Up to date, no one can tell where Flight MH370 is. Despite advanced remote sensing sensors and communication technologies, the MH370 has not been found since March 8, 2014, until now. The main claim of the MH370 tragedy is based on Captain Zaharie Ahmad Shah's suicide. Is it a precise conclusion that Captain Zaharie was beyond the tragedy of MH370? It is such a critical question and requires a deep understanding of the aerodynamic mechanisms. Regardless of advanced remote sensing technology, scientists using remote sensing could not detect an accurate geographical location for MH370's disappearance. This work will attempt to answer a critical question " did flight MH370 plunge into the Southern Indian Ocean or not? This work explores what could have happened to Malaysia Airlines Flight MH370 debris and flaperon due to ocean dynamic fluctuations. In this view, the multiobjective genetic algorithms are developed to track the trajectory movements of flight debris under the impacts of Indian ocean dynamics. Unlike other studies, the work does not only concern the surface trajectory model but involves other dynamic ocean components such as Rossby wave, eddies, velocity potential, and vorticity. These were considered to answer the critical question: " how did flaperon wash up on Réunion Island? ". This work also introduces a new technique to model the trajectory drift of the MH370 debris based on the amalgamation between the Volterra-Lax-Wendroff algorithm and the multiobjective algorithm based on the Pareto optimal solution. Finally, the genetic algorithm based on the Pareto optimization is explored to answer the significant question of " Why MH370 could not plunge into the Southern Indian Ocean? Lastly, this work attempt to answer the requested question by the public where is the MH370? Lastly, the answer to this question is addressed from the point of view of conspiracy theories based on Pareto optimization. In addition, this work also addresses what is the benefit of sea operations for searching MH370 approximately 1500 km off Perth, Australia. The answers to these critical questions are addressed scientifically in this present talk.

Keywords: MH370 Debris, Ocean Dynamics, Remote Sensing, Genetic Algorithms, Altimeter Interferometry Technique



INDUSTRY TALK 1

I1

Trimble CenterPoint® RTX Correction Services for Marine Application

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AllTerra (M) Sdn Bhd

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Trimble RTX® represents a family of GNSS correction services that provide customers with high-accuracy positioning via Satellite or the Internet. While stand-alone GNSS positioning without corrections provide horizontal accuracies that are typically more than 1 meter, Trimble RTX correction services can provide horizontal accuracies better than 2 cm. CenterPoint® RTX correction service is a flagship product of the Trimble RTX product portfolio. CenterPoint® RTX Marine is a real-time correction service, using an absolute positioning technique to model and correct GNSS biases, including clock errors, satellite orbit errors, and atmospheric delays, for construction and geospatial applications in the marine sector. CenterPoint® RTX Marine gives the precision you need in marine survey and construction applications with trusted reliability, worldwide. CenterPoint® RTX Marine correction service is utilizing all the modern GNSS constellations. Having more available satellites will keep you reliably on point in challenging GNSS environments. With a global reference network and advanced technology, CenterPoint® RTX Marine corrections are not dependent on any single base station being up and running. You can work without interruptions no matter what the status of local RTK hardware, cellular or radio networks is. Trimble RTX® correction services support a wide range of marine applications, including coastal construction, hydraulic dredging, hydrographic surveying, seafloor mapping, navigation, exploration, monitoring and more.

Keywords: Correction Services, Trimble RTX®, CenterPoint® RTX Marine

INDUSTRY TALK 2

I2

Acoustic Doppler Current Profiler

Mr. Suneesh Nair (Singapore)

Sea and Land Technologies Pte Ltd

e-mail: suneesh@sea-landtech.com

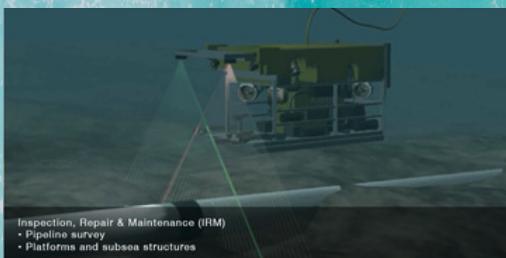
Acoustic Doppler Current Profilers (ADCPs) have traditionally been used for Current profiling as Oceanographic and mapping tools and at times also to estimate sediment concentrations, based on the Echo Intensity or Signal to Noise Ratio of the reflected signals from the 3 or 4 beam ADCP solutions. Nortek's Signature Vessel Mounted ADCP, like the 1000KHz and the 500KHz ADCP's with 5 transducers give the users a unique value proposition providing Echogram data on the 5th or the vertical beam, which is unlike the traditional SNR values from the slanted beams of ADCPs, as there is no side lobe interference on the Vertical beam and therefore it can produce data right up to the bed of the water body. This can be of significant value to users in the Dredging industry and also Bathymetric surveyors.

Keywords: Acoustic Doppler Current Profiler, Sediment Concentration, Dredging Industry

Pageo is a Offshore Survey Group originating from Indonesia founded in late 2004. Pageo is expanding internationally via Singapore and Malaysia based subsidiaries, Pageo International Pte. Ltd. and Pageo Geosience Sdh. Bhd. formed in 2011 and 2013 respectively. The Pageo Group provides services involving offshore survey, positioning, ROV's and a range of subsea services in support of the offshore oil & gas and construction industries primarily located in the Asia Pacific Region with Global expansion a key target.

Pageo is managed and staffed by highly trained and experienced personnel who possess experience in carrying out a wide variety of survey projects in Asia Pacific and Middle East including positioning, geophysical surveys, geotechnical survey, construction support surveys, ROV observation and intervention projects, oceanographic surveys, tracking, GIS work, data processing and dimensional control surveys so we are therefore able to offer the one stop shop approach to satisfy client requirements.

Pageo is able to offer cost effective high quality services using latest sophisticated technology available to the industry and through dedicated management and detailed planning we believe our winning formula of highly trained and competent personnel, state of the art equipment, robust work procedures and stringent QHSE offer a very attractive and practical solution to the offshore industry at large.



Pageo is continuously improving in house Quality, Health, Safety and Environment (QHSE) and works closely with clients to effectively deliver services and solutions of satisfactory quality in a safe manner and at a competitive cost to provide customer satisfaction and to meet any relevant standards.

HUMAN RESOURCE

Selective and stringent recruitment system of fresh graduates with in house training

TOTAL WORKFORCE:
144
STAFF AND GROWING

- 80 permanent qualified survey experts
- 60 contracted survey personnel
- 20 contracted ROV Pilot / Tech, Supervisors & Superintendents
- 40 Surveyors / Hydrographers
- 24 Survey Engineers
- 9 Geophysicists
- 6 ROV Pilot / Tech with survey capabilities
- 3 LBL Surveyor
- 2 LBL Engineer



Sea and Land Technologies Pte Ltd

Global Technologies / Seamless Solutions

SINGAPORE | INDONESIA | THAILAND | PHILIPPINES | VIETNAM | MALAYSIA



GNSS

- NOVATEL MARINEPAK7 MARINE GNSS RECEIVER



IMU

- SBG EKINOX
- SBG APOGEE



HYPACK MAX SOFTWARE

EDGETECH

- 6205 S2

RBR TIDE GAUGE

- RBR SOLO
- RBR VIRTUOSO3
- RBR DUO
- RBR DUET



AML OCEANOGRAPHICS

- SVP



TELEDYNE RESON

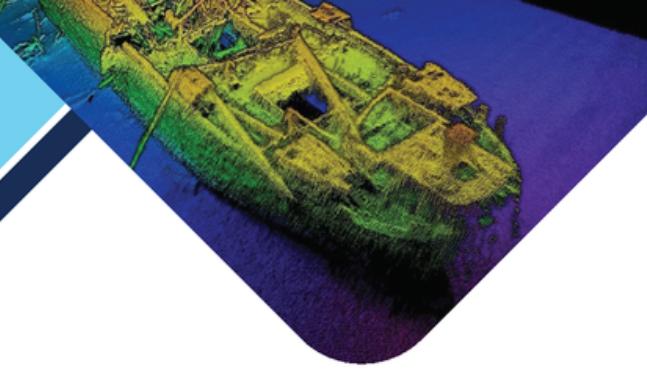
- SEABAT T20
- SEABAT T50
- SEABAT T51



- MD 30
- HYDROSWEEP DS



- HYDROGRAPHY
- OCEANOGRAPHY
- GEOPHYSICAL
- MET OCEAN



GET TO KNOW US

OUR SERVICES

- Multibeam Survey**
- Sub-Bottom Profiling Survey**
- ADCP Deployment & Data Collection**
- Water Quality Monitoring**
- Marine Sand Mining Studies**

17 years of experience (Est. 2006) in oceanography, hydrological and environmental projects including system application, data acquisition and data post-processing for MBES, SSS and SBP surveys, as well as ADCP deployment and water quality monitoring.

Norbit Subsea, one of the major high-technology brands in the Nordic countries that designed the world first successful fully integrated lightweight Multi-Beam Echosounder with Applanix POSMV and SV sensor, appointed GHOS as their official reseller in Malaysia, and is working hand in hand until today.

OUR PRODUCTS

nke
INSTRUMENTATION



(Water Quality Monitoring)

NORBIT
- explore more -

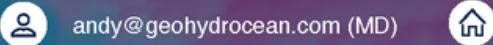


(Multibeam)

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Global-trak Systems

ABOUT US

Since 1997, Global-trak Systems Sdn. Bhd. (GTSSB) core strength is supporting the Malaysia Geospatial Industry by continuously expanding and evolving to promote and educate our customers on new technologies and industry trends.

We provide complete Geospatial solutions and services in Land Surveying, UAV, GIS Mapping, Mobile Mapping, Terrestrial Scanning, Deformation Monitoring, are specifically designed and configured to meet the needs and important of our geospatial customers. With over two decades in this industry, we understand the choice is really important, which is why we work hard to transform our business to meet the ever-changing and challenges in this competitive industry. This is further driven by our commitment to excel and deliver end-to-end Geospatial solutions.

GLOBAL-TRAK SYSTEMS SDN BHD

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47600, SUBANG JAYA,
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MALAYSIA

TEL: 603 8024 8599

FAX: 603 8024 8559

EMAIL: SALES@GLOBALTRAK.COM.MY

URL: WWW.GLOBALTRAK.COM.MY

ABOUT US

IGS Network (M) Sdn Bhd, formerly known as Egeo Technology (M) Sdn Bhd, was incorporated in 2009 as a private limited company and is 100% Bumiputra and registered with the Ministry of Finance (MOF). Our primary business is to provide surveying industry solutions, particularly in the supply and service of land and hydrographic surveys.



What We Do

- ① Supply and Rental - Land & Hydrographic Surveying Equipment
- ② Services - Engineering Survey, Plan Drafting, Land Matter

Our Services

SERVICES

1) Land Survey & Mapping

- Engineering Survey
- Cadastral Survey
- Demarcation Survey
- Topographical Survey
- Utility Survey and Detection
- GPS Observation
- Setting Out and Monitoring Survey
- Drone Survey / Aerial Photogrammetry

2) Hydrographic Survey - We providing bathymetric survey solutions

- High Resolution Multibeam
- Single Beam
- Side Scan Sonar



IGS NETWORK
INTELLIGENT GEOSPATIAL SOLUTIONS



**DELIVERING
TECHNOLOGY
SOLUTIONS TO
EXCEED
EXPECTATIONS**

- HYDRO INSPECTOR (ROV)
- GNSS RECEIVER
- LASER TRACKER
- UAV DRONE
- GROUND PENETRATING RADAR
- MULTIBEAM SYSTEM
- TIDE GAUGE SYSTEM

With an ever growing number of significant clients, some of which are



Jabatan Ukur dan
Pemetaan Malaysia



Petronas Gas Berhad



Dewan Bandaraya
Kuala Lumpur



Jabatan Kerja Raya

NO.12-3A
UKAY BOULEVARD, PERSIARAN ULU KELANG
JALAN MRR2, 68000 AMPANG
SELANGOR
+03 2380 0338

www.igsnetwork.my
sales@igsnetwork.my



THSGeoscience
Total Hydrographic Solutions

ABOUT US

THS Geoscience Sdn Bhd is the South East Asia region authorized reseller for the reputable QPS, is part of Total Specific Solutions since August 2020. Not only provides after-sales technical support, but also provides hands-on training customized to the specific requirement. and providing consultation to our client. Based in Kajang Selangor, 15km south of Kuala Lumpur.

PRODUCTS & SERVICES



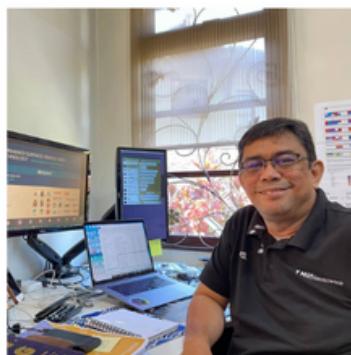
Software
Solutions



Support
& Training



Data Processing
& Consultancy



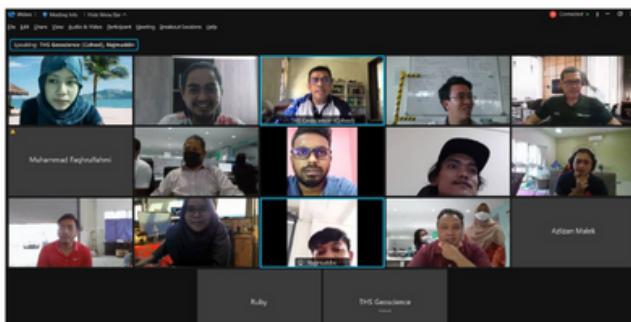
THSG LOG



"We sell, we support and we train"

OUR LOCATION

Unit 5A-1, Lot 90,
Kajang Waterfront,
Jalan S10/4,
Bandar Kajang,
43000 Kajang, Selangor, Malaysia



ADVANCED TRIMBLE GEOSPATIAL SOLUTION



TRANSFORMING THE WAY THE WORLD WORKS

Everything you do in the geospatial world leaves a mark. You want accurate, reliable, and intelligent solutions. With Trimble's Geospatial solutions, field applications, real-time communications, field and back office processing, you get the progressive tools in precision technology.



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Environmental Monitoring



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AECA Solutions

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GEO RUNDING SDN BHD

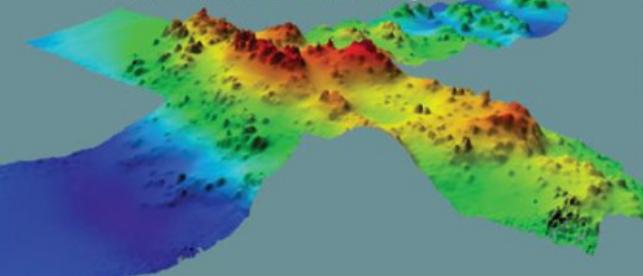
"MAPPING OUR ADROITNESS"

ABOUT US

GEO RUNDING SDN BHD was incorporated in APRIL 2019, by a group of survey professional and is fully owned by Malaysian Bumiputra. The company is currently active in participate with Private and government sectors on contract-based job on wide spectrum of land survey, hydrographic survey and Underground Utilities Mapping where we provide services in Malaysia. We are looking forward to spread our services all over Malaysia.

3D SEABED MAPPING

"KARANG PABUYONG, TIOMAN



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03-3123 4372

info.georunding@gmail.com

Wisma SM-GEO,

No.97, Jalan Bestari 6B,
Bandar Bestari, 42000 Klang,
Selangor Darul Ehsan

OUR SERVICES

LAND SURVEY

- TOPOGRAPHICAL/STRIP/ DETAIL SURVEY
- DEMARCATON SURVEY
- LEVELLING SURVEY

HYDROGRAPHIC SURVEY

- BATHYMETRIC SURVEY (SINGLE BEAM AND MULTIBEAM)
- DREDGING SURVEY (PRE/INTERIM/POST)
- SIDE SCAN SONAR SURVEY
- SUB BOTTOM PROFILING
- MAGNETOMETER SURVEY
- TIDAL MEASUREMENT
- CURRENT MEASUREMENT (ADCP)
- SEABED CORING AND SAMPLING

UNDERGROUND UTILITIES MAPPING

- UTILITIES UNDERGROUND CABLE DETECTION
- UTILITIES UNDERGROUND PIPE DETECTION

STESEN TOLOK AIR PASANG SURUT



ROLE OF JUPEM IN RELATION TO TIDAL OBSERVATION

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 OBSERVATION RECORD AND TIDAL PREDICTION BOOK



TYPE OF EQUIPMENT USED :

- DFT4 (Digital Fuess Type)
- Pressure Level Sensor (PLS)

GRAPHICAL TREND FOR SEA LEVEL RISE FOR STAPS PULAU PINANG AND PELABUHAN KELANG



STAPS CHENDERING AND PELABUHAN KELANG

STAPS OBJECTIVES

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

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



DTGSM MONUMENT



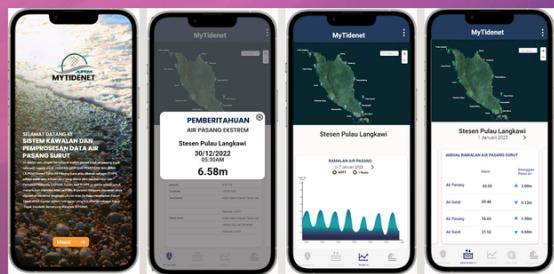
MAINTENANCE WORK IS IN PROGRESS

NEW WEB BASED FOR MYTIDENET V2

SELAMAT DATANG KE SISTEM KAWALAN DAN PEMPROSESAN DATA AIR PASANG SURUT.

JUPEM akan memproduksi sistem web berdasarkan untuk mendukung sistem pengawalan dan pemprosesan data air pasang surut. Sistem ini akan membolehkan pengguna mendapat maklumat maklumat tentang pergerakan air pasang surut di seluruh pantai tanah besar Malaysia. Maklumat maklumat ini termasuk maklumat maklumat tentang pergerakan air pasang surut, maklumat maklumat tentang pergerakan air laut, maklumat maklumat tentang pergerakan air bandar, maklumat maklumat tentang pergerakan air laut dan maklumat maklumat tentang pergerakan air bandar.

DEVELOPMENT OF NEW TIDAL MONITORING MOBILE APPS



JUPEM will produce a new web based system for Tidal Monitoring system so that the data can be easily disseminate to users and public. The user can obtain the forecast and recorded data easily from the new developed system.



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 East Asia Hydrographic Commission (EAHC)

VISION

To become a quality and credible hydrographic services provider.

MISSION

To provide accurate hydrographic information at reasonable time for marine purposes, national development, national defence and other use

PRESENT PLATFORMS

The National Hydrographic Centre (NHC) is currently operating a survey platform consisting of the KD Perantau, MV Danum 161 and MV Danum 162, all of which are equipped with multibeam data acquisition and processing systems complete with differential satellites positioning systems. Furthermore, under the Leasing Ship Contract, NHC also has access to an Autonomous Survey Vessel (ASV) for enhanced hydrographic survey capabilities. NHC also owns two Survey Boats located in Sandakan, Sabah and Port Klang, Selangor, which are used for shallow water survey.



MAL CHART SERIES

Malaysian Chart series (MAL) are published in conformation to IHO Standard and Specification. To date, 102 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, 124 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





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 unfailing 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

2736A, Jalan Permata 4, Taman Permata, Ulu Kelang, 53300 Kuala Lumpur

Tel : +603 41088540 Fax : +603 41071140

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Website: www.pejuta.com.my



Hydrographic Surveying I Programme
(UTM HYDRO I) FIG/IHO/ICA Category B
[14 MAY 2023 - 27 NOVEMBER 2023]

Recognised by



In collaboration with



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]".

Hydrography and Marine Technology Programme
(UTM HYDRO III) FIG/IHO/ICA Category A
[27 JANUARY 2023 - 27 DEC 2023]

Recognised by



In collaboration with



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).

UTM Hydrographic Surveying Programme Activities



For further details, please contact us:

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