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Dari Meja Ketua Editor

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Revolusi Perindustrian 4.0 kini rancak diusahakan serata dunia dari hari ke hari. Ianya merupakan satu revolusi baharu yang akan memberikan lebih banyak kemudahan dalam mewarnai gaya hidup sekali gus meningkatkan produktiviti ekonomi, hospitaliti, perkhidmatan dan sektor lain. Aktiviti perkongsian maklumat geospatial turut tidak ketinggalan menghadapi cabaran ini. Untuk merealisasikan revolusi ini, maklumat geospatial seharusnya sentiasa menerima pembaharuan dan menuju ke arah lebih pintar. Perkongsian maklumat geospatial juga harus sentiasa selari dengan dasar dan strategi Rancangan Malaysia Ke-12 (RMK-12) yang akan digubal berasaskan kepada tiga dimensi, iaitu pemerkasaan ekonomi, kelestarian alam sekitar dan kejuruteraan semula sosial.

Terbitan ini diharapkan dapat menjadi salah satu wadah dalam mempelbagaikan penyampaian berita berkenaan aktiviti perkongsian dan penyebaran maklumat geospatial kepada semua. Antara tujuan utama penerbitan BGSA ini adalah untuk menyebarkan maklumat terkini peristiwa dan aktiviti yang telah dijalankan sepanjang tahun.

Antara paparan dalam penerbitan kali ini ialah artikel-artikel teknikal yang disumbangkan oleh pengamal-pengamal geospatial. Turut dimuatkan untuk ruangan Aktiviti MyGDI pelbagai laporan berkaitan lawatan, pameran, kursus, latihan dan mesyuarat yang diadakan sepanjang tahun 2019. Kesemua aktiviti yang dijalankan merupakan antara usaha dalam mempromosikan Program Infrastruktur Data Geospatial Negara (MyGDI).

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PUAN HAJAH ABRIZAH BINTI ABDUL AZIZ
Pengarah MaCGDI

ADVANCING MALAYSIA'S NATIONAL SPATIAL DATA INFRASTRUCTURE BY LOOKING EAST

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Abstract

Malaysia has embraced the establishment of a National Spatial Data Infrastructure (NSDI) since 1997, despite that, a national policy on the management of geospatial data has been missing. Formulation of a National Geospatial Master Plan (NGMP) initiated by Malaysian Centre for Geospatial Data Infrastructure (MaCGDI) has been completed in May 2018 under the auspice of previous Ministry of Natural Resources and Environment (NRE). However, the fate of NGMP lies in uncertainty after the recent change of ruling party to the government. Meanwhile, we should revisit the ideas presented in NGMP itself, and realign it with the current political climate and financial situation of Malaysia. Malaysia has always looked up to Japan since the era of 1980. Japan has established their NSDI Act which is the "Basic Act on the Advancement of Utilizing Geospatial Information" in May 2007. Since then, long term "Basic Plan for the Advancement of Utilizing Geospatial Information" has been prepared, executed and evaluated accordingly, steadily guiding Japan's geospatial development. In accordance to a revived 'Look East Policy' of Malaysia, I attempt to take inspiration from Japan's NSDI experience. Several recommendations are made toward the end of this study. Nevertheless, the views and opinions expressed in here do not necessarily reflect the official policy or position of any agency of the Malaysian government.

1 Introduction

It is a well understood fact that geospatial information is important. Generally speaking, it's importance range from application as little as safeguarding individual privacy, protecting individual property rights, to as big as upholding national security and sovereignty of a nation. Historically, the National Spatial Data Infrastructure (NSDI) initiative begin with the United States of America (U.S.A.) when former President Bill Clinton ordered in Executive Order 12906 of April 11, 1994 to establish NSDI to advance the goals of the U.S.A. National Information Infrastructure (NII), and to avoid wasteful duplication of effort, promote effective and economical management of resources by all levels of governments (Government of USA, 1994). A pioneer in developing National Spatial Data Infrastructure (NSDI), the United States of America (U.S.A.) defines NSDI as:

"…the technology, policies, standards, and human resources necessary to acquire, process, store, distribute, and improve utilization of geospatial data"

(Government of USA, 1994)

The concept of SDI gained international recognition in the mid-1990s (Deloatch, 2014) and nations worldwide began to follow suits and embarked on a journey to establish their own NSDI. Malaysia began its effort in year 1997 when the Malaysian Cabinet decided to develop Malaysia's land information system by setting up a Secretariat for National Infrastructure for Land Information System (NaLIS). NaLIS Secretariat was later replaced by the Malaysian Centre for Geospatial Data Infrastructure (MaCGDI) in 2002, which is responsible for the development of the Malaysia Geospatial Data Infrastructure (MyGDI) as Malaysia's version of NSDI (MaCGDI, 2010).

2 Background And Progress Of NSDI Development In Malaysia

During the early 80s and 90s, when Malaysia is fast capitalizing on the emergence of internet together with the advances in information and communication technologies (ICT), valuable geospatial information was mainly captured and stored in standalone systems in various format and standards, accustomed to individual agency needs. Data sharing is not a common practice, if not even possible, to say the least. Realizing this, NaLIS was established as an initiative of Malaysia Government to promote and facilitate geospatial information sharing and to avoid wasteful duplication among related agencies. Five (5) years later MaCGDI took over the baton from NaLIS Secretariat with a stronger mandate to garner greater participation of partners (MaCGDI, 2010).

3 Geospatial Legislative Vacuum In Malaysia

Despite Malaysia endeavour of establishing a NSDI for more than 20 years, its progress in engaging data sharing and improving access of geospatial information to the public has been painstakingly slow. The responses to call for data sharing particularly among government linked utility companies that possess huge amount of geospatial data is lukewarm if not totally reluctant. According to study conducted, several major issues that have led to inefficient governance:

- **The absence of regulatory moves, coordination or any systematic governance at the highest government level;**
- **The direction of geospatial governance and strategy is no adequately recognised;**
- **SDI is not fully recognised;**
- **SDI governance is not adequately acknowledged;**
- **Limited spatial resources, skills and expertise;**
- **Inter-organisational conflict; and**
- **Lack of cooperation between government agencies.**

NaLIS Secretariat was set up by an executive order made by the Chief Secretary to the Malaysian Government through a government circular in 1997 and is not based on legislation (Nordin, 2006), and MaCGDI is basically a restructured NaLIS. Circulars and guidelines developed by MaCGDI are basically administrative order in nature and have no legal binding power over various federal agencies, and certainly non-obligatory for State agencies to abide by them. Although NSDI infrastructure has been long established in Malaysia, but without the proper legal framework to empower its governance and coordination, progress has been slow. Lackadaisical attitude from key geospatial agencies are slowing the geospatial reformation in Malaysia to tap the full potential of a Spatially Enabled Government.

Realising the missing link in Malaysia's NSDI framework, the 11th Malaysia Plan which spans from 2016-2020 recognised the need to formulate a new geospatial policy framework and legislation (MaCGDI, 2018b). In 2016, MaCGDI was tasked with formulating a National Geospatial Master Plan (NGMP) to rejuvenate the current NSDI infrastructure substantially.

4 National Geospatial Master Plan (NGMP)

The study was conducted from June 2016 and it was completed on May 2018. Its deliverables include the followings:

Volume 1 – Draft National Geospatial Policy (NGP)
Volume 2 – Proposed National Geospatial Governance Structure
Volume 3 – Draft National Geospatial Bill
Volume 4 – Proposed National Geospatial Enterprise Architecture Framework (NGEA)
Volume 5 – Proposed National Geospatial Strategic Plan (NGSP)

Volume 1 describes the direction of geospatial development for Malaysia and defines the purpose, principles, objectives, and strategic thrusts for the development and management of the national geospatial agenda. Volume 2 proposes organisational structure which is empowered to regulate and govern the implementation of the new National Geospatial Policy and Act. Volume 3 proposes a national legislation. Volume 4 proposes framework that describes the architecture of business governance and its relationship with technology resources, applications, and information to achieve current and future objectives in national geospatial management. Lastly, Volume 5 provides a national action plan for the next 10 years which will be the National Reference (MaCGDI, 2018b).

5 Geospatial Development In Japan

In 1994, the world was informed of the US initiative of developing an NSDI. Few months later, the Great Hanshin earthquake struck Japan in January 1995. These two (2) seemingly unrelated events have directly catalysed the support to develop a new GIS information infrastructure for prompt emergency responses and quick recovery in Japan (Murakami, 2008).

NSDI effort in Japan started with the setting up of a Liaison Council for GIS in 1995. Since then, much effort has been made by the Council includes establishing standards for geospatial information, determining long-term plan for development of Japan's national land spatial data infrastructure and promotion of dissemination of GIS. In 2002 the Council formulated 'GIS Action Program 2002 – 2005' targeting minimal electronic maps covering whole Japan, advancing base map data such as digital map 1:2500 and 1:25000 (Ono, 2009).

In 2005 a new "Council for promotion of positioning and geographic information system" was established. In 2007 'GIS Action Program 2010' was determined, the goal of this program is realising a society that enables advanced use of geospatial information, by facilitating the development of fundamental geospatial data to the level appropriate for positional references, preparing outlines of standards and rules for promoting circulation of geospatial information, establishing industry-academia-government cooperation system, and others (Ishizeki, Yoshida, & Takano, 2018).

An important effort came in 2007 with the enactment of "Basic Act on the advanced of utilising geospatial information" (hereafter referred to as the NSDI Act). In the same year, Ministry of Land, Infrastructure, Transport and Tourism (MLIT) detailed the NSDI Act requirement with an Ordinance defining fundamental geospatial data (FGD) items and standard, followed by a Public Notification regarding standard for technologies related to development of fundamental geospatial data (Ono, 2009). In the following section, we take a closer look at the NSDI Act in Japan that has helped the advancement of geospatial information utilisation.

5.1 Basic Act On The Advancement Of Utilising Geospatial Information (NSDI Act)

The NSDI Act of Japan main purpose is to advance policies concerning the Advancement of Utilising Geospatial Information (AUGI) because the Government believe geospatial data is essential in establishing an economy and society in which the people can live their lives securely and prosperously (Government of Japan, 2007).The NSDI Act has provided the geospatial community in Japan the necessary high-level legal framework to develop an infrastructure; however it leaves the details of its implementation to the Government, which is mandated to develop a Basic Plan in accordance with the principles and policies prescribed in the Act (Murakami, 2008).

The Act explicitly mentioned that it is the responsibilities of the States Government to develop a Basic Plan with specific goals and duration that is required to achieve them, make the plan public and review its achievements publicly. Meanwhile, the local governments are responsible for developing and carrying out policies according to the Basic Plan. The NSDI Act dictates that the government provides Fundamental Geospatial Data (FGD) and other geospatial information free of charge through the Internet.

The promulgation of this important Act set in motion the onset of geospatial data sharing and updating in a timely manner. The Geospatial Information Authority of Japan (GSI), which began to serve as the secretariat even before the promulgation of the Act (Ishizeki et al., 2018), together with the Cabinet Secretariat and National and Regional Planning Bureau of MLIT played a key role within the government as the secretariat of the Conference for the Advancement of Utilising Geospatial Information (hereafter, "Advancement Committee") (Government of Japan, 2015). The Advancement Committee were drafting plans to promote government-wide application, compiling policies promoted by relevant government agencies, and facilitating cooperation between industry, academia and government.

Since then, 3 Basic Plans for Plan for the Advancement of Utilising Geospatial Information (AUGI) have been developed by the Advancement Committee:

- Basic Plan for the Advancement of Utilising Geospatial Information (2008-2011)
- Basic Plan for the Advancement of Utilising Geospatial Information (2012-2016)
- Basic Plan for the Advancement of Utilising Geospatial Information (2017-2021)

5.1.1 Basic Plan for The Advancement of Utilising Geospatial Information (AUGI)

The Advancement Committee developed first “Basic plan for the Advancement of Utilising Geospatial Information (2008-2011)” in 2008 (Cabinet decision on April 15, 2008). In the first Basic Plan, basic strategies for the policies concerning AUGI, measures related to GIS and policies related to Space-based Positioning, Navigation and Timing (Space-based PNT) are stated. The period of the first Basic Plan is set for fiscal years 2008-2011 (Government of Japan, 2008). To promote measures formulated in this Basic Plan, the Action Plan for the Advancement of Utilising Geospatial Information (G-Spatial Action Plan) was enacted in August 2008. Under the G-Spatial Action Plan, GSI is carrying out various important measures including preparation, improvement, upgrading, provision and standardisation of geospatial information such as Fundamental Geospatial Data (UN-GGIM, 2015).

In 2011 Japan Cabinet established the second Basic Plan (2012-2016) against the backdrop of increasing demand for geospatial information with the explosive growth of personal technologies such as smartphones, and yet another massive earthquake that shock the world, the Great East Japan Earthquake. The government has taken to notice a fusion of new technology has improved the environment for utilising geospatial information, such as augmented reality (AR), cloud computing, open-sourced GIS, etc. New demand for indoor positioning is also on the rise. Besides, numerous devices that acquire information on position and time are becoming dependent on Space-based PNT, leading to the government intention to develop a practical quasi-zenith satellite system by increasing the number of QZSS satellite to four by late 2010s and complete a seven-QZS constellation targeting 2023 in the ‘Basic Plan on Space Policy’ (Nagata et al., 2017). In addition, fresh from earthquake and tsunami attack, the second Basic Plan stress the important of immediate availability of accurate geospatial information to be provided in order to contribute to the rapid recovery and restoration after natural disaster. Other focuses include seamless indoors and outdoors positioning amid growing expectations for effective evacuation plans for buildings and underground areas. Under this plan, a G-Spatial Information Centre is established to function as a hub of geospatial information and started its operation on 24 November 2016.

The third Basic Plan for AUGI (2017-2021) was established on March 24, 2017 by a Cabinet decision. The prospect of hosting 2020 Olympic loom largely over its policies formulation and dominate with Symbol Projects prioritised to showcase Japan as an advanced geospatial information utilisation society to the world. This Plan foresee the number of QZSS satellite increase to four targeting 2018 as planned under the second Basic Plan, providing highly accurate real-time locations and time across Japan, and anticipate the G-Spatial Information Centre to be fully operational in 2018 (Yoshida, 2018). The third Basic Plan includes some ambitious plans such as promoting a G-Spatial Disaster Prevention System, development of advanced automatic driving system, promoting delivery using drone, promoting precise indoor positioning, promoting automatic farm equipment driving technology, accelerating 3D data usage in i-Construction, etc.

5.2 Related Legislation & Policies, Initiatives Advancing Utilisation Of Data In Japan

In this section, we take a brief look at related legislation, policies in Japan that directly and indirectly help to advance geospatial information utilisation and the products from some of these policies and initiatives over the years.

5.2.1 Legislation and Policies Promoting Data Utilisation in Japan

Beside the NSDI Act which is enacted in 2007 and the subsequent three (3) Basic Plans developed for a period since 2008 to 2021, listed below are legislative and policies that has helped to advance the utilisation of geospatial information

a) Guidelines for Handling Personal Information when Utilising Geospatial Information (September 2010);
b) Guidelines for Promoting the Secondary Utilisation of Geospatial Information (September 2010);
c) Open Data Policy *(http://www.data.go.jp)*
   The Government of Japan adopted Open Government Data Strategy on July 4, 2012 as a fundamental strategy on promoting the use of public data by disclosing public data in machine-readable formats and allowing secondary use for profit-making or other purposes; and
d) Basic Act on the Advancement of Public and Private Sector Data Utilisation (December 2016) It is an Act to establish foundation to promote utilisation of data prepared by the government and the private companies, increase in the smoothness of content circulation, ensuring consistency between State’s and local public entities’ measures, through the formulation of Basic Plan and establishment of the Strategic Conference, in order to realise a vigorous Japanese society.

5.2.2 Initiatives to Advance Utilisation of Geospatial Information

a) Committee of AUGI (formed under NSDI Act)
- Chaired by Deputy Chief Cabinet Secretaries, members include Director – General of almost all ministries. Foresee the overall implementation of NSDI Act.
- Committee on Industry-Academia-Government Alliance (Initiated during Basic Plan 1)
- A linkage among business, academia and government established in October 2008 to exchange opinions, promote utilisation, formulate policies, and develop technologies and services to enable the society to intensively use geospatial information by taking social needs and challenges into account.
- Three (3) working groups (WGS) were set up: Research and Development, Disaster Prevention, and Geospatial Expo.

b) Committee on Industry – Academia – Government Alliance (Initiated during Basic Plan 1)
- Conferences, symposia, exhibit of new products and new services in which the government, industry and academia exchange opinions and information and to tap into the private sector's innovativeness to create new services and enlightening laypersons. The first Expo was held in September 2010.

c) R&D Map for Utilising Geospatial Information (Initiated during Basic Plan 1)
- Compiled by the Research and Development Working Group to provide a roadmap for future research and development in June 2009.

d) G – Spatial Information Center (https://www.geospatial.jp/gp_front/) (Initiated during Basic Plan 2)
- A portal site that act as a sort of clearinghouse for information from government and the private sector. A catalogue site of geospatial information operated at present by Association for Promotion of Infrastructure Geospatial Information Distribution (AIGID), based on the contract with the National Land Information Division of MLIT (Ishizeki et al., 2018). It gathers, analyses, processes, converts and provides geospatial information owned by different bodies.
- The establishment of G-Spatial Information Centre is decided by Basic Plan 2 and started operation on November 2016.
- Its usage is expanded to private enterprises and general public based on the 3rd Basic Plan trial of active utilisation (Yoshida, 2018).

e) GSI Maps Partner Network (Initiated during Basic Plan 2)
- This network was established in 2014 and conferences are held twice a year. It is a meeting among GSI (producer of GSI Maps), users of GSI Maps, and companies that want to make products using GSI Maps (Motojima, 2018).

f) Automated farm equipment (Initiated during Basic Plan 2)
- A 4 billion yen Japan government initiative in 2016 promoting farming automation technology using driverless tractors utilising global positioning system, agricultural drones capturing images helping farmers to make decisions managing crops (Allan Croft, 2016).

g) i – Construction ICT – Integrated Construction (Initiated during Basic Plan 2)
- MLIT launched i – Construction in 2016. Its goal is a 50% increase in construction workers' productivity with the use of drones paired with Lidar technology, driverless dozers, automated dump trucks, and robots (The Nikkan Kensetsu Kogyo Shinbun, 2015).

Visit to Onagawa nuclear power plant, Sendai, Japan

5.2.3 Products Resulted from The Relevant Initiatives:

a) Japanese Standards for Geographic Information (JSGI) (Initiated before Basic Plan 1)
- Japanese Standards for Geographic Information (JSGI) is established as a standard of the national government. Globally, formulation of standardisation of geographic information is carried out in the ISO/TC211. In Japan, as a results of joint research with private sectors, GSI made JSGI as standards in Japan for 13 basic standard items such as application schema, spatial reference, encoding, data quality and metadata (specifications of data), etc. Geographic information complying with JSGI includes the Digital Map 25000, Digital Map 2500, Digital National

Land Information, Residential block level Location Reference Information, among others. In addition, to promote use of standards, GSI developed the Japan Profile for Geographic Information Standards (JPGIS) in March 2005, as a practical profile of JSGI (Koarai, 2006).

b) Fundamental Geospatial Data (FGD) (Initiated during Basic Plan 1)
- Fundamental Geospatial Data prepared by GSI, by public surveying and mapping or by maritime surveying, refers to positional information including 13 categories as required under MLIT's Ordinance No.78 that should be used as the standard spatial reference for geospatial information. The first Basic Plan instructed that GSI shall virtually complete the development of FGD by 2011. However, currently only 10 features are available. For 3 features related to cadastre, more time is needed to develop the data. In fiscal 2008, fundamental geospatial data of 1:25,000 in scale for the entire country were publicly released on the Internet; at the end of fiscal 2011, highly precise 1:2,500 fundamental geospatial data covering nearly all of Japan's urban planning zones were released free of charge on the Internet (Government of Japan, 2012).

c) Quasi-Zenith Satellite System (QZSS) (Initiated during Basic Plan 1)
- The September 2010 launch of "Michibiki", Japan's first quasi-zenith satellites (QZSS) helped to supplement and strengthen the positioning functions of GPS, provide technical and utilisation corroboration among corporate and organisation. It enables Japan to effectively maintain an environment that enables the people to receive stable and highly reliable positioning. A unique capability includes two-way messaging function for safety confirmation after a disaster.
- In regards to ensure stable use of GPS in Japan, Joint Announcement on United States-Japan GPS Cooperation made in September 1998 by leaders of Japan and the US is serving as the basis for holding meetings as regularly as possible to investigate and discuss important items related to Global Positioning System (GPS) use (Government of Japan, 2012).

Visit to Very Long Baseline Interferometry (VLBI) Station, Tsukuba, Japan

d) Statistical Geographic Information System ("Thematic Maps" (Statistical GIS)) (Initiated during Basic Plan 1)
- A3 Statistical Geographic Information System ("Thematic Maps" (Statistical GIS)) on the "Portal Site of Official Statistics in Japan" (e-Stat) which is a clearinghouse for government statistics in the Official Statistics Sharing System and promote the integration of regional statistics and boundary information for statistical units held by government ministries into the Statistical GIS. The first Basic Plan instructed that full-scale operation of this system shall commence in 2008.

e) Denshikokudo ("Digital Japan") Web System (http://cyberjapan.jp/)
- Started in 2003 and discontinued in 2011, replaced by GSI Web Maps.

f) GSI Maps (https://maps.gsi.go.jp/) (Initiated during Basic Plan 1)
- Web map services provided by GSI. The data of GSI Map are called GSI tiles. GSI tiles are made from the data of Digital Japan Basic Maps, aerial photographs and other thematic maps.

g) Digital Japan Basic Map (http://www.jmc.or.jp/) (Initiated during Basic Plan 1)
- Map data made by GSI, which contain FGD features and other features such as place names, map symbols, etc. The data are published with CD-ROMs and online. They are not free (including cost of CD-ROMs, network and server maintenance, etc.). It can be purchased via Japan Map Centre.

GPS Fieldwork at College of Land, Infrastructure, Transport and Tourism (COLIT)

6 Geospatial Legal Trend Of Malaysia And Japan

Malaysia for the past two (2) years has been working hard to draft a National Geospatial Master Plan. It has been a herculean task to garner support, cooperation and achieved consensus from among the related government's agencies. Although the draft was finally completed in 2018, it has yet to be presented to the government of the day for deliberation, consideration, revision and approval. Matters are further complicated by the sudden change of government resulted from the recent general election, which seen the previous coalition that has ruled Malaysia for 61 years toppled and replaced. As a result, many initiatives, major projects approved and administered under the previous Government has been put on hold or terminated. The current financial situation in Malaysia also does not favour expanding MaCGDI to become the new Implementing Agency as envisioned by the drafted National Geospatial Bill. Amidst the uncertainty, we should revisit the ideas presented in NGMP itself, and realign it with the current political climate and financial situation of Malaysia. While doing so, we look at Japan's unique legislative framework in NSDI for inspiration.

Briefly, Japan's NSDI Act provide an overarching legal framework for one important purpose, which is to enhance utilisation of geospatial information. It did so by establishing basic principles and clarifying the responsibilities of the State and local governments for policies that will achieve this goal. In all honesty it sounds more like a guideline than a strict law. It made no mention about any detail plan, scope of power, governance structure, nor does it has any punitive measures. However, it acknowledged the synergy between geospatial data, GIS and PNT technologies (positioning, navigation and timing) is important to realise its goal. It's the collective responsibilities of all State and local governments to establish policies, not just the federal government alone. Basic plan shall be developed with tangible goal and timeline, review and result published, accountable to the people of Japan. As noted by Dr. Hiroshi Murakami, the former Director General of GSI, it creates an encouraging environment for the governments to start using digital map data and cooperatively work to develop and maintain FGD.

Meanwhile, in the case of Malaysia the proposed National Geospatial Bill wish to set up a National Geospatial Council chaired by the Prime Minister, establish a new Implementing Agency giving its Director General power to prescribe specifications for sharing foundation geospatial data from data custodian, ensure compulsory compliance from all data custodian, and detailing what constitute as an offence under this Act. The proposed bill makes no mention of any policy as its main purpose is to provide legal framework for the establishment of proper governance structure and ensure strict compliances. The enforcement clauses occupy almost half of all the entire proposed National Geospatial Bill, bestowing power to the Director General of the new Implementing Agency to seize or even arrest person who commit an offence under this Act. The stark contrast between the nature of Japan's NSDI Act and Malaysia's proposed National Geospatial Bill perhaps to a certain extent reflect the reality that most geospatial agencies in Malaysia still regard FGD as something meant for internal consumption, or they are not ready, or uneasy about sharing their data. Japan's NSDI Act promote encouragement while Malaysia's favour punishment in non-compliance. The lack of punitive measure in Japan's NSDI Act however has not hinder their effort in getting cooperation from various government agencies, due to the incentive of giving cooperation is greater than not, and a brilliant and systematic execution of Basic Plan, which steer the nation and making sure everyone know what to do for the next couple of years. Therefore, it is important for the Malaysia government to create incentive to sustain its geospatial revolution, to encourage cooperation rather than to have punitive measures.

7 Recommendations To Malaysia

Improving utilisation of geospatial data in Malaysia is essential in it's pursue of becoming an advance geospatial society. NGMP is vital to Malaysia's economy and catching up to the world trend in this era of Big Data, Internet of things (IoT) and Industry 4.0. There are now two urgent tasks for the Malaysian government, especially the Malaysian Centre for Geospatial Data Infrastructure (MaCGDI) that spearhead the formulation of NGMP: firstly, to identify possible shake-up to the current institutional and legislative arrangement; secondly, to revise NGMP considering the geospatial strategies of Japan, and to table the revised NGMP again at a later period.

7.1 Proposed Solutions Under Current Status Quo

The Risk Management under the proposed National Geospatial Strategic Plan (NGSP) has assumed many potential scenarios and suggested mitigation, and those scenarios include the risk of the proposed National Geospatial Policy, National Geospatial bill not approved, and Implementing Agency not established. The current administration has decided to shelve the NGMP proposal following a change of ruling party to the government after the May 2018 General Election. Under the current circumstances, I propose the current administration to consider the followings:

- To elevate MaCGDI status from a Division to a Department (for example: Malaysia Geospatial Agency).
- To relocate MaCGDI administratively under the Prime Minister's Department, neutral of any domain ministry.
- To solicit for the Chief Secretary to the Malaysian Government to chair MyGDI National Coordinating Committee (JPMK), the existing highest national committee.
- As proposed under mitigation in Risk Management:
  - ✔ Restructure MaCGDI internally, but not necessarily according to the proposed structure of Implementing Agency, but according to needs.
  - ✔ Review and revise existing circulars, guidelines and establish new one to be signed by the Chief Secretary to the Malaysian Government.
- Revise NGMP particularly in relation to:
  - ✔ National Geospatial Bill: Explicitly mentioning the policies of national geospatial agenda, clarifying responsibilities of all level of governments, review the need of punitive measures, and incorporating the need for Basic Plan.

7.2 Recommendations to Advance Utilisation of Geospatial Information

Sharing relevant geospatial information is important to advance its utilisation for the benefit of the whole nation. A good NSDI framework that shared irrelevant information is as good as useless. We saw this happened in government Open Data Policy where sometime what is being shared is of little interest and value to the general public. Therefore, we shall promote the utilisation of geospatial information aggressively and continuously, like what Japan is doing since 2007 for the past 11 years. Hence, I propose the following for consideration:

- Adopt systematic implementation of geospatial agenda like Basic Plan similar with Japan, which has high transparency and accountability.
- Provide Fundamental Geospatial Data (FGD) freely to the public, not just government to government (G2G), promoting secondary use hence invigorating business and contribute to society and economy development.
- Promote utilisation of GIS in every agency to maximise the benefit from geospatial information.
- Establishing MyGeospatial Partner Network similar with GSI Maps Partner Network.
- Establishing MyGeospatial Alliance which includes the government agencies, academia and Industry similar with the Committee on Industry – Academia – Government Alliance in Japan.
- Establishing MyGeospatial portal that act as clearinghouse not just for the government but also private sector.

8 Summary

Our Japan counterpart experience teaches us valuable lessons. A whole nation must march toward the same direction and for that we need a policy. Everyone should comply, and for that we need incentive and regulation. The geospatial data that is shared must be something that the people and the industry need and can benefit from, not something that has no demand, for that we need to listen and engage the people. When geospatial data is readily available, we need to know how to turn it into useful information, and for that we need tools, such as GIS. The general public must be enlightened of the benefit of utilising geospatial information in daily life. To advance the effective sharing and utilisation of geospatial information in Malaysia without jeopardising national security, relevant laws and regulations that might hinder it's grow should be revised. Subsequently, Malaysia should shift from a spatially-enabled government towards a spatially-enabled society.

Finally, a good culture and value system in Japan has certainly contributed to Japan's ability to develop at astonishing pace. A great NSDI framework will also fail if its citizen is selfish and uncooperative. Malaysia has much to emulate from Japan, and by looking east, hopefully Malaysia's NSDI development will take a quantum leap.

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SATELLITE ALTIMETER IN OCEAN WAVE HEIGHT STUDIES

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Abstract

The need for precise measurement of oceanic data such as ocean wave height has led to a development of many measurements technique. This paper presents how satellite altimeter technology have helped researchers in understanding ocean dynamics. Although conventional method of obtaining these data are well established especially in accuracy but most of these method are very sparse in term of spatial distribution. It was concluded that using altimetry data, we can solve the disadvantage of conventional measurement in terms of spatial data distributions.

1 Introduction

Most oceanographic research and study need the compilation of long-term databases of accurate oceanic properties such as significant wave height and wind speed. Before this, wave climate data are gathered through the deployment of oceanographic buoys and more recently through the use of numerical models (Caires et al. 2004). Both techniques have their own disadvantages. For instance, in-situ measurement using buoy clearly have limitation in terms of data coverage (spatially) and very expensive in term of deployment and maintenance.

Previously before there was time of radar altimeters, our knowledge and understanding of the world's wave climate were based on a few buoys moored off the coast of Japan, Europe and North America and visual observations taken from merchant ships (Gommenginger et al., 2003). All of the mentioned source of data have their own deficit. For example, VOS information was patchy, highly questionable and in many cases of poor quality but provide good special distribution meanwhile buoys provide very high accuracy data but very poor in term of spatial distribution. It was almost impossible to accurately combine both data.

Meanwhile, using model data actually can solve all these disadvantages but the biggest challenge for this technique relies critically on the accuracy of the model. Even though modern-day models contain sophisticated representations of wind–wave physics, the accuracy of such models are still limited (Tolman, 2002). For instance, studies conducted by Dobson et al. (1987) and (Monaldo, 1988) have shown that active remote sensing satellites, particularly Ku-band radar altimeter systems, are capable of measuring significant wave height and wind speed to an accuracy comparable to in-situ observations (e.g., buoys).

Satellite altimetry have given us a new perspective on ocean wave variation or climate. The series and various type of satellite altimeter instruments that made continuous measurements of significant wave height across the world make a better temporal and spatial coverage of the wave height data collection. The pilot work project using altimeters is mainly concentrated on simple mapping of wave variation and seasonal variation and investigating wave means. However the ability to look at inter-annual variability was possible after a longer record of wave height data was available. The dramatic increase of wave height at a few site around North East Atlantic were detected since late 1970's using altimeter technology.

The first opportunity for recording a long term data started with GEOS-3 in 1975. Unfortunately it did not have the capabilities for on board recording data. The first picture of wave height variation around the world are available with advent of Seasat in 1978. After the launch of Geosat in 1985, the chance for the first time to look at seasonal and inter-annual variation in the wave climate around the world were came true.

2 Altimeter Measurement Concept

The basic principle of satellite altimeter is based on the pulse that is reflected at the sea surface and backscattered according to wind and waves (refer figure 2.1). The pulse then will be received by the altimeter antenna after a few mili-seconds.

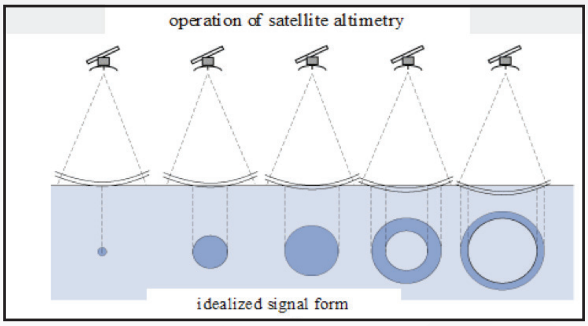

Figure 2.1: Footprint development (Courtesy of W. Bosch - Satellite Altimetry, ESPACE, 2010)

There are three (3) main parameters in reflecting the pulse from the ocean; they are the slope of the leading edge of the returned echo for wave height determination, travel time to measure distance to sea level and the energy of the impulse response for wind speed determination (Bosch, 2010). Meanwhile, the independent tracking systems are used to compute the satellite's three-dimensional position relative to a fixed Earth coordinate system (Din et al., 2012).

However, the situation is far more complex in practice. Several factors have to be taken into account for the corrections of altimeter range measurements such as orbit error (radial component) and instrumental effects such as electronic time delay, clock (oscillator) drift, offset antenna phase centre, centre of gravity, time lagging of observations, doppler shift error and so on. Another correction to be done is the atmospheric refraction due to ionosphere, troposphere (dry component) and troposphere (wet component). Other component that also can affect the signal is ocean surface such as ocean tides, earth tides; electromagnetic bias (sea state) and inverted barometer effect (Bosch, 2010). All of the effect and the correction can be referred to Figure 2.2.

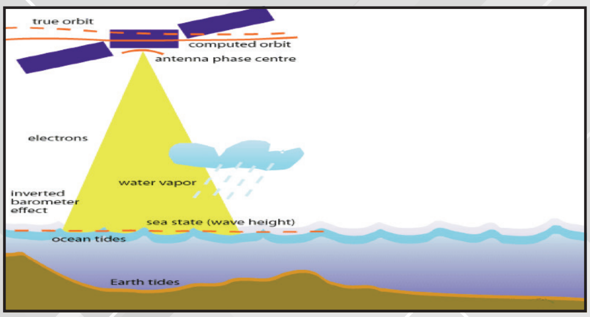

Figure 2.2: Corrections for Altimeter Range Measurements (Bosch, 2010)

Figure 2.3 shows the basic schematic diagram of satellite altimeter system (Jason-1) and its principle.

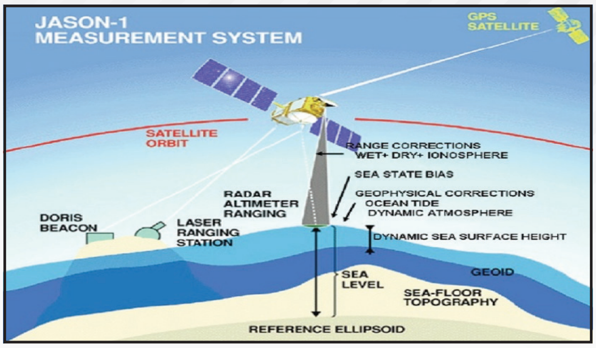

Figure 2.3: Principle of Satellite Altimeter (Courtesy of AVISO)

3 Conclusion

Remote sensing satellite technology is very useful and has a very huge potential in terms of measuring the dynamics of the earth either in ocean or on land. Satellite Altimeter technology fall within this concept. It provides a series of continuous data for years and can cover up for almost every part of the sea. This means that this technology can be used as a complementary tool to account for the limitations of the conventional win speed measurements techniques. In conclusion, satellite altimeter technology are extremely helpful in research, education and sea management.

4 Acknowledgement

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BUILDING INFORMATION MODELLING IN INDUSTRY AND ACADEMIC: IN THE LENSE OF GEOMATICS ENGINEERING AND SURVEYORS

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1 Introduction

US National Building Information Model Standard Project Committee stated that Building Information Modelling (BIM) is a digital representation of physical and functional characteristics of a facility. It is a model-based that combines technologies and processes to support the efficient creation and use of information for building construction and operations. As it is closely related to spatial information, BIM offers a familiar outlook and rich possibilities for surveyors and other geospatial professionals.

At present day, government and construction industry have realised the importance of implementing BIM in Malaysia. The establishment of National Cancer Institute in 2013 was the first ever project in Public Works Department Malaysia (PWD) and in fact in Malaysia that applied BIM. As time progress and technology evolves, more and more construction project required to adopt BIM in the building construction cycle.

However, despite the increasing awareness for BIM, more focus was given on construction industry and less is given to surveyors or in geomatics engineering point of view. Hence, the foundation should start from higher education so that the future geomatics graduates are fully prepared to face the industry. It is imperative to emphasise BIM in the context of geomatics. Currently, majority of higher education institutions provide BIM in the civil perspective rather than geomatics.

On top of that, Department of Survey and Mapping of Malaysia DSMM as the key industry player in conducting the survey and mapping business has embarked in implementing BIM through one of its digital delivery systems. This is to ensure that DSMM is always keep abreast on the latest survey technology.

2 What Is BIM For Geomatics?

Surveyors are involved in surveying the site to determine the availability of land and its relationship to existing structures and infrastructure. Then, during construction, they may be hired to carry out setting out-work. Beyond that, their involvement is usually minimal and fragmented.

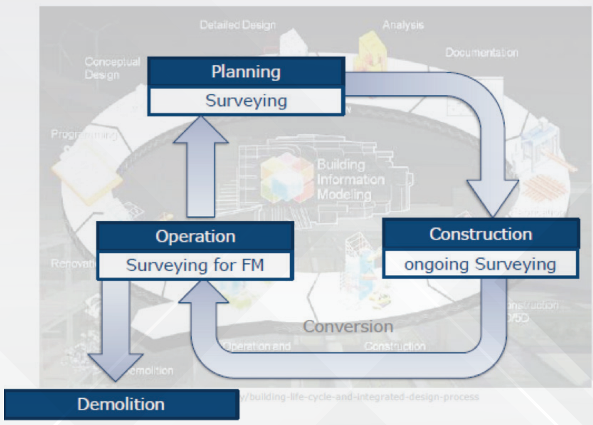

Figure 1: Surveyors' Role in the BIM Lifecycle
Source: FARO BIM for Surveyors during FIG Working Week 2017

Figure 1 depicts three (3) stages that might involve surveyors in the whole BIM lifecycle. The role of surveyors can be found in planning, construction and operational level. These job scopes are closely related with reality capture. Reality capture is a process of scanning an object, site or building and producing a digital model representation to capture site data quickly and more accurately than ever before and consequently connect it directly to the digital design process. The result is a comprehensive 3D model based on millions of point clouds mapping the entire site, whether it is a building renovation or an infrastructure project. Figure 2 shows DSMM Bangunan Ukur in point cloud and BIM Model.

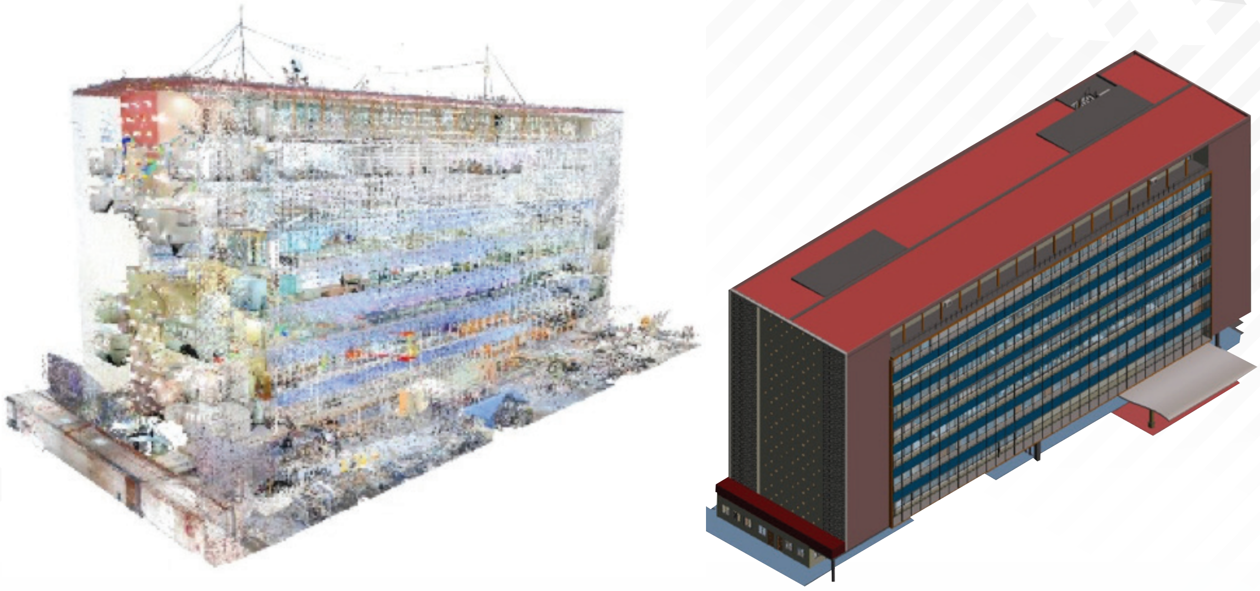

Figure 2: DSMM Bangunan Ukur in Point Clouds (left) and in BIM Model (right)

Construction as-built surveys possibly required at varying points during the construction process to monitor the construction as it is progressing. It is to provide valuable information such as whether the job is being done properly or on what level of completion the project has reached, and if the construction that was authorised is actually what is taking place. Theoretically, the collaboration involving BIM process should mean that buildings should match the design closely; and much has been made to ensure that result when BIM is used to "virtually build and test" before going to site. Still, there will always be as-built differences and surveyors could measure these during construction, when they are visible. Derry Long (2013) suggested that ongoing surveys should be made during construction with a view to recording the as-built position of detail, such as structural steelwork, and in real time, to capture it before finishes and decoration cover it up. Apart from that, reality capture is useful for ongoing surveying where surveyors are able to conduct model quality check, to carry out live analysis for construction processes as well as to do construction process verification.

Not only that, BIM can integrate very well with Geographic Information System (GIS) to assist in planning and at operational and maintenance level. Kaden and Clemen mentioned the use of geodata such as Digital Terrain Model (DTM) and geo-referencing method can help in planning of building for infrastructure projects where geo-design helps stakeholder to analyse, visualise the planned building within the context, and later help various stakeholders make better-informed decisions. Finally, by leveraging BIM and GIS, organisations with large infrastructure can visualise, analyse, integrate, and share information about facilities in organised ways.

3 BIM For Geomatics Students

Teaching BIM to Geomatics students require more effort and deep knowledge on the topic, this is mainly due to the facts that textbooks and software manuals are not enough and safe to say that there is no traditional BIM for Geomatics curriculum yet. Therefore, few appropriate approaches are needed to educate the students, for example - by realising BIM projects with industry partners to expose them with real job on the site. It is also recommended to expand the network and liaise with other faculties – for example, civil engineering faculty in order to guide students on the interdisciplinary work of BIM as the core of BIM is all about collaboration. Further outlook is to visit other higher education institution to learn and gain more insight and information related to BIM and Geomatics.

As stated by Clemen (2018) during BIM for Surveyors Workshop in Istanbul, there are several processes that can be adopted in teaching BIM for Geomatics Students. Always focus on treating BIM as a database instead of drawing. BIM is known to be object based and do bear in mind that BIM is a precise modelling with building objects. From 2D floorplans and sections BIM can transferred this information to semantic 3D model with appropriate drawing and workflows. Students shall also be exposed in creating and managing building objects using BIM software. This is crucial to show the importance of object libraries for measuring existing building as well as to link it with topology of building elements. Next is to emphasise on the value of point cloud for BIM. Students should master on the preparation of the point cloud using off the shelves BIM software as point cloud is a reference for the digitalisation of building elements. As mentioned earlier, point cloud is useful for as-built comparison between an existing model of a building and the observed point cloud. As BIM involved many stakeholders, it always has limitations on coordinate system. The right concept about internal and shared coordinate system and how to use the exact coordinate system is something that required attention.

4 Conclusion

Both the academia and the professional community attested to fact that education is critical for quickening the learning and recruitment of BIM professional for the industry (Yusuf et. al, 2015). They acknowledge the existence of gap between the industry expectations and higher education turned out graduates.

Macdonald, 2011 also mentioned that the education sector especially the higher education is still lacking behind in balancing the imbalance of the industrial needs in terms of manpower to the current turn-out. Studies also shown that the maximum utilisation of BIM benefits cannot be fully earnest because of lack of adequate manpower in the sector (Yusuf et. al, 2015).

The successful implementation of BIM in geomatics industry is heavily rely on the future graduates. With ample theory and sufficient industry exposure the role of surveyors in BIM based projects are guaranteed.

For surveyors working on BIM-based projects, flexibility is the key characteristic as it involved interdisciplinary scope. A surveyor is not expected to be a specialist on all aspects of a BIM-based project, but it is certainly important for the surveyor to understand the role of spatial information in the multiple BIM processes to ensure accurate and efficient utilisation of spatial data. If successfully done, surveyors can provide valuable services throughout a project's development, construction and operation stages.

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THE ESSENTIAL OF SIGNIFICANT CONSTITUENT FOR TIDAL PREDICTION AT PENINSULAR MALAYSIA

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Abstract

Tidal phenomenon is one of natural occurrence with fascinating event that is actually stored various knowledge which capable to be used as further research study. In previous century, tidal analysis had become a tool for marine development which contributes to development of the port and the bridge. In previous study, the implementations of constituents are remains based on Rayleigh Criterion which help on classifying the suitable parameter to be used in harmonic least square adjustment. Hence, the aim of this study is to identify the essential of significant constituent for tidal prediction which becomes a new implementation on creating a tool for tidal analysis. The method of this study are derived into three (3) parts which are: development of new program for tidal analysis by using MATLAB, identification of significant constituent by using statistical evaluation and reduction of the number constituent used in Harmonic Analysis. The new program has been evaluated with the outcome from the existing software (U-TAPS) and the actual observation of tidal data from Jabatan Ukur & Pemetaan Malaysia (JUPEM) by using F-variance ratio test. Until the program is proven to be significantly similar to the existing data, the reduction of the constituent cannot be made. The final result from this study shows that, the F-calculated of the new development program compared to existing software and actual tidal data are 1.071 and 1.045 respectively which indicates the statistical evaluation by using F-variance ratio test at 95% confidence interval is passed. Besides that, the final outcome by reducing the number of constituent used for tidal prediction contribute to the formation of statistical error. However, the error produced is still below millimetre level so, the need of significant constituent in Harmonic Analysis is not essential due to the increasing of error against the total number of time for tidal prediction. Therefore, the essential of significant constituent can be neglected based on the outcome of the study.

Keywords: *tidal analysis, statistical analysis, constituents*

1 Introduction

Tide is a natural of phenomenon that describes the rise and fall of sea levels. There are many experts from the abroad who conducted studies on the diversity of tides in Malaysia. Most analysis software used within our country originated from outsiders that give limitations to the operator of the application to conduct further analysis. This is because the algorithm involved is not known, so the capability and the accuracy of the software used cannot be determined. Besides that, tidal analysis is crucial enough to be know because it is one of the indicator that can be used in maritime development in Malaysia, for example harbor port, marine building, maintenance area, bridge, geology, petroleum and any other developments involving coastal and marine life environment (2005, Hery Purwanto). Since, tidal phenomenon is different in each location, so the data trends should be studied for relevant contribution for developmental purposes. The importance of tidal analysis is not limited to the development but it is also used by fishermen where the data can contribute to the prediction of dense living fish. Therefore, tidal analysis is important for a variety of reasons and the analysis is divided into two (2) methods which are Harmonic and Non-Harmonic Analysis.

Harmonic Analysis is one of the approaches which express the tidal record as a sum function of time that is being used in tidal study (Tamura et al., 2007). According to Venedikov (1966), the second approach of tidal analysis uses least square adjustment in Harmonic Analysis, however the method tends to separate undesired disturbances using numerical filters. In previous centuries, the research on tides has been conducted by the experts around the world. Harmonic Analysis was created based on Laplace theory which describes the relationship of Kepler's Law and Newton's Law on tidal natural behavior. This analysis is widely used by researchers due to its capability in analyzing long-term effect on tidal phenomenon and it is suitable for any type of tides. Besides that, this method is used to describe the tide which consists of a number of periodic waves due to the motion of sun and moon. By combining the series of periodic waves, the true behavior of the tides can be seen.

Next, Non-Harmonic Analysis called "response method" developed by Munk and Cartwright (1966) which takes multiple form linear regression analysis as a tool to predict oceanic tide. This method has the advantage over harmonic method to separate the admittance of different tidal species of spherical harmonics and can represent the variation of meteorological effects on local disturbance. Culmination technique is also considered as a non-harmonic method. This technique is linked to equilibrium theory which relate to time and level of high tide and low tide. This method is only suitable for semi-diurnal tides which are manually calculated in the form of table. Non-Harmonic Analysis does not provide as accurate representation of tide as Harmonic Analysis due to time and height difference in making the prediction.

In addition, tides are generated due to the rotation of earth and the motion of the moon. The force attraction between the moon and the earth will create a tidal phenomenon that cause from interference of centrifugal force (force generated due to rotation of earth) and force from the moon. Since gravity effects on the center of earth, it can maintain its own structure. However, the astronomical effects will cater the theory used on tidal analysis. Basically, the classical method of tidal analysis is based on Equilibrium theory where it's assumed that the earth is only covered by deep water layer which excluded the masses. The earth is also influenced by land masses which lead to disagreement of equilibrium theory. Therefore, by revising the theory used in tidal analysis, the implementations of Laplace theory is been used to reduce this effect, but the theory itself is still weak. Then, another method is applied on the harmonic equation by implementing Doodson's Filter Technique to improve the astronomical effects on tidal analysis. This method has shown a great result compare to previous analysis. The result of this statement can be seen through the program developed for tidal analysis by Hery Purwanto (2005). The program has been design by classifying the parameter of the astronomical argument using Doodson's technique for correction on astronomical parameter to derive a better accuracy of the output.

Last but not least, the area of this study is focused on the essential of tidal constituent for tidal prediction. The study conducted is to investigate the effects of insignificant constituent due to tidal prediction data which either can be neglected or it should be removed. According to J. Barton (2017), the accuracy of tidal prediction is depending on the number of constituent used in tidal analysis. Based on the previous study conducted by Hery Purwanto (2005), where the constituents used for tidal prediction is classified based on duration of tidal observation which based on the theory given by Rayleigh Criterion. It is understandable that the constituent used is maximized due to the criterion given by Rayleigh. So, among the constituent used, it might be affected by parameter which will reduce the accuracy of prediction data. Therefore, the new implementation on tidal analysis in determining the significant constituent for tidal prediction is believed to be a tool for improvement on generating prediction data of the tides which is hope to be new implementation in tidal analysis.

2 Tides

The nature of tide is shows periodical movement which describes the rise and fall of water level of the seas and the oceans. The force attraction between the moon and sun generates this movement. A tidal curve can be plotted using the height of the water level being recorded from a reference surface known as vertical datum. Normally, a tidal graph is plotted based on height (vertical axis) against time of observation (horizontal axis) to show the relationship of the rise and fall. Figure 1 shows the tidal graph provided by Crown (2015):

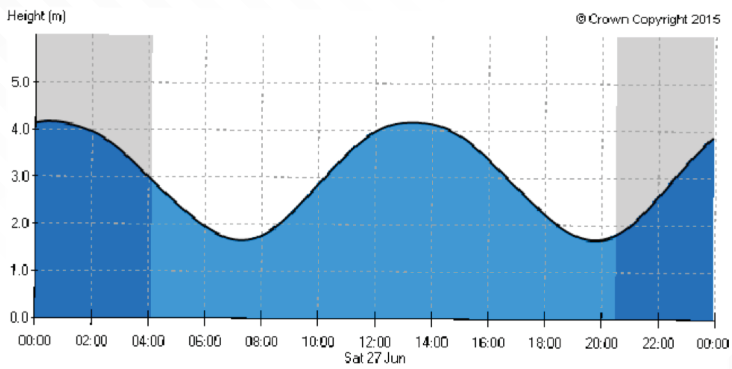

Figure 1: Tidal Curve Graph, Crown (2015)

As illustrated in Figure 1, tidal curve will generally show the high water and low water level. Based on example above, at 00:00 hour and 12:45 hour water levels is high while at 06:45 hour and 20:00 hour water level is low. These two (2) phenomena that occurred in a day are called as semi-diurnal tide. The difference in height between high and low tide is called range of tide. The other tidal phenomena are diurnal tide and mixed tide. Usually, during diurnal tide, high water and low water will occur once in a day, but for mixed tide it depends on the location between upper latitude and lower latitude on the earth. The information regarding the tide is important for navigators, e.g. when the ship wants to enter a shallow harbor and for construction on the sea. As for hydrography, the value of tide is important for reducing measured depth to a reference level.

3 Equilibrium Model

The rotation of the moon and the earth around each other will generate force of attraction. This force will affect the formation of tide. Figure 2 shows the theory of equilibrium of tides, Chamberlin & Dickey (2008):

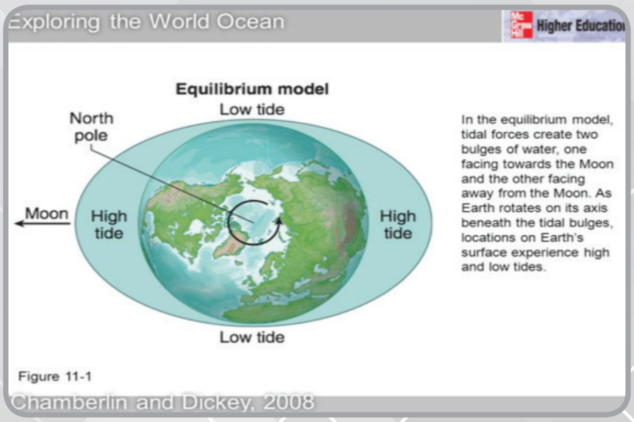

Figure 2: Equilibrium Tides Model, Chamberlin & Dickey (2008)

The equilibrium theory states that, the earth is fully covered with deep water layer. The surface of the water is always perpendicular to both forces which are centrifugal force and gravitational force.

Based on Figure 2, the difference of these two (2) forces will form equilibrium force that leads to formation of tides (spring, neap and astronomical). The deep water layer is assumed to prevent any effects on the surface water level due to the friction of the earth's rotation around its axis. The phenomena of spring, neap and astronomical tides are extracted from this theory.

4 Spring Tides And Neap Tides

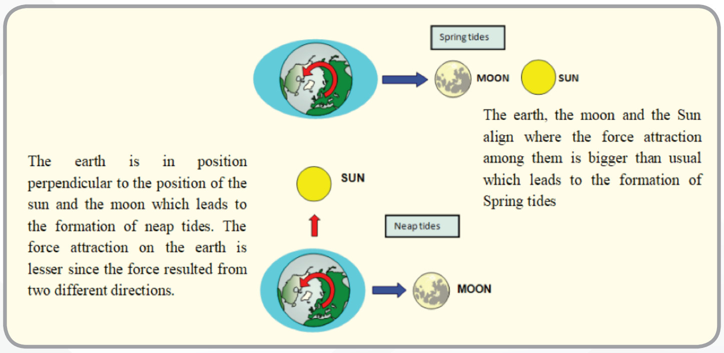

Figure 3: Spring Tide and Neap Tide, Keith Gibbs (2012)

Based on figure 3: Spring tide occurred when the earth, moon and sun lies into one line. It happens twice per month during the new moon and the full moon. During this phenomenon, the high water level will be higher than usual and the low water level will become lower than usual. Neap tide is another phenomenon of tides. During neap tide, the sun and the moon will be perpendicular to the earth. The high water level will be lower than usual while the low water level will be higher than usual. This tide is occurs in the first quarter and third quarter of the moon phase which been represented in Figure 4.

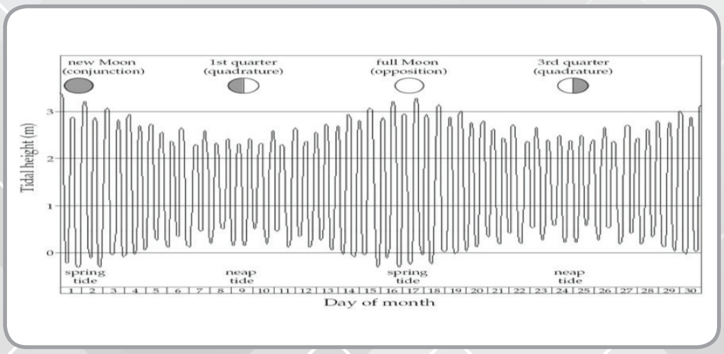

Figure 4: Tidal Cycle for Spring Tide and Neap Tide

5 Tidal Prediction

The method to predict tides is classified into two (2) which are Harmonic Analysis and Non-Harmonic Analysis. Both of these methods are working with tidal analysis. The table for prediction is drawn up using long time observations. Besides that, tidal prediction is necessary when the location does not have any tidal data. Although the result may be less accurate, but it can still be used in the survey.

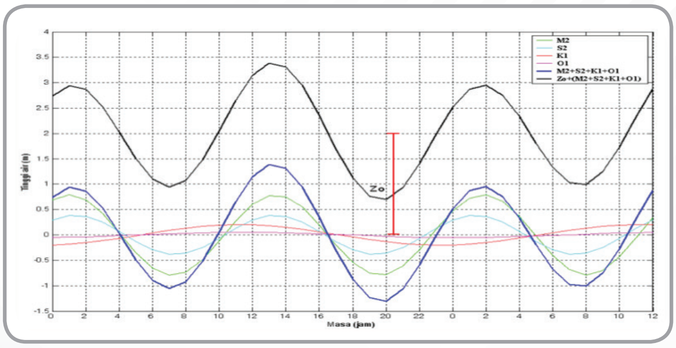

Figure 5: Harmonic Waves that Forms Tidal Height, Hery Purwanto (2005)

Based on Figure 5, the waves of the harmonic are drawn out to predict the tidal height. The calculation for tidal prediction is made by reversing the periodic wave from tidal analysis. The parameters are formed from harmonic equation analysis to predict tidal behavior in the future. The parameters are: minimum water level, velocity, amplitude and the phase from each constituent.

$$h(t) = Zo + \sum_{r=1}^{k} f_r H_r \cos((Vg_r + \mu_r) + \omega_r t_r - g_r) \quad (1)$$

This is the formula used for tidal prediction including the entire perimeters confined by harmonic equations.

6 Harmonic Analysis

Hery Purwanto (2005) stated that, Harmonic Analysis is one of the methods that describe tide as a number of periodic waves in which the cycle is equivalent to the motions of the moon and sun. By combining the movement of the periodic waves, it will describe the behavior of the tide. Since the motion of the moon and the sun is known quite precisely, the amplitude and the phases of the wave are deduced from water level measurements with the help of least square adjustment. Based on previous research, there are about 25 main constituents used for an accurate tidal prediction. According to Dronkers J.J (1975), the formula involved in Harmonic Analysis is:

$$h(t) = Zo + \sum_{r=1}^{k} f_r H_r \cos((Vg_r + \mu_r) + \omega_r t_r - g_r) \quad (2)$$

Vg is the parameter of the tide at the Greenwich, while and are the astronomical factors that called Nodes. By ignoring meteorological factor (*Vg, μ, f*) the height of the tidal can be derived from one of the harmonic function at *k* constituent through the equation below:

$$h(t_n) = Zo + \sum_{r=1}^{k} A_r \cos \omega_r t_n + \sum_{r=1}^{k} B_r \sin \omega_r t_n \quad (3)$$

Where;

$h(t_n)$	=	height of tide against time
Zo	=	minimum sea level
k	=	total number tidal constituent
t_n	=	observation for every one hour
		$(-n, -n+1, \ldots, 0, \ldots, n-1, n)$,
		t_0 the center time during observation

One of the methods to solve Harmonic Analysis is least square adjustment. By using this method, the observed time interval can be solved and produce amplitude and phase for all the constituents of the desired harmonic. The observation of the tide height will approximately equal to actual value when:

$$\mu^2 = \sum_{tn=-n}^{n} (h_t - \hat{h}_t)^2 = \textbf{Minimum}$$

This is the basis to least square method. The situation that fulfills the function μ^2 minimum is:

$$\frac{\delta\mu^2}{\delta Z_o} = 0; \frac{\delta\mu^2}{\delta A_r} = 0; \frac{\delta\mu^2}{\delta B_r} = 0; r = 1, \ldots, k$$

Based on the equation above, *2k+1* equation is produced for *Zo, Ar, Br,* which is the mean sea level and tidal constituents.

7 Evaluation Program

The parameters involved in Harmonic Analysis are important to study. Due to the astronomical effect and the time of observation made, it gives a major impact to tidal variations. Besides that, by understanding the effects of astronomical argument, the program created follows the procedure used by existing application (U-TAPS) to minimize the defect on the program.

In terms of evaluating the program, F-variance ratio test is used to identify the significance of the developed program compared to the actual observation data and U-TAPS. The data used in this section is a prediction data on January 2011 at Pulau Langkawi tidal station and the actual reading in that month. The result is shown as follow:

Table 1: F-Variance Ratio Test for Developed Program compared to U-TAPS & Actual Tidal Observation

Component	MATLAB	U-TAPS	Actual Observation
MSL	2.240	2.240	2.239
Variance	0.427528	0.45831	0.44686
Df	743	743	743
Calculated F	1.071 (MATLAB vs U-TAPS)		1.045 (MATLAB vs Actual)
F Crit. (95% CI)	1.14		1.14
Std. Deviation Residual Error	0.194866	0.276176	

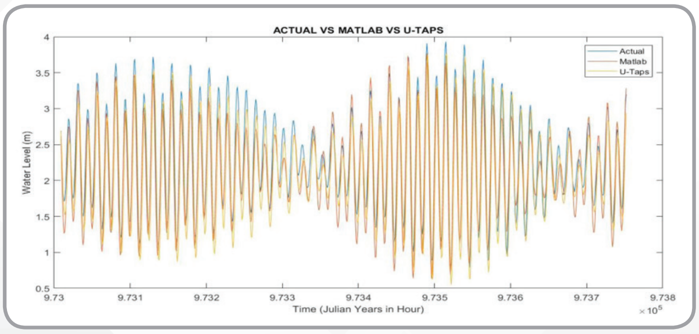

Figure 6: Actual, MATLAB, U-TAPS

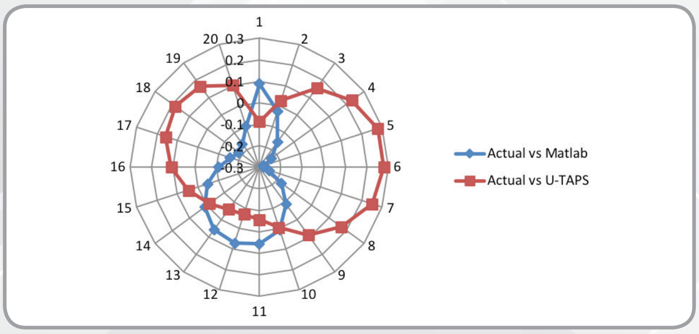

Figure 7: Accuracy Plot Error of 20 data sample of Prediction data from MATLAB and U-TAPS versus Actual Observation of tidal level.

The standard deviation error produced by MATLAB is 0.194866 which is 0.081 m less than U-TAPS 0.276176 which indicates the accuracy of the result is good enough compared to existing software. The difference in the tools used to solve mathematical arguments between each application may leads to this distinctive error. Since, MATLAB has its own tool box, the method to solve inversion matrix is quite different for other application. The conclusion can be made where MATLAB can produce a high accuracy of data prediction for tidal phenomena compared to existing software and the error trends are significantly inconsistent.

8 The Essential Of Significant Constituent For Tidal Prediction

Based on the program developed with MATLAB, all sixty four constituents are used in Harmonic Analysis to perform a prediction of water level in the year 2011. The prediction data have been organized accordingly to measure the different significant constituents compared to all constituents. The data is taken from 15 days until 6 months of the year 2011. The results are shown as follows:

Table 2: Pulau Langkawi

Hours (t)	SREAC (m)	SRESC (m)	Different (m)
360 (15 days)	0.178426343	0.178383334	4.3009e-05
744 (1 month)	0.194866101	0.194937593	-7.1492e-05
1416 (2 month)	0.216971258	0.217057889	-8.6631e-05
4046 (6 month)	0.289414213	0.28954609	-0.000131877

Table 3: Kukup

Hours (t)	SREAC (m)	SRESC (m)	Different (m)
360 (15 days)	0.190465304	0.191175029	-0.000709725
744 (1 month)	0.206418159	0.206391219	2.694e-05
1416 (2 month)	0.228244437	0.228150315	9.4122e-05
4046 (6 month)	0.231852672	0.231976706	-0.000124034

Table 4: Geting

Hours (t)	SREAC (m)	SRESC (m)	Different (m)
360 (15 days)	0.160316483	0.180409361	-0.0200929
744 (1 month)	0.158651151	0.169704749	-0.0110536
1416 (2 month)	0.210388497	0.210415001	-2.65e-05
4046 (6 month)	0.191194961	0.19120106	-6.099e-06

Table 5: Tanjung Gelang

Hours (t)	SREAC (m)	SRESC (m)	Different (m)
360 (15 days)	0.157247393	0.15723311	1.4283e-05
744 (1 month)	0.183850694	0.183850644	0.00000005
1416 (2 month)	0.189901761	0.189904677	-2.916e-06
4046 (6 month)	0.185822025	0.185827811	-5.786e-06

*SREAC : Standard Deviation Error All Constituent
*SRESC : Standard Deviation Error Significant Constituent

According to Table 2-5, the different of prediction data result produced with all constituents and significant constituents show a small difference in value. The difference in the output is no more than 1 millimeter which is too small and can be neglected. Based on the result produced at Pulau Langkawi, the difference in prediction made using both methods shows a constant trend of error (increasing value of error) compared to other places. This indicated that the trend of error could be depending on the types of tides at the location of tides gauge being installed. Even though, the error is increasing among the number of constituent used against time of prediction, but the value of error still remains within millimeter level and below. Therefore, it is proven that the statement made by J. Barton (2017) where the higher the number of constituent used in tidal program, the higher the accuracy of the prediction tides.

9 Conclusion

The research done is completely achieved the objective of the study. The conclusion can be made as followed:

Firstly, to develop a program to perform tidal analysis with astronomical effect by implementing Harmonic Least Square Adjustment. Based on this objective, the program is developed successfully using MATLAB programing language. The new program is proven to be significantly similar compared to existing software and the actual data using statistical F-variance ratio test. The program can be used now for further study and also can be used in industrial development.

Next, to analyse the significant constituent for tidal prediction using statistical evaluation. The study has been conducted to identify the significant constituent using statistical t-test. This method provides a way for researcher to remove blunders of constituent before making prediction of water level. On behalf of the study, this method is significantly solving the experiment conducted which is important to verify the problem on final objective.

Last but not least, to identify the essential of significant constituent for tidal prediction in Peninsular Malaysia. Based on the previous objective, the output produce shows that the effect of insignificant constituent to prediction data is too small which can be neglected. The difference has being compared from 15 days till 6 months on January 2011. Eventhough the number of constituent used is reduced to significant constituent, the standard deviation of residual error is still below 0.001 m compared to all constituent of prediction data which is too small. Therefore, the three (3) objectives of the research are completely achieved based on the outcome of the study.

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HOW COARSE SPATIAL RESOLUTION DATA CAN BE USED FOR SUSTAINABLE FOREST MANAGEMENT?

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Abstract

Forest degradation and deforestation is now at alarming rates. This problem occurs due to anthropogenic pressures such as selective logging, illegal logging, forest harvesting and over harvesting of wood fuel and timbers. Forest degradation and deforestation may give negative impacts to livelihood, biodiversity and climate. To achieve the sustainable forest management, estimation of tree species composition per unit compartment of forest reserve is crucial to be identified. Thus, forest management can be monitor by using remote sensing data. However, there are some limitations on coarse spatial resolution of satellite data due to the availability of mixing pixels in estimating tree species composition. Thus, spectral unmixing is one of the solution of mixing pixels.

1 Forest Degradation And Deforestation Issues

Tropical rainforest is rapidly decreasing and novel techniques are needed to ensure the ongoing conservation of this ecosystem (Mon et.al., 2012). As for example, according to Global Forest Resources Assessment (2010), mean of Malaysian deforestation rate is about 13% of 520,000 ha per year. Figure 1 shows the size of forest extent in million hectares which decreasing within ten years in Peninsular Malaysia. This problem occurs due to deforestation and forest degradation which are at progressive processed and advancing at an alarming rate (Panta et. al., 2008). Thus, forest degradation and deforestation in the tropics have importance to biodiversity conservation (Mon et. al., 2012).

Forest degradation is the reduction of forest capacity to provide goods and services (FAO, 2000, 2005). Forest degradation has impacts resulted from anthropogenic pressure (i.e. unsustainable timber harvesting, overharvesting of wood fuel and the fires at the edge of forest) that partially removes or damage forest without any replacement within allocated time frame (DeFries et. al., 2007).

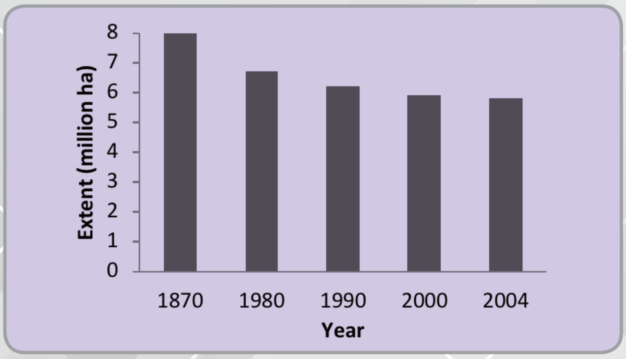

Figure 1: Changes in Forest Area From Year 1970 to 2004 in Peninsular Malaysia (Fao, 2005).

Meanwhile, deforestation is the conversion of forest to other land uses such as agriculture area, oil palm plantation, roads and other infrastructure (WWF, 2012). Besides, selective logging is one of the main factors of forest degradation and deforestation (FAO, 2005). Heavy selective logging may cause deforestation. Hence, degradation may forerunner to deforestation because of logging reducing the perceived conservation value and increases access to the forest which leads to clearing (DeFries et. al., 2007).

Furthermore, forest degradation may negatively affect livelihood, ecosystem function, climate and biodiversity of the forest where it become key issues which in line with the Reducing Emissions from Deforestation and Forest Degradation (REDD) especially on tree species which also the animals habitats (Mon et. al., 2012). Besides, forest degradation may contribute to carbon losses, especially in developing countries. This is because the populations of these countries may depends on the wood biomass for fuel and building materials (Blom et. al., 2010, Mertz et. al., 2012).

Therefore, it is important to cope with this problem by identifying source of degradation and deforestation. Thus, to cope with deforestation and forest degradation problem, numerous of studies using remote sensing techniques has been widely analyzed (Lele and Joshi, 2009) . Remote sensing technology has an ability to identify forest degradation and deforestation at large areal extent (Hasmadi, 2011; Panta, 2008). Identification of tree species distributions and estimation of tree species composition especially on timbers that have high commercial values can be one of the solutions to cope with forest degradation and deforestation problems by emphasizing remote sensing techniques. The useful information obtained can be used for planning and sustainable management of forest (Panta, 2008, Mon et. al., 2012).

In addition, by estimating tree species composition, the timber forest resource can be identified. Hence, selective and illegal logging can be monitored frequently due to the existence of temporally remote sensing data. Moreover, remote sensing data able to cover large areas and it suits with forest degradation and deforestation monitoring. Therefore, effective management activities can be developed to achieve sustainable forest management (SFM) (Mon et. al., 2012). However, monitoring forest degradation and deforestation using remote sensing techniques may have its own challenges especially when using medium and coarse spatial resolution.

2 Challenges In Identification Of Tree Species Using Remote Sensing Data

Remote sensing technology has been utilized in monitoring forest degradation and deforestation. Therefore, in order to cope with this problem, the sources of the problem need to be identified. Hence, estimations of tree species composition and its distribution are needed (Foody and Cutler, 2006). However, studies are limited by the spatial resolution of the remotely sensed data available expressed by the image's pixel size that coarser than desired with target features (Boyd and Foody, 2012). Therefore, this latter issue may relate to mixed pixel problem where the pixel not belongs to a single class but mixed with other classes. Nevertheless, medium and coarse spatial resolution may increase mixed pixels in the image (Foody et.al., 1996).

Besides, high heterogeneity of the features may lead to mixed pixels occurrence especially in medium and coarse spatial resolution data (Figure 2). Tropical rainforest on the other hand was heterogeneous, highly complex, with high density of emergent and large canopy tree. Hence, the occurrence of mixed pixels is high. Medium and coarse spatial resolutions may contribute to mixed pixels due to multiple spectral responses from many features in a pixel. According to Boardman and Kruse (2011), when target of interest is smaller or equal than the instantaneous of view (IFOV), therefore, mixed pixel is inevitable.

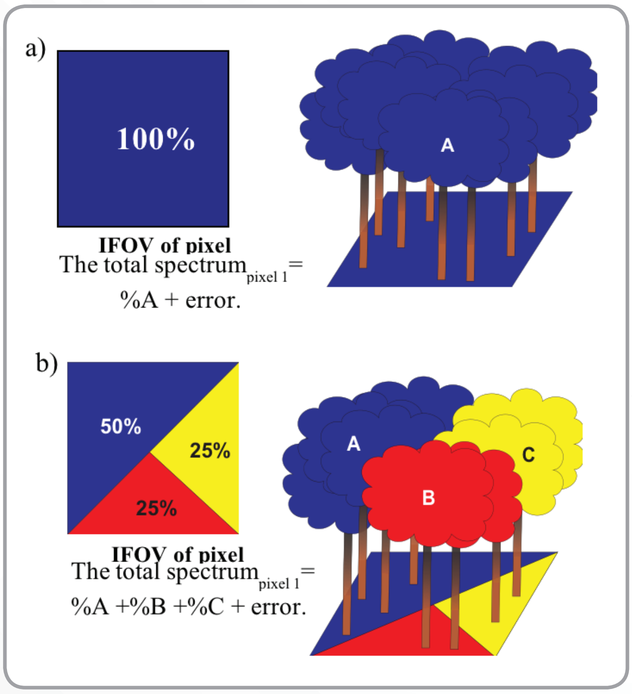

Figure 2: (a) Pure Pixel Represents One Feature Per Pixel
(b) Spectral Mixing from Three Different Features Per Pixel.

High spectral resolution of satellite remotely sensed data is also appropriate for mapping individual tree species with high precision and accuracy due to similar characteristics within tree species especially tree species from the same genera (Alvin, 2009; William and Hunt, 2002). Hence, spectral resolution with a narrow band is needed to differentiate similar tree from the same genera. Radiometric correction also important to ensure the ability to distinguish differences in reflectance values among pixel (Foody and Cox, 1994).

Thus, spectral unmixing approaches are necessary to overcome mixed pixels problem as spectral unmixing approaches has been used in numerous of previous studies (Hassan and Hashim, 2011; Boardman and Kruse, 2011; Ball et.al.,2004; William and Hunt, 2002).

3 Spectral Unmixing Analysis

Spectral unmixing is used for decomposing the mixed pixels that exist within the satellite images into a set of constituents spectra or abundance that indicates the proportions of each endmember presented in any given pixel. There are many numbers of spectral unmixing analysis, one of them is Mixture Tuned Matched Filtering (MTMF).

Mixture analysis is carried out using MTMF with input features selected from the previous MNF transformation of the multispectral data set. MTMF is the fraction of an image which allows false positives to be identified and eliminated from the abundance results (Boardman, 1998; Dehaan et al., 2007). Therefore, MTMF can be used to identify tree species in the ASTER dataset as it can calculate the quantity of target that much smaller than pixel size.

There are two (2) phases in MTMF algorithm which are a Matched Filter calculation for abundance estimation and Mixture Tuning calculation for false positive identification or rejection. In remote sensing context, Matched Filtering (MF) was a filtering processing for input data for matching the target spectrum and eliminates the remaining background spectra. The Mixture Tuning have segregating power in MTMF algorithm. The Mixture Tuning calculates a value of infeasibility for each MF classified pixel. The MTMF algorithm as described here implicitly requires zero mean, unit noise variance input data (such as MNF transformed data) for proper Mixture Tuning calculation.

4 Conclusion

As a conclusion, spectral unmixing modelling methods are one of the best ways to address mixed pixel problem. However, the accuracy of spectral unmixing methods may depend on spatial and spectral resolution of the satellite data. In addition, another supportive data are also needed to achieve more precise results for estimating relative abundance of tree species such as biophysical information, tree height and tree canopy size.

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SESI PENGUJIAN DISASTER RECOVERY CENTER BAGI APLIKASI MaCGDI

12 Mac 2019

Pusat Data Sektor Awam (PDSA) MAMPU, Bandar Enstek, Negeri Sembilan

Sesi pengujian Disaster Recovery Center (DRC) merupakan salah satu aktiviti di bawah Pelan Kesinambungan Perkhidmatan (PKP) bagi Kementerian Air, Tanah dan Sumber Asli (KATS). Pengujian ini diadakan bertujuan untuk menguji strategi pemulihan yang telah dibangunkan untuk aplikasi-aplikasi MaCGDI sekiranya terjadi bencana di Pusat Data MaCGDI. Antara contoh bencana yang mungkin berlaku adalah seperti virus komputer, serangan penggodam, kerosakan infrastruktur teknologi maklumat (ICT) akibat bencana alam seperti banjir, kebakaran atau gempa bumi.

Seramai 12 orang pegawai MaCGDI telah terlibat dalam sesi pengujian tersebut. Masing-masing memainkan peranan seperti *disaster recovery coordinator, server admin, network verifier, database verifier, application restorer* dan *application tester*. Semua aplikasi yang terlibat dalam pengujian ini telah berjaya dipulihkan dalam masa *Recovery Time Objective* (RTO) dan *Recovery Point Objective* (RPO) yang ditetapkan.

Hasil daripada sesi pengujian ini ialah dapat memastikan perkhidmatan dalam talian MaCGDI mampu dipulihkan sekiranya terjadi bencana dan pegawai-pegawai MaCGDI akan sentiasa bersedia untuk melaksanakan pemulihan. Selain itu, imej MaCGDI juga akan lebih terjamin sekiranya pemulihan dapat dilaksanakan tepat pada masanya.

KURSUS APLIKASI MyGEOTRANSLATOR UNTUK PEJABAT SETIAUSAHA KERAJAAN NEGERI PAHANG DAN AGENSI DI NEGERI PAHANG

12-14 Mac 2019

Bilik COE MaCGDI, Aras 8, Wisma Sumber Asli, KATS

Kursus Aplikasi MyGeoTranslator untuk Pejabat Setiausaha Kerajaan (SUK) Negeri Pahang dan agensi di negeri Pahang telah diadakan bagi memberi pendedahan dan kemahiran tentang penggunaan Aplikasi MyGeoTranslator.

Selain itu, kursus ini juga diadakan bagi membolehkan agensi di Negeri Pahang mendapat pengetahuan serta cekap dalam pengendalian data geospatial dan memastikan pelaksanaan penyediaan data tersebut dilaksanakan secara berterusan mengikut standard yang telah ditetapkan.

Kursus ini diadakan selama tiga (3) hari melibatkan peserta yang terdiri daripada agensi di Negeri Pahang seperti berikut:

Hari Pertama

- Majlis Perbandaran Kuantan
- Majlis Perbandaran Temerloh
- Majlis Perbandaran Bentong
- Majlis Daerah Lipis
- Majlis Daerah Bera
- Pejabat Daerah Dan Tanah Maran
- Pejabat Daerah Dan Tanah Pekan
- Pejabat Daerah Dan Tanah Raub
- Pejabat Daerah Dan Tanah Rompin
- Pejabat Daerah Dan Tanah Jerantut
- Pejabat Daerah Dan Tanah Cameron Highland
- Bahagian Perancang Ekonomi Negeri Pahang

Hari Kedua

- Majlis Daerah Maran
- Majlis Daerah Pekan
- Majlis Daerah Raub
- Majlis Daerah Jerantut
- Majlis Daerah Cameron Highland
- Pejabat Daerah Dan Tanah Kuantan
- Pejabat Daerah Dan Tanah Temerloh
- Pejabat Daerah Dan Tanah Bentong
- Pejabat Daerah Dan Tanah Lipis
- Pejabat Daerah Dan Tanah Bera
- Jabatan Perangkaan Negeri Pahang
- Bahagian Perancang Ekonomi Negeri Pahang

Hari Ketiga

- PLANMalaysia@Pahang
- Pejabat Pengarah Tanah dan Galian Pahang
- Jabatan Kerja Raya Negeri Pahang
- Jabatan Perhutanan Negeri Pahang
- Jabatan Pengairan dan Saliran Negeri Pahang
- Jabatan Ukur dan Pemetaan Negeri Pahang
- Lembaga Pembangunan Tioman
- Bahagian Kerajaan Tempatan (BKT) SUK Negeri Pahang
- Perumahan SUK Pahang
- Bahagian Kawal Selia Air (BKSA) SUK Pahang
- Perbadanan Setiausaha Kerajaan (PSK) SUK Pahang
- Bahagian Perancang Ekonomi Negeri Pahang

Antara modul-modul yang terkandung dalam kursus MyGeoTranslator adalah seperti berikut:

- Pengenalan kepada Aplikasi MyGeoTranslator
- Sub Modul Semakan Data
- Sub Modul Format Data
- Sub Modul Transformasi Koordinat
- Sub Modul Unique Parcel Identifier (UPI)
- Sub Modul Malaysian Standard 1759 (MS1759)
- Sub Modul Pengisian Malaysia Geospatial Metadata Standard (MGMS)
- Sub Modul Simbol Standard

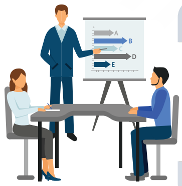
BENGKEL KUMPULAN KERJA STANDARD MULTILINGUAL GLOSSARY OF TERMS

21 Mac 2019

Pusat Hidrografi Nasional,
Pulau Indah, Klang, Selangor

Kumpulan Kerja Standard Multilingual Glossary of Terms dipertangungjawabkan untuk menterjemah terma-terma geografi/geomatik yang diguna pakai di dalam dokumen ISO/TC 211 Multilingual Glossary of Terms daripada Bahasa Inggeris ke dalam Bahasa Malaysia. Kumpulan kerja ini dianggotai oleh seramai 15 wakil dari pelbagai agensi persekutuan dan universiti yang berkaitan dalam bidang sistem maklumat geografi/geomatik. Bengkel Kumpulan Standard Multilingual Glossary of Terms Bil. 1/2019 telah diadakan pada 21 Mac 2019 di Pusat Hidrografi Nasional. Hasil daripada bengkel ini, sebanyak 132 terma sistem maklumat geografi/geomatik telah berjaya diterjemahkan oleh ahli kumpulan kerja. Hasil terjemahan ini akan diserahkan kepada Dewan Bahasa dan Pustaka (DBP) untuk semakan dan pengesahan dari segi tatabahasa.

MaCGDI bertindak sebagai penyelaras dan urus setia kumpulan kerja ini. Kumpulan kerja ini dibentuk di bawah Technical Committee Geographic 2 (TC/G/2), Jabatan Standard Malaysia. YBhg. Prof. Dato Dr Shattri bin Mansor selaku Pengerusi Kumpulan Kerja turut berkesempatan mengadakan kunjungan hormat ke atas Ketua Pengarah Hidrografi bersempena bengkel ini.



BENGKEL PEMBANGUNAN *ENTERPRISE ARCHITECTURE* GEOSPATIAL

Enterprise Architecture (EA) merupakan satu kerangka kerja yang memperihalkan secara terperinci sebuah arkitektur mengenai tadbir urus bisnes dan hubungannya dengan sumber-sumber teknologi, aplikasi dan maklumat bagi pengurusan geospatial negara. Ia telah pun dibangunkan oleh Pusat Infrastruktur Data Geospatial Negara (MaCGDI) secara asasnya pada tahun 2017 di bawah Projek Pembangunan Pelan Induk Geospatial Negara (NGMP).

Walau bagaimanapun, pelaksanaan bagi kerangka kerja ini perlu diperincikan lagi mengikut sektor dan jurang yang berkaitan dengan geospatial bagi memberi nilai tambah kepada proses kerja dan penyediaan strategi (road map) yang bersesuaian. Sehubungan itu, Digital EA Geospatial Negara perlu dilaksanakan merangkumi kajian awalan, jurang semasa (as is) dan pelan perancangan (to be) EA, pembangunan strategi dan metodologi, pembangunan indikator pemantauan dan penilaian (dashboard), latihan kepakaran serta pelaksanaan penyampaian (delivery) EA.

Pembangunan EA Geospatial ini juga adalah perlu sebagai satu amalan untuk penentuan strategik dan penyelarasan keupayaan bisnes dan teknologi maklumat (IT) bagi sesebuah organisasi yang berkaitan geospatial melalui pemahaman, penyelarasan dan perancangan aktiviti seperti yang dinyatakan dalam Malaysia Government Enterprise Architecture (MyGovEA).

Bagi tujuan tersebut, penyediaan spesifikasi projek dan penentuan terma rujukan (TOR) ini akan dihasilkan melalui beberapa siri bengkel yang dihadiri oleh pihak berkepentingan seperti bahagian dan jabatan di bawah Kementerian Air, Tanah dan Sumber Asli (KATS) serta agensi-agensi yang berkaitan.

Bagi mencapai matlamat tersebut, pihak MaCGDI telah mengadakan Bengkel EA Siri 1/2019 pada 2-3 April 2019 bertempat di Institut Latihan Kehakiman dan Perundangan (ILKAP), Bandar Baru Bangi, Selangor. Susulan daripada Bengkel Siri 1/2019, hasil penemuan yang telah dikompilasikan telah dibincangkan dalam Bengkel Siri 2/2019 yang diadakan pada 2 Mei 2019 bertempat di Institut Penyelidikan Sains & Teknologi Pertahanan (STRIDE), Kajang bagi mendapatkan input mengenai *high level initiative* setiap domain seterusnya menghasilkan draf bagi Penyediaan Spesifikasi Projek dan Terma Rujukan (TOR) Projek.

Pada masa hadapan, MaCGDI dijangka akan berperanan sebagai *one stop centre* bagi penyebaran dan perkongsian maklumat geospatial negara di samping dapat menjana pendapatan negara melalui perkhidmatan yang disediakan.

Bengkel Siri 1/2019
Tarikh : 2-3 April 2019
Tempat : Institut Latihan Kehakiman Dan Perundangan (ILKAP), Selangor

Bengkel Siri 2/2019
Tarikh : 2 Mei 2019
Tempat : Institut Penyelidikan Sains Dan Teknologi Pertahanan (STRIDE), Kajang, Selangor

BENGKEL PEMBANGUNAN PELAN KOMUNIKASI DAN OUTREACH PERKONGSIAN GEOSPATIAL NEGARA

15-16 April 2019

Bilik Jamuan VIP, Aras 13, Wisma Sumber Asli, KATS

Bengkel Pembangunan Pelan Komunikasi Dan Outreach Perkongsian Geospatial Negara merupakan bengkel siri pertama yang dianjurkan oleh Pusat Infrastruktur Data Geospatial Negara (MaCGDI), Kementerian Air, Tanah dan Sumber Asli (KATS) bagi membangunkan Pelan Komunikasi Dan Outreach Perkongsian Geospatial Negara (PKOPGN).

Secara ringkasnya, PKOPGN ini adalah salah satu cadangan daripada kajian Pelan Induk Geospatial Negara (NGMP) yang telah dibangunkan pada tahun 2018. Pelan ini turut dimasukkan di bawah Draf Dasar Perkongsian Geospatial Negara dan Cadangan Pelan Strategik Geospatial Negara bagi meningkatkan program outreach dan program MyGDI sedia ada. Selain itu, bagi penerapan geospatial secara keseluruhan serta mengukur keberkesanan peningkatan komunikasi.

Kehadiran penceramah, YBrs. Dr. Fadhlullah Suhaimi bin Abdul Malek, Chief Executive Officer (CEO) Perdana University, YBrs. Encik Mohd Haikal bin Abd Jalil, Pegawai Komunikasi Strategik dan YBrs. Cik Rozza Khairiah binti Rosli, Pegawai Perhubungan Awam Unit Komunikasi Korporat (UKK) KATS serta Pegawai Kanan MaCGDI dalam bengkel ini amat penting bagi memberikan pandangan serta ulasan yang bersesuaian mengikut kepakaran bidang masing-masing bagi tujuan penambahbaikan aktiviti outreach MaCGDI dan Program MyGDI.

Seterusnya, draf pelan komunikasi ini akan diangkat kepada Ketua Setiausaha KATS bagi mendapatkan persetujuan beliau sebelum dijadikan panduan dalam melaksanakan aktiviti outreach Program MyGDI. Diharapkan sesi bengkel ini dapat menghasilkan banyak pandangan serta ulasan yang boleh digunakan untuk penambahbaikan aktiviti outreach MaCGDI di masa hadapan. Pihak MaCGDI, KATS ingin mengucapkan terima kasih secara khususnya kepada YBrs. Dr. Fadhlullah Suhaimi bin Abdul Malek dan Unit Komunikasi Korporat KATS kerana sudi menerima jemputan sebagai penceramah bengkel ini. Semoga dengan ilmu yang dikongsikan dapat dimanfaatkan dalam Pembangunan Pelan Komunikasi Dan Outreach Perkongsian Geospatial Negara yang bakal dibangunkan.

SEMINAR GIS DAN PENGURUSAN TANAH DI INTERNATIONAL CENTER FOR LAND POLICY STUDY, TAIWAN

17-30 April 2019 Taiwan

Pengenalan

Seminar "Geospatial Information System (GIS) & Land Management" merupakan satu program latihan yang diadakan di peringkat antarabangsa dan dianjurkan secara tahunan oleh International Center for Land Policy Study (ICLPST), di Taiwan. ICLPST merupakan sebuah pusat penyelidikan dan latihan dasar tanah antarabangsa yang telah ditubuhkan pada tahun 19681 dan terletak di bandar Taoyuan, sebelah barat Taipei. Seminar tersebut berlangsung selama 14 hari bermula pada 17 April 2019 sehingga 30 April 2019. Sasaran peserta seminar adalah sebanyak 26 hingga 28 orang delegasi antarabangsa daripada peringkat pertengahan sehingga peringkat tertinggi yang berkemahiran dan berpengalaman dalam bidang GIS serta pengurusan tanah negara masing-masing.

Fokus utama seminar ini adalah bagi berkongsi pengalaman dan pencapaian pembangunan negara Taiwan dalam bidang GIS dan pengurusan tanah serta menjadi platform bagi membincangkan idea, pengalaman dan solusi di dalam isu yang berkaitan.

Hari pertama bermula dengan acara pembukaan rasmi oleh pengarah ICLPST, Dr. Jack Kuei-son Sheu. Beliau mengalu-alukan kehadiran semua peserta kursus GIS yang terdiri daripada 29 peserta dari 28 negara; Afrika (1), Amerika/Caribbean (8), Asia (9), Eropah (7) dan Pacific Ocean (4).

Jadual 1: Senarai Pembentangan Mengikut Kumpulan Negara.

Kumpulan	Negara
1	Belarus, Czech Republic, Eswatini, Greece, Guatemala, Honduras
2	Indonesia, Korea, Kosovo, Kiribati, Lithuana
3	Malaysia, Marshall Islands, Mexico, Mongolia, Nicaragua
4	Palau, Papua New Guinea, Paraguay, Philippines, Poland, Saint Christopher & Nevis
5	Saint Lucia, Serbia, Slovakia, Solomon Islands, Turkey, Vietnam

Kuliah pertama disampaikan oleh Dr. Thanh Van Hoang, Penolong Profesor di GIS Research Center, Universiti Feng Chia, Taiwan yang membentangkan mengenai GIS and Land Management. Kuliah yang berdurasi selama tiga jam tersebut menerangkan mengenai kedudukan dan lokasi Taiwan sebagai sebuah pulau di bawah Lingkaran Api Pasifik (Ring of Fire) terutama di bahagian timur yang terdiri daripada gunung dan bukit. Antara bencana yang kerap berlaku di Taiwan adalah seperti gempa bumi, taufan dan banjir kerana kebanyakan kawasan adalah sangat sensitif. Bagi bencana seperti banjir, pihak Kerajaan Taiwan memasang beribu-ribu sensor sepanjang pantai untuk memantau paras air. Negara maju ini juga mempunyai lebih 5,000 orang sukarelawan yang bekerja selama 24 jam jika berlaku sebarang bencana.

Sesi Pembentangan

Seminar diteruskan dengan pembentangan oleh Prof. Madya Chin-Farn Cheng dari National Central University yang berkongsi mengenai *Land Use Change Detection Using Satelite Data.* Objektif utama kaedah ini adalah untuk mengesan perubahan penggunaaan tanah menggunakan imej remote sensing dengan kekerapan setiap dua bulan pada skala kebangsaan. Kaedah ini penting bagi mengesan aktiviti haram penggunaan tanah dan untuk tujuan pembangunan yang lebih mampan dan bersepadu. Seterusnya pada sebelah petang, wakil Malaysia telah membentangkan tajuk *Exploring & Sharing Geospatial Information through MyGDI Data Services.*

Wakil Malaysia ketika membentangkan tajuk *Exploring & Sharing Geospatial Information through MyGDI Data Services*

Sesi Pembelajaran

Sesi pembelajaran diteruskan dengan pembentangan oleh Prof. Madya Han-Liang Lin, National Cheng Kung University. Beliau berkongsi kajian kes bagaimana GIS diaplikasikan di dalam perancangan dan reka bentuk bandar. Perancangan bandar di Taiwan terbahagi kepada tiga (3) kawasan iaitu *non-urban*, *urban* dan *national parks*.

Antara yang menarik perhatian adalah pembentangan daripada sebuah negara yang terletak di Eropah Tengah yang menjadi negara ke-69 terbesar di dunia dan kesembilan terbesar di Eropah iaitu Poland.

Puan Ewa Maria Surma berkongsi mengenai pembangunan dan cabaran dalam membangunkan Polish Spatial Data Infrastructure (PSDI) yang bermula pada tahun 2010 selaras dengan Infrastructure for Spatial Information in the European Community (INSPIRE).

Poland National Geoportal

Philippine Geoportal

Sesi Lawatan

National Center For High Performance Computing (NCHC)

Sesi lawatan bermula di National Center for High Performance Computing (NCHC) yang terletak di bandar Hsinchu. NCHC merupakan sebuah pusat super komputer yang telah ditubuhkan pada tahun 1991. Ia mempunyai kemudahan platform pengkomputeran dan jaringan rangkaian yang digunakan oleh para penyelidik, akademia tempatan dan orang awam. NCHC memainkan peranan utama dalam perkhidmatan teknologi awan Taiwan dengan mengintegrasikan pengkomputeran prestasi tinggi (HPC), storan dan rangkaian untuk menyediakan perkhidmatan awan dalam storan, *big data analytics* serta simulasi saintifik dan kejuruteraan. Semasa sesi lawatan, Timbalan Ketua Pengarah NCHC, Mr. Hsi Ching Lin telah membentangkan mengenai Taiwania 2 sebagai kerangka utama *Artificial Inteligence* (AI) yang paling berkuasa di Taiwan dan menguruskan data alam sekitar dan geospatial.

Peserta dibawa Melawat Fasiliti Super Komputer yang disediakan oleh NCHC

National Land Surveying And Mapping Center (NLSC)

Di Malaysia, Jabatan Ukur dan Pemetaan Malaysia (JUPEM) merupakan agensi yang bertanggungjawab dalam menyediakan perkhidmatan dan pengurusan ukur, pemetaan dan geospatial. Manakala di Taiwan, peranan tersebut dipertanggungjawabkan kepada National Land Surveying and Mapping Center (NLSC).

Wakil NLSC telah membentangkan mengenai *Introduction to Unmanned Aerial System* (UAS) & *Land Management System* (LMS) *of NLSC*, *Introduction to GIS Cadastral Map* dan *e-Taiwan Map Services*. NLSC juga telah membangunkan sistem maklumat bersepadu yang dinamakan *Taiwan Map Service* (https://maps.nlsc.gov.tw) yang memaparkan maklumat geospatial yang diperolehi oleh seluruh agensi kerajaan di Taiwan. Data geospatial yang dibangunkan oleh NLSC mematuhi spesifikasi *Web Map Services* (WMS) dan *Web Map Tile Services* (WMTS) serta mengikut pemakaian standard *Open Geospatial Consortium* (OGC).

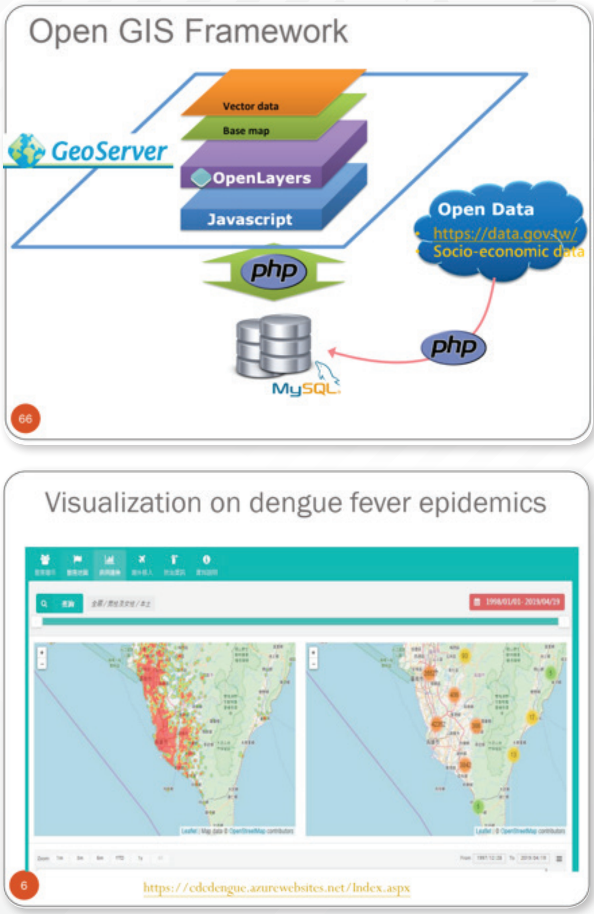
Soil And Water Conservation Bureau (SWCB)

Lawatan diteruskan ke Soil and Water Conservation Bureau (SWCB). SWCB merupakan sebuah agensi pertanian di Taiwan (ROC) yang bertanggungjawab dalam pemuliharaan tanah dan air, pengurusan tadahan air serta kawalan hakisan. SWCB juga telah membangunkan sistem pemantauan aliran serpihan sejak tahun 2002. Tujuan utama sistem pemantauan ini adalah untuk mengumpulkan maklumat aliran serpihan di lapangan sebanyak mungkin. Beberapa sensor meteorologi seperti meter cahaya, thermo-hydrometers, anemometer, jejak arah angin, kelembapan tanah dan barometer digunakan di setiap stesen pengawasan tetap untuk merekodkan kesan jangka panjang perubahan iklim global pada *slopeland* di Taiwan.

Teknologi Virtual Reality (VR) Diaplikasikan dalam Pemantauan Sisa Serpihan (Debris)

Research Center For Humanities And Social Sciences (RIHSS)

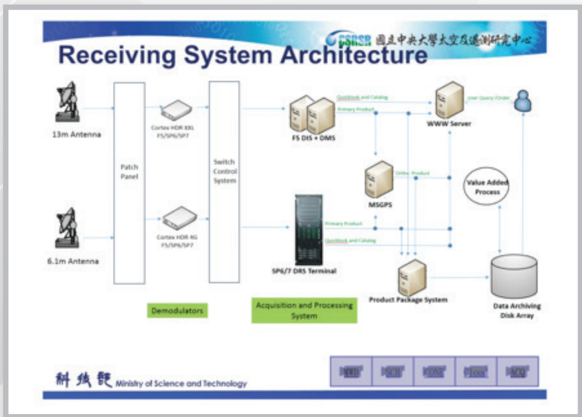
Lawatan seterusnya adalah ke Research Center for Humanities and Social Sciences (RIHSS), Academia Sinica di Bandar Taipei. RIHSS telah ditubuhkan pada Januari 2012 oleh Kementerian Sains dan Teknologi (dahulunya dikenali sebagai Majlis Sains Kebangsaan), Taiwan. Objektif utama penubuhan RIHSS adalah untuk mempromosikan kecemerlangan penyelidikan, menyediakan perkhidmatan kepada komuniti akademik, melahirkan kepakaran serta meningkatkan penguasaan dalam bidang sains sosial dan kemanusiaan.



Paparan *Open GIS Framework* yang digunakan dalam Hasil Kajian

National Center For High Performance Computing (NCHC)

Lawatan terakhir adalah ke Center for Space and Remote Sensing Research (CSRSR) di National Central University. Misi utamanya adalah dalam penyelidikan dan pengajaran *space and remote sensing*. Semasa sesi lawatan, setiap peserta telah didedahkan dengan pelbagai contoh kajian kes mengenai *environmental remote sensing*, *digital photogrammetry* dan maklumat berkaitan *satellite receiving station*.



Peserta dibawa Melawat Pusat Data yang terdapat di CSRSR

Penutup

Majlis penutup seminar dirasmikan oleh Pengarah ICLPST. Sebagai tanda penghargaan, para peserta menerima sijil kehadiran kursus dan wakil dari Malaysia bersama empat (4) peserta yang lain dari negara Turki, Paraguay, Lithuana dan Hondoras telah menerima *Award for Extraordinary Merit for Country Presentation.*

Penerima Anugerah Bergambar Bersama Timbalan Pengarah ICLPST

ICLPST

AWARD

This certificate is awarded to

Noreen Farisa Binti Mohd Nuri

from Malaysia

whose country presentation has earned

Extraordinary Merit

in the Seminar on Geographical Information System and Land Management conducted from April 17 to 30, 2019.

Kuei-son Sheu
Director of the
International Center for
Land Policy Studies and Training
Taiwan, ROC

Certificate No. A136 Date of Issue: April 30, 2019

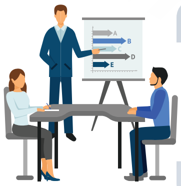
Peserta Kursus di ICLPST

Manfaat dan faedah yang telah diperolehi sepanjang seminar ini adalah seperti berikut:

- Mendapat pendedahan yang meluas berkaitan teknologi geospatial, aplikasi dan sistem GIS, pengurusan tanah dan pembangunan bandar pintar (smart city);
- Menambah ilmu melalui perkongsian pengalaman, maklumat dan pembentangan kajian kes merentasi negara;
- Meningkatkan jaringan di peringkat antarabangsa iaitu antara negara maju dan negara membangun dan berinteraksi dengan *Subject Matter Expert* (SME) di peringkat global;
- Menimba pengalaman perkongsian penggunaan aplikasi GIS dan remote sensing dalam pengurusan bencana, alam sekitar, sumber asli, pengangkutan dan pertanian serta berpeluang didedahkan dengan kaedah amalan terbaik (best practice); dan
- Percambahan idea yang lebih praktikal bagi memperkasakan SDI negara khususnya di MaCGDI.

Peluang berkongsi pengalaman dan pengetahuan bersama peserta pelbagai negara membuka satu horizon yang baharu melihat GIS dalam landskap negara maju. Lakaran kecemerlangan Taiwan dalam pembangunan GIS diterjemahkan melalui pelbagai kajian, teknologi, aplikasi dan model yang telah direalisasikan. Justeru, usaha yang optimum diperlukan bagi memperkukuh dan memperkasa SDI negara ini supaya terus unggul di pentas global menuju ke arah *Spatially Enabled World*. Usaha yang holistik diperlukan bagi melonjakkan MaCGDI sebagai organisasi berprestasi tinggi dan memperkasakan Program MyGDI ke arah perkhidmatan yang lebih efektif, inklusif dan responsif.

Secara konklusinya, pengunaan GIS di Taiwan banyak diaplikasikan di dalam pengurusan dan pemantauan bencana seperti gempa bumi, tanah runtuh, banjir dan taufan. GIS juga banyak diaplikasikan di dalam sektoral pengurusan bandar pintar (smart city), perancangan pembangunan, penilaian hartanah dan pertanian. Komitmen dan kesungguhan kerajaan Taiwan melalui pelbagai pembangunan model, sistem, aplikasi dan kajian yang berasaskan GIS bagi memastikan keselamatan dan kesejahteraan rakyat.



SESI KHIDMAT NASIHAT DAN BANTUAN TEKNIKAL BERKAITAN GEOSPATIAL KEPADA KEMENTERIAN INDUSTRI UTAMA

17 Jun 2019

Bilik Mesyuarat Nyatoh, Aras 11, Kementerian Industri Utama

Pada 17 Jun 2019, MaCGDI, KATS telah berkunjung ke Kementerian Industri Utama (MPI) bagi menyantuni undangan kementerian tersebut untuk melihat skop khidmat nasihat serta bantuan teknikal berkaitan geospatial daripada MaCGDI dalam pengurusan tanaman komoditi terutamanya sawit. Penghasilan peta dan maklumat geospatial tanaman komoditi telah dikenal pasti sebagai salah satu elemen penting dalam membantu memajukan industri komoditi yang berupaya memberi sumbangan kepada pertumbuhan ekonomi negara.

Lawatan kerja ini telah dipengerusikan oleh Ketua Setiausaha MPI, YBhg. Dato' Dr. Tan Yew Chong. Turut hadir bersama ialah barisan pengurusan tertinggi MPI yang terdiri daripada Timbalan Ketua Setiausaha, Setiausaha Bahagian Kanan dan Setiausaha – setiausaha Bahagian. Manakala pasukan MaCGDI telah diketuai oleh Puan Hajah Abrizah binti Abdul Aziz selaku Pengarah MaCGDI.

Pada sesi ini, MaCGDI telah berpeluang menerangkan dengan lebih terperinci mengenai peranan MaCGDI sebagai agensi penyelaras perkongsian maklumat geospatial di Malaysia di bawah Program MyGDI. Selain itu, MaCGDI turut membentangkan hasil kejayaan dan kolaboratif bersama agensi lain yang dibangunkan melalui aplikasi MyGOS. Sesi ini berjalan lancar dan diakhiri dengan perbincangan lanjut bersama YBhg. Dato' Dr. memandangkan beliau pernah mentadbir KATS sebelum ini sebagai Ketua Setiausaha.

LAWATAN KERJA KE BAHAGIAN KARTOGRAFI DAN GIS JUPEM

25 Jun 2019

Wisma Ukur, Ibu Pejabat JUPEM, Kuala Lumpur

Pada 25 Jun 2019 yang lalu, satu lawatan kerja telah diadakan ke Bahagian Kartografi dan GIS (BKGIS) bertempat di Wisma Ukur, Ibu Pejabat JUPEM, Kuala Lumpur. Lawatan ini telah disertai oleh seramai 10 orang pegawai dari Seksyen Pembangunan Standard dan Seksyen Aplikasi Web dan Multimedia, MaCGDI. Tujuan lawatan ini adalah untuk mendapatkan pandangan, perkongsian pengetahuan dan pengalaman dalam penyediaan video Aplikasi eMap dari pegawai BKGIS. Lawatan ini juga adalah sebagai pendedahan awal kepada pasukan projek MaCGDI sebelum menjalankan rakaman prototaip video visual bagi keperluan projek peluasan aplikasi MyGeoName.

Kehadiran pegawai-pegawai dari MaCGDI telah disambut oleh En. Nik Mohd Ramli bin Nik Yusoff, pegawai BKGIS JUPEM. Sempena lawatan, pegawai-pegawai MaCGDI telah diberi penerangan dan pembentangan mengenai pengenalan Aplikasi eMap, asas fotografi seperti kaedah dan teknik pengendalian video kamera serta perkongsian penghasilan *Quick Time Virtual Reality* (QTVR). Selain itu, pegawai MaCGDI juga turut didedahkan dengan kerja di lapangan secara *hands-on*, kaedah pengendalian kamera DSLR, kaedah pemprosesan QTVR serta penghasilan eMap.

MaCGDI mengucapkan ribuan terima kasih kepada BKGIS JUPEM kerana sudi menerima lawatan kerja ini dan diharapkan agar kerjasama seperti ini dapat diteruskan pada masa akan datang.

LAWATAN KERJA PIHAK BERKUASA KEMAJUAN PEKEBUN KECIL PERUSAHAAN GETAH

22 Ogos 2019

Bilik Mesyuarat Permata, Aras 7, Wisma Sumber Asli

Pada 22 Ogos 2019, MaCGDI telah menyantuni delegasi lawatan kerja pengurusan tertinggi Pihak Berkuasa Kemajuan Pekebun Kecil Perusahaan Getah (RISDA) yang diketuai oleh YBrs. Tuan Haji Rosely bin Kusip, Pengerusi RISDA.

RISDA berhasrat untuk membangunkan Sistem Maklumat Geografi (GIS) bagi memperkasakan capaian maklumat tanah kumpulan sasar pekebun kecil secara lebih tepat dan sistematik. Selain itu, lawatan kerja ini bertujuan mendengar dan berkongsi pengalaman serta kepakaran MaCGDI dalam membangunkan aplikasi GIS.

Lawatan kerja ini telah dipengerusikan oleh Puan Hajah Abrizah binti Abdul Aziz selaku Pengarah MaCGDI. MaCGDI telah menerangkan dengan lebih terperinci mengenai peranan MaCGDI sebagai agensi penyelaras perkongsian maklumat geospatial di Malaysia di bawah Program MyGDI. Selain itu, MaCGDI turut membentangkan hasil kejayaan dan kolaboratif bersama agensi lain yang telah dibangunkan melalui aplikasi MyGOS. Sesi ini berjalan lancar dan disambung dengan perbincangan lanjut dari kedua-dua pihak.

Secara kesimpulannya, MaCGDI berpuas hati kerana lawatan kerja ini telah menerima banyak pandangan dan idea baru yang dapat digunakan untuk penambahbaikan aktiviti oleh kedua-dua pihak. Ucapan terima kasih yang tidak terhingga juga kepada RISDA kerana telah menjadikan MaCGDI sebagai salah satu destinasi lawatan kerja pada tahun ini.

PAMERAN SEMPENA PUBLIC SECTOR CIO CONVEX 2019

8-9 Oktober 2019

Sime Darby Convention Centre, Bukit Kiara, Kuala Lumpur

Sempena Public Sector CIO Convex (PSCC) 2019 yang dianjurkan oleh Unit Pemodenan Tadbiran dan Perancangan Pengurusan Malaysia (MAMPU), MaCGDI telah dijemput untuk menyertai pameran di persidangan tersebut. PSCC 2019 telah diadakan pada 8 dan 9 Oktober 2019 bertempat di Sime Darby Convention Centre, Bukit Kiara, Kuala Lumpur.

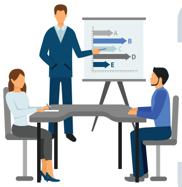
PSCC 2019 merupakan perhimpunan tahunan Ketua Pegawai Maklumat (CIO) agensi kerajaan, rakan strategik industri, pakar tempatan serta antarabangsa bagi membincangkan secara bersama mengenai teknologi, inisiatif dan cara lain bagi memberikan perkhidmatan yang lebih baik kepada rakyat.

Persidangan ini bertemakan ‘Gaining the Edge: Navigating the Future’ yang dihadiri kira-kira 1,300 peserta termasuk 21 pembentang antarabangsa daripada sembilan (9) buah negara dan 16 pembentang tempatan.

Pameran PSCC 2019 secara keseluruhannya telah mempamerkan produk dan perkhidmatan berkaitan teknologi maklumat (ICT) daripada pelbagai sektor. Kehadiran para peserta di ruang pameran ini dapat memberikan pendedahan dan meningkatkan lagi pengetahuan mereka terutamanya dengan trend teknologi ICT terkini. Istimewanya, MaCGDI merupakan satu-satunya agensi kerajaan yang diberikan pengiktirafan untuk bersama-sama MAMPU dalam menjayakan pameran sempena PSCC 2019.

YBhg. Dato’ Dr. Mazlan Yusoff, Ketua Pengarah MAMPU bersama-sama pengurusan tertinggi MAMPU telah meluangkan masa untuk mengunjungi booth pameran MaCGDI dan berpeluang melihat dengan lebih dekat usaha dan kejayaan kolaboratif MaCGDI bersama agensi lain di bawah Program MyGDI.

MaCGDI ingin menzahirkan sekalung penghargaan kepada pihak MAMPU kerana sudi menjemput MaCGDI untuk menyertai pameran ini dan berharap penganjuran persidangan seumpama ini membolehkan agensi kerajaan untuk bergerak lebih pantas dalam merancang serta memberikan perkhidmatan dengan lebih efisien dan berkesan kepada rakyat.



AKTIVITI MALAYSIA GEOSPATIAL ONLINE SERVICES 2019

Latihan Penggunaan MyGOS Kepada Jabatan Kerja Raya (JKR)

Tarikh : 15 Januari 2019
Tempat : Bilik COE MaCGDI, Aras 8, Wisma Sumber Asli, KATS

Latihan Penggunaan MyGOS bersama Angkatan Pertahanan Awam Malaysia (APM)

Tarikh : 13-14 Februari 2019
Tempat : Bilik COE MaCGDI, Aras 8, Wisma Sumber Asli, KATS

Bengkel Penyediaan Data Geospatial Ke Dalam Portal MyGOS Bersama Agensi KPDNHEP

Tarikh : 8 April 2019
Tempat : Kompleks Induk STRIDE, Kajang, Selangor

Latihan Penggunaan MyGOS Siri 2/2019 Kepada Pegawai Angkatan Pertahanan Awam Malaysia (APM) Perak

Tarikh : 9-10 April 2019
Tempat : Bilik COE MaCGDI, Aras 8, Wisma Sumber Asli, KATS

Bengkel Pelaksanaan Dan Promosi MyGOS Bersama Agensi Bil. 1/2019

Tarikh : 23 April 2019
Tempat : Bilik Mesyuarat Utama, Aras Bawah, Blok E, Wisma Darul Aman, Alor Setar, Kedah

Promosi MyGOS Bersama Agensi Dan Pihak Berkuasa Tempatan (PBT) Negeri Kedah

Tarikh : 24 April 2019
Tempat : Makmal Komputer, Wisma Darul Aman, Alor Setar, Kedah

Taklimat MyGOS Kepada Majlis Bandaraya Alor Setar

Tarikh : 24 April 2019
Tempat : Majlis Bandaraya Alor Setar, Kedah

Bengkel Penggunaan Aplikasi Story Map For ArcGIS Kepada Jabatan Alam Sekitar (JAS)

Tarikh : 30 April 2019
Tempat : Bilik Teknologi Maklumat, Aras 3, Jabatan Alam Sekitar, Putrajaya

AKTIVITI MALAYSIA GEOSPATIAL ONLINE SERVICES 2019

Latihan Story Map Menggunakan Aplikasi MyGOS Bersama Kraftangan Malaysia

Tarikh : 2 Mei 2019
Tempat : Bilik COE MaCGDI, Aras 8, Wisma Sumber Asli, KATS

Taklimat Dan Latihan Aplikasi MyGOS Kepada Jabatan Kesihatan Negeri Sabah

Tarikh : 3-5 Julai 2019
Tempat : Jabatan Kesihatan Negeri Sabah, Kota Kinabalu

Taklimat Pembangunan Prototaip MBAS APPS Under MyGOS Platform Kepada Majlis Bandaraya Alor Setar

Tarikh : 16-17 Julai 2019
Tempat : Majlis Bandaraya Alor Setar, Kedah

Bengkel User Requirement Specification (URS) Bersama Jabatan Penilaian Dan Perkhidmatan Harta Malaysia (JPPH) Bagi Projek MyGOS

Tarikh : 19-20 Ogos 2019
Tempat : Bilik Latihan JPPH, Putrajaya

Latihan Penggunaan MyGOS Kepada Pegawai Kementerian Perdagangan Dalam Negeri Dan Hal Ehwal Pengguna

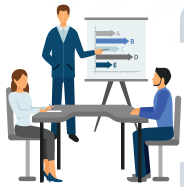
Tarikh : 22-23 Ogos 2019
Tempat : Bilik Latihan KPDNHEP, Putrajaya

Lawatan Inspektorat MyGOS Ke Bahagian Kejuruteraan Geoinformatik, Cawangan Senggara Fasiliti Jalan, Jabatan Kerja Raya (JKR)

Tarikh : 3 September 2019
Tempat : Ibu Pejabat JKR, Kuala Lumpur

Taklimat Dan Penggunaan MyGOS Di Bengkel Penyeragaman Harga Kementerian Perdagangan Dalam Negeri Dan Hal Ehwal Pengguna (KPDNHEP)

Tarikh : 4-6 September 2019
Tempat : Hotel Klagan, Kota Kinabalu, Sabah



MESYUARAT DAN PERBINCANGAN PROGRAM MyGDI 2019

Khidmat Runding Bersama Majlis Bandaraya Alor Setar (MBAS)

Tarikh : 22 Januari 2019
Tempat : MaCGDI, Wisma Sumber Asli, KATS

Perbincangan Projek Valuation Information System (VIS) Baru Oleh Jabatan Penilaian Dan Perkhidmatan Harta (JPPH) Bersama MaCGDI

Tarikh : 30 Januari 2019
Tempat : Bilik Perbincangan 3, Aras 8, Wisma Sumber Asli, KATS

Focus Group Discussion Bagi Penyediaan Dokumen Permulaan Projek (DPP) Pembangunan Sistem Daftar Warisan Jabatan Warisan Negara

Tarikh : 4-5 April 2019
Tempat : Pusat Pengembangan Warisan, Kuala Lumpur

Mesyuarat Agensi Tunjak Dan Custodian Data Geospatial Bagi Kategori *Transportation* Bilangan 1 Tahun 2019

Tarikh : 21 Ogos 2019
Tempat : Bilik Mesyuarat Permata, Aras 7, Wisma Sumber Asli, KATS

Mesyuarat Jawatankuasa Teknikal Clearinghouse MyGDI (JTCM) Bilangan 1 Tahun 2019

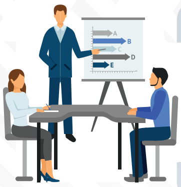
Tarikh : 12 September 2019
Tempat : Bilik Mesyuarat Mutiara, Aras 13, Wisma Sumber Asli, KATS

Mesyuarat Agensi Tunjak Dan Custodian Data Geospatial Bagi Kategori *Soil And Vegetation* Bilangan 1 Tahun 2019

Tarikh : 13 September 2019
Tempat : Bilik Mesyuarat Permata, Aras 7, Wisma Sumber Asli, KATS

Mesyuarat Agensi Tunjak Dan Custodian Data Geospatial Bagi Kategori *Aeronautical* Bilangan 1 Tahun 2019

Tarikh : 18 September 2019
Tempat : Bilik Mesyuarat Permata, Aras 7, Wisma Sumber Asli, KATS



MESYUARAT DAN PERBINCANGAN PROGRAM MyGDI 2019

Mesyuarat Agensi Tunjak Dan Custodian Data Geospatial Bagi Kategori *Demarcation* Bilangan 1 Tahun 2019

Tarikh : 25 September 2019
Tempat : Bilik Persidangan, Tingkat 15, JUPEM

Mesyuarat Agensi Tunjak Dan Custodian Data Geospatial Bagi Kategori *Utility* Bilangan 1 Tahun 2019

Tarikh : 1 Oktober 2019
Tempat : Bilik Mesyuarat Permata, Aras 7, Wisma Sumber Asli, KATS

Mesyuarat Agensi Tunjak Dan Custodian Data Geospatial Bagi Kategori *Hydrography* Bilangan 1 Tahun 2019

Tarikh : 2 Oktober 2019
Tempat : Bilik Mesyuarat Permata, Aras 7, Wisma Sumber Asli, KATS

Mesyuarat Agensi Tunjak Dan Custodian Data Geospatial Bagi Kategori *Geology* Bilangan 1 Tahun 2019

Tarikh : 8 Oktober 2019
Tempat : Bilik Mesyuarat Permata, Aras 7, Wisma Sumber Asli, KATS

Mesyuarat Jawatankuasa Teknikal Standard MyGDI (JTSM) Bilangan 1 Tahun 2019

Tarikh : 15 Oktober 2019
Tempat : Bilik Mesyuarat Mutiara, Aras 13, Wisma Sumber Asli, KATS

Mesyuarat Agensi Tunjak Dan Custodian Data Geospatial Bagi Kategori *Built Environment, Hypsography, Special Use* Dan *General* Bilangan 1 Tahun 2019

Tarikh : 16 Oktober 2019
Tempat : Bilik Mesyuarat Sri Menanti, Aras 4, Podium 1, Wisma Sumber Asli, KATS

Mesyuarat Jawatankuasa Teknikal Framework MyGDI (JTFM) Bilangan 1 Tahun 2019

Tarikh : 21 Oktober 2019
Tempat : Bilik Mesyuarat Sri Menanti, Aras 4, Podium 1, Wisma Sumber Asli, KATS

BULETIN GEOSPATIAL SEKTOR AWAM

FORMAT DAN GARIS PANDUAN SUMBANGAN ARTIKEL

Buletin Geospatial Sektor Awam oleh Pusat Infrastruktur Data Geospatial Negara (MaCGDI). Sidang Pengarang amat mengalu-alukan sumbangan sama ada berbentuk artikel atau laporan bergambar mengenai perkembangan geospatial di Malaysia.

GARIS PANDUAN UNTUK PENULIS

1. Artikel boleh ditulis dalam Bahasa Melayu atau Bahasa Inggeris.

2. Setiap artikel seboleh-bolehnya mempunyai abstrak dan perlu ditulis dengan huruf condong *italic*.

3. Format artikel adalah seperti berikut:

Jenis huruf *font*	: Arial
Saiz huruf bagi tajuk	: 12
Saiz huruf	: 10
Langkau *spacing*	: *Single*
Margin	: Atas, bawah, kiri dan kanan = 2.5 *cm*
Justifikasi teks	: Kiri
Lajur *column*	: Satu lajur setiap muka surat

4. Sumbangan hendaklah dikemukakan dalam bentuk *softcopy* dalam format ***Microsoft Word*.**

5. Semua imej grafik hendaklah dibekalkan dalam format **.tif** atau **.jpg** dengan resolusi tidak kurang daripada 150 d.p.i.

6. Segala pertanyaan dan sumbangan hendaklah dikemukakan kepada :

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Pusat Infrastruktur Data Geospatial Negara (MaCGDI)
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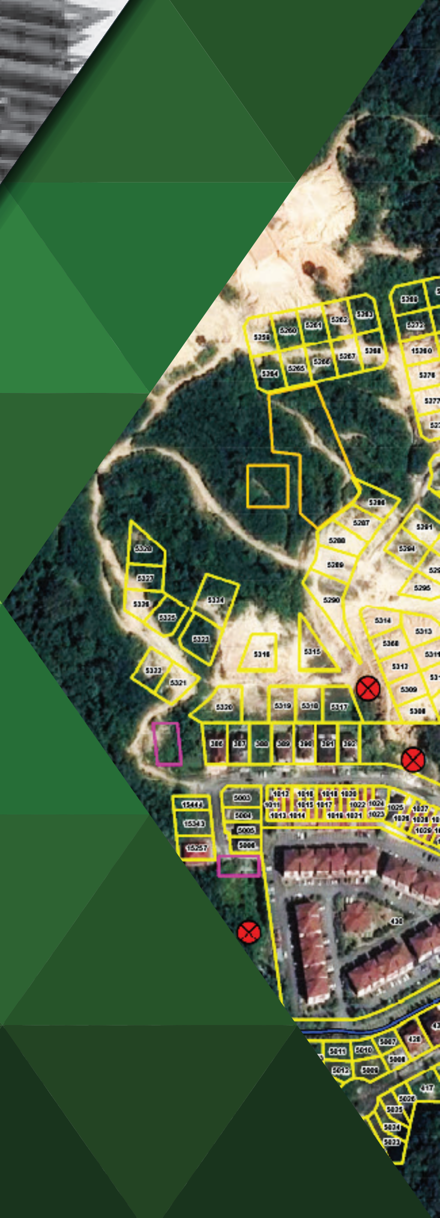

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