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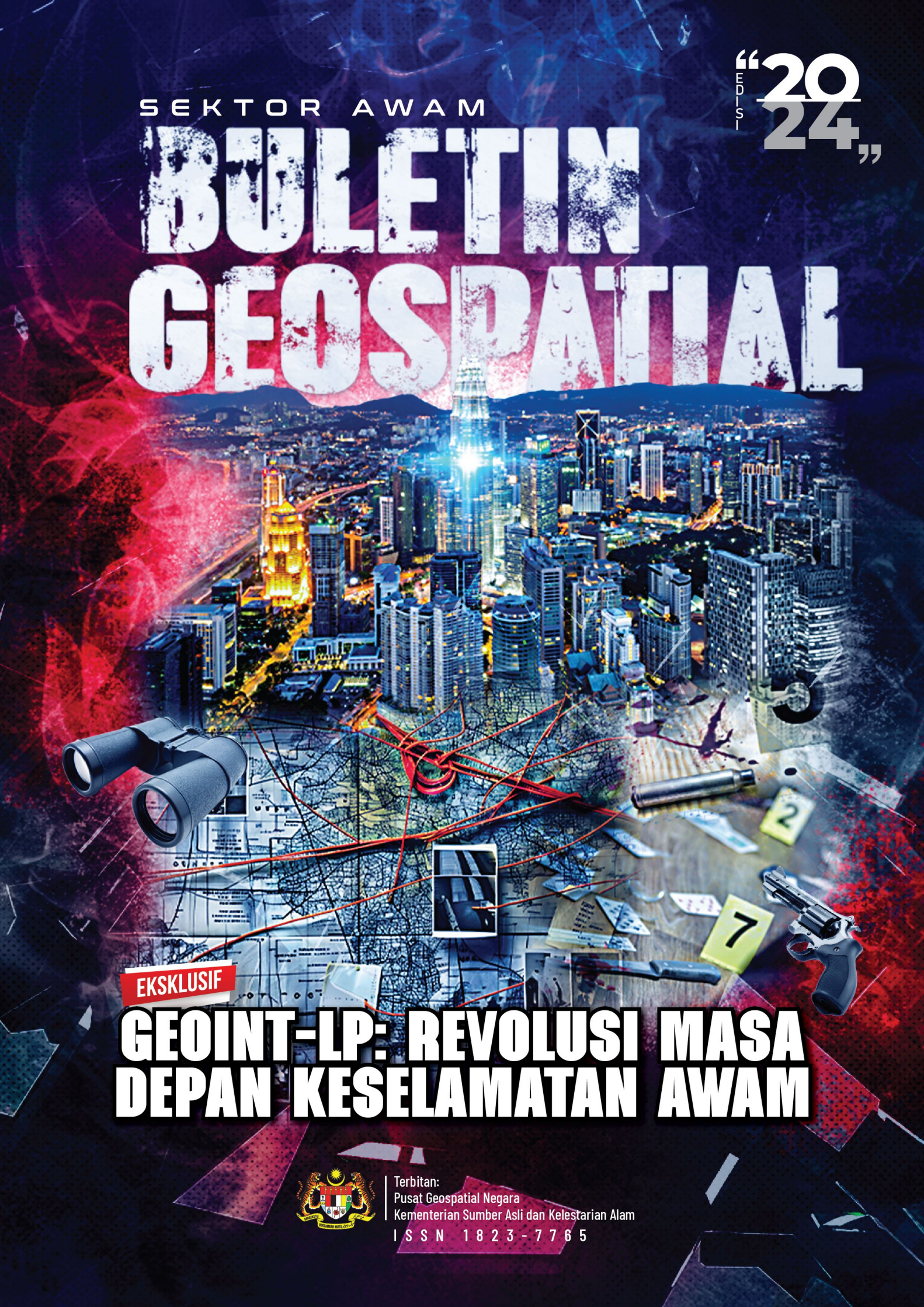
BULETIN GEOSPATIAL

EDISI "2024"



EKSKLUSIF

GEOINT-LP: REVOLUSI MASA DEPAN KESELAMATAN AWAM

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Pusat Geospatial Negara
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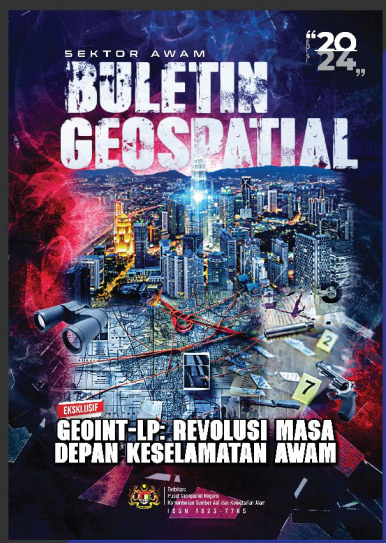
Kandungan



Sidang Pengarang

DARI MEJA KETUA EDITOR

Assalamualaikum dan Salam Malaysia Madani

Selamat datang ke Buletin Geospatial Sektor Awam (BGSA) Edisi 2024.

Syukur ke hadrat Ilahi, pada tahun ini, Pusat Geospatial Negara (PGN) dengan jayanya dapat menerbitkan sebuah buletin yang padat dengan informasi dan perkembangan terkini berkaitan bidang geospatial. Edisi 2024 kali ini mengetengahkan artikel eksklusif mengenai pembangunan sistem untuk keselamatan awam menggunakan teknologi *Geospatial Intelligence* (GEOINT) oleh Polis Diraja Malaysia (PDRM). Artikel ini memberikan maklumat tentang bagaimana teknologi GEOINT digunakan sebagai usaha PDRM mempertingkatkan keselamatan awam secara berkesan, satu langkah ke arah Malaysia yang lebih selamat.

Selain itu, BGSA Edisi 2024 turut memaparkan sumbangan artikel daripada para cendekiawan dan pakar daripada pelbagai institusi, seperti Institut Tanah dan Ukur Negara (INSTUN), Universiti Teknologi Malaysia (UTM), *International Islamic University Malaysia* (IIUM), termasuklah daripada PGN sendiri. Kepelbagaian pandangan dan ilmu yang dibawakan oleh penulis-penulis ini diharap dapat memberi manfaat yang besar kepada para pembaca dalam memahami dan mengaplikasikan teknologi geospatial dalam pelbagai bidang.

Tidak ketinggalan, kolum tetap yang melaporkan aktiviti dan promosi program Infrastruktur Data Geospatial Negara (MyGDI), yang merupakan fungsi utama PGN, diteruskan juga dalam edisi kali ini. Kolum ini bukan sahaja berfungsi sebagai wadah untuk memperkenalkan perkembangan terkini MyGDI, tetapi juga sebagai platform untuk memperkukuhkan kerjasama antara agensi-agensi kerajaan dalam usaha memajukan pembangunan dan perkongsian data geospatial di Malaysia.

Akhir kata, saya ingin merakamkan setinggi-tinggi penghargaan kepada semua terutamanya kepada penulis, penyelaras dan ahli sidang pengarang yang telah memberikan komitmen penuh dalam menjayakan penerbitan BGSA Edisi 2024 ini. Semoga buletin ini menjadi sumber inspirasi dan pengetahuan yang bermanfaat kepada semua pembaca.

Selamat membaca!

TS. RUSLIZA HANIM BINTI MAARIF
Ketua Editor
Buletin Geospatial Sektor Awam Edisi 2024
Pengarah Pusat Geospatial Negara (PGN)

Pembangunan Sistem Geospatial *Intelligence-Led Policing (GEOINT-LP)* Melalui Perisian Sumber Terbuka *(Open Source)* Bagi Keberhasilan Keselamatan Awam

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Abstrak

Polis Diraja Malaysia (PDRM) adalah agensi utama yang bertanggungjawab bagi memastikan keselamatan awam negara. Sejajar dengan Dasar Revolusi Perindustrian Keempat (4IR) Negara dan Malaysia MADANI, PDRM telah mengorak langkah menggunakan maklumat geospatial ke arah pendekatan *Intellingence-Led Policing* dalam menghadapi cabaran kepolisan moden masa kini. Pembangunan modul sistem seperti pemetaan jenayah, analisis data raya jenayah dan perisikan berupaya memajukan lagi model kepolisan semasa, sekaligus menghasilkan sistem *Geospatial Intellingence-Led Policing* (GEOINT-LP) yang berkesan dalam menganalisis kejadian jenayah berasaskan lokasi serta merancang program pencegahan jenayah secara strategik dan dinamik. Dengan kewujudan perisian geospatial sumber terbuka pada masa kini, pembangunan sistem lebih mudah dipelajari, kos efektif dan memberi impak tinggi terhadap keberhasilan keselamatan awam.

Pengenalan

PDRM adalah sebuah agensi penguatkuasaan utama yang berperanan dalam menjaga keselamatan dan ketenteraman awam. Dalam menjalankan operasi harian, taktikal dan strategik, PDRM memerlukan satu sistem berasaskan teknologi geospatial keselamatan seperti *Remote Sensing* (RS), *Global Positioning System* (GPS), *Geographic Information System* (GIS) dan *Satelite Image Data Analysis*. Teknologi geospatial ini telah digunakan oleh agensi kepolisan antarabangsa sejak 30 tahun yang lalu.

Sejak awal tahun 2003, PDRM menggunakan GIS dan GPS melalui Sistem C4i. Mulai tahun 2010, perkembangan teknologi geospatial mula diterapkan di beberapa jabatan dalaman PDRM. Keupayaan teknologi geospatial dalam PDRM bukan sahaja terhad kepada pemetaan dan analisis jenayah tetapi juga meluas kepada analisis *Forensic GIS, Crime Geographic Profilling, Crime Location Prediction, Satellite Image Intelligence Processing, Crime Combat Location, IoT Crime based Location Analysis, Victim Crime Behaviour Repeat Location Analysis, Disaster Prevention Analytics* dan *Strategic Management based Location Sustainability*. Ini menjadi asas kepada model *Geospatial Intellingence-Led Policing* yang turut diamalkan di peringkat antarabangsa.

> *Geospatial Intellingence-Led Policing* merujuk kepada penggunaan dan pengumpulan data raya untuk tujuan analitik, menghasilkan visualisasi lokasi dan trend jenayah, bagi membantu membuat keputusan serta merancang pembanterasan aktiviti jenayah.

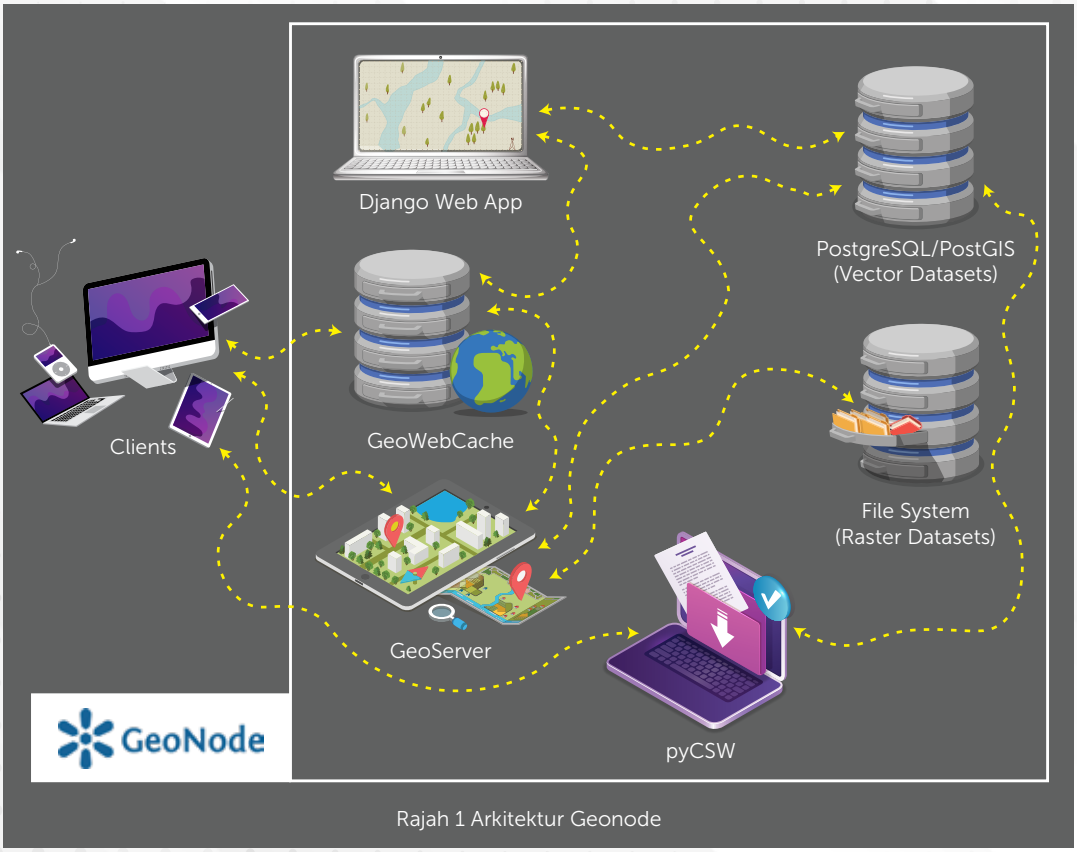
Geospatial Intellingence-Led Policing merujuk kepada penggunaan dan pengumpulan data raya untuk tujuan analitik, menghasilkan visualisasi lokasi dan trend jenayah bagi membantu membuat keputusan serta merancang pembanterasan aktiviti jenayah. Ketersediaan data raya dalam PDRM telah mendorong kepada pewujudan sistem *Geospatial Intellingence-Led Policing* (GEOINT-LP) sebagai inovasi dalam meningkatkan kualiti perkhidmatan kepada rakyat. Oleh itu, satu hab geospatial berpusat yang mengandungi pelbagai data keselamatan berasaskan lokasi diperlukan untuk memastikan PDRM terus maju dalam penggunaan teknologi ini. Platform GIS bersepadu juga diperlukan untuk menghubungkan data spatial daripada

pelbagai sumber dalaman dan luaran PDRM dalam satu pusat data geospatial yang membekalkan data terkini, tepat dan cepat yang boleh dicapai melalui platform hab geospatial PDRM ini.

Seperti amalan kepolisan antarabangsa yang menggunakan teknologi *geospatial intelligence* (GEOINT), PDRM juga tidak terkecuali dalam mengguna pakai teknologi ini bagi memastikan negara sentiasa aman dan selamat.

Inovasi Sistem GEOINT-LP

Sistem GEOINT-LP adalah platform berasaskan perkhidmatan web yang menghubungkan data raya daripada pangkalan data utama bagi tujuan analitik serta menghasilkan visualisasi dalam bentuk pemetaan untuk pencegahan jenayah dan keselamatan awam. Projek ini telah disenaraikan dalam Pelan Strategik PDRM 2021-2025 serta dalam permohonan di bawah peruntukan Rancangan Malaysia Ke-12. Memandangkan keperluan yang mendesak, projek ini dijalankan melalui pembangunan kendiri *(in-house development)* oleh PDRM kerana ia dianggap sebagai keperluan strategik dan penting.



Rajah 1 Arkitektur Geonode

Asas platform utama sistem ini menggunakan perisian sumber terbuka geospatial iaitu *Geonode* yang mengikut piawaian *Open Geospatial Consortium* (OGC). Dengan menggunakan perkakasan pelayan *(server)* sedia ada, pembangunan kendiri sistem GEOINT-LP dimulakan pada tahun 2022. Penggunaan perisian *Geonode* dipilih kerana keupayaannya menyokong penyimpanan data dalam pelayan *on-premises* milik jabatan, keselamatan perlindungan tinggi seperti penggunaan oAuth dan LDAP serta komponen yang menyokong piawaian OGC seperti *Django, pyCSW, CSW Metadata Catalogue, OpenLayers, geoExt Web Mapping Libraries, PostgreSQL/ PostGIS Spatial Databases, GeoServer OGC Services, 2D/3D map visualisation* dan *Geospatial Python Libraries* seperti ditunjukkan dalam Rajah 1.

Perisian GIS yang digunakan bagi pendigitalan data ialah *Quantum GIS* (QGIS). QGIS menyediakan sambungan terus kepada *Geonode*, memudahkan pengurusan dan perolehan data dengan sistematik serta secara masa nyata *(real-time)*. Perkongsian data masa nyata juga boleh dijalankan menggunakan perkhidmatan web seperti *Web Map Service* (WMS), *Web Feature Service* (WFS), *Web Coverage Service* (WCS), *Catalog Service for Web* (CSW), *Web Map Context* (WMC) dan *Tile Map Service* (TMS). Dengan keupayaan teknologi ini, sistem GEOINT-LP berfungsi sebagai hab utama perkongsian data bukan sahaja bagi data spatial tetapi juga data bukan spatial. Teknik integrasi kedua-dua jenis data ini boleh dilaksanakan dengan mudah melalui *Forward Link, Backward Link* dan *Bi-directional Link*.

Keberhasilan Sistem GEOINT-LP

Pada masa kini, sistem GEOINT-LP mempunyai lima (5) modul utama dengan lima puluh (50) lapisan data spatial dan dua puluh tiga (23) lapisan data bukan spatial. Antara modul utama yang disediakan termasuk modul sub sistem Pemetaan Laporan Polis dan sub sistem *Hotspot* Laporan Polis.

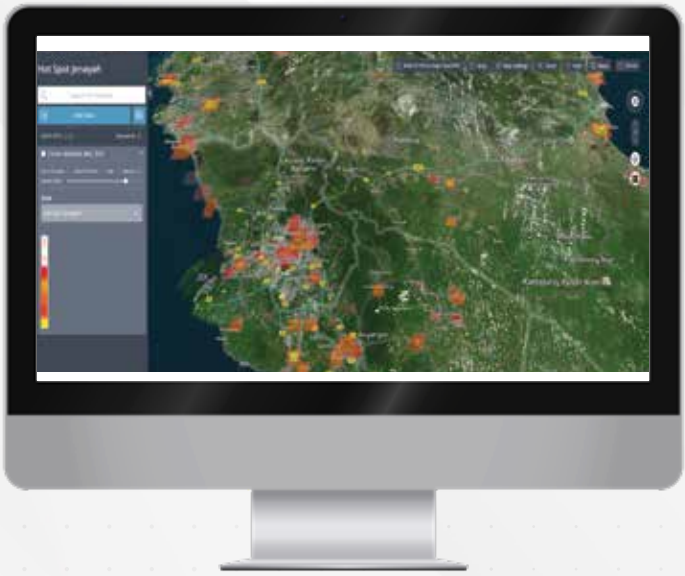
Rajah 2 Paparan web sistem GEOINT-LP

Rajah 3 Paparan data sistem GEOINT-LP

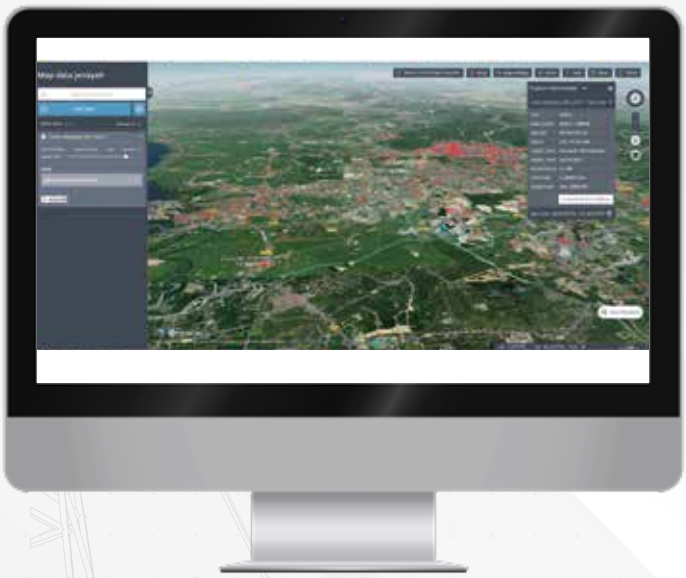
> **Sistem GEOINT-LP ini berkeupayaan menghasilkan data analitik secara masa nyata dengan visualisasi peta sama ada dalam bentuk 2D atau 3D**

Sistem GEOINT-LP ini berkeupayaan menghasilkan data analitik secara masa nyata dengan visualisasi peta sama ada dalam bentuk 2D atau 3D, bagi memudahkan pemerhatian terhadap corak, trend data serta kedudukan lokasi dengan lebih mudah seperti yang digambarkan dalam Rajah 4, Rajah 5 dan Rajah 6.

Rajah 4 Analisis *hotspot* dengan visualisasi 2D



Rajah 5 Analisis *hotspot* dengan visualisasi 3D



Rajah 6 Analisis *hotspot* dengan visualisasi 3D terperinci

> **Sistem GEOINT-LP yang dibangunkan menggunakan perisian sumber terbuka bukan sahaja dapat dibangunkan dalam tempoh singkat, iaitu satu (1) bulan termasuk dengan analitik data tetapi juga berupaya menyumbang kepada penyusunan strategi pengurangan jenayah yang amat berkesan.**

Kesimpulan

Sistem GEOINT-LP yang dibangunkan menggunakan perisian sumber terbuka bukan sahaja dapat dibangunkan dalam tempoh singkat, iaitu satu (1) bulan termasuk dengan analitik data tetapi juga berupaya menyumbang kepada penyusunan strategi pengurangan jenayah yang amat berkesan. Pendigitalan data serta visualisasi dinamik mempermudah dan mempertingkatkan keberkesanan pelaksanaan program-program pembanterasan jenayah secara berkala. Dengan keupayaan perkhidmatan web *(web services)*, sistem ini boleh diakses di pelbagai peringkat pentadbiran PDRM, sekali gus memudahkan capaian maklumat dan membolehkan keberhasilan keselamatan awam dicapai serta diukur dengan lebih tepat. Melalui platform sumber terbuka, pembangunan sistem geospatial ini bukan sahaja berfungsi sebagai alat untuk mengukur pencapaian strategi program yang sedang dilaksanakan tetapi juga membolehkan penyediaan model ramalan bagi menguji impak dan kesan terhadap keselamatan awam di masa hadapan.

Penghargaan

Penulis merakamkan perhargaan kepada Pusat Geospatial Negara (PGN), Kementerian Sumber Asli dan Kelestarian Alam, Putrajaya, yang telah memberikan ulasan dan nasihat teknikal bagi pembangunan sistem GEOINT-LP ini.

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Geographic Information System (GIS) Implementation in Public Sector

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Abstract

Geographic Information System (GIS) technology has revolutionised decision-making in government agencies, yet its adoption in Malaysia's public sector remains limited. The slow implementation rate is a significant factor behind the lack of interest. This study aims to identify critical success factors for GIS implementation in Malaysia's public sector. Research findings highlight six (6) essential success factors: GIS Champion, organisation structure, adequate staff, top management support, sufficient training, and resources. This study serves as a guideline for future GIS implementations, potentially enhancing GIS project management best practices within the Malaysian government. Implementing GIS technology effectively can optimise government spending and improve service delivery.

> "This study serves as a guideline for future GIS implementations, potentially enhancing GIS project management best practices within the Malaysian government."

Keywords :
Geographic Information System, Implementation, Public Sector.

Introduction

The Malaysian government has adopted GIS as part of its e-Government initiative to enhance public sector services. GIS, an IT application that analyses spatial data, addresses issues of scattered, outdated, and manually kept data. By integrating GIS, the government aims to improve service delivery efficiency and effectiveness.

GIS supports various fields and decision-making processes, prompting the Malaysian government to encourage its adoption across public sector services. Despite its recognised benefits, GIS implementation in many ICT systems proposed under the Malaysian Public Sector ICT Strategic Plan is still nascent. Pusat Geospatial Negara (PGN) oversees the development of Malaysia's Geospatial Data Infrastructure (MyGDI), aiming to improve geospatial data access. PGN supports public sector agencies by developing policies, standards, and guidelines for GIS implementation.

Problem Statement

The 10th Malaysian Plan tasked MAMPU (Malaysian Administrative Modernisation and Management Planning Unit) with assessing GIS implementation effectiveness over ten (10) years. The findings revealed that most government agencies are still at the preliminary stage of GIS usage. Key issues include:

- Lack of GIS Expertise: The public sector lacks a specific scheme of service for GIS professionals, despite local institutions producing graduates in this field.
- Institutional Issues: GIS development is hindered by the absence of a coordinating body, leading to uncoordinated and inconsistent GIS implementations. Additionally, there is a dearth of empirical studies on GIS implementation success factors in Malaysia.

The study seeks to answer the following research questions:

- What factors contribute to the success of GIS implementation?
- What are the most critical success factors for GIS projects in the Malaysian public sector?

Objectives

- Identify factors contributing to GIS implementation success based on the research model.
- Rank the most critical success factors for GIS projects in the Malaysian public sector.

Literature Review

GIS technology, recognised for its ability to synthesise and analyse spatial data, has become essential in various professions and fields (Ceccato & Snickars, 2000; Drummond & French, 2008; Gocmen, 2009). GIS is defined as a computer system for storing, displaying, and analysing spatial data (Burrough & McDonnell, 1998; Wang Fahui, 2006).

Successful GIS implementation requires a combination of components, typically following IT implementation processes: planning, user requirements analysis, system design, system development, and system maintenance. However, challenges such as funding and top management scepticism about GIS benefits can impede implementation.

GIS Capabilities

GIS offers several capabilities that benefit public sector organisations:

- Increased Efficiency: GIS can enhance project management efficiency, saving public funds and reducing expenses.
- Improved Communication: GIS visualises information through maps and reports, integrating with other platforms and media, including mobile devices.
- Effective Data Management: GIS handles spatial and attribute data, facilitating data sharing, accuracy, and control through database management systems.

Overview of GIS Implementation

Implementation involves technical and organisational issues (Azad, 1993; Croswell, 1991). Successful GIS implementation depends on appropriate staff, organisational structures, and a shared understanding of the technology's potential (Huxhold & Levinsohn, 1995; Chan & Williamson, 1996; Campbell & Masser, 1992).

Financial, technical, technological, educational, organisational, and human behavioural factors can restrict GIS implementation (Branko. I. Cavric, 2002). Strong organisational support is crucial (Abdullah et al., 2002; Innes & Simpson, 1993; Ramasubramanian, 1999).

- **Sufficient Training:** Training to enhance user knowledge of GIS implementation.
- **GIS Champion:** A leader who drives GIS development and diffusion.

GIS Implementation in Malaysia

Introduced in the early 1980s, GIS is used in various Malaysian fields, including surveying, engineering, urban planning, education, and agriculture. Significant applications include:

- **Geology:** GIS displays geological assessments, such as digital elevation models in the Klang Valley (Manap et al., 2009).
- **Crime:** GIS supports crime prevention by analysing relationships between variables and land parcels (Suryavanshi, 2001).
- **Medicine:** GIS maps health facilities and disease distributions, such as dengue fever (Shaharudin et al., 2002).
- **Town Planning:** GIS assists in managing and monitoring town planning processes (Mohd Ali Abu Bakar, 2004).
- **Education:** GIS is studied for its effectiveness in enhancing students' interest in geography (Lateh et al., 2010).

GIS Success Factors

Success factors for GIS implementation, as identified by various researchers, include:

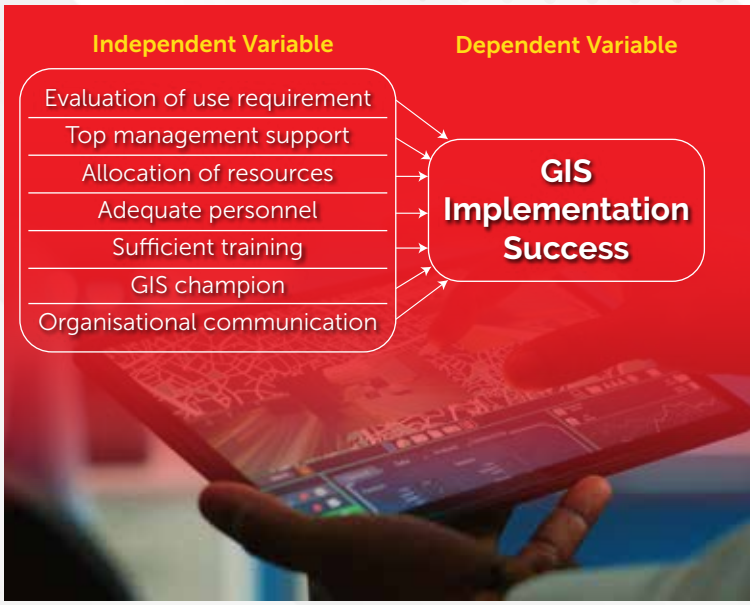
- **User Requirement Analysis:** Evaluating user needs to fulfil stakeholder requirements.
- **Top Management Commitment:** Support and commitment from top-level management.
- **Sufficient Resources:** Adequate time, money, equipment, and personnel.
- **Adequate Personnel:** Skilled staff for GIS operations and management.
- **Organisation Structure:** Effective communication and coordination within the organisation.

Research Methodology

This research employed a quantitative method for systematic and objective analysis.

Research Model

This research used research model by Onsrud and Pinto (1993) to identify GIS implementation success factors, as follows:



Data Collection

Questionnaires were distributed to various government agencies, with 30 sets completed by respondents from federal and state departments.

Analysis

Demographic profiles and respondents' experiences were analysed to understand their backgrounds and involvement in GIS projects.

Demographic Profile

Most respondents were project team leaders or responsible officers, with a majority holding bachelor's degrees. Few had professional project management certifications.

Demographic Profile	Category	Frequency	%
Gender	Male	14	46.7
	Female	16	53.3
	Total	**30**	**100.0**
Group Age	20-29	7	23.3
	30-39	13	43.3
	40-49	7	23.4
	50-59	3	10.0
	Total	**30**	**100.0**
Current Position	Top Management	1	3.3
	Project Manager	2	6.7
	Project Team	13	43.3
	Team Member	5	16.7
	End User	9	30.0
	Total	**30**	**100.0**
Level of Education	SPM	5	16.7
	STPM	2	6.7
	Diploma	9	30.0
	Bachelor	13	43.3
	Master	1	3.3
	Total	**30**	**100.0**

Table 1 Demographic Profile

Respondents' Experience

Respondents Experience	Category	Frequency	%
Certification on Project Management	CAPM	1	3.3
	PGMP	1	3.3
	None	28	93.3
	Total	**30**	**100.0**
Type of Project	GIS Infrastructure	13	43.3
	System Application	14	46.7
	GIS Hardware & Software	3	10.0
	Total	**30**	**100.0**
Size of Project	<100 000	22	73.3
	101K-200K	1	3.3
	201K-500K	3	10.0
	>1M	4	13.3
	Total	**30**	**100.0**
Project Approach	In Sourcing	8	26.7
	Out Sourcing	15	50.0
	Co Sourcing	2	6.7
	Unknown	5	16.7
	Total	**30**	**100.0**

Table 2 Respondents Experience

Respondents had varying levels of experience with GIS projects, mostly involving system application development and infrastructure. Most projects were relatively small in budget.

Organisational Structure Factors

The study identified differences between the research model and actual findings as follows, emphasizing the importance of GIS champions, adequate staffing, and sufficient training.

Factors	Mean	Rank
User Requirements	3.0333	6
Top Management	3.3333	5
Sufficient Resources	2.5667	7
Adequate Staff	4.000	2
Sufficient Training	3.800	3
GIS Champion	4.700	1
Organisation Structure	3.6667	4

Table 3 Research model adapted from Onsrud and Pinto

Critical Success Factors

To strengthen the analysis, factor analysis was employed, specifically using the Kaiser Criterion to identify significant factors. Introduced by Kaiser (1961), this technique determines factors based on eigenvalues, with eigenvalues greater than one indicating a significant factor. The results of the factor analysis, summarised in Table 4, reveal the factors identified based on their eigenvalues.

Component	Initial Eigenvalues	Rotation Sums of Squared Loadings
	Total	(% of Variance)
1	12.714	21.985
2	6.060	21.175
3	2.023	20.870
4	1.695	8.590
5	1.202	6.962
6	1.109	5.949

Component	Factors
1	GIS Champion
2	Organisation Communication
3	Adequate Personnel
4	Top Management Support
5	Sufficient Training
6	Sufficient Resource

Table 4 Summarise of Critical Factors

As mentioned, the purpose of this research is to identify the critical success factors that contribute to the successful implementation of GIS in the public sector. The results highlight differing perceptions during GIS implementation and the research model, indicating that various departments manage GIS implementation differently. The analysis underscores that for successful GIS implementation, the Malaysian government must consider all highlighted factors. These include having a GIS champion, effective organisational communication, adequate personnel, strong top management support, sufficient training, and adequate resources.

> "The analysis underscores that for successful GIS implementation, the Malaysian government must consider all highlighted factors. These include having a GIS champion, effective organisational communication, adequate personnel, strong top management support, sufficient training, and adequate resources."

> "Budget constraints hinder GIS implementation, particularly at the local authority level, where geospatial data tasks are often assigned to non-specialised staff."

Conclusion

This research proposes a strategy involving adjustments and supplements to current institutional arrangements to address GIS implementation challenges. Recommendations include implementing a shared data dictionary system and conducting pilot projects to test inter-sector instruments.

Budget constraints hinder GIS implementation, particularly at the local authority level, where geospatial data tasks are often assigned to non-specialised staff. Ensuring the success of GIS implementation requires considering all identified critical factors.

GIS has the potential to transform public sector operations, significantly impacting government activities and public information quality. Effective GIS implementation will enhance service delivery and optimise resource utilisation.

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Kepentingan Infrastruktur Data Geospatial dalam Pembangunan Bandar Pintar

(The importance of Geospatial Data Infrastructure in Smart City Development)

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Pengenalan

Matlamat utama inisiatif bandar pintar *(smart city)* adalah untuk mewujudkan persekitaran bandar yang mampan, boleh didiami dan berdaya tahan yang memberikan kualiti hidup yang tinggi kepada rakyat sambil memacu pertumbuhan ekonomi dan pembangunan mampan (Halegoua, 2020).

Pembangunan bandar pintar diperkukuhkan lagi dengan pembangunan teknologi termaju seperti *Internet of Things* (IoT), Kepintaran Buatan (*Artificial Intelligence*, AI) dan Analitik Data Raya *(big data analytics)*. Penggunaan pelbagai teknologi termaju ini dapat meningkatkan penyampaian perkhidmatan awam dan pengalaman secara keseluruhan (Silva et al., 2018).

> **Pembangunan bandar pintar sangat bergantung pada ketersediaan dan kebolehcapaian data geospatial, yang dijana oleh Infrastruktur Data Geospatial (GDI)**

Pembangunan bandar pintar sangat bergantung pada ketersediaan dan kebolehcapaian data geospatial, yang dijana oleh Infrastruktur Data Geospatial (GDI). GDI merupakan satu kerangka melibatkan polisi, standard, data geospatial dan teknologi yang membantu dalam capaian dan perkongsian maklumat geospatial (Rajabifard & Williamson, 2002). GDI membolehkan pihak yang terlibat dengan inisiatif bandar pintar untuk mengumpul, membuat analisis, memapar dan mengedar data geospatial yang berkaitan melalui pelbagai sistem yang menyokong penyampaian perkhidmatan bandar seperti pengangkutan, tenaga, air dan pengurusan sisa. Dengan menggunakan GDI, bandar pintar dapat membangunkan model geospatial yang mengintegrasikan data spatial untuk mengenal pasti corak, trend dan perspektif yang dapat membantu dalam membuat keputusan serta membangunkan polisi.

Kajian ini bertujuan menilai kepentingan GDI dalam pembangunan bandar pintar dengan mengenal pasti isu-isu dan langkah-langkah untuk mengintegrasi GDI dalam pembangunan bandar pintar.

Kepentingan GDI dalam Pembangunan Bandar Pintar

Kepentingan integrasi GDI dalam pembangunan bandar pintar boleh dilihat daripada beberapa kajian terdahulu. Ia boleh dibahagikan kepada beberapa fokus utama iaitu; integrasi data spatial, strategi pentadbiran, keselamatan data spatial, carian dan analisis metadata, integrasi sensor, polisi dan interoperabiliti data.

Isu-isu Integrasi dalam Bandar Pintar

Terdapat beberapa isu utama yang telah diketengahkan oleh kajian-kajian terdahulu berkaitan integrasi GDI dalam inisiatif bandar pintar. Antara isu utama yang dinyatakan adalah berkaitan (1) data geospatial, (2) integrasi sensor berkaitan, (3) pengurusan data geospatial, (4) keperluan untuk menambah baik metadata dan (5) isu berkaitan institusi dan pentadbiran.

Rajah 1 Lima (5) isu utama integrasi GDI dalam bandar pintar

> **Format data yang berbeza dan kualiti data yang tidak terjamin merupakan cabaran utama yang perlu diatasi bagi memperbaiki integrasi GDI dalam inisiatif bandar pintar.**

Bagi isu berkaitan data geospatial, perhatian perlu diberikan terlebih dahulu kepada isu format, kualiti dan interoperabiliti data (Ghosh & Mukherjee, 2022; Moshrefzadeh et al., 2017; Nagaraja et al., 2020). Format data yang berbeza dan kualiti data yang tidak terjamin merupakan cabaran utama yang perlu diatasi bagi memperbaiki integrasi GDI dalam inisiatif bandar pintar. Selain itu, interoperabiliti data perlu ditingkatkan kerana inisiatif bandar pintar ini memerlukan pelbagai jenis data termasuk data spatial dan data bukan spatial yang harus berfungsi secara saling melengkapi.

Bagi isu integrasi sensor pula, data spatial yang digunakan, sepatutnya boleh diintegrasikan secara tidak langsung dengan pelbagai sensor lain seperti kamera litar tertutup (CCTV), sensor lampu trafik dan sensor-sensor berkaitan (Bhattacharya & Painho, 2017; Iban & Aksu, 2020; Rabelo et al., 2017). Kebolehan untuk mengintegrasikan sensor-sensor terkini dengan data spatial akan meningkatkan lagi kebolehcapaian dan kemas kini data yang sedia ada.

Selain itu, isu berkaitan pengurusan data geospatial turut dibangkitkan khususnya berkaitan garis panduan atau prosedur untuk pengumpulan, penyimpanan, pemprosesan, analisis dan pengedaran atau visualisasi data spatial (Ghosh & Mukherjee, 2022; Moshrefzadeh et al., 2017). Dengan adanya garis panduan dan prosedur yang baik dapat membantu pihak pengurusan bandar pintar dalam meningkatkan kualiti, kebolehcapaian, keselamatan serta interoperabiliti data (Chaturvedi et al., 2019).

Isu metadata juga sering dibincangkan di mana terdapat keperluan untuk menambah baik metadata supaya lebih dinamik untuk memudahkan proses carian dan analisis (Rajaram et al., 2018). Penambahbaikan ini boleh dilaksanakan dengan memasukkan topik peta dan hipergraf bagi melihat hubungan antara topik dalam metadata yang sedia ada. Ini akan memudahkan lagi proses carian dan analisis topik secara lebih mendalam.

Akhir sekali, isu institusi dan pentadbiran GDI dalam bandar pintar turut diketengahkan (Iban & Aksu, 2020; Kim et al., 2019). Pelaksanaan GDI bandar pintar melibatkan pelbagai agensi, jabatan dan bahagian. Ini memerlukan pengurusan rentas-institusi yang melibatkan undang-undang, dasar dan kerangka kerja organisasi untuk memastikan komunikasi dan kerjasama yang berkesan.

Ke Arah Integrasi GDI dalam Bandar Pintar

Berdasarkan isu-isu yang telah dikenal pasti, perancangan untuk menambah baik integrasi GDI dalam bandar pintar boleh dilaksanakan dengan lebih strategik. Kajian ini mengetengahkan beberapa cadangan inisiatif yang merangkumi tiga (3) hala tuju utama, iaitu menambah baik integrasi data geospatial, mempertingkatkan kemajuan teknologi dan pembaharuan institusi (rujuk Rajah 2).

Rajah 2 Hala tuju integrasi GDI dalam bandar pintar

Integrasi data geospatial boleh ditambah baik melalui pemudahcaraan dan pengaktifan data geospatial. Ini termasuk meningkatkan interoperabiliti dan kemudahan capaian data daripada pelbagai sumber serta memastikan data yang dihasilkan tepat, relevan dan terkini.

Untuk meningkatkan penggunaan teknologi, adaptasi terhadap teknologi terkini dan akan datang yang berkaitan dengan GDI perlu dilaksanakan. Contohnya, teknologi seperti pembelajaran mendalam, pembelajaran mesin dan kecerdasan buatan dapat membantu meningkatkan keupayaan pengurusan data geospatial dan pemetaan pintar dalam bandar.

Pembaharuan institusi pula perlu diberi tumpuan bagi memperkasa kerjasama dan kolaborasi antara agensi yang terlibat dalam pembangunan bandar pintar. Ini termasuk memperbaiki komunikasi dan meningkatkan penglibatan aktif semua pihak supaya pengurusan bandar pintar akan lebih efisien melalui sokongan dan koordinasi yang lebih baik antara institusi.

Secara keseluruhannya, untuk memastikan kejayaan pelaksanaan bandar pintar, integrasi yang efektif terhadap data khususnya data geospatial, pengurusan data yang cekap, keselamatan data yang kukuh serta pengurusan institusi yang baik adalah amat diperlukan.

Kesimpulan

> "Kajian ini menunjukkan kepentingan untuk melihat semula asas bagi pelaksanaan integrasi GDI dalam inisiatif bandar pintar"

Integrasi GDI dalam inisiatif pembangunan bandar pintar bukanlah satu perkara baru, namun terdapat beberapa isu berkaitan integrasi perlu dilihat dan ditambah baik. Kajian ini mengenal pasti lima (5) isu dan menggariskan tiga (3) hala tuju utama untuk menambah baik integrasi GDI dalam inisiatif bandar pintar, iaitu: menambah baik integrasi data geospatial, mempertingkatkan kemajuan teknologi dan pembaharuan institusi. Kajian ini menunjukkan kepentingan untuk melihat semula asas bagi pelaksanaan integrasi GDI dalam inisiatif bandar pintar bagi memudahkan pengumpulan, pemprosesan, analisis serta visualisasi dan pengagihan data geospatial di antara agensi-agensi utama dalam inisiatif bandar pintar.

Penghargaan

Penulis merakamkan ucapan terima kasih kepada Universiti Teknologi Malaysia (UTM) kerana membiayai projek ini di bawah Geran Penyelidikan Galakan UTM (UTMER), nombor vote 31J77.

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The Potential of Geospatial Technique in Mapping the Uncharted Reefs in Malaysia

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Abstract

Coral reefs in Malaysia are vital ecosystems that support marine biodiversity, protect coastlines, and contribute to local economies. However, many reefs remain uncharted due to the logistical and technological challenges of traditional mapping methods. This study explores the application of advanced geospatial techniques for mapping uncharted coral reefs in Malaysia, focusing on the Pahang coastal region. The integration of satellite imagery, Geographic Information System (GIS), and underwater photogrammetry enhances the resolution and scope of mapping efforts. This research highlights the potential of geospatial techniques to revolutionise reef exploration and conservation in Malaysia, promoting sustainable management of marine resources.

> By dissipating wave energy, coral reefs help protect coastal communities from flooding and property damage, thus safeguarding human lives and infrastructure.

Figure 1 Nearshore reef exploration in Pahang coastal waters since 2020

Introduction

Coral reefs, often referred to as the "rainforests of the sea," are among the most vital marine habitats. Despite covering only 1% of the ocean floor, they support approximately 25% of all marine life, making them one of the most biodiverse ecosystems on the planet. This remarkable biodiversity is crucial for the health and stability of marine environments, as coral reefs provide habitat, food, and breeding grounds for a wide variety of marine species, including fish, invertebrates, and algae. The importance of coral reefs extends beyond their ecological value. They play a critical role in coastal protection, acting as natural barriers that reduce the impact of waves, storms, and erosion on shorelines. By dissipating wave energy, coral reefs help protect coastal communities from flooding and property damage, thus safeguarding human lives and infrastructure. This protective function is particularly vital in regions prone to hurricanes, typhoons, and other severe weather events.

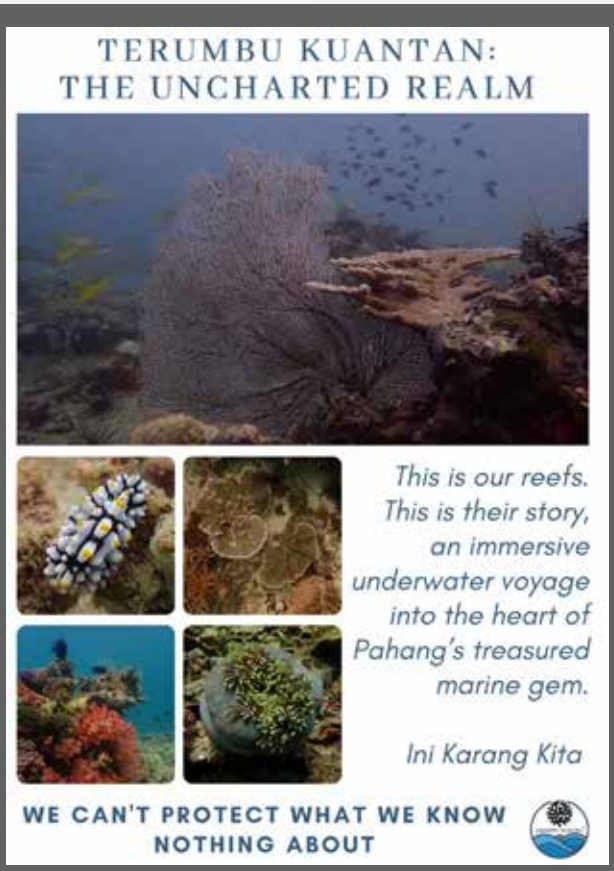


Figure 2 Some of the benthic communities' structure found in Kuantan coastal waters

Furthermore, coral reefs are a cornerstone of marine tourism, attracting millions of visitors worldwide who engage in activities such as snorkelling, scuba diving, and wildlife observation. The vibrant colours and diverse marine life of coral reefs create unique and mesmerizing underwater landscapes that draw tourists, contributing significantly to local economies. In many coastal regions, tourism generated by coral reefs provides employment and income for communities, supporting hotels, restaurants, tour operators, and other businesses. In addition to tourism, coral reefs are integral to fisheries. They serve as nurseries for numerous fish species, many of which are commercially important. The complex structures of coral reefs offer shelter and feeding grounds for juvenile fish, enhancing their survival rates and contributing to the productivity of nearby fisheries as shown in Figure 2. Small-scale and subsistence fishers rely heavily on the abundance of fish associated with coral reefs for their livelihoods and food security.

Nearshore Reefs Exploration in Pahang Coastal Area

Nearshore reefs exploration in Pahang coastal waters has evolved significantly over the past decade as shown in Figure 3. Between 2012 and 2020, coral video transect surveys were conducted, providing valuable visual insights into reef health, species diversity, and coral coverage. From 2021 to 2023, more advanced methods such as Single Beam Echo Sounders (SBES) and 3D photogrammetry were introduced, enabling detailed mapping of reef topography and structural complexity. These technologies allowed for a more precise understanding of reef distribution and morphology. In 2024, exploration efforts took another leap forward with the deployment of multibeam echo sounders and ROV-based surveys, providing high-resolution bathymetric data and the ability to investigate reef ecosystems in greater detail and depth, ultimately advancing conservation and management strategies for these critical habitats.

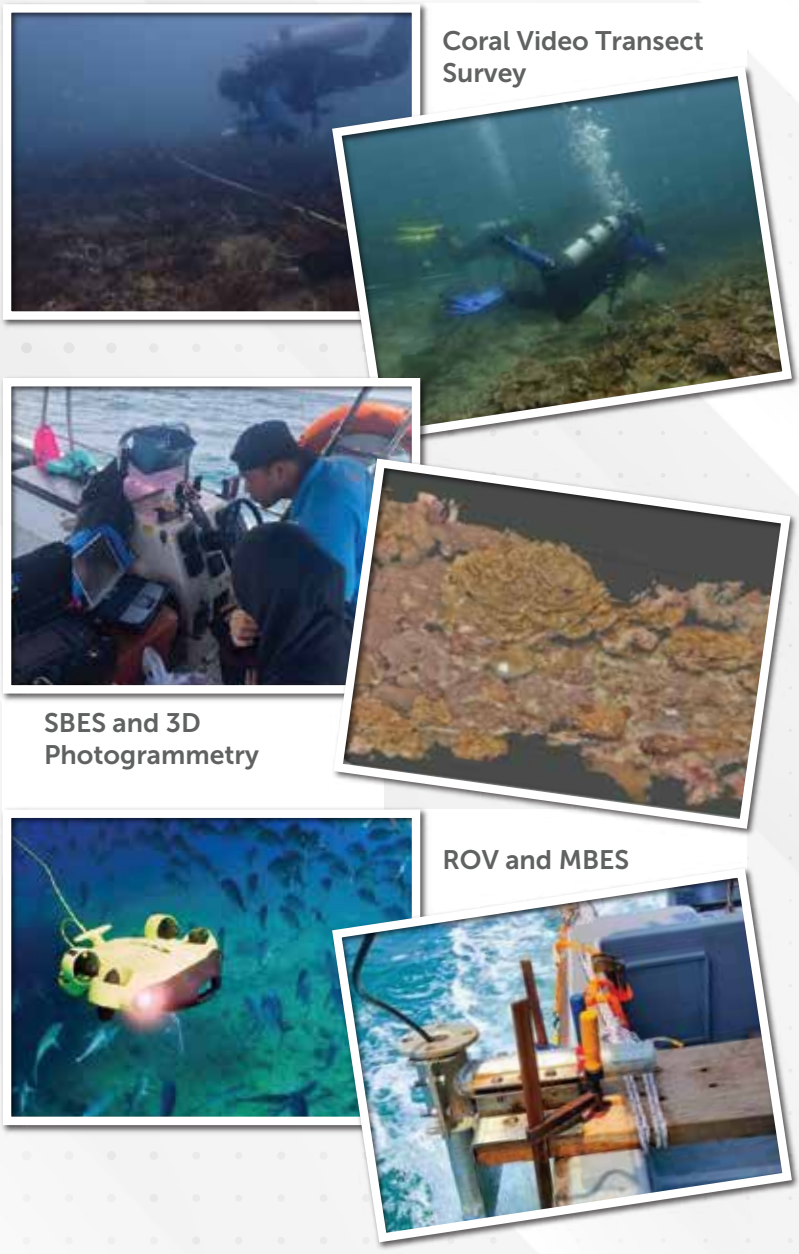
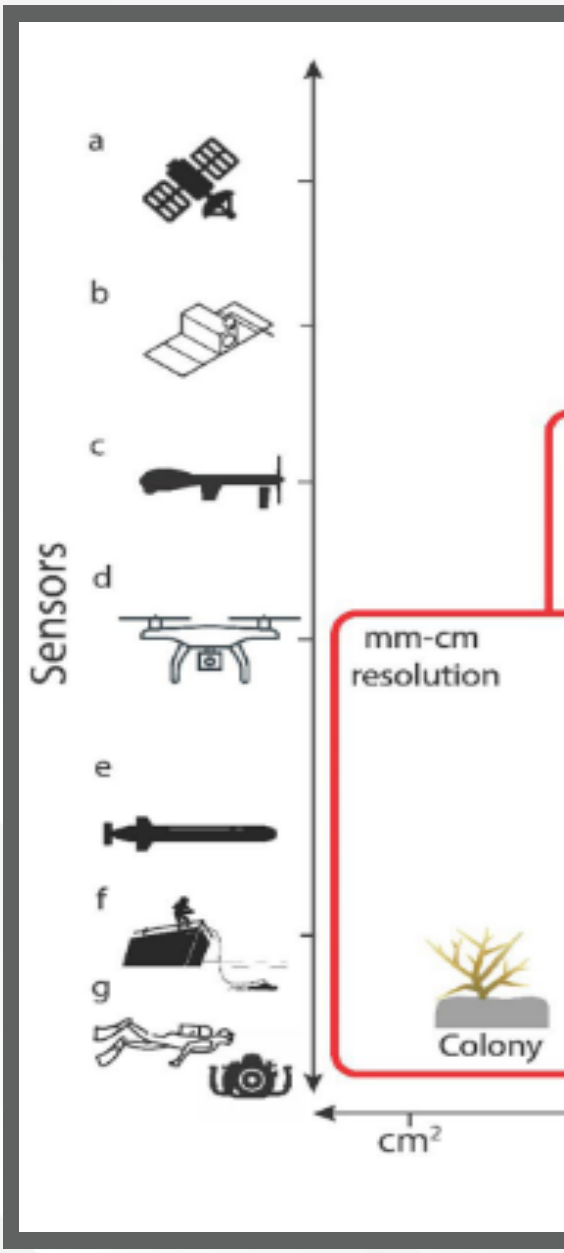


Figure 3 Nearshore reefs exploration in Pahang coastal area between 2012-2024.



Geospatial Application on Coral Reef Mapping

The use of geospatial technologies in coral reef mapping represents a transformative approach to understanding and conserving these vital marine ecosystems at multiple scales (Figure 4). By leveraging advanced tools and techniques such as satellite imagery, remote sensing, GIS, and underwater photogrammetry, researchers can obtain comprehensive, high-resolution data on coral reef structures, health, and dynamics. These technologies not only enhance the accuracy and efficiency of mapping efforts but also enable the continuous monitoring and assessment of coral reefs, which is crucial for effective conservation and management.

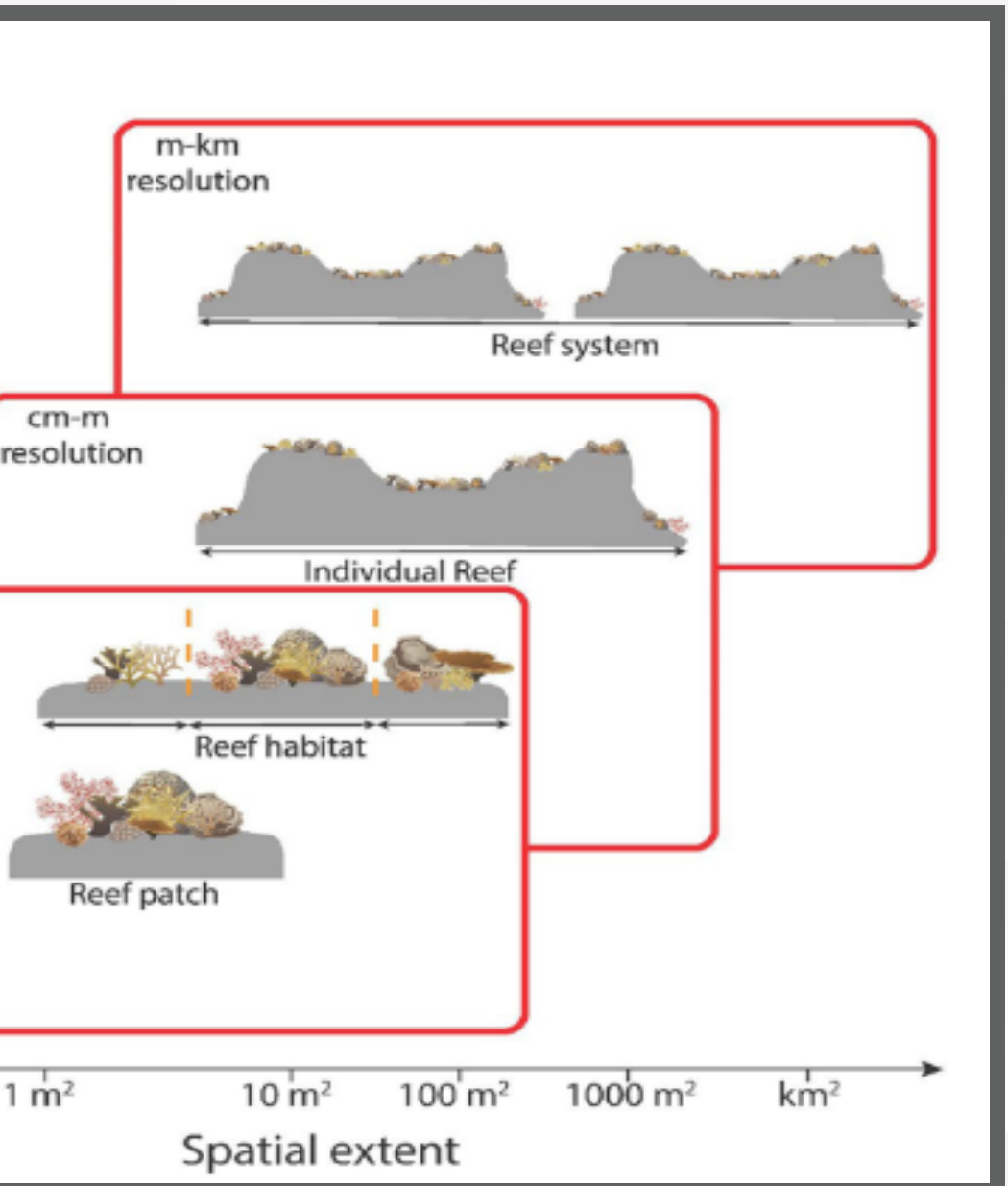


Figure 4 Advanced geospatial technologies offer varying levels of resolution from coarse-scale satellite imagery to high-resolution underwater photogrammetry (Lutzenkirchen et al., 2024).

Satellite Imagery

Satellite imagery is one of the most powerful geospatial tools for coral reef mapping. High-resolution satellites, such as Sentinel-2A, Landsat, and WorldView, provide extensive spatial coverage, allowing for the mapping of large and often remote reef areas that are otherwise difficult to access. These satellites can capture images with resolutions as fine as 10 meters, offering detailed views of reef structures and the surrounding marine environment. One of the significant advantages of satellite imagery is its ability to monitor changes over time. By analysing time-series data, researchers can detect trends and anomalies, such as coral bleaching events, sedimentation, and algal overgrowth. This temporal monitoring is essential for understanding the impacts of environmental stressors and human activities on coral reefs and for implementing timely conservation interventions. Figure 5 highlights such approaches as reported by Lutzenkirchen et al., 2024.

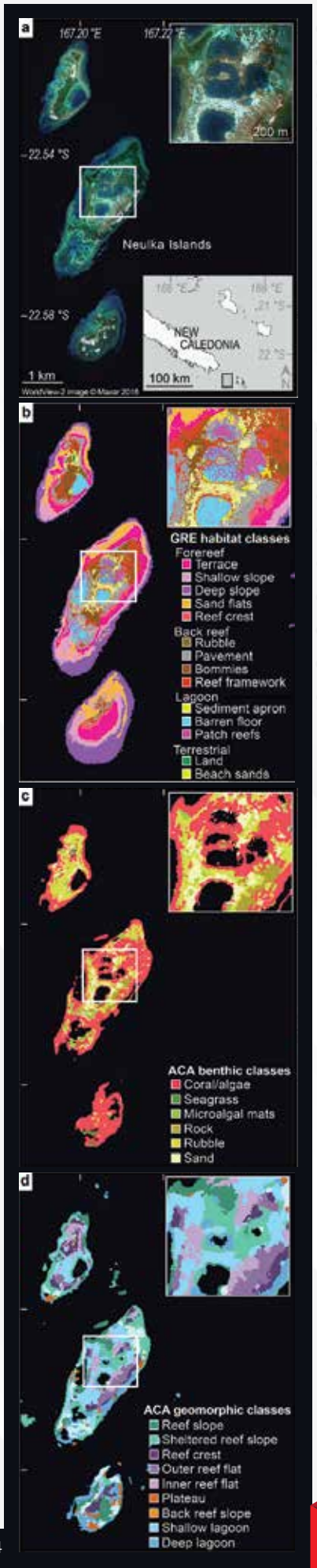


Figure 5 Satellite imagery of the Neulka Islands (New Caledonia) by Lutzenkirchen et al., 2024

Geographic Information System (GIS)

GIS is integral to coral reef mapping, providing a platform for storing, analysing, and visualising geospatial data. GIS allows researchers to integrate various data sources, including satellite imagery, remote sensing data, and field observations, to create comprehensive maps and models of coral reef ecosystems. Through GIS, spatial analyses can be conducted to assess reef health, biodiversity, and habitat extent. For example, GIS can be used to identify areas of high coral cover, detect changes in reef morphology, and evaluate the impacts of human activities such as coastal development and pollution (da Silveira et al., 2021). Additionally, GIS facilitates the creation of predictive models that can forecast future changes in reef conditions under different environmental scenarios, aiding in proactive conservation planning.

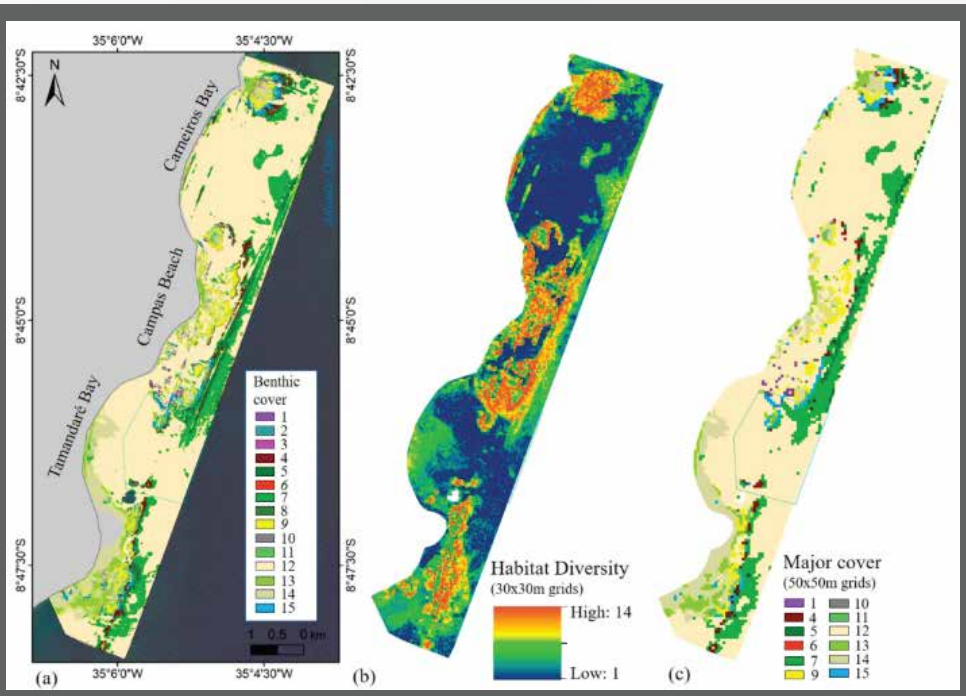


Figure 6 Coral reef mapping in Pernambuco State, Brazil by da Silveira et al. (2021)

Underwater Photogrammetry

Figure 7 3D photogrammetry survey to visualise coral reef ecosystem in Kuantan coastal water

Underwater photogrammetry is a technique that involves capturing multiple overlapping photographs of reef structures from different angles and processing them with specialised software to generate detailed 3D models as shown in Figure 7. These models provide accurate representations of the reef's physical features, enabling precise measurements of coral colonies, reef rugosity, and other structural attributes. The use of underwater photogrammetry is particularly valuable for fine-scale mapping and monitoring of coral reefs. It allows researchers to document changes in coral cover, growth rates, and structural complexity over time, providing critical data for assessing reef health and resilience. The high level of detail obtained through photogrammetry also supports habitat classification and species identification, contributing to a deeper understanding of reef biodiversity.

Challenges and Future Directions

Despite the advancements in geospatial technologies, several challenges remain in coral reef mapping. Data accuracy can be affected by environmental factors such as water clarity, depth, and weather conditions. Additionally, the high cost of advanced mapping tools and the need for specialised expertise can limit their accessibility, particularly in developing regions. Future directions in coral reef mapping involve the integration of multiple geospatial techniques to overcome these challenges. Combining satellite imagery, remote sensing, GIS, and underwater photogrammetry can provide a more comprehensive and multi-scale understanding of coral reef ecosystems. Advances in machine learning and artificial intelligence (AI) are also set to revolutionise coral mapping, enabling automated image analysis and pattern recognition to process vast amounts of data more efficiently. Moreover, the increasing availability of high-resolution satellite imagery and affordable drone technology is democratising coral reef mapping, making it accessible to a broader range of stakeholders. Collaborative efforts and open data initiatives will further enhance our ability to map and monitor coral reefs globally, fostering international cooperation in marine conservation.

> "Combining satellite imagery, remote sensing, GIS, and underwater photogrammetry can provide a more comprehensive and multi-scale understanding of coral reef ecosystems."

In conclusion, the mapping of uncharted coral reefs in Malaysia is a vital endeavour for preserving marine biodiversity and supporting local communities. Current methods have provided valuable insights but are limited by various constraints. The integration of advanced geospatial techniques offers a promising future for coral reef mapping, enabling comprehensive and efficient assessments at multiple scales.

Conclusion

> "By leveraging the power of geospatial techniques, we can uncover the hidden treasures of our marine ecosystems and ensure their protection for future generations."

As we continue to develop and refine these technologies, it is crucial to prioritise collaboration and data sharing to maximise their impact. By leveraging the power of geospatial techniques, we can uncover the hidden treasures of our marine ecosystems and ensure their protection for future generations. The journey towards comprehensive coral reef mapping is challenging, but with the right tools and collaborative efforts, it is an achievable goal that will benefit both nature and humanity.

Enhancing Open Geospatial Data Services in Malaysia:

A Comparative Analysis of Best Practices in the United States, Canada, and Switzerland

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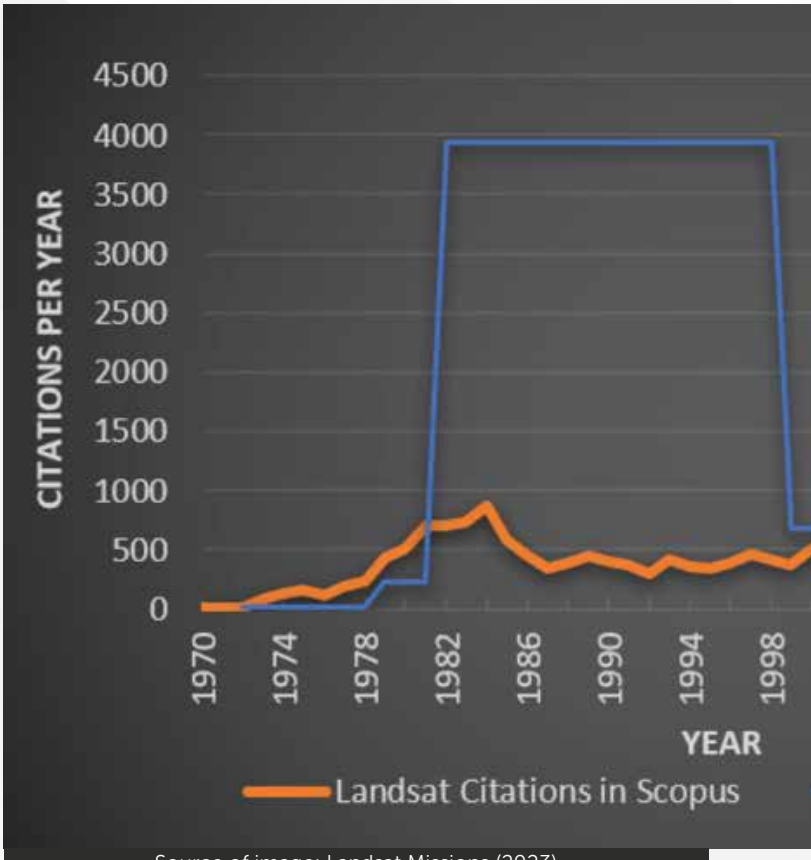
Abstract

This research study explores the valuable insights from a comparative analysis of open geospatial data best practices observed in the United States, Canada, and Switzerland. The objective is to identify effective strategies for enhancing Malaysia's current geospatial data services. The study investigates open file-based geospatial data variety and policies in the three (3) countries. Despite certain limitations in making direct comparisons, the findings provide essential preliminary insights by learning from the best practices. This study contributes to the groundwork for more comprehensive and efficient open geospatial data services in Malaysia, fostering enhanced accessibility of geospatial information for diverse stakeholders.

Keywords :
Geospatial data, open data services, data variety, policies, national geospatial agency

Introduction

> "Open data initiatives are transforming geospatial information access globally by offering free and unrestricted geographic datasets that drive innovation and decision-making."

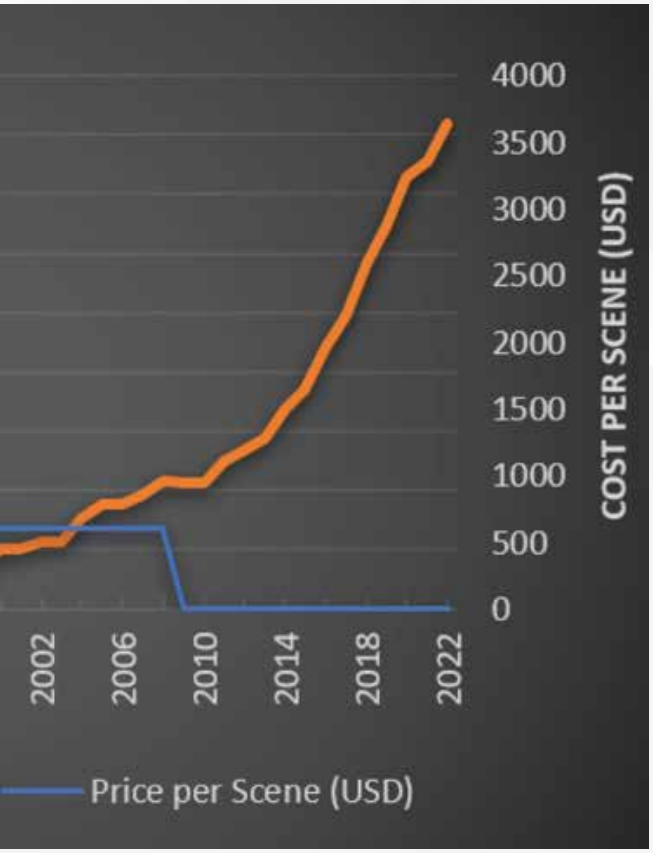


Source of image: Landsat Missions (2023)

Figure 1 Landsat Data Citations in Scopus versus the Data Price

Open data initiatives are transforming geospatial information access globally by offering free and unrestricted geographic datasets that drive innovation and decision-making. Recognizing geospatial data as public property, governments play a crucial role in ensuring accessibility and transparency, which aligns with principles of democratic governance and citizen empowerment (Craglia et al., 2012; Vancauwenberghe et al., 2019). Open data initiatives can significantly boost data usage and return on investment. As illustrated in Figure 1, the United States Geological Survey (USGS) Landsat data saw a marked increase in citations after the data was made openly available in 2010.

Despite the benefits, Malaysia has not fully adopted open geospatial data due to concerns over balancing accessibility with revenue and navigating legal and policy complexities. This research examines the open data practices of the United States, Canada, and Switzerland to gather insights for enhancing Malaysia's geospatial data services, focusing on the types of data offered and the policies in place.



"Despite the benefits, Malaysia has not fully adopted open geospatial data due to concerns over balancing accessibility with revenue and navigating legal and policy complexities."

Geospatial data is tied to specific Earth locations, represented by geographic coordinates (Dinkins, 2023), and supports various applications. This study focuses on three (3) main types of geospatial data:

- **Topographic Data:** Details the Earth's surface, including natural and artificial features, crucial for urban planning, environmental analysis, and infrastructure development.
- **Elevation Data:** Provides vertical height information, essential for flood modelling, slope analysis, and precision agriculture.
- **Boundary Data:** Defines administrative and political divisions, important for governance, land management, and electoral planning.

Geospatial data can be in vector (discrete features) or raster (grid cells) formats, with common file types like Shapefile and GeoTIFF. Providing data in diverse formats enhances accessibility and utility across applications.

Most countries have a government agency that coordinates, manages, and promotes geospatial data, referred to in this study as the national geospatial organisation. In the United States, the USGS handles extensive geospatial data and collaborates widely to ensure data quality and accessibility. In Canada, the Earth Sciences Sector (ESS) of Natural Resources Canada (NRCan) oversees the Canadian Geospatial Data Infrastructure (CGDI), facilitating nationwide data sharing. In Switzerland, Swisstopo manages topographic data and promotes open data initiatives, working with various authorities to ensure data availability for multiple applications. These organisations play key roles in advancing open geospatial data accessibility and use in their respective countries.

Data and Methods

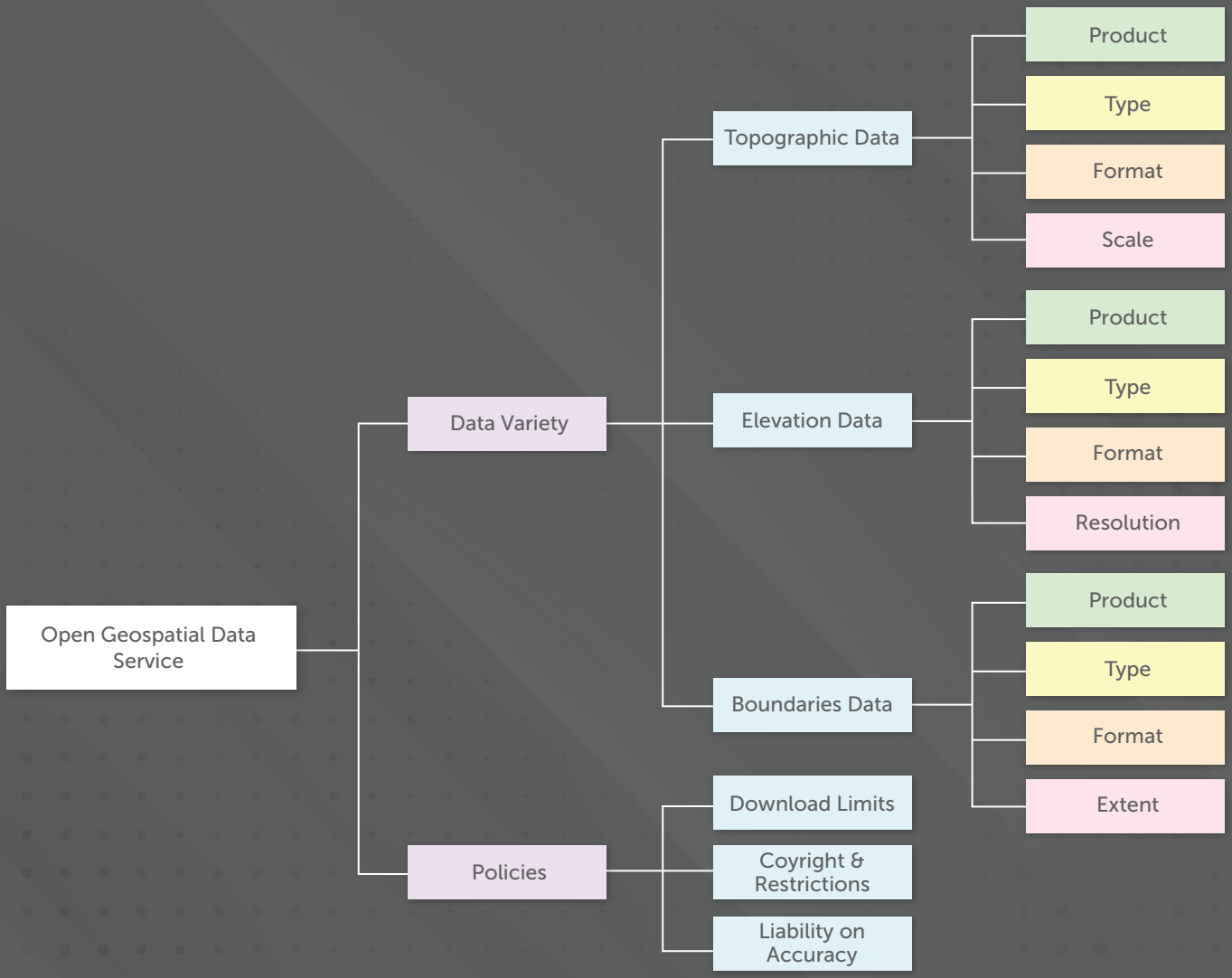


Figure 2 Comparison framework of open geospatial data services between best practice countries

This study examines open geospatial data practices in the U.S., Canada, and Switzerland, focusing on data variety and open data policies. Information is collected from the official websites: USGS (U.S.), NRCan (Canada), and Swisstopo (Switzerland). Platforms analysed include TopoView and The National Map by the USGS, GeoGratis by the NRCan, and Swisstopo's main site. QGIS Desktop Version 3.28.3 is used for viewing the downloaded datasets.

The study uses the comparison framework in Figure 2 to evaluate common practices in data variety and policies. The variety of topographic, elevation, and boundary data is evaluated considering the product, type, format, and scale/resolution/extent of the open data. In term of policies, the study investigates the download limits, copyright and restrictions, and liability on accuracy of the open geospatial data. Insights from this analysis aim to improve Malaysia's open geospatial data services.

Analysis and Findings

Data Variety

Open Data Variety	US	Canada	Switzerland
1. Topographic Data			
Product			
Multiple	✓	✓	✓
Type			
Raster	✓	✓	✓
Vector	✓	✓	✓
Scale			
Large (≤ 1:10,000)	✓	✓	✓
Small (> 1:10,000)	✓	✓	✓
File Format			
Multiple	✓	✓	✓
2. Elevation Data			
Product			
Multiple	✓	✓	✓
Type			
Raster	✓	✓	✓
Vector	✓		✓
Resolution			
High (≤ 1 meter)	✓		✓
File Format			
Multiple	✓		✓
3. Boundary Data			
Product			
Multiple			✓
Type			
Raster			✓
Vector	✓	✓	✓
Extent			
National level	✓	✓	✓
State level	✓		✓
File Format			
Multiple	✓	✓	✓

Table 1 Summary of open geospatial data variety by the United States, Canadian, and Switzerland governments

Table 1 compares the variety of open geospatial data provided by USGS (U.S.), NRCan (Canada), and Swisstopo (Switzerland). Switzerland leads, offering all elements of the study's open geospatial data framework, followed by the U.S., which omits only two (2) elements, and Canada, which omits five (5) elements.

Topographic Data: All three (3) countries provide multiple products in raster and vector formats, various scales, and file formats. Figures 3 and 4 present examples of USGS topographic maps of the same area, captured in different years illustrating the changes of features over time. These maps are available openly and valuable for historical data analysis.

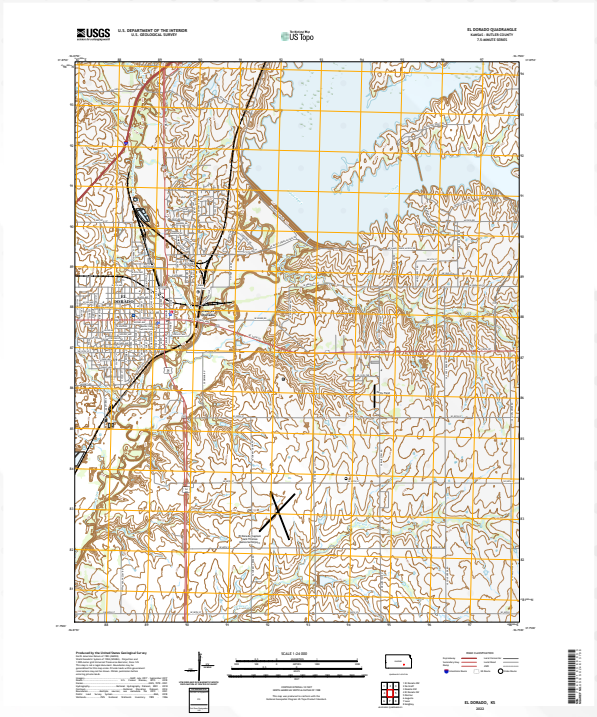


Figure 3 The 2022 US Topo Map of El Dorado

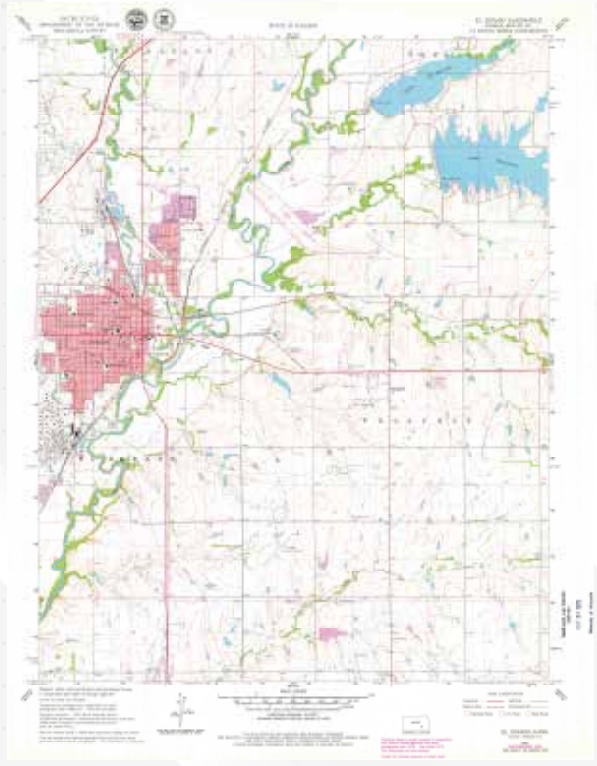


Figure 4 The 1979 Topographic Map of El Dorado

Elevation Data: The U.S. and Switzerland meet all framework elements, offering high-resolution products in multiple formats. Canada offers products in raster format only, with a top resolution of 2 meters and GeoTIFF format. Figure 5 shows an example of elevation data product from the Swisstopo, Switzerland, available for free download in Shapefile format from their website. It is a 1.56-gigabyte vector dataset, with a 25-meter grid spacing, accurately represents the relief of the whole Swiss landscape.

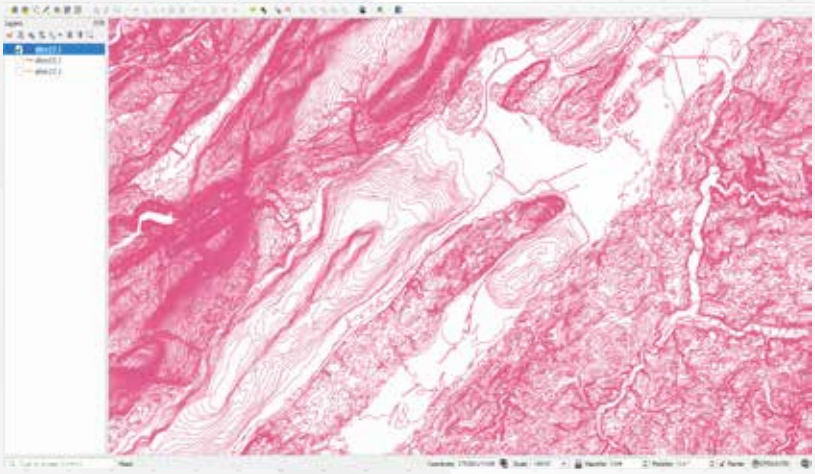


Figure 5 Swisstopo's Digital Height Model of 25 meters interval (DHM25)

Boundary Data: Only Switzerland offers multiple products in both vector and raster formats. The U.S. and Canada provide only vector products. While the U.S. and Switzerland include both national and state boundaries, Canada offers national boundaries only. All three (3) countries provide data in multiple file formats. An example of boundary data is shown in Figure 6, featuring a 33.3-megabyte administrative features dataset downloaded from GeoGratis, NRCan, available in Shapefile and File Geodatabase (FGDB) formats.

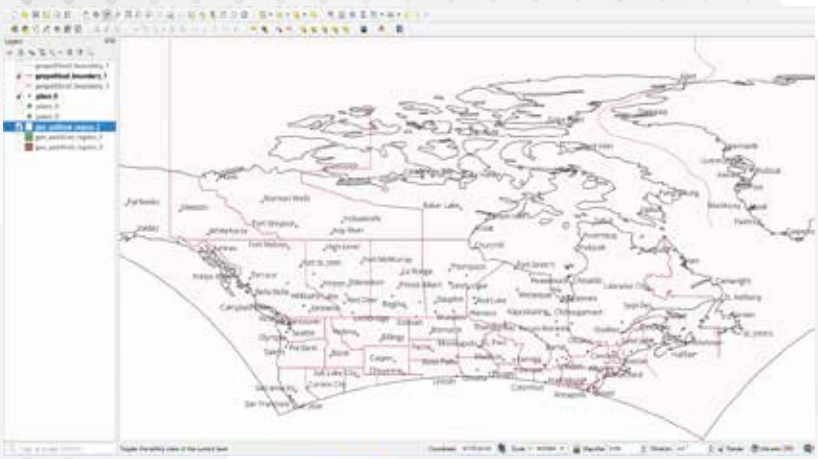


Figure 6 Canada's administrative features dataset

Policies

United States: USGS
USGS geospatial data has no download limitations. Data is public domain, requiring no copyright permission, though crediting "U.S. Geological Survey" or "Department of the Interior/USGS" is appreciated. No warranty or liability is provided for data accuracy or completeness.

Canada: NRCan
NRCan's GeoGratis platform data has no download limits and follows the Open Government License - Canada (OGL-Canada), allowing free use and modification with attribution to NRCan. Data is provided "as is" without warranties.

Switzerland: Swisstopo
Swisstopo allows unlimited file-based downloads with proper attribution under the Open Government Data (OGD) Strategy. The data is free of charge and can be used for any purpose. No warranties are provided for data accuracy or completeness.

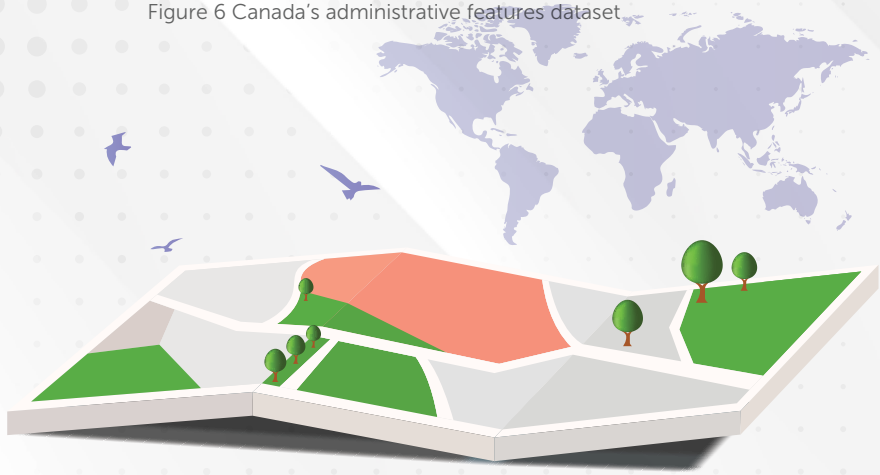
In summary, all three (3) countries offer open access with no download limits. The U.S. data is public domain, while Canadian and Swiss data follow OGL-Canada and the Swiss OGD Strategy. All disclaim liability for data accuracy, leaving verification to users.

Based on the findings, Malaysia can improve geospatial data accessibility and usage by learning from the USGS, NRCan, and Swisstopo as follows:

Diverse Datasets: Offering a variety of open geospatial datasets, including historical maps, to cater to a broader range of users and applications.

Clear Policies: Adopting clear and transparent policies regarding download limits and usage restrictions to enhance user understanding and access.

Open Access: Making geospatial data open-access and placing it in the public domain to encourage wider usage and easier access for various stakeholders.



Permissive Licensing: Implementing a permissive license like OGL-Canada, allowing free use, modification, and distribution with proper attribution.

Liability Disclaimer: Including disclaimers about data accuracy and liability, clarifying that data is provided "as is" and disclaims responsibility for errors or omissions.

Continuous Improvement: Regularly reviewing and updating data and policies to align with best practices and user needs.

By adopting these lessons, Malaysia can enhance openness, accountability, and user-centricity in our geospatial data initiatives, benefiting researchers, policymakers, businesses, and the public.

> "Malaysia can enhance its open geospatial data services by adopting best practices from the U.S., Canada, and Switzerland, which emphasise public accessibility."

Discussions and Conclusion

Malaysia can enhance its open geospatial data services by adopting best practices from the U.S., Canada, and Switzerland, which emphasise public accessibility. Implementing these methodologies could reduce costs and increase efficiency.

However, this study has certain limitations. It does not include a comparison of Malaysia's economic situation with those countries, which may impact investment in geospatial data. Furthermore, it lacks an analysis of data sales and security policies, as well as feedback from Malaysian data users.

Future research should examine the economic impact of data accessibility, evaluate policies in the Fees Act and General Circular No. 1/2007, and gather user feedback on geospatial data dissemination. This will provide a comprehensive understanding and help improve data services in Malaysia.

Despite these limitations, this study offers valuable preliminary insights for enhancing Malaysia's open geospatial data services, laying the groundwork for future research and improvements.

REFERENCES;
Craglia, M., Shanley, L., & Nativi, S. (2012). Digital Earth from vision to practice: Making sense of citizen-generated content. Journal of Spatial Science, 57(1), 15-20.
Dinkins, P. (2023, February 12). Geospatial data: Understanding, collection, and applications. Open Source GIS Data. https://opensourcegisdata.com/geospatial-data-understanding-collection-and-applications.html.
Landsat Missions. (2023, April 21). Fifteen Years of Open Data Allows Advancements in Landsat Use and Research. USGS. https://www.usgs.gov/landsat-missions/news/fifteen-years-open-data-allows-advancements-landsat-use-and-research.

Aktiviti MyGDI 2024

04 JANUARI 2024

FORUM BICARA SISTEM MAKLUMAT GEOGRAFI (GIS): "GIS PENERAJU INDUSTRI BERTEKNOLOGI TINGGI"

DEWAN PERDANA, FAKULTI SAINS SOSIAL DAN KEMANUSIAAN, UNIVERSITI KEBANGSAAN MALAYSIA

09 JANUARI 2024

FORUM "TEKNOLOGI GEOSPATIAL: ARAH TUJU, CABARAN DAN PROSPEK MASA DEPAN"

DEWAN SERI ISKANDAR, UITM CAWANGAN PERAK

09 JANUARI 2024

MENYERTAI PAMERAN SEMPENA GEOSPATIAL *OPEN DAY* ANJURAN UITM CAWANGAN PERAK

DEWAN SERI ISKANDAR, UITM CAWANGAN PERAK

29 JANUARI – 01 FEBRUARI 2024

BENGKEL PENGESAHAN DATA GEOSPATIAL SEDIA ADA DAN BAHARU NEGERI KEDAH

HOTEL ROYAL SIGNATURE, ALOR SETAR, KEDAH

23 JANUARI 2024

LATIHAN PENGEMASKINIAN DATA MyGEOCKAPS, KEMENTERIAN KESIHATAN MALAYSIA (KKM)

BILIK LATIHAN COE, ARAS 8, PUSAT GEOSPATIAL NEGARA (PGN)

31 JANUARI 2024

LAWATAN KERJA UNIT PENYELARASAN PELAKSANAAN (ICU), JABATAN PERDANA MENTERI (JPM) KE PGN, NRES

BILIK MESYUARAT PERMATA, ARAS 7, PGN

05 – 08 FEBRUARI 2024

BENGKEL PENGESAHAN DATA GEOSPATIAL SEDIA ADA DAN BAHARU NEGERI PERAK

HOTEL EXCELSIOR, IPOH, PERAK

19 – 22 FEBRUARI 2024

BENGKEL PENGESAHAN DATA GEOSPATIAL SEDIA ADA DAN BAHARU NEGERI PERLIS

HOTEL SERI MALAYSIA, PERLIS

26 FEBRUARI 2024

KHIDMAT RUNDING PANGKALAN DATA GEOSPATIAL KEPADA JABATAN KERJA RAYA

BAHAGIAN KEJURUTERAAN GEOINFORMATIK, CAWANGAN SENGGARA FASILITI JALAN, IBU PEJABAT JKR MALAYSIA

28 FEBRUARI 2024

LAWATAN AKADEMIK PELAJAR PUSAT PENGAJIAN ILMU KEMANUSIAAN, UNIVERSITI SAINS MALAYSIA (USM)

BILIK MESYUARAT MUTIARA, ARAS 13, MENARA PETRA

04 – 06 MAC 2024

PROGRAM FAMILIARISASI BAGI PEROLEHAN PENGEMASKINIAN, VERIFIKASI DAN PEMBANGUNAN DATA GEOSPATIAL NEGERI PERLIS, KEDAH DAN PERAK UNTUK PGN, NRES

AMVERTON HERITAGE RESORT AYER KEROH, MELAKA

05 - 08 MAC 2024

KURSUS ASAS PERISIAN QGIS BERSAMA KERAJAAN NEGERI TERENGGANU

BILIK COE, ARAS 8, PGN

20 MAC 2024

PERBINCANGAN KOLABORASI MyGDX BERSAMA JABATAN DIGITAL NEGARA

BILIK MESYUARAT PERMATA, ARAS 7, PGN

21 MAC 2024

LAWATAN KE PUSAT RAMALAN DAN AMARAN BANJIR NEGARA (PRABN) JABATAN PENGAIRAN DAN SALIRAN MALAYSIA

LAWATAN KE PUSAT RAMALAN DAN AMARAN BANJIR NEGARA (PRABN) JABATAN PENGAIRAN DAN SALIRAN MALAYSIA

20 MAC 2024

PERBINCANGAN KOLABORASI MyGDX BERSAMA JABATAN DIGITAL NEGARA

BILIK MESYUARAT PERMATA, ARAS 7, PGN

23 APRIL 2024

LAWATAN AKADEMIK PROGRAM GEOMATIK, POLTEKNIK SULTAN HAJI AHMAD SHAH (POLISAS) KE PGN, NRES

BILIK MESYUARAT MUTIARA, ARAS 13, MENARA PETRA

29 APRIL - 2 MEI 2024

ADMINISTERING IN MICROSOFT SQL SERVER TRAINING

BILIK LATIHAN COE, ARAS 8, PGN

29 - 30 APRIL 2024

MENYERTAI PAMERAN SEMPENA *12TH IGRSM INTERNATIONAL CONFERENCE AND EXHIBITION ON GEOSPATIAL AND REMOTE SENSING (IGRSM 2024)*

BILIK LATIHAN COE, ARAS 8, PGN

30 APRIL 2024

LAWATAN DAN LIBAT URUS SURUHANJAYA PERKHIDMATAN AIR NEGARA (SPAN) KE PGN, NRES

BILIK MESYUARAT PERMATA, ARAS 7, PGN

31 APRIL 2024

TAKLIMAT SISTEM PENGURUSAN SERAHAN DATA (SPSD) BERSAMA AGENSI PEMBEKAL DATA (APD)

SECARA DALAM TALIAN

07 - 09 MEI 2024

AUDIT PEMANTAUAN KEDUA ISO/IEC 27001:2013 *INFORMATION SECURITY MANAGEMENT SYSTEM* (ISMS) PGN (AUDIT DALAM)

HOTEL SERI MALAYSIA, PERLIS

13 MEI 2024

SESI DEMO SISTEM MyGEOSHARE

BILIK LATIHAN COE, ARAS 8, PGN

14 MEI 2024

MAJLIS PENTAULIAHAN PROJEK PEROLEHAN PENGEMASKINIAN, VERIFIKASI DAN PEMBANGUNAN DATA GEOSPATIAL NEGERI PERLIS, KEDAH DAN PERAK UNTUK PGN, NRES

BILIK MESYUARAT PERMATA, ARAS 7, PGN

15 MEI 2024

TAKLIMAT MENGENAI SISTEM RUJUKAN KOORDINAT BAGI TUJUAN UKUR DAN PEMETAAN DI MALAYSIA OLEH JUPEM

BILIK MESYUARAT PERMATA, ARAS 7, PGN

15 - 16 MEI 2024

SQL IN MICROSOFT SQL SERVER TRAINING

BILIK LATIHAN COE, ARAS 8, PGN

17 MEI 2024

LATIHAN SISTEM GEOUPLOAD BERSAMA CAWANGAN KAWALAN AMALAN PERUBATAN SWASTA (CKAPS), KKM

BILIK LATIHAN COE, ARAS 8, PGN

27 MEI 2024

MESYUARAT KUMPULAN KERJA PANGKALAN DATA NAMA GEOGRAFI KE-16 (KKPDNG)

BILIK MESYUARAT MUTIARA, ARAS 13, MENARA PETRA

23 MEI 2024

MESYUARAT JAWATANKUASA PENYELARAS MyGDI KEBANGSAAN (JPMK) KE-14 TAHUN 2024

BILIK MESYUARAT MUTIARA, ARAS 13, MENARA PETRA

24 MEI 2024

***TRANSFER OF TECHNOLOGY (TOT) MyGEOLEARNING* - MODUL KUIZ KEPADA PENGGUNA CAWANGAN PERKHIDMATAN GEOSPATIAL (CPG)**

BILIK LATIHAN COE, ARAS 8, PGN

28 - 30 MEI 2024

LATIHAN APLIKASI MyGDI EXPLORER BAGI PENGISIAN DAN PENERBITAN METADATA BILANGAN 1/2024 (KATEGORI UTILITY)

BILIK LATIHAN COE, ARAS 8, PGN

28 - 30 MEI 2024

PYTHON PROGRAMMING FUNDAMENTALS TRAINING

BILIK LATIHAN COE, ARAS 8, PGN

05 - 06 JUN 2024

KURSUS PENGENALAN GIS DAN PENGGUNAAN APLIKASI MyGEOTRANSLATOR KEPADA JABATAN METEOROLOGI MALAYSIA (METMALAYSIA)

BILIK LATIHAN COE, ARAS 8, PGN

10 - 11 JUN 2024

INTRODUCTION TO WEB DEVELOPMENT WITH HTML, CSS & JAVASCRIPT TRAINING

BILIK LATIHAN COE, ARAS 8, PGN

SIRI 1
24, 26-27 JUN 2024

SIRI 2
22-23 & 25 JULAI 2024

SIRI 3
13-15 OGOS 2024

SIRI 4
10-12 SEPTEMBER 2024

BENGKEL *TRANSFER OF TECHNOLOGY* (TOT) APLIKASI MyGEOSC

BILIK LATIHAN COE, ARAS 8, PGN

12 JUN 2024

MESYUARAT JAWATANKUASA TRANSFORMATION TASK FORCE CAMERON HIGHLANDS (TTFCH) WORK GROUP 7 RIVER SEDIMENT MANAGEMENT – PEMBANGUNAN PETA ASAS CAMERON HIGHLANDS

NAHRIM

19 JUN 2024

MESYUARAT PEMBENTANGAN PROJEK DAN ISU-ISU BERKAITAN DI CAMERON HIGHLANDS

PEJABAT TANAH DAERAH CAMERON HIGHLANDS, PAHANG

26 JUN 2024

MESYUARAT JAWATANKUASA TEKNIKAL MyGDI NEGERI TERENGGANU (JTMN) BIL. 1 TAHUN 2024

DALAM TALIAN

13 JUN 2024

MESYUARAT KEPERLUAN INTEGRASI DAN PENAMBAHBAIKAN APLIKASI BERSAMA KDN MELALUI PROGRAM JOINT INTERIM OPERATIONAL CAPABILITY (IOC)

BILIK MESYUARAT PERMATA, ARAS 7, PGN

20 JUN 2024

PERBINCANGAN DAN SESI *HANDS-ON* SISTEM PENGURUSAN SERAHAN DATA (SPSD) KEPADA SUPER ADMIN

BILIK LATIHAN COE, ARAS 8, PGN

25 JUN 2024

MESYUARAT KUMPULAN KERJA STANDARDISASI KOD DAN WARNA SIMBOL (KWS) BAGI FITUR KATEGORI UTILITI BIL. 1/2024

BILIK MESYUARAT PERMATA, ARAS 7, PGN

27 JUN 2024

MESYUARAT KEPERLUAN INTEGRASI DAN PENAMBAHBAIKAN APLIKASI BERSAMA AGENSI ANTIDADAH KEBANGSAAN (AADK) MELALUI PROGRAM *JOINT INTERIM OPERATIONAL CAPABILITY* (IOC)

BILIK MESYUARAT PETUNIA
ARAS 3, BLOK A
AADK, KAJANG, SELANGOR

28 JUN 2024

MESYUARAT KEPERLUAN INTEGRASI DAN PENAMBAHBAIKAN APLIKASI BERSAMA JABATAN KESELAMATAN DAN KESIHATAN PEKERJAAN (JKKP) MELALUI PROGRAM *JOINT IOC*

BILIK MESYUARAT UTAMA, ARAS 5, JKKP

29 JUN 2024

MENYERTAI PAMERAN SEMPENA MAJLIS PELANCURAN *COMMUNITY RECYCLING PROJECT – PLASTIC WASTE TO FUEL* – KARNIVAL ALAM SEKITAR PERINGKAT UNIVERSITI PENDIDIKAN SULTAN IDRIS (UPSI) DAN HARI TERBUKA FAKULTI SAINS KEMANUSIAAN (FSK) 2024

KAMPUS SULTAN ABDUL JALIL SHAH, UNIVERSITI PENDIDIKAN SULTAN IDRIS (UPSI), TANJONG MALIM, PERAK

01 JULAI 2024

MESYUARAT KHIDMAT RUNDING PERKHIDMATAN GEOSPATIAL BERSAMA BAHAGIAN TANAH, UKUR DAN GEOSPATIAL (BTUG), NRES

BILIK MESYUARAT BAP, ARAS 3, BLOK F11, NRES

01 - 04 JULAI 2024

BENGKEL SEMAKAN DAN PENGEMASKINIAN PANGKALAN DATA NAMA GEOGRAFI BAGI NEGERI TERENGGANU

PEJABAT SUK NEGERI TERENGGANU

02 - 03 JULAI 2024

BENGKEL INTEGRASI KEDAH GEOSPATIAL (ARCGIS) DENGAN SISTEM BUKAN GEOSPATIAL

KEDAH DIGITAL LIBRARY, KEDAH

04 JULAI 2024

SESI *HANDS-ON* SISTEM PENGURUSAN SERAHAN DATA (SPSD) KEPADA PENGGUNA PGN, NRES

BILIK LATIHAN COE, ARAS 8, PGN

03 JULAI 2024

MESYUARAT KUMPULAN KERJA *MULTI-LINGUAL GLOSSARY OF TERMS* (MLGT) MAKLUMAT GEOGRAFI/GEOMATIK BIL. 1/2024

BILIK PERBINCANGAN, ARAS 8, PGN

10 JULAI 2024

MESYUARAT PEMANTAUAN STATUS PELAKSANAAN APLIKASI MyGIS HASIL MAJLIS BANDARAYA ALOR SETAR (MBAS)

MAJLIS BANDARAYA ALOR SETAR, KEDAH

11 JULAI 2024

TOT MyGEOLEARNING - MODUL KUIZ KEPADA PENGGUNA PGN, NRES

BILIK LATIHAN COE, ARAS 8, PGN

15 JULAI 2024

BENGKEL PENAMBAHBAIKAN ANTARA MUKA MyGEOPORTAL PGN, NRES

DEWAN BAIDURI, MENARA PETRA, PUTRAJAYA

16 JULAI 2024

LAWATAN TEKNIKAL KE BAHAGIAN PEMETAAN UTILITI, JABATAN UKUR DAN PEMETAAN MALAYSIA

BAHAGIAN PEMETAAN UTILITI, JABATAN UKUR DAN PEMETAAN MALAYSIA

BENGKEL *BUSINESS REQUIREMENT SPECIFICATION* (BRS) APLIKASI TANAH RIZAB MELAYU (TRM), SEKSYEN TANAH, BAHAGIAN TANAH, UKUR DAN GEOSPATIAL (BTUG), NRES

BILIK MESYUARAT PERMATA, ARAS 7, PGN

19 JULAI 2024

MESYUARAT KEPERLUAN INTEGRASI DAN PENAMBAHBAIKAN APLIKASI BERSAMA MOT MELALUI PROGRAM JOINT IOC

BILIK MESYUARAT BAHTERA, ARAS 8, MOT

24 JULAI 2024

KUNJUNGAN HORMAT KE JABATAN PENGURUSAN MAKLUMAT, DEWAN BANDARAYA KUALA LUMPUR (DBKL) BAGI SESI LIBAT URUS PROJEK PENGEMASKINIAN, VERIFIKASI DAN PEMBANGUNAN DATA GEOSPATIAL WILAYAH PERSEKUTUAN KUALA LUMPUR DAN WILAYAH PERSEKUTUAN PUTRAJAYA

IBU PEJABAT KEDAH, ALOR SETAR, KEDAH

30 JULAI 2024

KAJIAN PEMBANGUNAN PELAN INDUK GIS BERSEPADU DI JABATAN PENGAIRAN DAN SALIRAN MALAYSIA (JPS) DAN PUSAT MAKLUMAT SUMBER AIR NEGARA - PROGRAM LIBAT URUS PERKONGSIAN BERSAMA INDUSTRI DAN LAWATAN TEKNIKAL KE PGN, NRES

BILIK MESYUARAT MUTIARA, ARAS 13, PETRA

29 JULAI 2024

KUNJUNGAN HORMAT KE PERBADANAN PUTRAJAYA (PPJ) BAGI SESI LIBAT URUS PROJEK PENGEMASKINIAN, VERIFIKASI DAN PEMBANGUNAN DATA GEOSPATIAL WILAYAH PERSEKUTUAN KUALA LUMPUR DAN WILAYAH PERSEKUTUAN PUTRAJAYA

PERBADANAN PUTRAJAYA

31 JULAI 2024

MESYUARAT JAWATANKUASA TEKNIKAL NAMA GEOGRAFI KEBANGSAAN (JTNGK) KE-26

HOTEL SRI MALAYSIA KANGAR, PERLIS

05 - 07 OGOS 2024

BENGKEL SEMAKAN SEMULA DRAF MS 1759 – *GEOGRAPHIC INFORMATION/GEOMATICS – FEATURE AND ATTRIBUTE CODES* (SIRI II) ANJURAN JABATAN STANDARD MALAYSIA (JSM)

BANGI, SELANGOR

06 OGOS 2024

KHIDMAT RUNDING PERMOHONAN DATA GEOSPATIAL KEPADA JABATAN PERKHIDMATAN PEMBENTUNGAN DAN PENGAIRAN BAGI KEPERLUAN MENDAPATKAN MAKLUMAT BAGI MELAKSANAKAN KAJIAN OLEH PIHAK PERUNDING

JABATAN PERKHIDMATAN PEMBETUNGAN, SUASANA PJH PUTRAJAYA

07 OGOS 2024

TAKLIMAT GEOBIM OLEH ESRI MALAYSIA

BILIK MESYUARAT PERMATA, ARAS 7, PGN

09 OGOS 2024

MESYUARAT KEPERLUAN INTEGRASI DAN PENAMBAHBAIKAN APLIKASI BERSAMA CKAPS, KKM MELALUI PROGRAM *JOINT IOC*

SECARA DALAM TALIAN

MESYUARAT *"KICK-OFF"* SEBUT HARGA PEROLEHAN PENGEMASKINIAN, VERIFIKASI DAN PEMBANGUNAN DATA GEOSPATIAL NEGERI PAHANG,TERENGGANU DAN KELANTAN BAGI TUJUAN PERKONGSIAN MAKLUMAT UNTUK PGN, NRES

SECARA DALAM TALIAN

13 OGOS 2024

MESYUARAT KEPERLUAN PELAKSANAAN APLIKASI GIS BAGI KEGUNAAN JAWATANKUASA *TRANSFORMATION TASK FORCE CAMERON HIGHLANDS*

WISMA SRI PAHANG, KUANTAN, PAHANG

20 - 22 OGOS 2024

BENGKEL KAJIAN KEPERLUAN BISNES (BRS) SISTEM PENDIGITALAN DATA WARISAN JABATAN WARISAN NEGARA (JWN)

HOTEL SERI MALAYSIA, MELAKA

14 -15 OGOS 2024

BENGKEL KAJIAN KEPERLUAN PENGGUNA (URS) BAGI PROJEK PERKHIDMATAN PENGEMASKINIAN, VERIFIKASI DAN PEMBANGUNAN DATA GEOSPATIAL NEGERI PAHANG, TERENGGANU DAN KELANTAN BAGI TUJUAN PERKONGSIAN MAKLUMAT UNTUK PGN, NRES

BANGI RESORT HOTEL

16 OGOS 2024

LAWATAN DAN PERBINCANGAN INISIATIF MyGDI BERSAMA JABATAN DIGITAL NEGARA (JDN)

WISMA SRI PAHANG, KUANTAN, PAHANG

27 OGOS 2024

ESRI NATIONAL GOVERNMENT BOOTCAMP 2024

DASHBOX HOTEL, CYBERJAYA

19 OGOS 2024

LAWATAN DAN PERMOHONAN KOLABORASI *PROOF OF CONCEPT GEOBIM*

IBU PEJABAT KEDAH, ALOR SETAR, KEDAH

22 - 24 OGOS 2024

BENGKEL PERANCANGAN PEROLEHAN PROJEK ICT BAHARU RMKE-13 (TAHUN 2026) BAGI PGN, NRES

BANGI RESORT HOTEL

28 OGOS 2024

TAKLIMAT PERKONGSIAN DATA GIS BERSAMA PLANMALAYSIA JOHOR BAGI PROJEK PENGEMASKINIAN, VERIFIKASI DAN PEMBANGUNAN DATA GEOSPATIAL NEGERI JOHOR

HOTEL SERI MALAYSIA, MELAKA

02 - 03 SEPTEMBER 2024

AUDIT PEMANTAUAN KEDUA ISO/IEC 27001:2013 *INFORMATION SECURITY MANAGEMENT SYSTEM* (ISMS) PGN (AUDIT LUAR OLEH SIRIM QAS INTERNATIONAL)

BILIK MESYUARAT PERMATA, ARAS 7, PGN

03 SEPTEMBER 2024

LATIHAN APLIKASI MyGDI EXPLORER BAGI PENGISIAN DAN PENERBITAN METADATA BAGI KATEGORI AERONAUTIKAL

BILIK LATIHAN COE, ARAS 8, PGN

05 - 07 SEPTEMBER 2024

BENGKEL PENYEDIAAN PELAKSANAAN PROSEDUR OPERASI STANDARD (SOP) KHIDMAT RUNDING PEMBANGUNAN APLIKASI GIS BAGI PGN, NRES

BAYVIEW HOTEL MELAKA

6 SEPTEMBER 2024

MESYUARAT JAWATANKUASA KEBANGSAAN NAMA GEOGRAFI (JKNG) KE-20

BILIK PERSIDANGAN, JUPEM

11 SEPTEMBER 2024

LAWATAN TEKNIKAL KE KOMPLEKS PUSAT KAWALAN TRAFIK UDARA KUALA LUMPUR (KLATCC)

KOMPLEKS PUSAT KAWALAN TRAFIK UDARA KUALA LUMPUR, SEPANG

17 SEPTEMBER 2024

KUNJUNGAN HORMAT *NATIONAL GEOSPATIAL DATA CENTER (CENTRO NACIONAL DE DADUS GEOESPACIAIS - CDNG), MINISTRY OF PLANNING AND STRATEGIC INVESTMENT OF TIMOR-LESTE* KE PGN, NRES

BILIK MESYUARAT PERMATA, ARAS 7, PGN

19 SEPTEMBER 2024

MESYUARAT AGENSI TUNJAK DAN CUSTODIAN DATA GEOSPATIAL BAGI KATEGORI *BUILT ENVIRONMENT, HYPSOGRAPHY, SPECIAL USE* DAN *GENERAL* KALI KE – 13

BILIK MESYUARAT PERMATA, ARAS 7, PGN

25 SEPTEMBER 2024

MESYUARAT AGENSI TUNJAK DAN CUSTODIAN DATA GEOSPATIAL BAGI KATEGORI *HYDROGRAPHY*

BILIK MESYUARAT PERMATA, ARAS 7, PGN

8 OKTOBER 2024

MESYUARAT KUMPULAN KERJA *MULTI-LINGUAL GLOSSARY OF TERMS* (MLGT) MAKLUMAT GEOGRAFI/ GEOMATIK BIL. 2/2024

BILIK MESYUARAT PERMATA, ARAS 7, PGN

10 OKTOBER 2024

MESYUARAT AGENSI TUNJAK DAN CUSTODIAN DATA GEOSPATIAL BAGI KATEGORI *UTILITY* KALI KE – 13

BILIK MESYUARAT PERMATA, ARAS 7, PGN

24 OKTOBER 2024

MESYUARAT AGENSI TUNJAK DAN CUSTODIAN DATA GEOSPATIAL BAGI KATEGORI *DEMARCATION* KALI KE – 12

BILIK MESYUARAT PERMATA, ARAS 7, PGN

14 OKTOBER 2024

MESYUARAT AGENSI TUNJAK DAN CUSTODIAN DATA GEOSPATIAL BAGI KATEGORI *AERONAUTICAL* KALI KE – 8

BILIK MESYUARAT PERMATA, ARAS 7, PGN

29 OKTOBER 2024

HARI GIS 2024 NRES

DEWAN SERI MELATI, PPJ, PRESINT 3, PUTRAJAYA

03 OKTOBER 2024

MESYUARAT AGENSI TUNJAK DAN CUSTODIAN DATA GEOSPATIAL BAGI KATEGORI *SOIL* DAN *VEGATATION* KALI KE – 13

BILIK MESYUARAT PERMATA, ARAS 7, PGN

04 OKTOBER 2024

MESYUARAT AGENSI TUNJAK DAN CUSTODIAN DATA GEOSPATIAL BAGI KATEGORI *TRANSPORTATION* KALI KE – 13

BILIK MESYUARAT PERMATA, ARAS 7, PGN

11 NOVEMBER 2024

MESYUARAT AGENSI TUNJAK DAN CUSTODIAN DATA GEOSPATIAL BAGI KATEGORI *GEOLOGY* KALI KE – 13

BILIK MESYUARAT PERMATA, ARAS 7, PGN

15 OKTOBER 2024

MESYUARAT KUMPULAN KERJA STANDARDISASI KOD DAN WARNA SIMBOL (KWS) BAGI FITUR KATEGORI *UTILITY* BIL. 2/2024

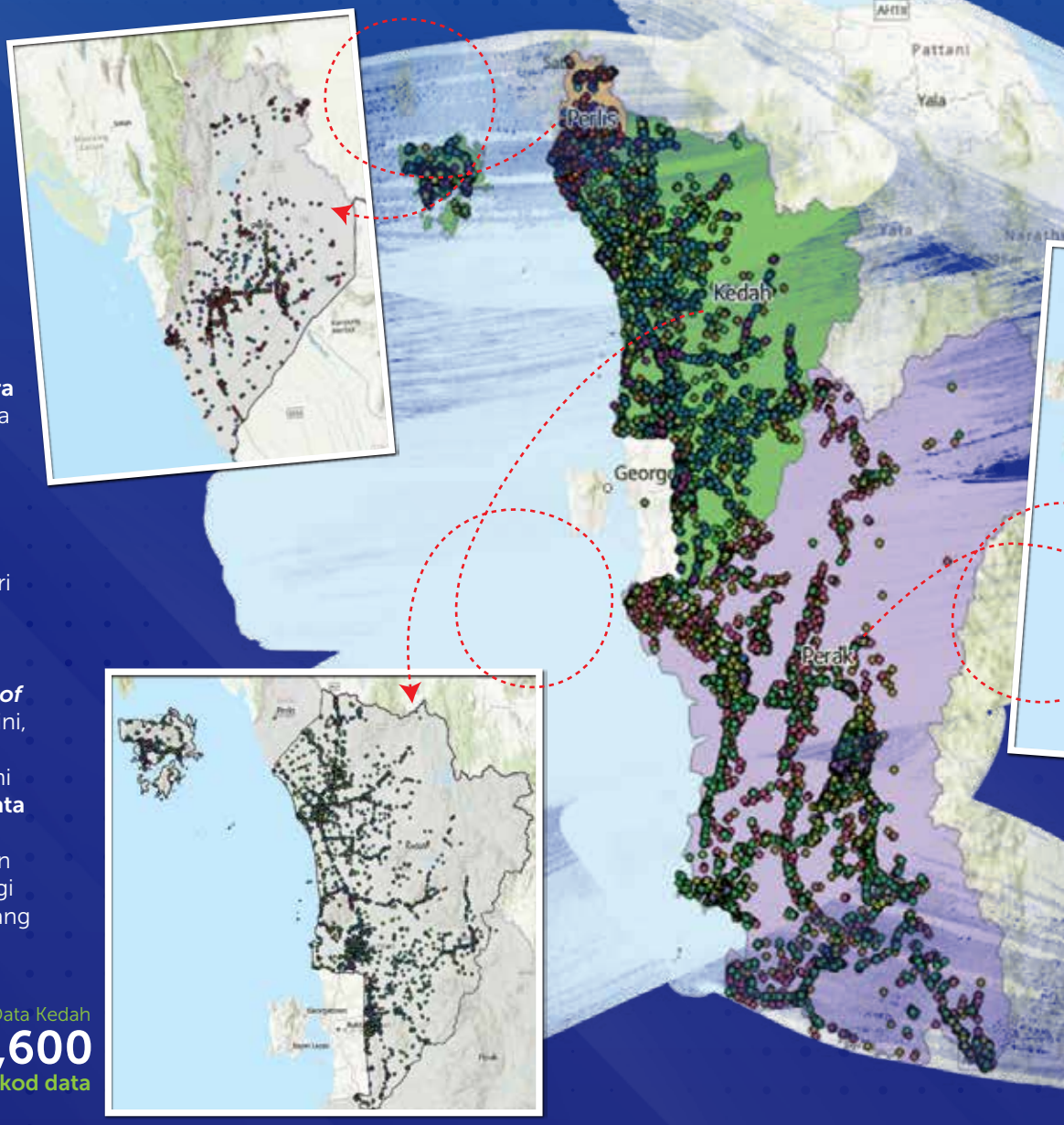
BILIK MESYUARAT PERMATA, ARAS 7, PGN

NOVEMBER 2024

MESYUARAT KUMPULAN KERJA STANDARDISASI KOD DAN WARNA SIMBOL (KWS) BAGI FITUR KATEGORI *UTILITY* BIL. 2/2024

BILIK MESYUARAT PERMATA, ARAS 7, PGN

Pengemaskinian Data Kategori *Built Environment* di Perlis, Kedah dan Perak



Jumlah Rekod Data Perlis
1,782
rekod data

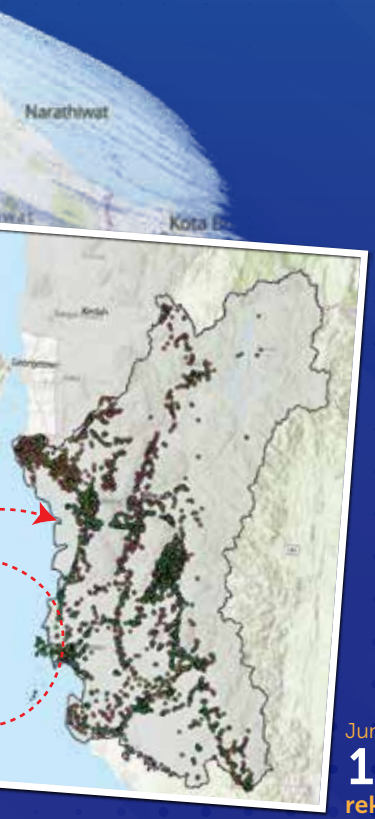
Projek pembangunan **Pusat Geospatial Negara (PGN)** dengan kerjasama agensi negeri seperti **PerakGIS, BPEN Kedah** dan **BPEN Perlis** telah berjaya mengemas kini data Kategori *Built Environment* bagi Negeri Perlis, Kedah dan Perak. Antara objektif utama projek ini adalah memastikan ***data Point of Interest (POI)*** yang terkini, tepat dan disahkan oleh custodian data. Usaha ini memperkukuh **Pusat Data Geospatial (GDC)** dan menyokong perkongsian data melalui **MyGDI**, bagi manfaat semua pihak yang berkepentingan.

Jumlah Rekod Data Kedah
15,600
rekod data

Sebanyak 80 lapisan data kategori *Built Environment* yang tersedia di GDC pada tahun 2024 untuk perkongsian MyGDI.

Ciri-ciri maklumat POI yang ditetapkan:

1. Kedudukan POI berada pada *centroid compound* bangunan
2. Mengikut standard MS1759
3. Sistem Koordinat GDM2000 MRSO
4. Lampiran gambar POI terkini
5. POI disemak dan disahkan oleh agensi kerajaan negeri



Jumlah Rekod Data Perak
17,061
rekod data

Tahukah anda?

1. Gambar POI terkini dicerap menggunakan **GoPro MAX 360-degree** memberikan pandangan komprehensif di lapangan.
2. Imej satelit daripada **Maxar MGP Pro** dan **SecureWatch** digunakan untuk membantu membuat semakan data di pejabat dan cerapan di lapangan.

Dokumen Gazetir
Negeri Sarawak

Terbitan 2023 - Edisi I

Pusat Geospatial Negara (PGN), di bawah Kementerian Sumber Asli dan Kelestarian Alam (NRES), berperanan sebagai Pengerusi dan Sekretariat bagi Kumpulan Kerja Pangkalan Data Nama Geografi dan Gazetir Kebangsaan (KKPDNG) di bawah Jawatankuasa Kebangsaan Nama Geografi (JKNG). KKPDNG bertanggungjawab membangunkan pangkalan data nama geografi dan menerbitkan dokumen gazetir kebangsaan.

Dokumen Gazetir Negeri Sarawak 2023 ini menyenaraikan **13,205 nama geografi** di Sarawak untuk rujukan agensi kerajaan, swasta, akademik dan orang awam. Setiap nama geografi dilengkapi dengan maklumat seperti sejarah negeri, jenis entiti dan koordinat lokasi.

Data nama geografi di dalam dokumen ini diperoleh daripada **Jabatan Ukur dan Pemetaan Malaysia (JUPEM)** dan disahkan oleh **Jawatankuasa Penamaan Geografi Negeri (JPGN) Sarawak**. Setiap nama telah melalui proses semakan terperinci bagi memastikan kesahihan ejaan, jenis entiti dan lokasinya.

SCAN ME

Dokumen ini boleh diakses melalui pautan:
MyGeoName –
https://mygeoname.mygeoportal.gov.my/pdf/13.pdf

Malaysian Standard bagi Geospatial Metadata - Fundamental and Implementation Schema (MS 2647:2023)

Pengenalan:

MS2647:2023 adalah standard geospatial yang dibangunkan oleh Kumpulan Kerja Standard Metadata Geospatial Malaysia (NSC 07/TC 2/WG 3) di bawah Jawatankuasa Standard Kebangsaan Teknologi Maklumat, Komunikasi dan Multimedia (NSC 07). Wakil daripada pelbagai agensi seperti Jabatan Ukur dan Pemetaan Malaysia (JUPEM), PLANMalaysia, Pusat Geospatial Negara dan lain-lain telah terlibat dalam pembangunan standard ini. MS2647:2023 diterbitkan oleh Jabatan Standard Malaysia (JSM) pada 21 Disember 2023.

Kandungan:

MS2647:2023 menerangkan skema metadata untuk set data dan perkhidmatan geospatial. Ia menyediakan maklumat tentang pengenalan, keluasan, kualiti, aspek spatial dan temporal, rujukan spatial, gambaran, pengedaran serta pemerolehan dan pemprosesan maklumat geografi, termasuk data imej dan grid. Standard ini juga menetapkan skema XML untuk melaksanakan dan mengesahkan metadata mengikut model konseptual.

Kegunaan:

MS2647:2023 terpakai untuk:

- Pengkatalogan pelbagai sumber, aktiviti *clearing house* dan penerangan lengkap set data dan perkhidmatan.
- Perkhidmatan geografi, set data geospatial, siri set data dan ciri-ciri geografi.

Pembelian:

Dokumen ini MS2647:2023 boleh dibeli di laman web mySOL pada harga RM210.00 dalam format PDF.

SCAN ME

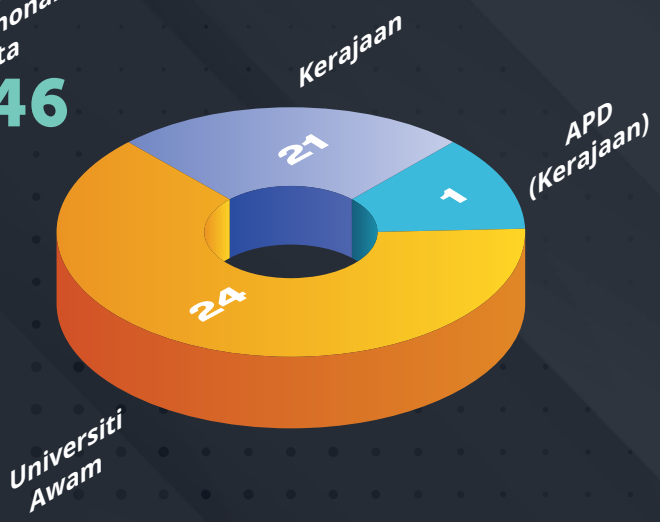
Statistik Perkongsian dan Pelepasan Data di bawah Program MyGDI bagi Tahun 2024

JUMLAH ANGGARAN PENJIMATAN KOS:

RM8.67juta (berdasarkan pengiraan hasil tidak dituntut bagi perkongsian dan pelepasan data di bawah Program MyGDI)

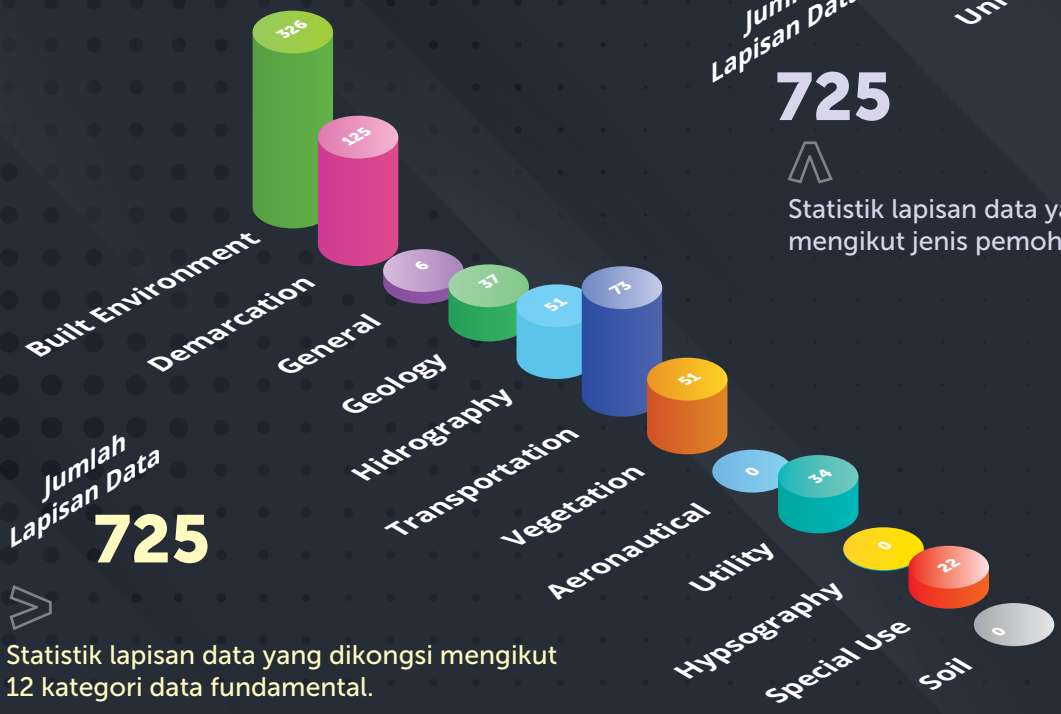
Perkongsian dan pelepasan data geospatial melalui Program MyGDI buat masa ini adalah terhad kepada agensi kerajaan (*Government to Government*; G2G) dan pendidikan awam (*Government to Education*; G2E) sahaja serta turut terpakai kepada Agensi Pembekal Data (APD) di bawah Program MyGDI.

Jumlah Permohonan Data
46



Jumlah Lapisan Data
725

Statistik lapisan data yang dikongsi mengikut jenis pemohon.



Jumlah Lapisan Data
725

Statistik lapisan data yang dikongsi mengikut 12 kategori data fundamental.

*Statistik di atas sehingga 15 Oktober 2024.


Terbitan:
Pusat Geospatial Negara
Kementerian Sumber Asli dan Kelestrian Alam
GEOUPLOAD
Inisiatif terbaharu untuk memudahkan pengguna platform MyGOS dan MyGEOSC mengemaskini data geospatial secara kelompok
GEOUPLOAD
Dashboard
Muat Naik
Tetapan
Selenggara
Log Keluar
BILANGAN AGENSI
6
BILANGAN LAYER
12
BILANGAN REKOD MUAT NAIK
5856
SASARAN PENGGUNA
Agensi yang menggunakan platform MyGOS dan MyGEOSC tetapi
✓ TIDAK mempunyai perisian GIS desktop
✓ TIDAK mempunyai sistem kemasukan data
FUNGSI GEOUPLOAD
• Mengemaskini data geospatial secara kelompok. Data yang ingin ditambah adalah dalam format .csv dan mempunyai maklumat koordinat x dan y
• Menghubungkan sistem non-spatial kepada platform MyGOS atau MyGEOSC menggunakan fungsi API
Untuk maklumat lanjut, sila e-mailkan kepada Seksyen Aplikasi GIS, Cawangan Perkhidmatan Geospatial, PGN, NRES di pgn.giss@nres.gov.my

AKAN DATANG

Aplikasi MyGeoShare

MyGeoShare akan menggantikan proses manual bagi permohonan data geospatial dan memudahkan pengguna untuk membuat permohonan secara dalam talian. Melalui dashboard yang interaktif, pengguna dapat memantau status permohonan data geospatial dengan lebih berkesan.

Nantikan pelancaran **MyGeoShare** - inovasi permohonan data geospatial yang lebih mudah dan efisien!

Sistem Pengurusan Keselamatan Maklumat (ISMS) PGN: **Komitmen terhadap Keselamatan Data**

DATA ANDA SELAMAT DENGAN KAMI!

7-9 Mei 2024:
Audit Dalam

2-3 September 2024:
Audit Luar (SIRIM QAS International)

Pusat Geospatial Negara (PGN) telah menyediakan rangka kerja sistematik dan berstruktur mengikut piawaian **ISO/IEC 27001:2013 ISMS** untuk memastikan maklumat kekal selamat, berintegriti dan sentiasa tersedia. Sejak 2014, PGN telah melaksanakan ISMS untuk melindungi data dan maklumat, memberikan jaminan kepada pihak berkepentingan bahawa maklumat yang diuruskan adalah terlindung daripada sebarang ancaman.

Proses Pensijilan ISMS PGN Terkini dan Akan Datang:

- **Pensijilan** (2022)
- **Audit Dalam** (Mei 2024): Disyorkan agar audit luar dilaksanakan.
- **Audit Luar** (September 2024): Memperolehi keputusan cemerlang, iaitu **0 NCR *(Non-Conformity Reports)*** dan **0 OFI *(Opportunities for Improvement)***. PGN disyorkan untuk meneruskan persijilan sehingga 15 Julai 2025.
- **Pensijilan Semula** (2025): PGN akan mendapatkan pensijilan semula mengikut piawaian baharu **ISO/IEC 27001:2022**.

PGN akan terus komited untuk memperkukuh keupayaan dalam pengurusan keselamatan maklumat mengikut piawaian ISMS.

INDEKS KUALITI AIR

Pelan tindakan mempertingkatkan kualiti bekalan air mentah

INDEKS KUALITI AIR

Pelan tindakan kawalan hakisan dan endapan sungai

INDEKS KUALITI AIR

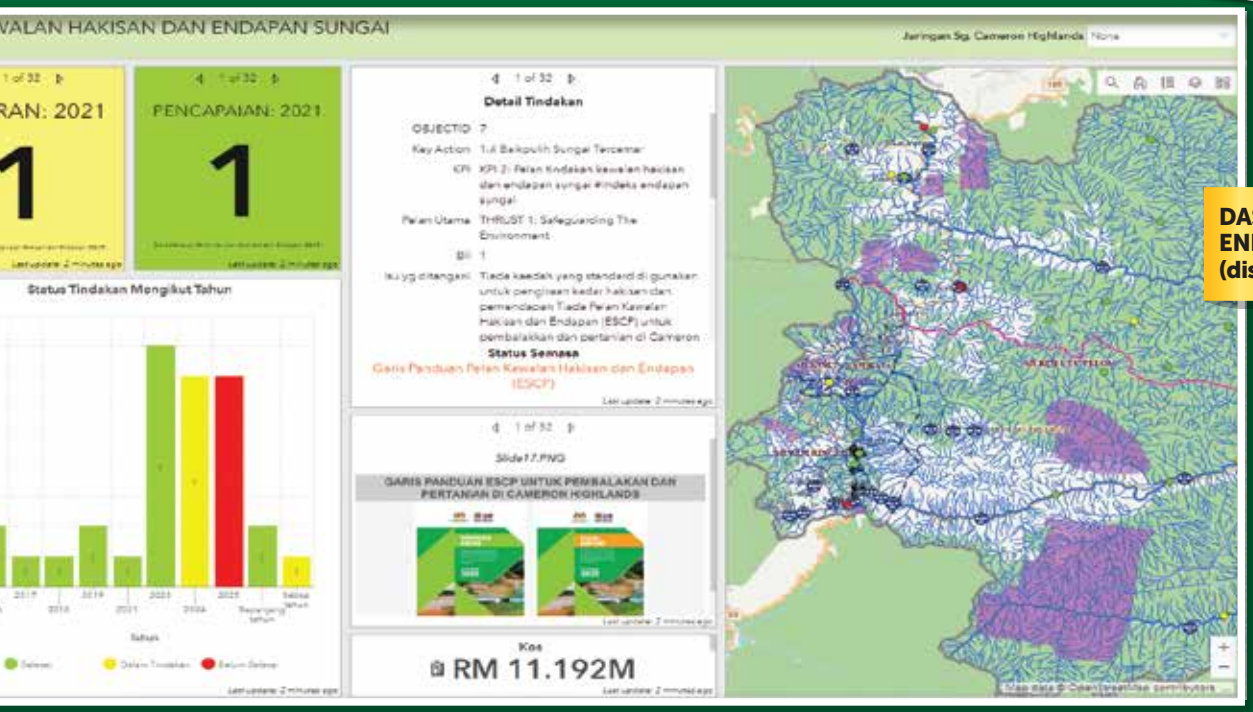
Pelan tindakan mempertingkatkan sistem saliran dan kawalan banjir bandar

Jawatankuasa Transformation Task Force (TTF) Cameron Highlands ditubuhkan untuk mengembalikan semula kegemilangan daerah Cameron Highlands. Jawatankuasa ini diterajui oleh Kebawah Duli Yang Maha Mulia Pemangku Raja Pahang, Tengku Mahkota Tengku Hassanal Ibrahim Alam Shah Ibni Al-Sultan Abdullah Ri'ayatuddin Al-Mustafa Billah Shah sebagai Penasihat Diraja dan penubuhan jawatankuasa ini mendapat perkenan Kebawah Duli Yang Maha Mulia Seri Paduka Baginda Yang Di-Pertuan Agong.

Transformation Task Force Cameron Highlands

KEY PERFORMANCE INDEKS (KPI)

RIVER SEDIMENT MANAGEMENT "PENGURUSAN ENDAPAN SUNGAI"



DASHBOARD PENGURUSAN ENDAPAN SUNGAI (disediakan oleh PGN)

PEKELILING TERKINI MyGDI!

Pada bulan Januari 2024, Pusat Geospatial Negara (PGN), Kementerian Sumber Asli dan Kelestarian Alam (NRES) telah mengeluarkan Surat Pekeliling Garis Panduan dan Prosedur Operasi Standard (SOP) terbaharu bagi pelaksanaan Infrastruktur Data Geospatial Negara (MyGDI):

SPP 1/2024:
GARIS PANDUAN BAGI PEMBANGUNAN DAN PELAKSANAAN MyGDI

SPP 2/2024:
GARIS PANDUAN PELESENAN GEOSPATIAL DAN PENGIRAAN HARGA DATA PRODUK GEOSPATIAL

SOP PERKONGSIAN DAN PELEPASAN MAKLUMAT GEOSPATIAL DI BAWAH MyGDI

Garis Panduan dan SOP ini dikeluarkan sebagai panduan yang jelas mengenai perkongsian dan pelepasan maklumat geospatial di Malaysia serta untuk memperkasakan pelaksanan program MyGDI.

Semua pekeliling lama yang berkaitan telah dibatalkan dengan kemas kini ini. Layari MyGeoportal untuk mengakses dokumen Garis Panduan dan SOP terbaharu ini!
https://www.mygeoportal.gov.my/ms/polisi-dan-standard-mygdi

SCAN ME

Jemputan Penyertaan Artikel

BULETIN **GEOSPATIAL** SEKTOR AWAM

Buletin Geospatial Sektor Awam (BGSA) adalah penerbitan tahunan yang mengandungi perkembangan aktiviti dan promosi MyGDI. Turut dimuatkan dalam BGSA adalah artikel yang dihantar oleh para pengamal geospatial. Justeru, sidang pengarang BGSA ingin menjemput anda untuk menghantar artikel penulisan anda sendiri untuk dimuatkan dalam buletin ini. Jadi, jangan lepaskan peluang ini!

PANDUAN UMUM UNTUK PENULIS

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

2. Setiap artikel teknikal perlu mempunyai abstrak dan kata kunci *(keywords)*;

3. Format-format lain adalah seperti berikut:

Jenis huruf *(font)*	: Arial
Saiz huruf bagi tajuk	: 12
Saiz huruf	: 10
Langkau *(spacing)*	: *Single*
Margin	: 2.5 cm untuk atas, bawah, kiri dan kanan
Justifikasi teks	: Kiri
Lajur *(column)*	: Satu lajur setiap muka surat
Bilangan muka surat	: 5 hingga 6 muka surat termasuk rajah, jadual dan sebagainya;

4. Sumbangan hendaklah dikemukakan dalam bentuk *softcopy* dokumen Microsoft Word;

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

6. Segala pertanyaan dan penyertaan hendaklah ditujukan kepada alamat yang tertera di bawah:

PUSAT GEOSPATIAL NEGARA
KEMENTERIAN SUMBER ASLI DAN KELESTARIAN ALAM
ARAS 7 & 8, MENARA PETRA
NO. 25, PERSIARAN PERDANA, PRESINT 4
PUSAT PENTADBIRAN KERAJAAN PERSEKUTUAN
62574 PUTRAJAYA
(U.P.: SEKRETARIAT BULETIN GEOSPATIAL SEKTOR AWAM)

03 - 8886 1156
03 - 8889 4851
pgn.p&o@nres.gov.my

Pusat Geospatial Negara
Kementerian Sumber Asli dan Kelestarian Alam

Aras 7 & 8, Menara PETRA
No.25, Persiaran Perdana, Presint 4
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