SITJOURNAL
Security Intelligence Terrorism Journal

Security Intelligence Terrorism Journal (SITJ), Vol. 02 No. 03 (2025), pp. 290-296
Research Article
doi: https://doi.org/10.70710/sitj.v2i3.65

Utilization Of Geospatial Intelligence (Geoint) In The Intelligence Cycle To Support The Role Of State Intelligence In Indonesia

Wisnu Hastungkoro Djati[1,a,*], Diah Setyorini Gunawan[1,b]

[1]Sekolah Tinggi Intelijen Negara, Bogor
[a]wisnudjati77@gmail.com; [b]diahsetyorini943@gmail.com
*Corresponding author

Article Info
Received: 30-June-2025
Revised: 30-Aug-2025
Published: 8-Sept-2025

Keywords
Geospatial Intelligence; Intelligence; Intelligence Cycle

Abstract
The development of information technology has changed the paradigm of access to intelligence resources globally, including in the field of Geospatial intelligence (Geoint). Geoint integrates Imaginary intelligence (Imint) and Geospatial data (Geoinfo) in the context of strategic intelligence for comprehensive collection and analysis of geographic conditions and enemy activities. This paper highlights the utilization of Geoint in supporting the role of state intelligence in Indonesia in the intelligence cycle. The result of this paper shows the potential of Geoint to be utilized in supporting the role of intelligence organizations, especially in Indonesia, in dealing with dynamic threats that are evolving into new-style warfare. In the intelligence cycle, Geoint provides the necessary geospatial data and information and facilitates the process of planning, collecting, processing, and distributing information to support national security policy.

1. Introduction

The development of technology and information is increasingly significant, causing access to intelligence resources to be more open and public, including in the utilization of Geospatial intelligence (Geoint). Geoint is a synergy of Imaginary intelligence (Imint) and Geospatial data (Geoinfo) and a branch of strategic intelligence that includes the collection and analysis of comprehensive data on geographical and enemy conditions through intelligence techniques and methods (Slesinski et al., 2023). The use of Geoint today can also be utilized in multiple fields, such as the use of Geoint for monitoring and mapping urban areas (Aslam et al., 2023), mapping the distribution of areas and prioritizing post-pandemic health awareness programs such as Covid-19 (Alrige et al., 2022), and identifying illegal activities and potential development of forest areas (Perazzoni et al., 2020). The current use of Geoint in various multi-fields shows that geospatial information and data can help carry out the tasks and roles of various organizations, especially State Intelligence Organizations.

The development of an increasingly dynamic strategic environment causes changes in the form of threats that are not only in the form of military threats, but have developed into non-military threats and lead to a new style of warfare, or hybrid war, that must be able to be faced by state intelligence, including in Indonesia. The presence of state intelligence in Indonesia is becoming increasingly important in carrying out its role in accordance with Law No. 17/2011 on State Intelligence, which is to carry out a series of activities, actions, work, and efforts to carry out early detection and early warning to prevent, ward off, and overcome the emergence of threats to national interest and security. With the increasingly dynamic threats faced, using Geoint as a new discipline and due to technological advances in intelligence data collection methods, is needed. Geoint becomes an integrated part of the intelligence cycle is very important because

Geoint can provide image data and geospatial information needed in the process of information and data collection and analysis in the intelligence cycle (Henrico & Putter, 2024).

2. Literature Review

2.1. Remote Sensing

Remote sensing is a technology that enables data collection without direct contact with the subject. This technology utilizes sensors to measure or detect various types of energy, such as electromagnetic radiation and acoustic signals that are emitted, reflected, or spread by the observed object (Janga et al., 2023). This technology was then developed to perform earth observation from various sensors and platforms, with the main objective of generating image and spectral data in large volumes and extreme complexity (Huang et al., 2018). The use of remote sensing technology as a part of techniques in geography will continue to develop along with technological development that occurs (Jensen & Dahlberg, 1983). In principle, remote sensing technology distinguishes objects by determining differences in electromagnetic waves emitted, reflected, and absorbed using a platform vehicle.

Remote sensing technology works simply by placing a sensor device onto a platform vehicle such as a satellite or an Unmanned Aerial Vehicle (UAV). Along with technological advances, the development of modern sensor technology has now had a significant impact because it can provide an overview of the Earth's surface coverage through satellite imagery with better spatial, spectral, and temporal resolution than previous technologies (Sishodia et al., 2020). If in recent decades remote sensing has been synonymous with the use of satellites as a platform and representation of remote sensing technology, in today's modern era it has been possible to improve remote sensing system form any target on the earth's surface through aerial imaging form UAV's with advantages in low cost effectiveness, high spatial resolution and operational capabilities (Osco et al., 2021). However, this does not mean abandoning the development of remote sensing technology in utilizing satellite platforms; even now, satellites have been developed to provide real-time and accurate remote sensing data (Zhang et al., 2022). The development of sensors and platforms in remote sensing technology is expected to increase and become more complex.

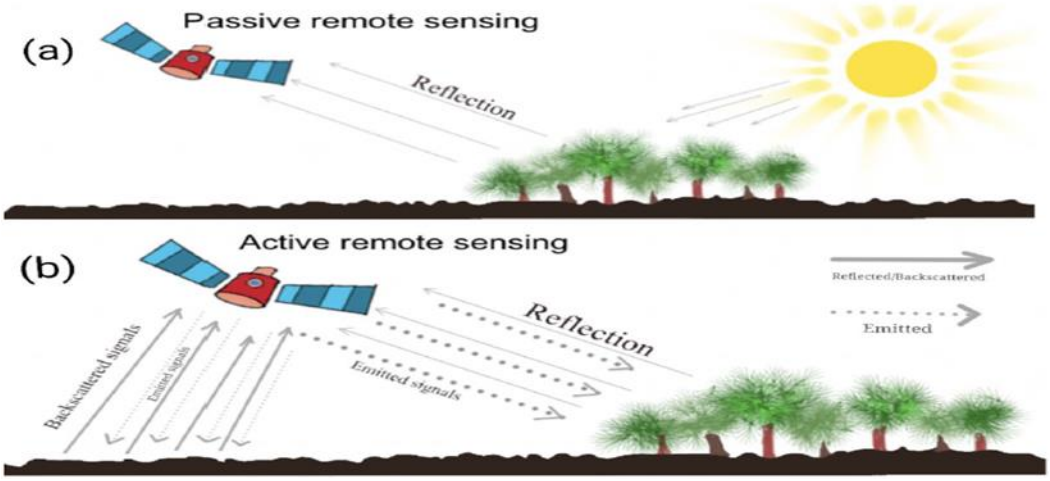

Figure 1. Remote Sensing Technology Using Active and Passive Sensor Methods

2.2. Geoint

Geoint can be understood as a technology that uses image data and geospatial information to collect data and information due to technological advances that continue to develop today. Geoint is analyzing and exploiting geospatial images and information to describe, evaluate, and visually represent Earth's physical picture and geographical activities. Part of Geoint is imagery and Imint from satellite imagery, aerial platforms, UAV's and other similar means (Pinto Hidalgo & Silva Centeno, 2023). The working of Geoint can be understood by conducting data collection and analysis based on the depiction of data and information derived from Imintm. The depiction is obtained through satellite imagery, aerial photography, and Geographic Information System (GIS) integration. Through integrating multiple data sources, Geoint enables comprehensive mapping and monitoring, facilitating the identification of vulnerable areas and

potential security risks. Through Geoint, stakeholders empower authorities to deploy resources and implement targeted interventions preemptively, mitigating potential threats before they escalate (Science et al., 2024). Along with technological advances, the use of data and information obtained through Geoint can incorporate artificial intelligence (AI) in the processing and analysis of data and give rise to a new term, Geospatial Artificial Intelligence (GeoAI). GeoAI is the integration of AI with Geoint to solve problems and issues that are geographic in nature (Wang et al., 2024).

2.3. Intelligence Cycle

The Intelligence Cycle is a series of procedures or steps of the intelligence work process. According to Prunckun (2019), the intelligence process consists of seven steps: planning and briefing, information gathering, data examination, data processing, data analysis, report writing, and dissemination. Furthermore, Saronto (2020) also elaborated on the Rotating Wheel of Intelligence (RPI) process as developing basic information into intelligence products that users can use to help make important decisions. The RPI Process has four stages: planning and directing, collection, processing, and use and distribution.

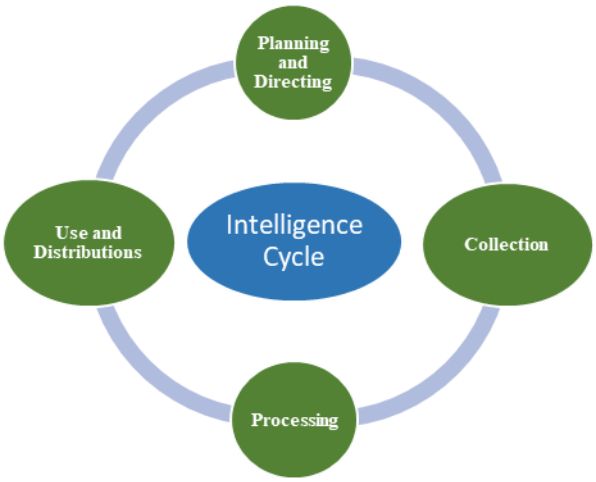

Figure 2. Intelligence Cycle (Processed by Researchers)

The description of each stage is as follows :

1. Planning and directing: This is a management action to identify data to present intelligence products to users. This stage is both the beginning and the end of the RPI Process. It is the initial stage because it depends on the leadership's planning and direction, and it is the final stage because it is related to decision-making.

2. Information gathering: This is the process of collecting data information to be processed into an intelligence product. The collection of information can be done from closed sources through intelligence activities or operations, as well as from open sources that obtain information from open sources such as the internet, radio, television, newspapers, books, etc.

3. Processing: This is the process of processing basic information into an intelligence report, including recording, assessing, interpreting, integrating, and summarizing so that it becomes an intelligence product that is ready to be used and distributed to users.

4. Use and Distribution: This is the process for users and other needy parties. At the end of the series, the RPI Process may end or repeat itself with the provision of new Element of Information (UUK) if there are new developments if there is a lack of data needed for policy-making considerations

3. Methodology

This research uses qualitative research methods with data presentation as an analytical descriptive. The focus of this research is to describe the utilization of Geoint in the Intelligence Cycle to support the role

of State Intelligence in Indonesia. The data sources used are of the secondary type through literature studies from references such as books, journals, and research reports. Rahayu (2020) defines library studies or literature as activities related to library data collection methods, reading, recording, and processing research materials. The data that has been obtained is then analyzed and processed and arranged in the form of structured paragraphs.

4. Result and Discussion

4.1. Geoint in Supporting The Role of State Intelligence

This research uses qualitative research methods with data presentation as an analytical descriptive. The focus of this research is to describe the utilization of Geoint in the Intelligence Cycle to support the role of State Intelligence in Indonesia. The data sources used are of the secondary type through literature studies from references such as books, journals, and research reports. Rahayu (2020) defines library studies or literature as activities related to library data collection methods, reading, recording, and processing research materials. The data that has been obtained is then analyzed and processed and arranged in the form of structured paragraphs.

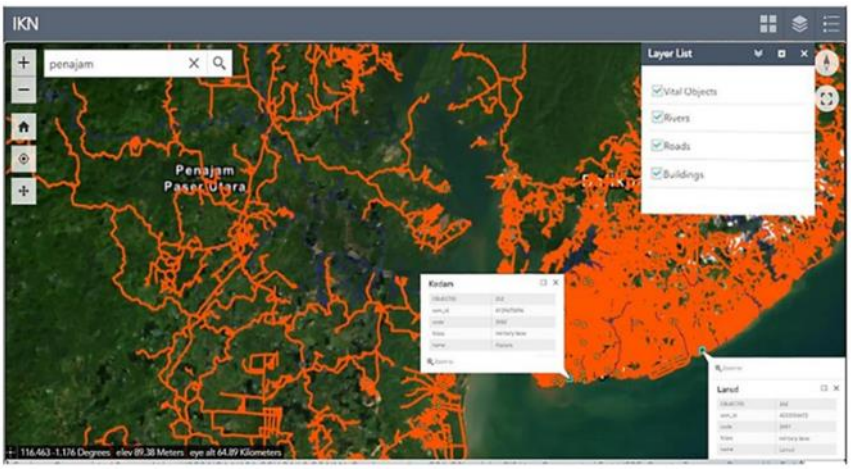

Figure 3. Data from Aerial Photography of the IKN Area

The next stage after planning and directing is collection, Geoint can be used to provide important information to intelligence organization related to terrain topography, enemy locations, assets, equipment and calculation of the best route so that all aspect can be considered such as geospatial data and information, intelligence methods and necessary technology which are then combined or integrated from various sources using GeoAI capabilities such as maching learning and big data and Geoinfo. The capabilities of Geoint technology can be used to collect accurate data using LiDAR, GNSS (Global Navigation Satellite System), Multi Imaging Sensor, and other Geoint technologies that can provide more precise and accurate data.

One of the uses of Geoint related to the collection stage in the intelligence cycle is to search or determine the headquarters of the Armed Criminal Group (KKB) in the Papua Region by paying attention to several variables to localize the search area, such as locations close to water sources, away from residential areas, in lan cover areas that rarely have humans, have relatively good temperatures and historical acts of terrorism (Hutomo et al., 2022). With the amount of information spread due to the development of information and communication technology, Geoint can be utilized in collecting information quickly and accurately. The amount of information spread across various media platforms today can be used to optimize the accuracy and speed of collecting information according to their needs and become an effective technology for collecting information and protecting information considered a state secret (Yusfan et al., 2021).

Figure 4. Result of Geoint Utilization in Mapping Headquarters II Kodap IV Paniai Leadership Damianus Magai Yogi

Then, in the processing of the intelligence cycle, in this state, there is a process of analyzing the geospatial data and information that has been collected. Through Geoint, the analysis process by utilizing GeoAI can have a revolutionary impact in earth observation and remote sensing with the advancement of deep learning algorithms and the availability of high-resolution geospatial data, so that complex analysis can utilize the functions of GeoAI (Liu et al., 2023). The use of GeoAI in the processing of the intelligence cycle can be used in several applications such as being used to conduct a more comprehensive analysis of maritime traffic through the process of combining the result of satellite imagery and AIS in identifying ships, classifying ships based on their operational environment and the purpose of sailing the ship and analyzing if some potential violatiions or crimes may be committed in the waters (Jones et al., 2023). In addition, Geoin, by utilizing remote sensing technology, can be used to understand the actions of KKB groups in the Papua and West Papua regions. The intelligence analysis results indicate that remote sensing technology important role in understanding phenomena or events. Geoint can be utilized as an initial analysis in determining the group's hiding and assisting in conducting intelligence analysis to produce assessments and predictions to facilitate policy making in dealing with the group (Samad & Persadha, 2023).

Figure 5. Geoint Utilization Result using Google Earth Applications Beoga District Area, Puncak Regency, Papua Mountains

The last stage in the intelligence cycle is the use and distribution, where in this stage the result of intelligence analysis that has been carried out will be used and distributed to users or policy makers related to national security and interest, so that information security also becomes very important to avoid data leakage. Geospatial data and information are very important for national security and defense. Therefore, not all geospatial information should be accessible to the public, such as the location of vital state objects

and military facilities related to state sovereignty. Regarding information security, Geoint can be used to secure this important information so that it cannot be accessed by irresponsible parties (Yusfan et al., 2021).

5. Conclusion

Geoint is a new discipline using image and geospatial information for data collection. Geoint is an important part of the intelligence cycle, with Imint as its sub-discipline. The utilization of Geoint in the intelligence cycle can be done at the intelligence cycle stages of planning and directing, collection, processing, use, and distribution. For state intelligence, Geoint can assist in mapping and identification related to the geographic aspect of the target. Geoint can also assist state intelligence in conducting early detection and warning of potential threats that interfere with national interest and security, and can also assist intelligence analysts in making appropriate policy priorities based on the results of image data and geospatial information. Geoint utilization in Indonesia can be improved to support the State Intelligence's role further. Some efforts can be made by developing infrastructure, such as a national geospatial data platform, increasing human resources capacity in the field of Geoint, developing regulations, and increasing cooperation between institutions related to the utilization of Geoint in Indonesia.

References

Alrige, M., Bitar, H., Meccawy, M., & Mullachery, B. (2022). Utilizing geospatial intelligence and user modeling to allow for a customized health awareness campaign during the pandemic: The case of COVID-19 in Saudi Arabia. *Journal of Infection and Public Health, 15*(10), 1124–1133. https://doi.org/10.1016/j.jiph.2022.08.018

Henrico, S., & Putter, D. (2024). Intelligence collection disciplines—A systematic review. *Journal of Applied Security Research.* Advance online publication. https://doi.org/10.1080/19361610.2023.2296765

Huang, Y., Chen, Z. X., Yu, T., Huang, X. Z., & Gu, X. F. (2018). Agricultural remote sensing big data: Management and applications. *Journal of Integrative Agriculture, 17*(9), 1915–1931. https://doi.org/10.1016/S2095-3119(17)61859-8

Hutomo, A., Gultom, R. A. G., & Purwantoro, S. A. (2022). Penggunaan geoint pada operasi militer dalam penanggulangan KKB Papua dengan operabilitas pada sistem K4IPP. *Citizen: Jurnal Ilmiah Multidisiplin Indonesia, 2*(1), 153–158. https://doi.org/10.53866/jimi.v2i1.44

Janga, B., Asamani, G. P., Sun, Z., & Cristea, N. (2023). A review of practical AI for remote sensing in Earth sciences. *Remote Sensing, 15*(16), Article 4112. https://doi.org/10.3390/rs15164112

Jensen, J. R., & Dahlberg, R. E. (1983). Status and content of remote sensing education in the United States. *International Journal of Remote Sensing, 4*(2), 235–245. https://doi.org/10.1080/01431168308948543

Jones, A., Koehler, S., Jerge, M., Graves, M., King, B., Dalrymple, R., Freese, C., & Von Albade, J. (2023). BATMAN: A brain-like approach for tracking maritime activity and nuance. *Sensors, 23*(5), Article 2424. https://doi.org/10.3390/s23052424

Liu, S., Li, K., Liu, X., & Yin, Z. (2023). Geospatial AI in Earth observation, remote sensing, and GIScience. *Applied Sciences, 13*(22), 12203. https://doi.org/10.3390/app132212203

Osco, L. P., Marcato Junior, J., Marques Ramos, A. P., de Castro Jorge, L. A., Fatholahi, S. N., de Andrade Silva, J., Matsubara, E. T., Pistori, H., Gonçalves, W. N., & Li, J. (2021). A review on deep learning in UAV remote sensing. *International Journal of Applied Earth Observation and Geoinformation, 102,* 102456. https://doi.org/10.1016/j.jag.2021.102456

Pinto Hidalgo, J. J., & Silva Centeno, J. A. (2023). Geospatial intelligence and artificial intelligence for detecting potential coca paste production infrastructure in the border region of Venezuela and Colombia. *Journal of Applied Security Research, 18*(4), 1000–1050. https://doi.org/10.1080/19361610.2022.2111184

Prunckun, H. (2019). *Methods of inquiry for intelligence analysis* (3rd ed.). Rowman & Littlefield Publishing Group.

Samad, M. Y., & Persadha, P. (2023). Analisis intelijen terhadap manfaat penginderaan jauh dalam memahami aksi kelompok separatis di Indonesia guna mendukung sistem pertahanan negara. *Jurnal Keamanan Nasional, 9*(1), 55–74. https://ejurnal.ubharajaya.ac.id/index.php/kamnas/index

Saronto, Y. W. (2020). *Intelligence: Intelligence theory and network development* (IX ed.). ANDI Yogyakarta Publisher.

Science, E., Journal, T., Publishers, F. E., Biu, P. W., Oliha, J. S., & Obi, O. C. (2024). The evolving role of geospatial intelligence in enhancing urban security: A review. *EST Journal, 5*(2), 483–495. https://doi.org/10.51594/estj/v5i2.826

Setiawan, S., Supriyadi, A. A., Widodo, P., & Navalino, D. A. (2024). Aerial photo database model of Indonesia's national territory in a geospatial intelligence perspective. *Journal of Applied and Natural Science, 16*(2), 637–645. https://doi.org/10.31018/jans.v16i2.5468

Sishodia, R. P., Ray, R. L., & Singh, S. K. (2020). Applications of remote sensing in precision agriculture: A review. *Remote Sensing, 12*(19), Article 3136. https://doi.org/10.3390/rs12193136

Slesinski, J., Wierzbicki, D., & Kedzierski, M. (2023). Application of multitemporal change detection in radar satellite imagery using REACTIV-based method for geospatial intelligence. *Sensors, 23*(10), Article 4922. https://doi.org/10.3390/s23104922

Wang, S., Huang, X., Liu, P., Zhang, M., Biljecki, F., Hu, T., Fu, X., Liu, L., Liu, X., Wang, R., Huang, Y., Yan, J., Jiang, J., Chukwu, M., Reza Naghedi, S., Hemmati, M., Shao, Y., Jia, N., Xiao, Z., … Bao, S. (2024). Mapping the landscape and roadmap of geospatial artificial intelligence (GeoAI) in quantitative human geography: An extensive systematic review. *International Journal of Applied Earth Observation and Geoinformation, 128,* 103734. https://doi.org/10.1016/j.jag.2024.103734

Yusfan, M. A., Supriyadi, A. A., Martha, S., Gultom, R. A. G., & Sakti, S. K. (2021). Geospatial intelligence (GEOINT) as a national defense strategy for information overload in Indonesia. *International Journal of Engineering Technology and Natural Sciences, 3*(2), 56–62. https://doi.org/10.46923/ijets.v3i2.129

Zhang, B., Wu, Y., Zhao, B., Chanussot, J., Hong, D., Yao, J., & Gao, L. (2022). Progress and challenges in intelligent remote sensing satellite systems. *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing, 15,* 1814–1822. https://doi.org/10.1109/JSTARS.2022.3148139