Geospatial Intelligence (GEOINT) As A National Defense Strategy for Information Overload in Indonesia

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Abstract

The global phenomenon in the Industrial Revolution 4.0 era is currently hitting Indonesia. Many information floods the public every minute with various content spread across multiple media. This information for a country can be a powerful weapon as a form of intelligence product to prepare a national defense strategy. The demands of an increasingly fast-paced era make GEOINT needed to obtain information quickly, accurately and integrate synthesis and analysis. Therefore, this study was conducted to identify the development of GEOINT in Indonesia and its application in overcoming information overload in the present. This study uses the library method by collecting references relevant to the research problem from various sources. The study results indicate that the overload of information from multiple increasingly sophisticated media due to technological developments has made GEOINT's information sources richer. GEOINT in Indonesia continues to optimize accuracy and speed in geospatial analysis to avoid losing to the rate of data sources that continue to increase, both from human resources, hardware, software, and access to information available according to Indonesia's needs. GEOINT as a national defense strategy can be carried out as a form of effective information collection and can protect confidential information. GEOINT will become increasingly valuable in both military and non-military management over the next few years.

Keywords: Geospatial Intelligence, GEOINT, National Defense Strategy, Information Overload, Indonesia, Technological Development.

INTRODUCTION

The global phenomenon in the Industrial Revolution 4.0 era is currently hitting Indonesia. A lot of information floods the public every minute with various content spread across multiple media, as shown in Figure 1. This flood of information has profoundly impacted Indonesia, both individually and within the government. Information that was once very difficult to obtain is now like an open hand. In addition to the ease of getting information as a form of positive effect, on the other hand, a lot of information quickly also has a negative impact. When information comes with the public or the government that is not ready to accommodate and manage that information, it can threaten the national defense.

Threats due to the flood of information in question include noise due to hoax information and data leakage that must protect personal or state personal data. In addition, from the individual perspective of the Indonesian people, especially young people, excessive information causes increased consumerism and a decrease in ethics. It weakens awareness of the nation and state which can divide integrity and the unity of the Unitary State of the Republic of Indonesia.

Based on this, it is necessary to have a national defense strategy to manage scattered information to deal with these threats and disturbances. The national defense strategy, in this case, is not only in the form of strengthening physical strength but also needs to increase the intelligence of the tools or means used.

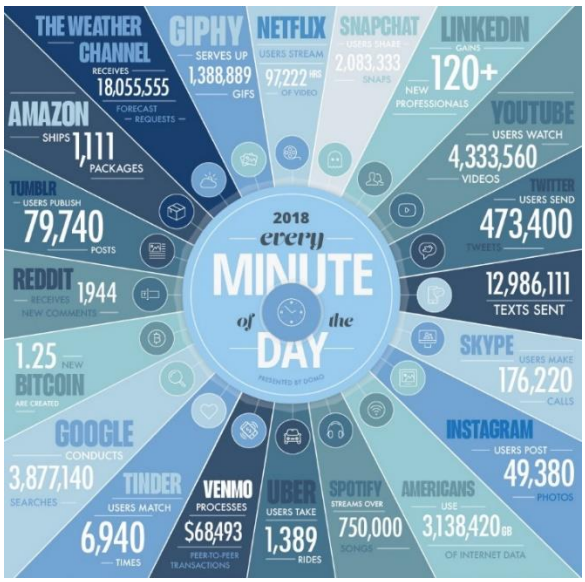

Figure 1. Infographic of Overload Information 2018 (Domo, 2018)

Current technological developments need to be considered that almost all scattered information contains geospatial information. Geospatial information includes specific locations, geometric information (shape, distance, dimensions, geophysical structure, etc.), attribute information (medical services, hotels, school rankings, population, etc.), and information obtained through geospatial analysis of prespecified data and information (Santos, Jr. et al., 2005).

Sources of information can be obtained from historical data storage media of time and location (geotag), which is inputted from various digital tools to transportation equipment. Geospatial information is not limited to maps, demographic data, commercial databases, satellites, Unmanned Aerial vehicles (UAV) only, but any description of any data that refers to geographic references (geocoding). The connection between the internet and the GPS installed in these devices makes deployment easy and fast integration. Large amounts of geographic data are collected through routine and apparent means such as map collection, expeditions, and travel. This included mapping, geodesy, photogrammetry, and pre-digitization mapping. After the Cold War, the use of aerial reconnaissance data from satellites and aircraft was increasingly included (Clarke, 2009).

Information is not just an addition to knowledge for the progress of a country. However, information for a nation can be a powerful weapon in the form of intelligence products to prepare a national defense strategy for the national interest. James F. Dunnigan said, "Obtaining timely accurate information about your opponent, and preventing him to from doing the same, is what military intelligence is all about." Dunnigan explained that military intelligence is information about the enemy obtained at the right time, preventing the enemy from doing the same thing to us. (Dunnigan, 2003). Geospatial needs for handling civil and military emergencies through GIS application technology that is already running have encouraged Indonesia's development of geospatial intelligence (GEOINT) systems.

The demands of an increasingly fast-paced era make GEOINT needed to obtain information quickly, accurately and integrate synthesis and analysis. This power of GEOINT has become known as an assertive new field of investigation that has proven to be the most valuable tool for predicting activity and imagining around the world (Schultz, 2004).

GEOINT is a new discipline designed at the turn of the millennium to integrate intelligence and visual dissemination with the art and science of mapping, charting, and geodesy. Given the vast and ever-evolving nature of the discipline, there is no universally accepted definition (Lee, 2013). However, several experts came up with the definition of GEOINT, including the following.

Lt. Gen. James R. Clapper, in "Imagine the Power of GEOINT", says, "GEOINT is about more than pictures. GEOINT makes possible in-depth assessments and judgments based on the information gleaned from visual depictions. In short, GEOINT is more than imagery, maps, charts, and digital displays showing where the bad guys are. GEOINT, at its best, is the analysis that results from the blending of all of the above into a dynamic, composite view of features or activities natural or manmade on earth" (Clapper, 2004). This brings National Geospatial-Intelligence Agency (NGA) geospatial intelligence (GEOINT) as "The Exploitation and analysis of imagery and geospatial information to describe, assess, and visually depict physical features and geographically referenced activities on the earth" (NGA (National Geospatial-Intelligence Agency), 2004).

While NGA defines GEOINT as intelligence activity, Bacastow and Bellafiore define geospatial intelligence as "Ability to explain, understand, and interpret to predict the human impact of an event or action in a spatial setting. It is also the ability to identify, collect, store, and manipulate data to create spatial knowledge through critical thinking, spatial inference, and analytical techniques. Finally, it is the ability to present knowledge in a way that suits the decision-making environment" (Bacastow & Bellafiore, 2009).

GEOINT consists of images, image information, and geospatial intelligence, as defined by the US code (*10 US CODE: ARMED FORCES, Chapter 22: National Geospatial-Intelligence Agency, Section 467: Definitions*, n.d.). Therefore, the sources of information data that can collect are geospatial data from field measurements or imagery and various media that use the electromagnetic spectrum. Even it can be from social media, such as Flickr, Twitter, and Facebook (Meta), in the web-based extensible markup language (XML), audio, or video formats like previously discussed.

GEOINT data may be collected publicly or privately. Data may be publicly collected from social networks (including cyber transactions between individuals and groups) and crowdsourcing mechanisms (e.g. OpenStreetMap). Information gathered from social networks is not explicitly spatial information but implicitly contains spatial content, making it suitable for new types of spatial analysis. (Tandaric, 2015). This kind of data can collect type data on stationary and moving targets with electro-optics, such as Infra-Red (IR), Medium Wave Infra-Red (MWIR), Short Wave Infra-Red (SWIR), MSI, HSI, and HD. In addition, the collection is also carried out on related sensor programs (active and passive), and non-technical facilities are carried out by personnel to enter geospatial information (NGA (National Geospatial-Intelligence Agency), 2005).

Geographical data is constantly being collected today in civil and military contexts. The rate at which

such information is collected is becoming central to military geographers' "big data" problem. Remote sensing missions can collect gigabytes of data. It quickly scales to terabytes and petabytes as the data is archived for future references. Similarly, with billions of social media users, the amount of potentially valuable data generated each day is enormous (Coorey, 2018).

Therefore, this study was conducted to identify the development of GEOINT in Indonesia and its application for overcoming information overload in the present. This study addresses two main issues. First, this research is intended to help decision-makers better understand geospatial intelligence in Indonesia. Second, summarize research topics related to the function of GEOINT as a national defense strategy in dealing with information overload.

METHOD

This study uses the library method by collecting references relevant to the research problem from various sources: search reference journals, books, and web pages related to GEOINT to deal with information overload. References in the form of text and images are filtered according to their needs by looking at the title, abstract, and keywords. After the documents are collected, they are analyzed in-depth to produce the research findings.

RESULT AND DISCUSSION

Information Overload

Barry Schwartz, a professor of psychology at Hubbarford, presents different heuristics that people use to choose from other choices. As the number of options grows, more effort is required to make decisions, making errors more likely (Schwartz, 2004). In this regard, the large amount of information presented must also lead to a lot of effort to decide, including in the preparation of the national defense strategy.

Currently, information data from social media with a temporal location and trace is very influential in making intelligence products. It is following what was stated by Coorey, who recognized that access to social media as a source of GEOINT in public and private sphere was a problem (Coorey, 2018). The collection of information data that used to be mass-collected in various types of intelligence and tactics at a considerable cost and risk by personnel in the field can now be minimized. In this case, automated analysis methods are being followed up to synthesize existing data sources to be processed as intelligence.

One source of intelligence products as information data is the social media from Indonesian internet users. Referring to the Datareportal year in January 2021, shown in Figure 2., Indonesia has 274.9 million inhabitants. Among Indonesia's large population, Indonesia has 202.6 million Internet users, most of whom are teenagers. As many as 170 million people use social media every day for about 8 hours (Datareportal, 2021). The information retrieved spatially can be identified from the results of postings, tweets, and other internet usages. The analytics software in GEOINT can filter out this large volume of unstructured data and visualize it in geographic and temporal contexts.

Figure 2. Data digital Indonesia (Datareportal, 2021)

Personal mobile devices with cameras and GPS with data reception and transmission capabilities are becoming a rich source of GEOINT information. The task of collecting, combining, analyzing, and integrating large amounts of data from these devices is enormous and is part of the "big data" problem. The collection of massive data from time to time allows analysts to know the pattern of activity and find out the cause of the problem to predict the impact of something that will cause in the future. This kind of thing is helpful for various state interests in dealing with disasters, drug smuggling, or terrorism. Of course, the data used by GEOINT must be of high quality in the process of accepting and storing it because the data is precious.

The challenge of today's era where information is overloaded is valuing data into useful information. What should note is whether the source of the data obtained is original or has undergone data manipulation. The expert translators should avoid misinformation to be accurate data for the national interest. As the authority for the protection of national defense, the government is expected to create a geospatial information management system for defense needs to deal with this.

GEOINT in Indonesia

GEOINT in Indonesia continues to grow by optimizing accuracy and speed in geospatial analysis so as not to lose to the rate of data sources that continue to increase not only in hours but minutes to seconds. Likewise, the data is more complex to absorb to study various types of existing geospatial data. The facilities referred to include improving human resources, hardware, software, and access to available information according to Indonesia's needs.

Geospatial intelligence was introduced in 2003 and formulated as legal code that created and commissioned NGAs (Clarke, 2009). GEOINT is a

new term used to produce information using geospatial data, including terrain analysis, photogrammetry, cartography, and remote sensing activities.

This GEOINT activity has been carried out since World War and continues to grow. In ancient times, geospatial information was initially centered on maps and graphs as a provider of measuring and modeling the shape and gravity of the earth, determining precise locations commonly used with photogrammetry and global positioning system needs. However, since the sophistication of satellites and the digital era, GEOINT has increased by connecting various other intelligence capabilities, such as Imagery Intelligence (IMINT), Electronic Intelligence (ELINT), Human Intelligence (HUMINT), Communication Intelligence (COMINT), Telemetry Intelligence (TELINT), and Measurement and Signal Intelligence (MASINT) (Rajab & Supriyatno, 2019). GEOINT in the past and now in terms of operating concepts are almost the same, but now it is much more comprehensive in terms of its spatial and temporal scale ranges. GEOINT now refers more to visual representations to make it easier for users to interpret geospatially.

The lack of managing separate intelligence operations began to be felt by America since the 9/11 terrorist attacks resulted in many intelligence functions being combined to form National Geospatial-Intelligence Agency (NGA). Apart from the need for intelligence that continues to increase, this also encourages Indonesia to improve the performance of intelligence and non-intelligence organizations or institutions with capabilities related to satellites and their derivatives with the geospatial community. It is done to establish complete cooperation in solving complex problems. These geospatial communities include the Geospatial Information Agency, the National Institute of Aeronautics and Space or the BRIN Aviation and Space Research Institute, the Directorate of Topography of the Indonesian Army, the Naval Hydro Oceanography Center, the Aerial Photography Service, the Ministry of Marine Affairs and Fisheries, the Ministry of Environment and Forestry, and individual/private parties engaged in the geospatial field.

In 2013, the Geospatial Information Agency, Indonesian National Armed Forces Navy, Navy, Army, Police of the Republic of Indonesia, and the National Search and Rescue Agency (BASARNAS) established an integrated geospatial intelligence agency to protect national security as a national defense strategy. Deputy V for Technology at the State Intelligence Agency Adiari said geospatial information technology for intelligence operations at the Indonesian State Intelligence Agency was already sophisticated. The technology is operated by young Indonesians (Hamzah, 2013). In addition, collaboration with software providers related to GEOINT is also carried out, one of which is the Directorate of Topography of the Indonesian Army (Prihartini, 2021).

On the development side of defense technology and industry, technological tools and facilities are improved following the Defense Regulation Number 15 of 2009 concerning the Development of Defense Technology and Industry. In this Ministerial Regulation, there are instructions for product development and technology transfer programs oriented towards technology development and RMA (Luthfi, 2012). Among the specific concepts at the core of the RMA is the idea of information warfare (Mallick, 2000). Therefore, Indonesia needs to adopt new technologies to integrate old and new data to manage volume data, task automation, easy access, and better analysis.

It can already be seen in PT Len Industri as an industry engaged in the Indonesian defense sector that focuses on developing C5ISR (Command, Control, Computers, Communications, Cyber, Intelligence, Surveillance, and Reconnaissance). The C5ISR is a determinant of the superiority of the primary weaponry system and is integrated with various national defense systems (Net-Centric Warfare) (Teguh, 2021). Implementation of C5ISR involves gathering large amounts of multiple types of intelligence continuously and in real-time. It contains GEOINT, which is to process the intelligence information into operational support data.

The technology developed today through sensing can create a vehicle that operates 24 hours and can be remotely controlled in the military and non-military. Currently, the GEOINT process is carried out by combining an integrated Geographic Information System and “big data”. The merging and overlaying required advanced analysis, remote sensing, and geoprocessing. This includes period analysis and analysis of the behavior and interactions of natural and human phenomena on the surface of the earth. Ensuring a continuous supply of these topics required efficient tasking, processing, utilization, and data dissemination at target time intervals across large geographic areas (Clarke, 2020).

It is hoped that a better GEOINT system will be created in the future, which is not limited to vehicles that can drive remotely. Still, intelligence products can also be integrated and distributed in real-time to government agencies authorized to make decisions on various increasingly complex Indonesian problems. As machines take over more and more roles in the decision chain, GEOINT will play a key role in developing custom machine learning that enables timely situational awareness at the tactical level (Coorey, 2018).

GEOINT as A National Defense Strategy for Information Overload

The need for national defense in the face of threats and disturbances is vital for the integrity of a country. Countries in peace conditions are needed to prepare for war if one day it will happen. It requires resources, knowledge, defense equipment, and a capable defense system. All the above defense needs cannot be separated from the factors and geographical conditions of the country's territory.

This geographic-based information is crucial in national defense and security. Therefore, not all of the earth's information can be consumed by the public. Examples are military locations and confidential information related to state sovereignty. It is where the important role of geospatial intelligence comes into play. GEOINT as a national defense strategy can be done as an effective form of information gathering, which must also do with GEOINT activities in protecting vital information and state confidentiality from being leaked to unwanted parties.

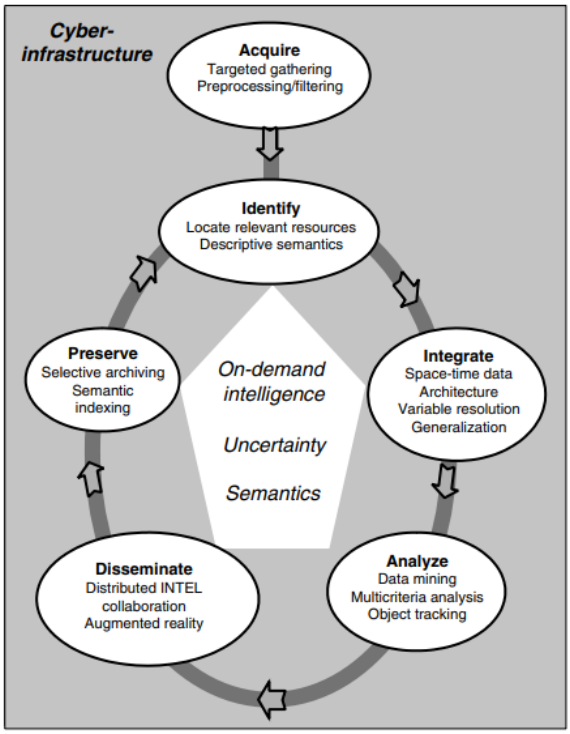

Figure 3. GEOINT information flow (National Research Council (U.S.). Mapping Science Committee., 2006)

Based on the National Geospatial-Intelligence Agency, six GEOINT functions form a sequential cycle as shown in Figure 3: acquire, identity, integrate, analyze, disseminate, and preserve. The first stage is acquiring, where the process of collecting by GEOINT is as much as possible. Still, for the new generation called GEOINT2, the collection is carried out not only to collect many data but also effectively and efficiently. Second, identify information resources that have automatically linked relevant information but still have manual controls for interpretation. The third stage interprets various information, combines data, and identifies changes. The fourth is to analyze the selected information done by both humans and machines with multiple levels of security. Fifth, distribute and disseminate information to Intel to collaborate. The final stage is to preserve the data to be reused. The challenge is so much information available today, even terabytes per day (National Research Council (U.S.). Mapping Science Committee., 2006).

Overloading information in the current era is very easy to obtain because increasingly sophisticated tools and technology make it easier for anyone to access it. The ability to exploit data from images is increasingly modern. The latest software allows users to see through clouds or smoke that the human eye previously could not identify. In addition, high-resolution imagery can also identify changes and camouflage based on the historical data collected. Sensors are getting better and better to detect small variations in the ground surface elevation to detect vehicle tracks in desert areas. All data collected can be captured on stationary or moving targets using electro-optics, such as Short Wave Infra-Red (SWIR), Infra-Red (IR), Medium Wave Infra-Red (MWIR), MSI, HSI, and HD. In addition to the collection, related sensor programs (active and passive) and non-technical facilities can also be carried out by personnel to enter geospatial information (NGA, 2005).

Concerning GEOINT, the role and use of information data are very much considered, so technology also continues to develop to keep up with the acceleration of this information. Priorities for GEOINT Research states, "GEOINT must evolve further to integrate forms of intelligence and information beyond traditional geospatial imagery and information sources and must move from an emphasis on data and analysis to an emphasis on knowledge" (National Research Council (U.S.). Mapping Science Committee., 2006). It means that GEOINT was developed to visualize all activities recorded by the media, as is the case with CCTV. CCTV that records the time and location of the subject somewhere. How the condition and positions. Such information is useful for defense strategy at every level of the strategic environment, particularly in policy decision-making. With increasingly sophisticated and intelligent technologies, such as satellites and Unmanned Aerial Vehicles, geospatial intelligence is also getting faster and more accurate. It can be directly channeled by the user to respond to threats immediately.

Nevertheless, the requirement for HUMINT persisted and the concept evolved into a new version called Human Geography. Human Geography collects physical, cultural, political, and social subjects and uses spatial analysis to transform raw GEOINT data into activity-based information. In this regard, GEOINT managers and analysts should be familiar with the basic concepts of research methodology, geo-

statistics, and spatial analysis. These professionals must also have cultural knowledge and understanding of the processes of physical and social systems in large and small areas.

Based on the discussion above, the emphasis is on accountability and that GEOINT is significantly capable of managing the information needed for national defense strategies. GEOINT has been useful for a wide variety of cases, including being used as a key resource for potential Chapter VII interventions, UN investigations, and international criminal tribunal prosecutions (Public, 2008).

GEOINT has been and continues to assist countries in dealing with national defense threats effectively. Threats that are developing today can be visually described and assessed from various sources of spatially important information. GEOINT, which can provide large volumes of important information and present it from synthesizing multi-dimensional geographic reference data in real-time, makes decision-makers informed and more aware of the facts revealed by the data obtained.

CLOSING

Conclusion

GEOINT is used to utilize information data from collection, analysis, presentation, and distribution to users (decision-makers) with data that can facilitate accuracy effectively and efficiently can be used as a national defense strategy in facing the era of the Industrial Revolution 4.0 where information overload occurs in Indonesia.

Over the next few years, GEOINT will become increasingly valuable in the ongoing fight against using the World Wide Web for nefarious purposes, such as recruitment and communication among terrorist groups, combating domestically grown drug smuggling, or protecting against cyber warfare from international enemies. Apart from the military field, even in non-military areas, such as handling disasters that threaten national security, GEOINT can be applied using various public information provided by the general public through social media more quickly and accurately.

Solution

Decision-makers are expected to support and improve integrated GEOINT activities between government agencies and the geospatial community. The provision of forums and meetings, including workshops and consensus studies on improving GEOINT, should continue. Intelligence collaboration with each function can complement each other's GEOINT products with a broader and deeper scope for wise decision-making. In addition, the completeness of GEOINT tools and resources is expected to be more intelligent and consistently implemented through good information management in each of its developments.

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