

Geo-Intelligence, Geospatial Information and Artificial Intelligence Applications

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INTRODUCTION

Today, we face a fast-growing advancement in multiple technologies providing us with various options and choices. Geo-Intelligence is an explorable area that enables pre-determined actions and the anticipation of potential adversarial actions. The 3-dimensional view of terrain and buildings helps anticipate potential areas that the adversaries may use. In the contemporary settings of uncertainties in global geopolitics, geo-intelligence could assist in shaping out the possible challenges faced by Malaysia and worldwide. With the Trump 2.0 administration and tariffs on imported goods, further uncertainties are being created, and the effect can be felt globally.

Let us first see what Geo-Intelligence is, which is derived from geospatial information obtained from multiple sources. Geospatial relates to mapping requirement which relies upon data obtained from four domains of sources: outer space, air space, ground and sea. Outer space data would be taken from satellite images. However, there may be situations in which clouds and weather conditions could block pictures. Here, sensory sources can be obtained from images captured from the aircraft, mainly aeroplanes, helicopters and Unmanned Aerial Vehicles (UAV) can be used to cover the gaps from satellite information. As for the sea, it is essential to obtain hydrography information. The advent of hydro spatial technology, enabling a better understanding of the ocean, could facilitate the management of the ocean.

While geo-intelligence technology is used, geopolitical information cannot be disregarded. Geopolitical information is equally important and helps to enable the focus of geo-intelligence. Without geopolitical information, geo-intelligence may require continuous analysis and updates. Therefore, geopolitical information helps to narrow down the focus of geo-intelligence.

REMOTE SENSING TECHNOLOGIES AND GEOSPATIAL INFORMATION

The blending of remote sensing devices that provide imagery data could assist the development of Geo-Intelligence. The satellites located in outer space can capture satellite images, which can provide images for geospatial information. However, at times, clouds could block pictures, and weather conditions may further hinder the ability to get the required data. These gaps can be covered by capturing aircraft and unmanned aerial vehicle images. Photographs taken could also be used as general sensory data, making them more transparent and better. Those images taken from multiple remote sensing devices could further generate geospatial data. Today, with the advent of software development, geospatial information can be generated faster than the traditional cartography method, that is, the manual way of generating maps.

Geospatial data could be obtained from images generated by sensory devices ranging from satellite images, images captured from aircraft and unmanned aerial vehicles, radars, and

physical capture of images on land and generation of hydro-spatial information right to the seabed. Companies such as Esri have products to generate maps at a faster rate and in a shorter duration. Geospatial information can be in the form of 2-dimensional or 3-dimensional information. Today, some companies sell satellite images, enabling them as an alternative to generate a 3-dimensional view of terrain and buildings from geo-spatial systems. This relates to the enabling of digital twin technologies. Digital twinning technology relates to the capabilities of software applications today to transform virtually and enable detailed analysis before generating the actual objects.

GEO-INTELLIGENCE

Intelligence, Surveillance, and Reconnaissance (ISR) were traditionally used in intelligence assessment. Today, geospatial information allows 3-dimensional analysis of terrain generated from 2-dimensional maps or a digital twin. This digital twin technology allows further geo-intelligence analysis, gathering, and transformation of data and information into intelligence. The digital twin technology enables speedy generation of three-dimensional visuals that help generate geo-intelligence.

There are also various Artificial Intelligence (AI) apps to enhance geo-intelligence generation further. For example, the AI app could process information on the most likely approaches that adversaries would use. With the generation of visual analysis, obtaining real-time data provides more updated and accurate information, enabling faster reaction, which is a competitive advantage.

Today, geo-intelligence generation from geospatial software through real-time images can provide more accurate intelligence information. With the development of remote sensing devices, real-time satellite images have broadened the observation span compared to the traditional line of sight. Updated satellite images, near real-time, could provide intelligence on a broader range than radar could reach. For example, information on ship locations that can cover the South China Sea and provide the location of each vessel could enable better monitoring of ship movements and combat sea-based nontraditional threats.

There has been tremendous development in Hydro-spatial through an integrated approach. Geospatial knowledge in oceanography provides a more holistic approach to managing maritime resources. Hydro sensory devices ranging from the sea surface level, such as Buoy and Moored Arrays, Profiling Floats, Unmanned Surface Vehicles and Sensor Networks are fitted under boats. Meanwhile at the seabed are devices such as Remote Operated Vehicles, Deepsea Cameras and Sensors, Acoustic Doppler Current Profilers and Autonomous Underwater Vehicles (AUVs) and Gliders. Both device categories can help develop hydro-spatial data, contributing to Geo-Intelligence expansion capabilities.

CONCLUSION

The advancement of satellite technology, imagery devices, remote sensing technologies, and Artificial Intelligence applications can enhance Geo-Intelligence. Technology also enables more exhaustive monitoring coverage, an area that could be further explored and exploited to obtain the information that could be obtained. However, not all countries can afford to embrace

these technologies due to financial constraints. Therefore, geopolitics must be analysed to determine the crucial technologies required. It is hoped that deeper research could be explored through collaboration with other countries, using their knowledge and technology.