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Simulation of Military Operation to National Capital City (IKN) Nusantara if Sipadan Island is a Military Base

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Abstract
Simulation of military operation to national capital city (ikn) nusantara if sipadan island is a military base is aimed to find out the types of military operations that might occur in the future. The military operation used in this simulation are airbone operations, submarine operations, and landing operations. the results of the simulation of the travel time of a fighter aircraft are about 15-38 minutes, where the distance from Sipadan Island to IKN Nusantara is 602 km and the estimated minimum aircraft speed is 950 km/hour and a maximum of 2,500 km/hour. If a beach landing operation is carried out, information is obtained that the shortest distance between Sipadan Island and Sebatik Island is 78.9409 km. if submarine operations are carried out, the ALKI II route is the most suitable path for submarines to traverse where this is obtained from the Indonesian bathymetry map data. Based on the results of this study, the conclusion is that the islands of Sipadan do not and not yet have a potential military threat, but this research can be used as a literature study if in the future the islands of Sipadan begin to be monitored for the construction of military bases.

Keywords : Simulation, Military Operation, IKN Nusantara, Sipadan Island

INTRODUCTION

Simulation refers to the process of creating a virtual environment or model that behaves like a real-world system or process. The model can be used to study how the system or process behaves under different conditions, or to predict how it might behave in the future. In simulation, a set of rules, equations, or algorithms are used to model the behavior of a system or process. This can be done for a variety of purposes, such as testing the performance of a new product, predicting the behavior of a complex system, or training people to operate in a realistic environment.

Simulation can be used in many different fields, including engineering, physics, biology, economics, and even entertainment. For example, computer simulations can be used to predict the behavior of a bridge during an earthquake, to simulate the spread of a virus through a population, or to train pilots to fly a plane in different weather conditions.

There are several types of simulation, including physical simulation, mathematical simulation, and computer simulation. Physical simulation involves creating a physical model of a system, while mathematical simulation involves using mathematical equations to model a system. Computer simulation is a type of mathematical simulation that uses computer algorithms to model the behavior of a system.

Simulation has become an increasingly important tool for understanding and predicting the behavior of complex systems, and it is widely used in both research and industry.

A military operation is a coordinated and planned action conducted by military forces to achieve specific objectives, such as capturing territory, neutralizing enemy forces, or providing humanitarian aid. Military operations can be large-scale or small-scale, and they may involve a wide range of military capabilities, including ground troops, aircraft, naval vessels, and other

specialized equipment.

Military operations can be conducted in a variety of settings, such as on land, at sea, or in the air. They can be offensive, defensive, or a combination of both, and they can be conducted in a variety of environments, from urban areas to rugged terrain. The success of a military operation depends on a variety of factors, including the quality of intelligence, the coordination and synchronization of forces, and the skill and bravery of individual soldiers.

Military operations can be classified into different types, such as conventional warfare, irregular warfare, and special operations. Conventional warfare involves the use of regular military forces in a traditional battlefield setting, while irregular warfare involves the use of unconventional tactics by irregular forces, such as guerrilla fighters. Special operations involve highly trained and specialized units conducting missions that are outside the scope of traditional military operations, such as counterterrorism or hostage rescue.

Military operations can be complex and risky endeavors, and they often require significant planning, training, and resources. They can also have significant political and social consequences, and they must be conducted within the framework of international law and ethical norms.

Simulation of military operations refers to the use of computer-based models and simulations to replicate the planning, execution, and evaluation of military operations. These simulations use advanced computer algorithms to model the behavior of military forces, weapons systems, and other elements of a military operation. They allow military planners and decision-makers to explore different scenarios and evaluate the potential outcomes of different courses of action.

Simulation of military operations can be used for a variety of purposes, such as training, research, and operational planning. In training, military personnel can use simulation software to practice and refine their skills and tactics in a safe and controlled environment. In research, simulations can be used to explore the effectiveness of different military strategies and technologies. In operational planning, simulations can be used to develop and evaluate different courses of action in advance of an actual operation.

The complexity and fidelity of military simulations can vary widely, depending on the specific needs and goals of the simulation. Some simulations focus on tactical-level operations, such as infantry maneuvers, while others simulate larger-scale operations involving multiple units and weapons systems. Some simulations are designed to replicate specific real-world scenarios, such as urban combat or counterinsurgency operations, while others are more abstract and generic in nature.

Military simulations can be conducted using a variety of software and hardware tools, including specialized simulation software, computer networks, and even physical mockups and models. They often involve the integration of multiple components, such as terrain modeling, weather simulation, and artificial intelligence algorithms to simulate the behavior of opposing forces. Overall, simulation of military operations provides a valuable tool for military planners and decision-makers to explore different scenarios and evaluate the potential outcomes of military operations before committing real-world resources and personnel.

Sipadan Island is a small island located off the east coast of Malaysian Borneo in the Celebes Sea. It is known for its stunning natural beauty, rich marine life, and world-class diving opportunities. The island is part of the Sipadan Island National Park, which is a protected marine park and a designated UNESCO World Heritage site.

Sipadan Island is a small, uninhabited island that measures only about 12 hectares (30 acres) in size. It is located about 36 kilometers (22 miles) off the east coast of Sabah, Malaysia, in the Celebes Sea. The island is part of the larger Sipadan Island National Park, which covers an area of about 33,000 hectares (82,000 acres) and includes several other islands and coral

reefs.

Sipadan Island is known for its unique underwater topography, which includes steep walls that drop to depths of up to 600 meters (2,000 feet), and a variety of caves, tunnels, and overhangs. These features provide shelter and habitat for a diverse array of marine life, including over 3,000 species of fish, hundreds of species of coral, and numerous species of sharks, rays, and sea turtles.

Sipadan Island is considered one of the best dive destinations in the world due to its clear waters, diverse coral reefs, and abundant marine life. Divers can explore a variety of dive sites around the island, including walls, caverns, and large schools of fish. The island is particularly well-known for its large populations of green and hawksbill turtles, which can often be seen swimming and feeding in the waters around the island.

One of the main attractions of Sipadan Island is its large population of sea turtles, particularly green and hawksbill turtles. These turtles use the island's beaches as nesting sites, and can often be seen swimming and feeding in the waters around the island. The island is also home to a variety of other marine creatures, such as barracudas, jacks, reef sharks, and whale sharks (which are often seen in the area from April to May).

In addition to diving, visitors to Sipadan Island can also enjoy other outdoor activities such as snorkeling, swimming, and sunbathing. The island has several white sand beaches and offers stunning views of the surrounding sea and nearby islands. Visitors can also explore the local villages and experience the traditional culture of the region.Due to its unique marine environment, Sipadan Island has become one of the world's top destinations for scuba diving and snorkeling. The island has more than a dozen dive sites, each with its own unique features and marine life. Some of the most popular dive sites include Barracuda Point, South Point, and Turtle Cavern. Access to Sipadan Island is limited and regulated in order to protect the island's fragile ecosystem. Only a limited number of visitors are allowed on the island each day, and all visitors must obtain a permit in advance. Diving and snorkeling activities are closely monitored and regulated to minimize their impact on the marine environment. Due to its status as a protected area, access to Sipadan Island is limited and regulated. Only a limited number of divers and visitors are allowed on the island each day, and all visitors must obtain a permit in advance. The island is accessible by boat from nearby towns such as Semporna and Tawau.

A national capital city is the city that serves as the administrative, political, and sometimes cultural center of a country. It is typically the location of the country's government institutions, such as the Presidential Palace, Parliament, and Supreme Court, as well as the residences of top government officials.

Some examples of national capital cities around the world include:

- Washington, D.C. in the United States
- London in the United Kingdom
- Paris in France
- Tokyo in Japan
- Beijing in China
- Moscow in Russia
- New Delhi in India
- Brasília in Brazil
- Canberra in Australia
- Ottawa in Canada

In some cases, the national capital city is also the largest city in the country, while in other cases, it may be a smaller or less populous city. The role and significance of a national capital city can vary widely depending on the country and its political, historical, and cultural context.

"Nusantara" is a term that is commonly used in Indonesia to refer to the Indonesian

archipelago. The term comes from Old Javanese and means "archipelago" or "island group". The Indonesian archipelago is made up of more than 17,000 islands, which are scattered across the equator between the Indian and Pacific oceans.

The region has a rich history and culture, with influences from Indian, Chinese, and European civilizations, among others. It is home to a diverse range of cultures, languages, and ethnicities, including Javanese, Balinese, Sumatran, and many others. The term "nusantara" is often used in Indonesia to refer to a sense of national unity and identity among the diverse peoples of the archipelago. It emphasizes the idea that despite their differences, the people of the region share a common history, culture, and destiny.

In addition to its cultural significance, the term "nusantara" is also important in the context of Indonesia's political and economic development. As a maritime nation, Indonesia has sought to assert its sovereignty over the waters surrounding the archipelago, and has used the concept of "nusantara" to frame its maritime policies and territorial claims in the region. A military base is a facility or installation used by a military organization or government to support and train military forces, conduct operations, and provide logistics and support services. Military bases can be located within a country's borders or in foreign countries, and can be operated by a single military branch or by joint forces. Military bases can take various forms, including air bases, naval bases, and army bases. These bases can have a wide range of facilities, such as barracks, training grounds, firing ranges, hospitals, and supply depots. They can also house various types of equipment, including aircraft, ships, and armored vehicles.

The location of military bases is often strategic, allowing for quick deployment of military personnel and equipment in response to threats or emergencies. Bases can also serve as a deterrent against potential adversaries and provide a visible presence of military power.
However, the presence of military bases can also be controversial, particularly in foreign countries where they can be seen as a symbol of foreign occupation or aggression. Some communities have also raised concerns about the environmental impact of military bases and the potential health risks associated with their activities.

A military base located on an island is called an "island military base". Island military bases can be found in various parts of the world, particularly in strategic locations that allow for the projection of military power and the defense of the surrounding region.
Some examples of island military bases include:

- Diego Garcia: a small atoll in the Indian Ocean that is home to a joint U.S.-U.K. military base.
- Guam: an island territory of the United States located in the Western Pacific Ocean that hosts a large U.S. military presence.
- Okinawa: a Japanese island that is home to several U.S. military bases and has been the subject of controversy and protests over the years.
- Jeju Island: a South Korean island that is home to a newly constructed naval base.

Island military bases can pose unique logistical and environmental challenges, as supplies and personnel often need to be transported by air or sea. The presence of military bases can also have an impact on local communities and ecosystems, leading to concerns about environmental degradation, displacement of indigenous peoples, and cultural erosion.

RESEARCH METHODS

Spatial analysis is the process of examining geographic data to identify patterns, relationships, and trends. It involves the use of techniques and algorithms to understand spatial relationships between geographic entities. Some examples of spatial analysis methods include:

- Overlay: Overlay is a method used to compare two or more map layers or vector data by merging or clipping overlapping areas between them. This allows users to estimate the quantity or concentration of objects in a particular area.
- Proximity Analysis: Proximity analysis is a method used to identify and evaluate spatial relationships between objects. This method can be used to find objects that are near each other, determine the shortest distance between two objects, or identify objects located around a particular area.
- Spatial Statistics: This method is a statistical technique used to identify and analyze spatial patterns in geographic data. Some examples of spatial statistical analysis include clustering analysis, spatial correlation analysis, and spatial regression analysis.
- Network Analysis: This method is used to analyze relationships between objects through a network or path. Network analysis can help identify the shortest route between two locations, calculate travel time, or determine the optimal location for a facility.
- Interpolation: This method is used to produce unknown values in geographic space using known data. Some examples of interpolation techniques include Kriging, Inverse Distance Weighting, and Trend Surface Analysis.

Spatial analysis methods can be used in various fields such as mapping, environmental modeling, natural resource management, and urban planning.

Spatial analysis can provide insights and solutions to a wide range of problems in different fields. Here are some examples of how spatial analysis can be applied:

- Environmental Studies: Spatial analysis can be used to understand the impact of human activities on the environment. For example, it can be used to identify areas of deforestation, pollution, or habitat destruction, and assess the severity of these issues.
- Public Health: Spatial analysis can be used to identify disease hotspots or areas with high incidence rates of particular diseases. This information can help public health officials target interventions, allocate resources, and develop prevention strategies.
- Urban Planning: Spatial analysis can be used to analyze urban growth patterns and plan for future development. It can be used to identify areas that need more infrastructure, such as roads or schools, or areas that are at risk of flooding or other natural disasters.
- Transportation: Spatial analysis can be used to optimize transportation networks, such as identifying the most efficient routes for delivery trucks or determining the best location for a new bus stop.
- Business: Spatial analysis can be used to identify target markets, assess customer behavior, and optimize sales territories. For example, retailers can use spatial analysis to determine the best location for a new store based on demographics and competition.

These are just a few examples of how spatial analysis can be used to solve real-world problems. With the increasing availability of geographic data and powerful analytical tools, spatial analysis is becoming more accessible and valuable in many fields.

The method used is to know the simulation of military operations using airborne operations, submarine operations, and beach landing operations. for airborne operations what you want to know is the estimated travel time of a fighter aircraft when carrying out operations. for submarine operations what you want to know is the coverage of sea areas that are suitable for submarine diving. while the beach landing operation is the measurement of the distance from Sipadan Island to Kalimantan Island.

RESULT AND DISCUSSION

Airborne operations

Airborne operation is a type of military operation in which troops and equipment are delivered to a target area by air. It involves the use of airborne forces, such as paratroopers, who are dropped from aircraft via parachute, or air assault forces, who are transported by helicopter. Airborne operations are typically used for surprise attacks or to quickly seize key objectives deep in enemy territory. They are also used to support ground forces by securing flanks, conducting raids, or disrupting enemy operations. The success of an airborne operation depends on factors such as accurate intelligence, effective planning and coordination, and air superiority over the target area.

Airborne operations have been used in various military conflicts throughout history, including World War II, the Vietnam War, and the Gulf War. The most famous airborne operation in history is perhaps the D-Day invasion of Normandy on June 6, 1944, during World War II. The operation involved the drop of thousands of Allied paratroopers behind enemy lines in Nazi-occupied France, in order to disrupt German defenses and pave the way for the main invasion force.

In addition to paratroopers and air assault forces, airborne operations can also involve the use of air-dropped supplies, vehicles, and equipment. For example, during the Gulf War, the U.S. military used a combination of paratroopers and air-dropped supplies and equipment to rapidly deploy forces into the theater of operations.

The success of airborne operations often depends on a variety of factors, including the availability of suitable landing zones, the effectiveness of air support and intelligence gathering, and the ability of ground forces to quickly consolidate and secure the target area. Despite the risks and challenges involved, airborne operations remain a valuable tool in modern military operations, allowing forces to quickly project power over long distances and execute complex missions with speed and agility.

Airborne operations require specialized training, equipment, and tactics, and involve significant risks to the troops involved. Paratroopers and air assault forces must be trained in advanced skills such as airborne insertion techniques, combat operations in urban environments, and tactical air assault missions. They must also be physically fit and mentally prepared to operate in high-stress environments.

Airborne operations can be conducted using various types of aircraft, depending on the size and nature of the operation. Fixed-wing aircraft such as transport planes and cargo planes are often used to transport paratroopers and air-dropped supplies, while helicopters are used for air assault missions and transport of air assault forces.

The effectiveness of airborne operations can be enhanced by using advanced technologies such as GPS navigation, secure communication systems, and unmanned aerial vehicles (UAVs) for reconnaissance and surveillance. These technologies can help to ensure accurate targeting, rapid deployment of forces, and effective coordination between airborne and ground units.

Despite the risks and challenges involved, airborne operations remain a key element of modern military strategy. They offer a rapid, flexible, and highly mobile means of projecting force over long distances and executing complex missions in a variety of environments. As such, they are likely to continue to play an important role in future military conflicts.

So in this simulation, there is 4 potential threats to IKN Nusantara that is shown in the figure below.

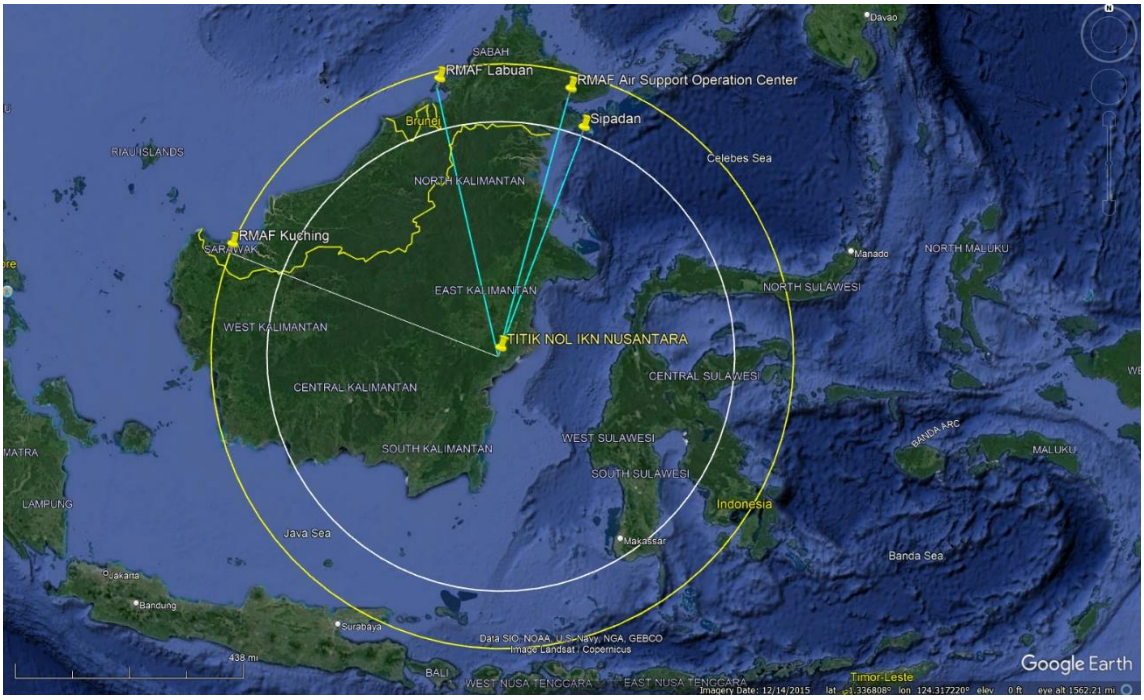

Fig. 1. Potential Airborne Threats to IKN Nusantara

The potential threat of airborne operations arises from 4 location points, namely from Table 1.

No	IKN to	Distance	Estimation travel time of figther jets
1	Sipadan	602 km	15 – 38 minute
2	RMAF Air Support Operation Center	688 km	16,5 – 43,5 minute
3	RMAF Labuan	712 km	17 – 45 minute
4	RMAF Kuching	759 km	18 – 48 minute

*With an estimated lowest speed of 950 km/h and a top of 2,500 km/h and the flight motion is a direct straight flight from point A to point B

Submarine operations

Submarine operation is a type of naval operation in which submarines are used to carry out a variety of tasks, including intelligence gathering, reconnaissance, surveillance, and combat operations. Submarines are highly capable and stealthy vessels that can operate underwater for extended periods of time, making them a valuable asset for naval operations.

Submarines are equipped with advanced technologies such as sonar systems, torpedoes, and missiles, which allow them to detect and engage surface ships, other submarines, and land targets. They can also be used to insert special operations forces into enemy territory, gather intelligence, and conduct covert operations.

One of the most important roles of submarines is to protect naval fleets and strategic assets by detecting and deterring enemy submarines and surface ships. Submarines can also be used to launch missiles at land targets or conduct precision strikes against enemy vessels.

Submarine operations require specialized training, equipment, and tactics. Submarine crews must be highly skilled in a variety of areas, including navigation, propulsion systems, weapons systems, and communication systems. They must also be physically and mentally prepared to operate in confined spaces for extended periods of time, often under highly stressful conditions.

Modern submarines are highly advanced vessels that incorporate the latest technologies in propulsion, navigation, and weapons systems. They are capable of operating at great depths and speeds, and can remain underwater for weeks or even months at a time.

Submarine operations are an important element of modern naval strategy, and are likely to continue to play a key role in future conflicts. As such, they require ongoing investment in research and development to maintain the technological edge necessary to compete in the increasingly complex and competitive global security environment.

Submarine operations have a long history, dating back to the early 20th century. During World War I and II, submarines were used extensively by the German and Japanese navies to attack allied shipping and disrupt naval operations. Since then, submarines have become a key element of naval strategy for many countries, including the United States, Russia, China, and the United Kingdom.

One of the key advantages of submarines is their stealth and ability to remain undetected underwater. This makes them an ideal platform for intelligence gathering, reconnaissance, and covert operations. Submarines can also be used to launch surprise attacks on enemy vessels or conduct naval blockades to disrupt shipping and trade.

Submarine operations also require specialized logistics and support systems, including submarine bases, maintenance facilities, and supply chains. These support systems must be carefully planned and maintained to ensure that submarines can operate effectively over long periods of time.

Despite their advantages, submarine operations also present significant risks and challenges. Submarines are highly complex vessels that require extensive training and maintenance to operate safely and effectively. They also pose significant risks to their crews, who must be prepared to operate in confined spaces under highly stressful and dangerous conditions. Overall, submarine operations represent a critical element of modern naval strategy, offering a versatile and highly effective means of projecting force, gathering intelligence, and conducting covert operations. As such, they are likely to continue to play a key role in future conflicts.

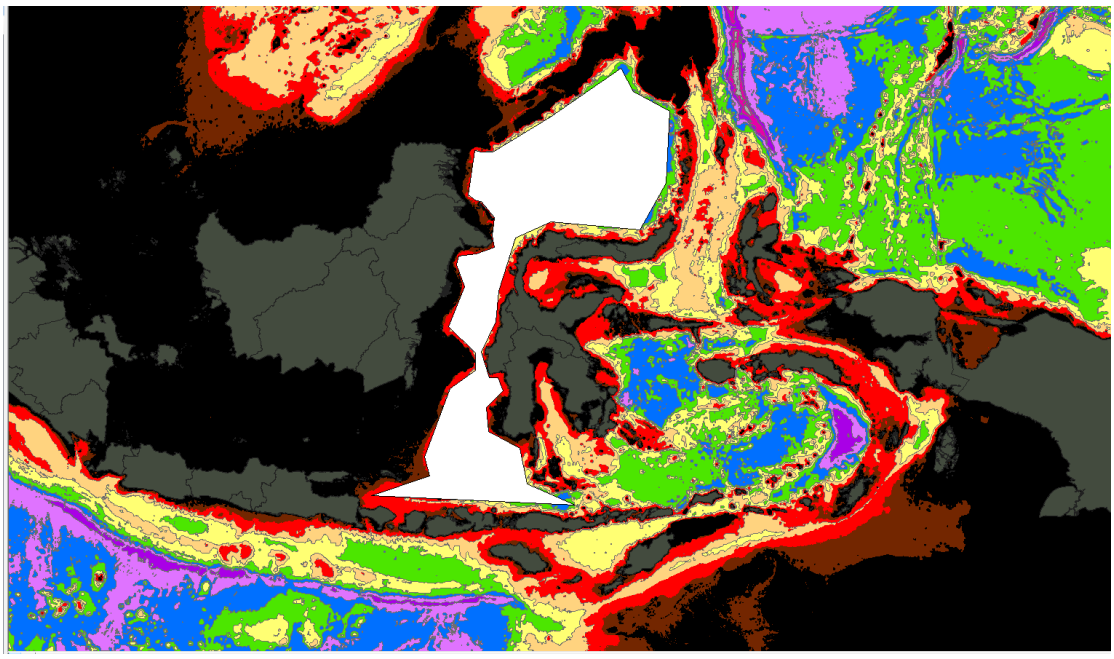

Fig. 2. Potential Submarine Operation Coverage

In the figure above, the white color is the coverage area that can be used in the submarine operation based on the batimetri map and the ability of a submarine that can be diving to the depth of 300 m.

- Beach landing operations

A beach landing operation is a military maneuver in which troops and equipment are landed on a hostile beach from sea-based vessels, such as amphibious assault ships or landing craft. The objective of a beach landing operation is to establish a foothold on the beach and quickly secure the area, allowing for the safe and efficient disembarkation of troops and equipment.

The success of a beach landing operation depends on a number of factors, including the selection of an appropriate landing site, the effectiveness of naval and air support, and the ability of ground forces to quickly secure the beach and establish a beachhead. Troops and equipment must be unloaded quickly and efficiently, and defensive positions must be established to protect the landing force from enemy counterattacks.

Beach landing operations have been used in a number of major conflicts throughout history, including the D-Day landings of World War II, the Korean War, and the Gulf War. They remain an important element of modern military strategy, offering a flexible and effective means of projecting force and securing strategic objectives.

However, beach landing operations are also highly complex and risky maneuvers, and require extensive planning, training, and coordination between different branches of the military. They can also be highly vulnerable to enemy defenses, such as coastal fortifications or mines, and require careful reconnaissance and intelligence gathering to ensure a successful outcome.

Beach landing operations are typically conducted as part of a larger amphibious assault, in which a naval task force is used to transport troops and equipment to a hostile shore. Amphibious assaults can be used to seize and secure key objectives, such as ports, airfields, or strategic coastal areas, or to support larger military operations by establishing a base of operations close to the enemy.

In addition to the challenges of securing the beachhead, beach landing operations can also be complicated by a variety of environmental factors, such as weather, tides, and surf conditions. These factors can impact the timing and success of the operation, and require careful planning and coordination to minimize risks and ensure a successful outcome.

One key advantage of beach landing operations is their ability to quickly deploy large numbers of troops and equipment to a hostile shore, allowing for the rapid projection of force and the establishment of a strong defensive position. However, they also require significant logistical support, including supply lines and transportation, to sustain operations over extended periods of time.

Overall, beach landing operations remain an important element of modern military strategy, offering a versatile and effective means of projecting force and securing key objectives in a wide range of scenarios. However, they also present significant risks and challenges, and require careful planning, coordination, and training to ensure a successful outcome.

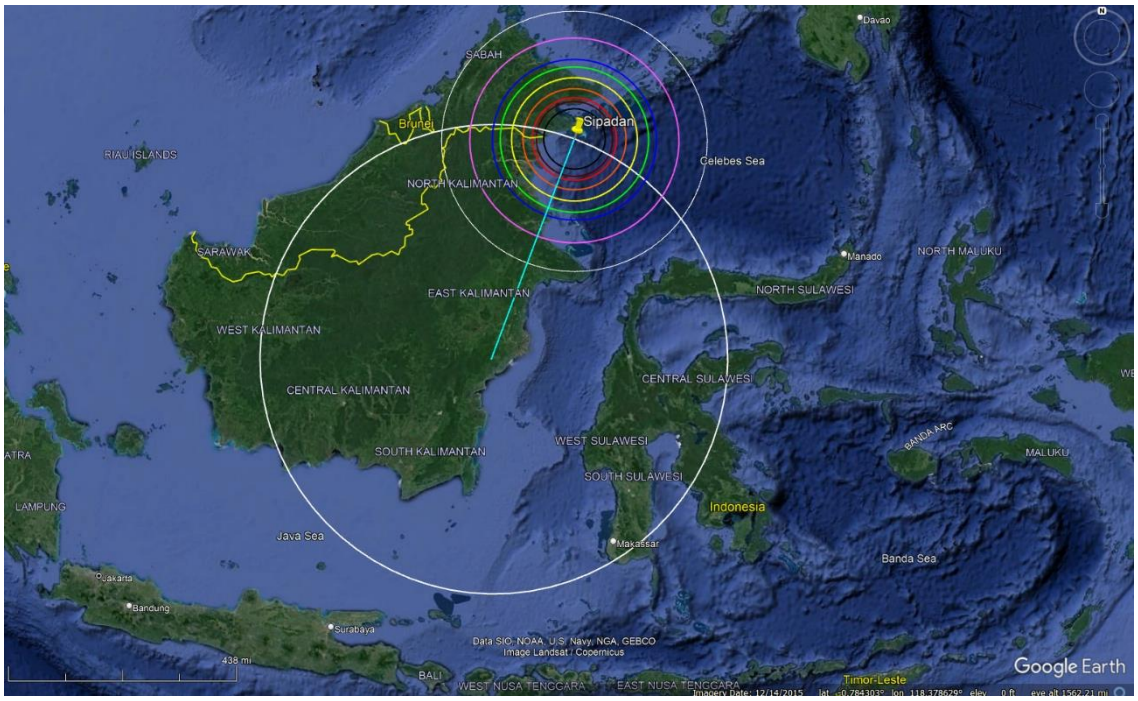

Fig. 3. Potential Beach Landing Operation

In the figure above, it is an a radius of potential threats from sipadan to IKN Nusantara through beach landing operation. Those radius is a image of area operation that might be used in the operation. The operation might be landed in these following location

No	Circle Color	Distance Radius	Area Radius ($A=\pi r^2$)	Circumference Radius ($c=2\pi r$)	Location
1	Black	78,9409 km	19.577 km^2	496 km	Pulau sebatik
2	Brown	97,7211 km	30.000 km^2	614 km	Pulau nunukan
3	Red	107,907 km	36.580 km^2	678 km	Pulau bunyu
4	Orange	132,2578 km	54.953 km^2	831 km	Pulau tarakan
5	Yellow	161,224 km	81.660 km^2	1013 km	Salimbatu/ Tanjung Selor
6	Green	190,19 km	113.638 km^2	1.195 km	Tanahkuning
7	Blue	210,403 km	139.076 km^2	1322 km	Tandjoengbatoe
8	Pink	268,4944 km	226.475 km^2	1687 km	Amasangkar
9	Purple	341,5465 km	366.479 km^2	2146 km	Talok

CONCLUSION

The feud between China and the United States in the Indo-Pacific region, especially the South China Sea has the potential to disrupt regional stability and security. Maritime security related to undisturbed shipping traffic and communications is an effort that the United States is guarding. China's presence in the South China Sea area threatens the interests of the United States regarding sea traffic which will have an impact on the global economy and its country if no action is taken. Countries in Southeast Asia see this problem as something that must be resolved. The presence of AOIP is expected to be able to help resolve existing problems

regarding actions that are carried out individually by ASEAN member countries. The difference in these views was seen before the formation of the AOIP which is known from the divisions between ASEAN members who support China and the United States. The existence of AOIP is expected to be central in solving problems in the Indo-Pacific region that can maintain maritime security stability in the area. Looking at the results of the research that has been done, further studies are still needed regarding the role of each country regarding the Indo-Pacific. An understanding of the role of the state in viewing the Indo-Pacific will be a complement to studies related to the topic. The study that has been carried out is expected to be a consideration for stakeholders in solving problems that occur in the Indo-Pacific region

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