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Revitalization Concept Of Automatic Position Monitoring Information System (SIPPO) On Vessels Security Operations On The Indonesia-Malaysia Border

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Abstract: Indonesia has sea borders with 10 countries, of which one that is still in dispute is the waters of the Ambalat Block. The Indonesia-Malaysia border security operation is one of the operations carried out by the Naval Base. The vast waters of the Ambalat block require an integrated monitoring system between the Navy Ship and the nearest base/station. Therefore, it is necessary to revitalize the use of SIPPO for Naval Ship elements in sea operations. This underlies the researcher to carry out research with the formulation of the problem "How to revitalize the use of automatic position coastal information system technology of Naval Ship elements to support Indonesia-Malaysia border security operations." This research was conducted to be able to explore more deeply things that are not yet widely known and analyze Navy regulations as guidelines for the reuse of SIPPO and regulations for the use of SIPPO equipment on Navy Ships and the advantages of using SIPPO in carrying out Indonesia-Malaysia border security operations. Data collection was obtained from direct interviews with sources and means of remote communication with informants who were divided into regulators, operators, and observers. The data obtained was then processed using Nvivo 12 software and then analyzed using Soft System Methodology (SSM). The results showed that the creation of a new Navy regulation as a guideline for the reuse of SIPPO in sea operations is needed to revitalize the device and in the regulation, there must be sanctions given to Navy Ship operators who do not activate the SIPPO device because this equipment has advantages as one of the tools that can integrate communication and monitoring between stations/bases on land and between fellow Navy ships so that it can help make decisions quickly, effectively and efficiently.

Keywords: Regional Border, Revitalisation, SIPPO, NVivo 12, (Soft System Methodology) SSM.

1. INTRODUCTION

Indonesia is the largest archipelago in the world with a coastline length of more than 108,000 km consisting of 17,504 islands and a sea area of approximately 6.4 million km^2, which means that 2/3 of Indonesia's territory is oceanic. The Indonesian Sea itself has borders with 10 countries, namely: India, Thailand, Malaysia, Singapore, Vietnam, Philippines, Palau, Papua New Guinea (PNG), Timor Leste (RDTL), and Australia (Vanya, 2024). The implication of Indonesia's geographical location and constellation is that border areas become potential conflicts, including the sea border between Indonesia and Malaysia in the waters of the Ambalat Block (Djuyandi et al, 2023). After the release of Sipadan and Ligitan Islands, a series of problems, especially those related to the maritime boundary issues of the two countries, were associated with the large potential of oil and gas contained in the currently disputed area known as the Ambalat Block case (Djuyandi et al, 2024). Malaysia claims waters as far as 70 Nm from Sipadan Island and Ligitan Island. As a result of the difference in boundary determination by Malaysia, there are frequent boundary violations in the Ambalat Block, both by: Diraja Malaysia Navy

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(TLDM), Diraja Malaysia Air Force (TUDM), *Polis Marine* vessels and aircraft, Malaysian *Maritime* Empowerment Agency vessels and aircraft.

Border area security operations according to TNI Commander Regulation number: Perpang/173/XII/2011 concerning the manual for the implementation of border area security operations are all efforts and activities to ensure the sovereignty of state territory on land, sea, and air borders with other countries, from all forms of threats and violations, including survey and mapping activities (Emmerson, 2016). The goal is to maintain integrity and prevent and eliminate all forms of threats that may arise in the land, sea, and air border areas between the Republic of Indonesia and other countries (Huang, 2019). While the targets of the operation related to the sea border area are as follows:

a. Maintaining the integrity of the sea area at the Republic of Indonesia's borders with other countries.

b. The creation of security stability along the Republic of Indonesia's maritime borders with other countries.

c. Preventing all illegal activities and or utilisation for illegal activities of the sea border area between the Republic of Indonesia.

d. Implementation of law enforcement in the sea border area between the Republic of Indonesia and other countries.

Based on the above, the Naval Base is an operational command with the main task of carrying out power projection to carry out sea operations to support sea control and to achieve strategic goals in the context of upholding sovereignty and law at sea (Mustaqim et al, 2024). The following table is data on boundary violations committed by Malaysia, both by TLDM, TUDM, *Polis Marine*, and APPM in the Ambalat block. Until now, there are still boundary violations that occur in the Ambalat Block area so the Indonesia-Malaysia border security operations have become a special concern for the Naval Base in protecting the waters.

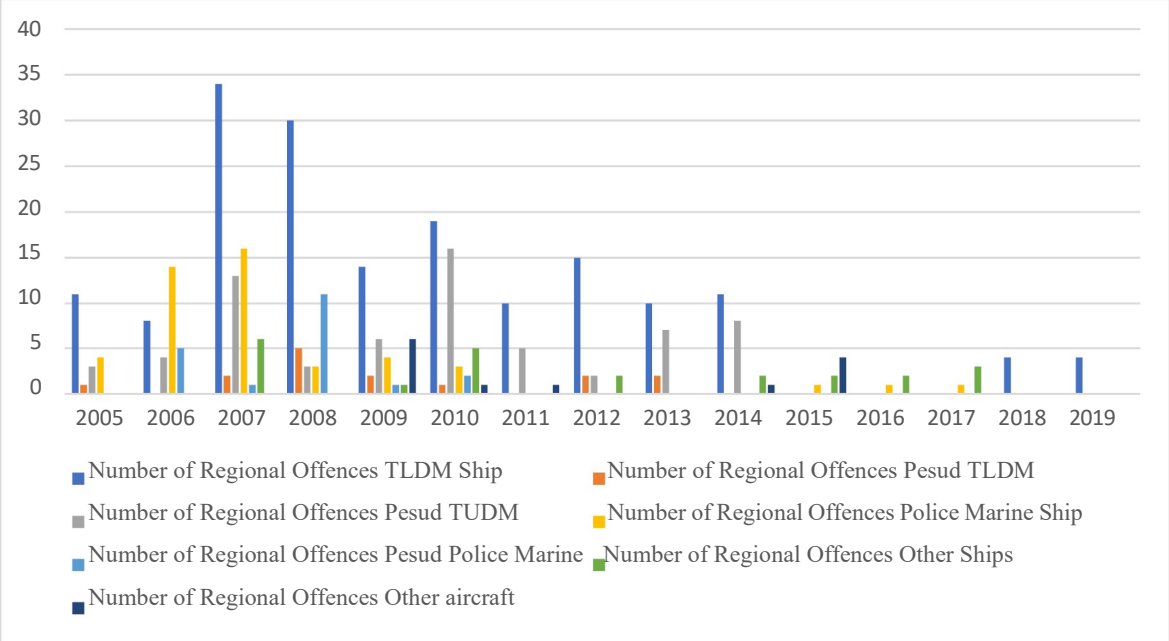

Figure 1: Number of vessel offenses

Source: Researcher's processed results, 2025

The Indonesia-Malaysia sea border security operation in the Ambalat Block area has been held for 15 years from

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2010 until the current year 2025 (Ningtias et al, 2018). The Ambalat Arc operation has played a significant role in suppressing violations of state sovereignty in the waters of the Ambalat Block (Lili et al, 2024). As an archipelagic country whose waters are much larger than land, the Navy must build *Maritime Domain Awareness*, which is defined as the knowledge of what is happening at sea in a water area that can have an impact on security, economy, and so on. The challenge in *Maritime Domain Awareness* (MDA) that must be considered is the effort.

To anticipate global threats that no country can do alone (Firdaus & Umar, 2022). MDA is a key component of active maritime defense that requires coordinated efforts across strategic, operational, and tactical levels, and technically requires automatic and continuous monitoring of Naval Ships patrolling the waters and can be reported as soon as possible so that due to the presence in the region (Partoga & Setiyono, 2020).

2. RESEARCH METHODS

The research used a qualitative methodology to analyze the benefits of using SIPPO with an exploratory approach to dig deeper into largely unknown things. Data sources in the form of primary data were obtained through interviews with informants following the research subject. Meanwhile, secondary data was obtained by literature study and other supporting documents and sites on the internet related to the research conducted. The data that has been collected is then processed using NVivo 12 software. NVivo 12 acts as a research tool for classifying various types of data, coding data, and visualizing data mapping. The results obtained are the achievement of data triangulation and visualization of relationships between data and informants (Saptono et al, 2021).

The analysis technique in this study uses the *Soft System Methodology* (SSM) method developed by Checkland & Scholes (1999). The use of SSM analysis techniques in this study is considered relevant because SSM has also been applied in defense and security studies since its early development by Peter Chekland. In SSM, there are seven stages of data analysis, namely problem identification, expressing the problem with a *rich picture*, formulating the *root definition* by doing *system thinking*, system modeling, comparing the analysis results with the situation in the field, core analysis, and problem-solving recommendations.

3. RESULTS

3.1. Data Analysis Using *Soft System Methodology*.

The first stage is to determine the problem that has been done in the introduction. The second stage is the stage of pouring a complex problem situation that was previously carried out with three forms of analysis, namely Intervention, Social and Political Analysis, and then presented with a picture called a *rich picture*. The *rich picture* presents the views of stakeholders on their main roles and concerns related to research problems in the real-world process from the results of *coding* and triangulation with NVivo 12 software.

The Intervention Analysis aims to determine the parties that caused this study, namely: a) Clients (C), people who cause interventions related to problematic situations: researchers and supervisors 1 and 2, b) Practitioners (P), people doing research: Researchers, c) Owners (O), people who are affected by efforts to improve problematic situations: Naval Ships as well as the Ministry of Transportation and the Ministry of KKP. Social Analysis consists of three elements, namely roles, norms, and values. The categories created based on roles in the context of this research are operators, regulators, and observers. In this role element, it is known that the General Staff of Naval Operations and the Office of Communication and Electronics are the regulator group. Naval Base, Naval Base Operations Staff. Meanwhile, as an observer group, the Ministry of Transportation and the Ministry of KKP. Related to norms, the regulator and operator groups are under the command rate in the implementation of daily operations and activities

Political Analysis There is a discussion of *the disposition of power* and *the nature of power* discussed from each institution related to the research from the group of regulators, operators, and observers in this study. *Disposition of power* in this article is an organizational structure that is made hierarchically from each institution that has a role in carrying out orders

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in border security operations. *The nature of power* referred to in this study is a naturally formed condition with a *power* structure in the situation and the process that controls it. The *nature of power* between regulators and operators is a hierarchy that is a military chain of command based on position and rank.

3.2. Interpretation of Research Results

The results of research through interviews with the *owners* found several findings in the form of statements, and opinions that emerged. The General Staff of Naval Operations stated that SIPPO is indispensable and the regulations can be poured into the decision of the chief of staff which regulates the mechanism of use, procurement, and readiness in ensuring confidentiality so that it needs to be updated and adjusted to the strategic environment of threats and technological developments and the level of compliance of lower units to apply in the field in carrying out operations. The same opinion as the Director of Navigation of the Directorate General of Sea Connection, the Ministry of Transportation has issued a Regulation of the Minister of Transportation PM Number 7 of 2019 concerning the Installation and Activation of Automatic Identification Systems (AIS) for Ships Sailing in Indonesian Waters and has been enforced on 20 August 2019 which requires all ships sailing in Indonesian waters to install and activate AIS. This is in line with the statement from the Head of the PSDKP I who stated that by requiring the installation of VMS on fishing vessels, all ship positions can be monitored because the transmitter installed on the ship because it transmits ship position data to the satellite, processed at the Processing Center, then submitted to the Fisheries Vessel Monitoring Centre (FMC), Director General of PSDKP.

4. DISCUSSION

4.1. System Thinking Revitalisation of regulations on the use of SIPPO technology for Naval Base Ship elements to support Indonesia-Malaysia border security operations.

By SSM theory, the *root definition* discussion related to the revitalization of SIPPO reuse regulations using the PQR formula is to answer the *What*, *Why*, and *How* questions. While the PQR formula in question is as follows:

"*Do* P, *by* Q, to achieve R"

Establishing Regulations on the use of SIPPO (P), by making a kasal regulation (Q) to get the ideal regulation for the reuse of SIPPO Furthermore, the *root definition* that has been formulated will be tested and refined with the *Customers*, *Actors*, *Transformation*, *Worldview*, *Owners*, *Environment* (CATWOE) analysis.

Identification with CATWOE analysis is the basis for the preparation of the conceptual model that will be made later. Furthermore, the results of the CATWOE will be further analysed with the 3E criteria (*Efficacy*, *Efficiency* and *Effectiveness*) to measure the performance of the activity system.

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Table 1. Root Definition - CATWOE and 3E Analysis

RD 1	Establish Regulations on the use of SIPPO (P), by making a kasal regulation (Q) to get the ideal regulation for the reuse of SIPPO.
CATWOE ANALYSIS	
C *(Customer)*	Naval Base Commander, Naval Headquarters, Naval Base Sops, Naval Base, Fleet II Naval Base, Naval Ship Commander.
A *(Actor)*	Headquarters Operation Staff and Department of Communication and Electronics
T *(Transformation)*	Providing an understanding of the use of SIPPO on Navy Ships is a necessity and must so that it can be adhered to by all Navy Ships on duty in operations.
W *(Worldview)*	The making of the Chief of Naval regulations will create a clear provision or legal basis for the reuse of SIPPO in sea operations carried out by Naval Ships.
O *(Owners)*	Operation Staff and Department of Communication and Electronics
E *(Environment)*	The making of the Regulations of the Chief of Staff will take time to make and also the stipulation requires a process.

CRITERIA 3E	
Efficacy	SIPPO is one of the Naval Ship monitoring tools that can be used to obtain information and data in *real-time* and *up to date* faced with the situation of the development of the strategic environment of Indonesian waters whose dynamics can change at any time so that SIPPO is needed by leaders in developing tactics and strategies if we know of threats and violations of territory.
Efficiency	Optimizing the Chief of Staff's regulation on SIPPO, the reuse of SIPPO will directly utilize all existing Naval Ships, Vessels, and Bases.
Effectiveness	With the enactment of the Navy Chief Rule on SIPPO, decision making by the leadership will be easier to implement because it can monitor in *real time* all Naval Ships operating in Indonesian territory.

Source: Processed results of researchers, 2025

4.2. Conceptual Model Revitalisation of regulations on the use of SIPPO technology for Naval Ships and Naval Bases to support Indonesia-Malaysia border security operations

The next stage of SSM is to form a conceptual model (the fourth of the seven stages of SSM) by connecting all the activities that will be carried out in order to perform the T process (in the CATWOE analysis table), so that it becomes a complete system. This step combines all the steps in the third stage or *root definition* in problem-solving.

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Table 2. Conceptual and Activity Models

RD-1	Activities	Activity Description
Establish a regulation of the Chief of Staff on the use of SIPPO (P), through the preparation until the ratification of the Chief of Staff regulation (Q) to support the Indonesia-Malaysia border security operations.	Activity 1	Carry out planning for the formation of the working group team, place and time of activity implementation
	Activity 2	Form a working group in planning, studying and analysing regulations that will be made by considering the direction and policies of the leadership related to these regulations.
	Activity 3	Formulate terms of reference as a temporary draft of the regulation to be made.
	Activity 4	Discussing and conducting discussions by inviting several resource persons to get suggestions and input to improve the
	Activity 5	Carry out a script test attended by speakers and responders as corrections and suggestions
	Activity 6	Refinement of the script after the script test by making a draft of the interim script to be submitted to the leader
	Activity 7	Carry out the ratification and issuance of the text of the regulation of the chief of staff and distribute the text in accordance with the distribution list made.
	Activity 8	Carry out improvements to manuscripts that have been published by regulators if there are things that are deemed necessary to be evaluated through a feedback mechanism.

4.3. Comparison of Conceptual Model with Reality.

The next stage (the fifth of the seven stages of SSM), is the comparison of the conceptual model with the reality found in the *real world*, namely, the findings in the field during data collection, which is carried out to find a *comparison of models and the real world*. The fifth stage of SSM is the comparison of conceptual models with real-world reality (the results of research in the field during data collection). The results of the data obtained will be the formulation of action steps for improvements that can be recommended as a solution to existing problems in the field. The researcher then determines

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questions to review the real-world problematic situation based on the activity system in the conceptual model. The questions are formed based on the logical thinking of the researcher as an SSM practitioner.

Table 3. Comparison of Conceptual Models

No.	Activities	How do the activities in the conceptual model happen in the real world? (Implementation)	Who organized the activity? (Executor)	How can the processes in the conceptual model be *sustainable*? (Follow-up Plan)
1.	Carry out planning for the formation of a working group team (Pokja), place and time of activity implementation	Carry out planning to organize the working group, time, and venue.	Operation Staff and Department of Communication and Electronics	The activities carried out are the initial stages of planning the creation of a
2.	Form a working group (Pokja) to plan, study, and analyze regulations that will be made by considering the direction and policies of the	Carry out the preparation of the number of personnel who will discuss the regulations to be made in accordance with their fields.	Operation Staff and Department of Communication and Electronics	Carried out the preparation
	Leadership related to these regulations.			
3.	Formulate terms of reference as a temporary draft of the regulation to be made	Carry out the preparation of manuscript outlines by needs	Operation Staff and Department of Communication and Electronics	The activity carried out is the stage of formulating the points of the manuscript
4.	Discussing and conducting discussions by inviting several resource persons to get suggestions and input to improve the	Invite resource persons and experts in the field who can provide input, opinions and suggestions to the working team in formulating a study.	Operation Staff and Department of Communication and Electronics	This activity analyzed in detail each section of the manuscript.

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5.	Carry out a script test attended by speakers and responders as corrections and input suggestions	Invite a team of assessors, responders, and other resource persons as a stage of testing.	Operation Staff and Department of Communication and Electronics	Manuscript testing is carried out to obtain a product that is applicable and can be used as a
6.	Refinement of the manuscript after the test of the manuscript by making a temporary draft manuscript to be submitted to the chairman	The results of the script testing and getting input from respondents and resource persons following their fields, the regulations were compiled in the form of a script	Operation Staff and Department of Communication and Electronics	Created a temporary script that can be used as an initial guideline for using the equipment.
7.	Carry out the ratification and issuance of the text of the regulation of the chief of staff and distribution of the text by the distribution list made.	This activity has not been fully implemented because it is only a temporary script	Operation Staff and Department of Communication and Electronics	Need to propose a plan for the preparation/revision and approval of manuscripts with provisional status to become applicable and permanent procedures.
8.	Carry out improvements to manuscripts that have been published by regulators if there are things that are deemed necessary to be evaluated through a feedback mechanism.	This activity was advised to the Chief of Staff following the feedback mechanism.	Operation Staff and Department of Communication and Electronics	Carry out a plan to redraft /revitalize the regulation text by established procedures.

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4.3. Revitalisation of regulations on the use of SIPPO technology for Naval Base Ship elements to support Indonesia-Malaysia border security operations.

Communication is one of the most fundamental activities in humanity. The delivery of a message and information from one source to another will lead to a common meaning and goal to be achieved. Regarding the use of SIPPO which has been used by the Navy, it is a technological device that can monitor the position of Navy ships in *real-time* and can send data and information *up to date*. According to the theory of *Sea Power* according to A.T Mahan, *Sea Power* is not only about how the strength of the army in this case the navy but in a larger sense related to the control of international trade and economy through the sea, the maritime economy as an instrument of diplomacy, deterrence and political influence in peacetime and naval operations in times of war. In the book, there are six elements of "Sea Power" that are discussed about the use of SIPPO where there are two elements, namely geographical position and area. These two elements affect the degree of operations carried out by Coarmada II, in this case, the operation of securing the Indonesia-Malaysia sea border where the area has a lot of oil and natural gas content so that there is a unilateral claim from the Malaysian government stating that the area is part of their country's territory so that the government in this case the Navy alerted Navy ships in a sea operation in the waters of the Ambalat block to be able to control and monitor the area. SIPPO is a communication device that can integrate between Navy ships carrying out operations. Naval Base and Puskodal as the mouth of the flow of information and data collected, analyzed and presented to the leadership as material to decide a problem that occurs in the field. Following communication theory and system theory, this SIPPO is a device that is a unity of the two theories. Mulyadi explained that the system is a group of elements that are closely related to one another and function together to achieve goals in communicating each individual hopes that the purpose of communication itself can be achieved and to achieve it some elements must be.

Based on the results of the comparative analysis of the conceptual model on the advantages of using the SIPPO of the Naval Ship element of the Naval Base in controlling and monitoring the Naval Ship element carrying out border operations, it was found that the range of *real-world* and *system thinking (gap)* where the activity has not been carried out (research *gap*) by related instruments.

The implementation of operations carried out by the Navy in securing border areas involves elements incorporated into the Integrated Fleet Weapons System (SSAT). To ensure the security of the sea area, a system, and equipment capable of presenting information on ships operating in the Navy's NKapal area and information on Navy ships operating in the area is needed. Systems and equipment as a means of control and monitoring include Information Systems for element dislocation in real time, Information on ships operating, unknown ships *Illegal vessels)* and *mobile monitoring devices.*

In the implementation of an operation, a software tool is needed in the form of regulations governing applicable instructions containing procedures for conducting an operation. The use of SIPPO is regulated in the Temporary Manuscript Technical Manual for Operating Radio Frequency Data (RFD) Automatic Position Monitoring Information System (SIPPO) Navy General Publication. According to the theory of Legislation, it is stated that the theory of legislation is oriented towards clarity and clarity of meaning and understanding and is cognitive in nature. This theory emphasizes how to form legislative material that contains binding legal norms in written form because it is a written decision, laws, and regulations as legal rules where regulations are made by officials or office environments that have the authority to make regulations that apply and bind the public.[1] In the use of SIPPO, a technical manual is issued in the form of a temporary manuscript where the manuscript is issued because it is urgently needed as a reference in carrying out an activity but has not been formally prepared based on predetermined procedures.

The rulemaking is adjusted to the policy direction of the TNI Commander and the priority program of the Chief of Staff who wants the *interoperability of* operating systems with C4ISR.

technology, which is a defence system that utilizes information and communication technology as well as sensing equipment including radar and satellites because this system is needed in order to be effective and efficient in operational activities.

5. CONCLUSION

From the analysis of the discussion above, it can be concluded that the revitalization of the regulations on the use of SIPPO technology for Naval Ships and Naval Bases to support the Indonesia-Malaysia border security operations. Furthermore, the researcher recommends the following:

Firstly, in order to revitalise the use of SIPPO technology, the Naval Ship element of the Naval Base in the context of Indonesia-Malaysia border security operations requires an effort to re-submit regulations for the use of SIPPO on Naval Ships of the Naval Base and to support the program requires encouragement from the regulator, in this case Sopsal and Diskomlekal, which can plan to revitalise the use of SIPPO on all existing Naval Ships.

Secondly, there is a need for regulations governing the use of SIPPO on Navy Ships by requiring them to keep the device active because this has been regulated in regulations to be issued by Sopsal and there must be sanctions given to Navy Ships that deliberately disable the SIPPO equipment so that this equipment will remain on so that control and monitoring by the leadership will still be carried out following the development of the situation in border areas with other countries.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest regarding the research, authorship, and/or publication of this article.

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