



## USE OF TECHNOLOGY TO PREVENT ILLEGAL FISHING: A CASE STUDY PERSPECTIVE IN THE NATUNA SEA

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<https://doi.org/10.69812/ijsp.v1i1.45>

### Article Info



### Article History;

Received:

2024-08-16

Revised:

2024-08-22

Accepted:

2024-08-27

### Abstract:

This study discusses the role of technology in preventing illegal fishing (IUU fishing) in Indonesia's Natuna Sea. The Natuna Sea has a large marine area and is prone to violations such as illegal fishing, illegal vessels, and unauthorized exploration of natural resources. To protect Indonesia's sovereignty, security, and economic rights, the government needs effective technology to monitor fishing. Vessel Monitoring Systems are technologies used to monitor the activities of fishing vessels and detect violations. Other technologies used include Humanless Underwater Sensor Technology (HUST), remote sensing technology, and automatic identification system (AIS). These are also used to increase the effectiveness of surveillance. This paper focuses on the role of technology in preventing illegal fishing and provides solutions to improve fisheries monitoring in the Natuna Sea.

**Keyword:** *Vessel Monitoring System; Fishing Business; Protection; Development*



### INTRODUCTION

Indonesia is one of the largest archipelago countries in the world. Indonesia has very wide waters and a very wide sea area. In fact, Indonesia's maritime area exceeds Indonesia's total land area. The Exclusive Economic Zone is a route outside Indonesia's territorial waters and borders. Simply put, the Exclusive Economic Zone is Indonesia's third maritime boundary after the territorial boundary and continental shelf boundary. EEZ was announced on March 21 1980 by Minister of Foreign Affairs Mokhtar Kusmartmadja. An exclusive economic zone, or EEZ, is a territorial boundary set 200 miles from maritime bases, and a country has rights to all natural resources within it. In addition, the state has the right to implement and enforce all legal measures and has the freedom to navigate and fly over its territory.

Indonesia's exclusive economic zone provides freedom of navigation and international air traffic, as well as freedom to lay undersea cables and pipes, in accordance with applicable principles of international maritime law. Natuna Regency, is one of the districts in the Riau

Islands Province, Indonesia. Natuna is the northernmost archipelago in the Karimata Strait. To the north, Natuna borders Vietnam and Cambodia, to the south it borders South Sumatra and Jambi, to the west it borders Singapore, Malaysia, Riau and to the east it borders East Malaysia and West Kalimantan. The use of EEZ in the Indonesian EEZ region is regulated in Law Number 5 of 1985 concerning Exclusive Economic Zones. Articles 5 to 8 regulate exploration, exploitation and conservation of natural resources in the Indonesian EEZ region. Parties who wish to utilize natural resources in the Indonesian EEZ region must obtain permission from the Indonesian Government. However, most of these resources have not been maintained and have not been utilized optimally. This region is also prone to various violations, such as illegal fishing (IUU fishing), illegal shipping, and exploration of natural resources without permits. Law enforcement in the Natuna EEZ is important to maintain Indonesia's sovereignty, security and economic rights.

The most common IUUF activity in this area is illegal fishing. Illegal fishing will continue to occur in the Natuna Lake area until 2023. Based on AIS data received by the Indonesia Maritime Justice Initiative in February 2022, there are at least 12 Vietnamese fishing vessels and 8 Chinese fishing vessels suspected of carrying out illegal fishing activities in WPP 711 Natuna Sea North. The emergence of several cases shows the Indonesian government's commitment to safeguarding sovereignty and natural resources in the EEZ region, raising several questions regarding the effectiveness of the EEZ law in the Natuna Sea.

One method that is very necessary for fisheries management is monitoring, control, and observation. A fishing vessel monitoring system (vessel monitoring system) is a form of monitoring system in the field of catching or transporting fish, using satellites and transmitter equipment placed on fishing vessels to facilitate supervision and monitoring of fishing vessel activities based on the position of the vessel being monitored in the fishing vessel. screen vessel monitoring system at the fishing vessel monitoring center. In general, the status of various fish stocks and the marine environment has created strong incentives for countries to implement VMS as a component of an overall checking, control and reconnaissance strategy. The emergence of innovative technology, especially those related to satellite-based VMS, has the potential to increase the effectiveness of checking, control, and observation systems through various useful information at relatively low costs compared to just relying on more traditional observing, control, and reconnaissance measures, such as enforcement law at sea manually. Vessel monitoring systems are used primarily for fisheries enforcement purposes, but also provide information on the spatial and global distribution of fishing activity for use in fisheries and environmental assessment and management.

nd research focus written in question form by following:

## RESEARCH METHOD

This research uses a qualitative descriptive approach. The nature of the investigation is normative, namely an investigation of the laws and regulations that apply to the case. In this research, the researcher plays an important role as the subject of data collection. While secondary data is as much data as data from library research, research documents, and data from other people's processing (Hadikusuma, 1995). Secondary data is taken from sources in the form of primary legal materials, secondary legal materials and tertiary legal materials (Soekanto, 2006). The data used as research results in this work are secondary data such as letters and numbers, available data, obtained from people other than researchers, and

disseminated through data sources such as libraries, media, literature. Therefore, this type of research is included in the category of library research.

## RESULT AND DISCUSSION

This section contains the data characteristic of subject/object/sample/ research respondent, data analysis result, testing instrument and hypothesis (if any), answer of research question, findings and findings interpretation. This section if possible, can be graphed for each research variable. Furthermore the descriptive statistic value was presented (Eg; Mean, SD, Maximum, Minimum) with its interpretation. In the end of this section showed the hypothesis research result and its discussion completely.

### Illegal Fishing: An Overview Conceptual

Illegal fishing, or arrest fish illegal, is activity arrest fish which violate law and regulation which applies in something water area. This practice includes a wide range of actions, starting from arrest fishing without a permit, use of prohibited fishing gear (such as trawls or bombs fish), fishing in prohibited zones or during prohibited seasons, up to violation quota catch which has set. Illegal fishing not only harm in a way economy because reduce potency income country and detrimental to local fishermen who depend on fisheries resources, but also threaten continuity source power fishery and ecosystem sea in a way whole. Overfishing consequence illegal fishing can cause decline population fish, damage habitat sea, and disturbance on the chain food.

### Technology in Supervision Fishery: Framework Theory

Technological developments have opened up new opportunities in efforts to overcome illegal fishing. Various technologies such as Vessel Monitoring System (VMS), radar, Automatic Identification Systems (AIS), technology sensing far (remote sensing), and artificial intelligence have been used effectively for monitor activity boat catcher fish, identify activity suspicious, and gather proof violation.

### Vessels Monitoring Systems (VMS)

Illegal fishing is one of the problems faced by many countries in the world, including Indonesia. Illegal fishing give rise to lots loss, good from facet economy, environment, and social. Government Indonesia through Ministry Marine And Fishery (KKP) has make various efforts to overcome the problem of illegal fishing. Wrong the only one supported by device advanced technology which known with Vessels Monitoring Systems "VMS" or System Supervision Boat Catcher Fish (SPKP).

VMS is system tracking based satellite which possible monitoring the position, speed and direction of ship movement in real-time. VMS data can used for ensure boat operate in accordance permission which given, detect activity arrest fish in zone forbidden or on time which forbidden, and identify pattern behavior which no in accordance with practice arrest fish which responsible answer. Use VMS Also is a form of Indonesia's commitment to comply with international, regional and international regulations national regulations regarding fisheries conservation and management sustainable. Since 2003, VMS was implemented by installing transmitter on sized fishing vessels more than 30 GT. VMS not only monitors the movement of fishing vessels, but also ensure compliance with the provisions applicable.

By because that, based on Regulation Minister Marine And Fishery Number 42/PERMEN-KP/2015 concerning Fishing Vessel Monitoring System, fishing vessels measuring over 30 GT operating in the territory of the Unitary State The Republic of Indonesia must operate in the National Fisheries Management Area (WPPNRI), transmitter VMS must installed in sea free. Implementation very important for help reach continuity source power fishery and ensure that these resources can be used sustainably for interest public local.

Although Vessels Monitoring Systems (VMS) own benefit in supervision activity fishery, there is a number of weakness which need noticed, between others: Information Limitations: Information generated by VMS Possible own limitations in scope activity boat. A number of activity boat Possible No covered fully in information which accepted, so that the analysis carried out may be incomplete, Vulnerability to Manipulation: Although VMS designed for monitor ship movement accurate, the system remains vulnerable to manipulation. It is possible that the owner boat or administrator can try for trick system with method turn off or manipulate transmitter VMS.

### **Humanless Underwater Sensors Technology (HUST)**

Technology sensors lower water without crewman or which normal known as Humanless Underwater Sensors Technology (HUST) is technology which monitor underwater environments without direct human presence. Sensorship placed underwater are used to collect data about conditions environment like temperature, pressure, acidity (pH), existence material chemistry dangerous, as well as the presence and behavior of organisms. HUST allows access to underwater areas that are difficult for humans to reach, such as the deep sea, remote locations, and dangerous environments. HUST can also reduce survey costs and time underwater environment compared to traditional methods that use human or ship diving. Therefore, HUST is expected to become means for install sensors detection (network seismic) in body water and increase accuracy system detection which there is. HUST Work with various mechanism sensing. Among them is sensors seismic which detect vibrations on the sea floor, metal sensors that detect approaching ships, and sensors ID which detect ID which has own permission arrest fish in region border.

### **Technology Sensing Far (Remote Sensing)**

Remote sensing technologies, such as satellite imagery and radar, can be used to monitor fishing activities over a wide area. Satellite imagery can detect existence boat in sea, even ships small which no be equipped VMS. Meanwhile, radar can be used to detect ships at night or in bad weather conditions. Analysis of satellite imagery and radar data can help identify boat which no registered in VMS, identify use of prohibited fishing gear (for example, through wave pattern analysis or temperature surface sea), and monitor condition environment sea.

### **Automatic Identifications System (AIS)**

AIS is an automatic identification system that transmits information about vessel identity, position, speed and destination via VHF radio signals. AIS data can be used to complete VMS and remote sensing data, as well as for track ship movements in more detail. AIS is a transceiver device which operate on frequency maritime in accordance regulations International Maritime Organization (IMO). AIS operates on two dedicated frequency channels or VHF, that is: 161,975 MHz - Channel 87B (simple, For delivery to the ship) And 162,025 MHz - Channel 88B (duplex, for delivery to land).

Device This transceiver automatically sends AIS messages. By sailing to everything directions in the vicinity of vessels equipped with AIS transmitters/receivers, past situations cross in surroundings can understood like Which is displayed on map navigation electronic which displays system information "ECDIS" or Chart Navigation System Electronics (SENC) or Electronic Navigation Chart (ENC). AIS transceivers ships, land transport monitoring equipment and "VTS" ship tracking systems possible monitor then cross boat in in areas supervision and provide instructions and advice in dangerous situations. When the ship is outside AIS base station range, information transmitted by the AIS transceiver received by the AIS receiving satellite device and sent back to the VTS, so that allows constant monitoring of the ship's position. By implementing the system AIS, can arrange Then cross boat And reduce navigation hazards.

### **Intelligence Artificial (Artificial Intelligence)**

Intelligence artificial can used For analyze data VMS, sensing Far, And AIS in a way automatic. Algorithm AI can trained For recognize suspicious patterns of vessel behavior, such as changes in speed or sudden direction, movement in restricted zones, or falsification of AIS data. AI too can be used to analyze satellite imagery and radar data for detection the anomaly Possible indicates its existence activity illegal fishing. With thus, AI can help fishery monitoring authorities to identify potency violation in a way more fast And efficient.

### **Studies Case Sea Natuna: Context and Challenges**

Waters sea Indonesia which wide contain lots source power fishery. A wealth of sources fisheries power in Indonesian waters clear interesting attention of foreign parties, who may also exploit it illegally through illegal fishing activities. This illegal fishing activity is carried out by foreign fishermen from neighboring countries who enter illegally into Indonesian waters. Through various approach, fisherman foreign capable catch fish in waters Indonesia and sell it to outside Indonesia for get profit which significant. Illegal fishing not only endangers fisheries resources sea Indonesia, but also reducing productivity and fish catches significantly, thereby causing harm to state finances. Foreign fishermen often enter into Indonesian waters come from countries such as Thailand, Vietnam, the Philippines, and Malaysia. Sea Natuna, Sea Sulawesi North, Sea Maluku, And sea Arafura is region which most affected by the activity illegal fishing.

Natuna Sea, which is located on the border between Indonesia, Malaysia, and Vietnamese, have wealth source power fishery which overflow. However, This wealth also makes it vulnerable to illegal fishing. The size of the area sea, limitations source power supervision, and complexity problem transnational becomes a challenge alone in the effort tackle illegal fishing in the Natuna Sea. Another challenge is overlapping claims over the sea area Natuna by a number of country.

This can make it difficult to enforce laws against foreign ships which do illegal fishing in the region the. Besides that, practice illegal fishing often involves organized criminal networks that have sources power and technology advanced for avoid detection and arrest. This meaning, illegal fishing activities that occur in Indonesian Natuna waters, which carried out by foreign fishermen, can be interpreted as a traffic crime state (transnational crime) because its activities and networks are cross-border; the actors involved and their various activities transcend national borders. Activity illegal which nature cross limit this become problem Serious for Indonesia.

## Conceptual Framework

This study uses a conceptual framework that integrates the concepts of illegal fishing, fisheries monitoring techniques and the Natuna Sea case study. The objectives of this study are to analyze the role of technology in combating illegal fishing in the Natuna Sea, identify factors that influence the effectiveness of technology use, and provide policy recommendations to improve fisheries monitoring in the region.

## CONCLUSION

Based on analysis which has done in study this, can concluded that the use of fisheries monitoring technology has a role which is significant in efforts to prevent and overcome illegal fishing in the Natuna Sea. Technologies such as VMS, sensing Far, AIS, and intelligence proven artificial effective in enhancing the authority's ability to monitor vessel activities fishing, identifying suspicious activity, and collecting evidence violation.

However, the effectiveness of implementing this technology cannot be separated from various factors supporter. Resource capacity people, inter-agency coordination, framework strong laws, and political support are important factors that must be noticed For ensure success utilization technology in supervision fishery.

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