

DESIGN OF FISHING SHIP MONITORING INFORMATION SYSTEM CASE STUDY IN THE MARINE AND FISHERY RESOURCES SUPERVISION UNIT

Muhammad Reza Romahdoni*

Diniyyah Institute of Technology and Business Lampung, Jl. Raya Negeri Sakti KM 16 Gedong Tataan, Pesawaran 35366, INDONESIA

Mezan el-Khaeri Kesuma

UIN Raden Intan Lampung, Jl. Endro Suratmin, Sukarame, Kec. Sukarame, Bandar Lampung 35131, INDONESIA

Muhammad Yusril

Mahesa

UIN Raden Intan Lampung, Jl. Endro Suratmin, Sukarame, Kec. Sukarame, Bandar Lampung 35131, INDONESIA

Dadang Hartabela

The University of Kitakyushu, 4-2-1 Kitagata, Kokura Minami-ku, Kitakyushu, Fukuoka, JAPAN

Article Info

Article history:

Received: Jan 6th, 2022

Revised: Feb 10th, 2022

Accepted: March 25th, 2022

Keywords:

Fishing,
Information Systems,
Monitoring,
SMS Gateway

To cite this article :

Abstract

The Marine and Fishery Resources Supervision Work Unit (SATKER PSDKP) Lempasing Bandar Lampung is a Unit or Work Unit under the Jakarta Marine and Fishery Resources Supervision Base which is indirectly mandated by Law Number 45 of 2009 concerning amendments to Law number 31 of 2004 on fisheries. The web-based fishing boat monitoring application makes it easy for admins to find out the position of fishing boats and can send SMS Gateway messages to fishermen. Where the admin can detect the location of fishing boats by utilizing the android device used by fishermen and Google Maps Fire. This web-based monitoring is built using PHP, MySQL, GAMMU and bootstrap while the development method is Structured System Analysis and Design (SSAD). This monitoring will provide convenience for the Admin and the captain in detecting the location of the ship and the destination of the ship in looking for fish at sea.

INTRODUCTION

The Lempasing Marine and Fishery Resources Supervision Work Unit (SATKER PSDKP) which is a Unit or Work Unit under the Jakarta Marine and Fishery Resources Supervision Base is an indirect mandate from Law Number 45 of 2009 concerning amendments to Law number 31 2004 concerning fisheries, where responsible and sustainable management of fisheries resources is an observation that must be implemented. The presence and implementation of the Lempasing PSDKP SATKER are also based on the Decree of the Minister for Empowerment of State Apparatus No. 2712/M.PAN/12/2005 dated December 30, 2005, as well as the Minister of Marine Affairs and Fisheries Regulation No. 04/MEN/2006 concerning the Organization of

UPT Work Procedures in the Supervision of Marine and Fishery Resources which includes 58 Satker.

Then to strengthen the Main Tasks of the Satker in 2008 it was confirmed by the Decree of the Director General of P2SDKP No. Kep.12/DJ-P2SDKP/ and renewed in 2009 with the Decree of the General Director of P2SDKP Number KEP.070/DJ-P2SDKP/IV/2009 with the stipulation of Fisheries Supervisors at the UPT, Satker and SDKP Supervision Post so that the composition of personnel is expected to facilitate performance Field Work Unit. In the process of monitoring (monitoring) fishing vessels, the Lempasing PSDKP SATKER does not yet have a system that can monitor the presence of fishing vessels and the allocation of fishing areas, making it difficult for the

• Corresponding author:

Muhammad Reza Romahdoni, Software Engineering Study Program, Institut Teknologi dan Bisnis Diniyyah Lampung, Jl. Raya Negeri Sakti KM 16 Gedong Tataan Pesawaran, INDONESIA. ✉reza@instidla.ac.id

© 2022 The Author(s). **Open Access.** This article is under the CC BY SA license (<https://creativecommons.org/licenses/by-sa/4.0/>)

administrative and supervisory departments to search for departure history and the location of fishing boats, given the magnitude of the risks that will be faced when the ship searches for fish in the middle of the sea, such as natural disasters, physical damage to the ship or violations when searching for fish at sea.

1. Study-related

Based on previous studies conducted about system monitoring.

The study which conducted by :

1. Amiek Soemarmi, Erlyn Indarti, Pujiyono, Muhamad Azhar, Dian Wijayanto with the title " *Vessel Monitoring System (Vms) Technology*

As a Strategy for the Protection and Development of the Fishery Industry in Indonesia1 " explained this research aims to determine the use of Vessel Monitoring System (VMS) technology as a strategy for the protection and development of the fishing industry in Indonesia. Fisheries businesses in Indonesia are still facing various problems, including the existence of illegal fishing practices and weak supervision.

The approach method used in this study is a normative juridical approach. Reviewing legal norms in laws and regulations related to public information disclosure and policies to accelerate the development of the fishing industry as well as the impact of VMS implementation. The results of the study indicate that the use of VMS technology can create transparency in the management of marine resources throughout the world, to prevent the occurrence of criminal practices such as illegal fishing. If this is done, the Indonesian fishing industry will be free from crimes such as illegal fishing and the development of the fishing industry in Indonesia will be realized. [1].

2. Siti Monalisa, Ade Indra Sukma with the title " *Web-Based Ship Trip Monitoring Information System at Pt. Pelayaran Laut Seraya* " explained PT. Pelayaran Laut Seraya was founded in 1987 having its address at Jalan Diponegoro No. 18

Selatpanjang Village, Tebing Tinggi District, Meranti Islands Regency, Riau Province, PT. Pelayaran Laut Seraya has a branch office in the city of Pekanbaru which is located at Jalan Bintara No. 14G Kelurahan Kota Tinggi Kec.

Pekanbaru City. PT. Seraya Sea Shipping has various activities such as providing ship departure schedules, monitoring ship movements, and making ship document assets. The use of the current system requires a lot of paper as material for printing the files that have been entered, and with a long process, it also takes a lot of time which will make the work pile up, in this system it also makes searching for data from time to time increasingly difficult to find because there is currently a lot of data, and the data is stored sheet by sheet in Microsoft Excel.

The purpose of this research is to build a system regarding ship data and monitoring ship trips for PT. Pelayaran Laut Seraya. The system built is a system that can help PT. Pelayaran Laut Seraya carries out its business processes, such as monitoring ship travel data, inputting and processing ship data, making ship trip reports, and monitoring ship documents. The system design technique uses the Object Oriented Analysis Design (OOAD) and Tools Unified Modeling Language (UML) methods, the system testing technique uses the Blackbox method and the User Acceptance Test (UAT) the system development method uses the waterfall method which is a method with a sequential model. The result of this research is a web-based ship trip monitoring information system. [2].

3. SW Widyanto, M. Agus, S. Wisnugroho, and S. Asuhadi with the title " *Design of Marine Vessel Monitoring Technology Based on an Automatic Identification System for the Security of Fishermen in Wakatobi* " explained Just as people who inhabit coastal areas and small islands, some Wakatobi people have a livelihood as a traditional fisherman. Their fishing technique still uses small boats with minimal facilities such as hand lines, kite lines, and drift rods, resulting in a high number of fishermen accidents in the

middle of the sea.

The automatic identification system that is designed and will be made has the aim of monitoring the fishing vessel so that the handling of emergency conditions can be responded to quickly. This vessel monitoring system consists of two main parts, namely onshore devices installed on the shoreline, and mobile devices placed on each fishing vessel to be monitored. Both of these automatic identification systems work like Base Transceiver Station-mobile phones on mobile phone systems. The results in the form of a portable design that is user-friendly and equipped with distress devices are concluded to be able to contribute to the benefits for fishermen in terms of ease of operation and security of fishing activities. [3].

4. Aprililian. E. Chopsticks, Revols. D.Ch. Thoughts of Dan Francisco. PT Pangalila with the title " *The implementation of monitoring, controlling, surveillance of fish transporting vessels above 30 GT at the Bitung Ocean Fishery Port* " explained that the Directorate General of Marine and Fishery Resources Supervision through the Bitung Marine and Fishery Resources Supervision Base is tasked with ensuring the activities of fishing vessels departing and landing in Bitung. The Bitung Ocean Fishing Port is a base port following the laws and regulations in force in Indonesia. The research is more aimed at monitoring the compliance of fishing vessels and also against illegal activities that violate the applicable laws and regulations, as well as the application of sanctions against these vessels as a consequence of the violations committed.

This research was conducted based on the descriptive method. Sanctions for violations are carried out based on the applicable laws and regulations, namely the technical instructions for supervising the operation of fishing vessels no Kep.143/DJ.PSDKP/2012. The results showed that the percentage level of compliance with the rules was at high-level compliance (76%-100%), where the rules implemented were the suitability of the base port, the suitability

of ship documents, the number of days of operation and the suitability of the number of fish with storage capacity. The implementation of sanctions has been carried out on vessels that do not comply, and this has shown a good effect on fishers based at the Bitung Ocean Fishing Port. [4].

5. A Sumarudin, Bayu Rasukma Raga, Willy Permana Putra, Fachrul Pralienka Bani Muhamad, Agfianto Eko Putro with the title " *Application of Fishing Boat Tracking and Fish Spots based on Automatic Identification System* " explained about 63 thousand Indonesian fishermen in 2013, with various natural conditions less uncertain and the fish point for the fishing area is uncertain for small fishermen which are around 9.6 KM from the coast. This has an impact on the activities of small fishermen who only go out to sea one day (one-day fishing) and will find it difficult to find fish spots. In this study, we developed an application to help fishermen go to the sea and find fish points using fish point information based on data input from the application.

When fishermen are looking for fish in the sea, they generally have their habits to find out the point of the fish, but this often results in inaccuracies in finding the point of the fish. Fishermen also usually share information with other fishermen about where the fish are, the catch they get, and the weather at sea. Uncertain weather conditions are one of the factors when catching fish, this causes fishermen to fail to go to sea and eventually lose. Applications that are developed based on websites and mobiles act as clients. Data on boat position, boat speed, boat direction, boat tilt conditions, and boat id are obtained from the devices on the boat. The data is then sent to the broker gateway on the webserver.

This application requires a web service to handle tasks that cannot be handled by brokers directly, such as storing and changing data in the database. To be able to connect with applications, both websites and mobile, a web socket protocol is needed. The application has

been successfully implemented on fishermen and can assist fishermen in finding fish points and fishing boats can be monitored in the vessel management system on the mainland in the form of websites and mobile applications. [5].

- Ramos Somya with the title " *Real Time Vehicle Monitoring System Based on Android using CouchDB Technology at PT. Pura Barutama*" explained. Based on the research conducted, it was concluded to create a vehicle monitoring system that can be accessed by the production unit of PT. Pura directly is to create a vehicle monitoring system that is implemented into 2 Android-based mobile applications.

The first application is an application used by vehicle drivers for tracking and reporting purposes, while the second application is a monitoring and verification application used by administrators (in this case the unit representatives who are using PT. Pura transportation services [6].

- Rianto March Siringoringo with the title " *Design and Implementation of Monitoring of Motorized Vehicles Based on Gps And SMS*" explained that there have been many vehicle location determination systems, and the search system must also go through a long process so that finding information on the location of the object takes a long time.

- The system designed in this Final Project utilizes GPS (Global Positioning System) technology, Arduino Mega 2560, Wavecom GSM modem, HC-05 Bluetooth module, android smartphone, and Android applications that we can download for free in the AppStore. To start the vehicle, we must know the vehicle key code which can only be accessed via the user's smartphone. The android smartphone will send the vehicle key code to the Arduino Mega via the HC-05 Bluetooth connection so that the vehicle can be turned on. Every 15 minutes the tool will send the coordinates of the vehicle to the user's cellphone via SMS in the form of latitude and longitude coordinates. Then to track the position of the vehicle the user will

enter the coordinates of the vehicle in the form of latitude and longitude into the google map. At certain times if the user wants to know the position of the vehicle, the user can request the position by sending an SMS to the sim card number on the Wavecom modem [7].

1.1 System Development Life Cycle (SDLC)

System Development Life Cycle (SDLC) is a system development method. The cycle or life cycle of system development is a form used to describe the main stages and steps in these stages in the development process. In the systems life cycle, each part of systems development divided into several stages of work. Each of these stages has its characteristics. The main stages of the system development life cycle can consist of systems planning, systems analysis, system designs, systems selection, systems implementation and systems maintenance).

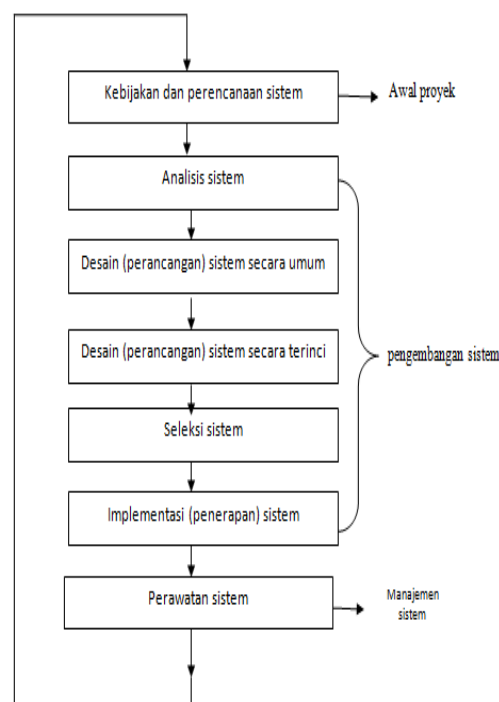


Figure 1. structured system analysis and design

1.2 Method of collecting data

To collect important data that will be used in building the system, the

following data and information collection methods will be carried out:

1. Interview Method

Interviews were conducted by interviewing parties related to the use of information systems at the Lempasing PSDKP SATKER office. The interviewees included: Head of Administrative staff and the head of the Lempasing PSDKP SATKER office. This interview technique was conducted to obtain the latest information regarding the problem of monitoring (monitoring) fishing vessels [8].

2. Observation Method (*observation*)

The observation method is carried out by direct observation of the object under study so that it can be understood how the system works. Observations were made several times during the research period to learn how the processes that run in ship monitoring activities at the SATKER PSDKP Lempasing Bandar Lampung office [9].

3. Literature review

The literature review is carried out by reading, citing, and collecting theoretical data by monitoring, the *internet* and studying reference documents and other records that support the research process [10].

2. Analysis and Results

2.1 Analysis

At this stage, an analysis of the proposed system is carried out on the system using Context Diagrams.

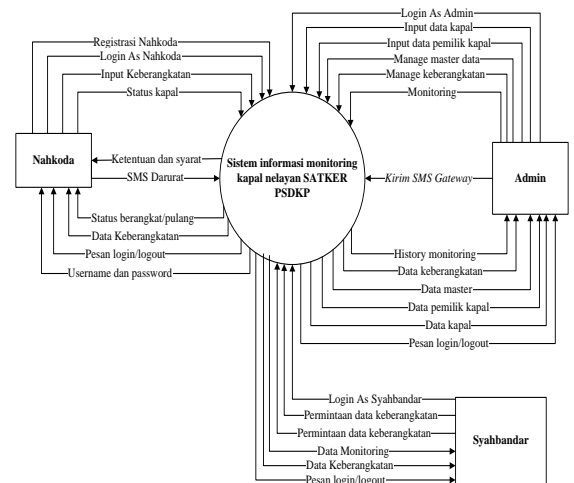


Figure 2. Context Diagram System

Figure 2. shows the context diagram of the proposed system, the system design describes the overall data flow.

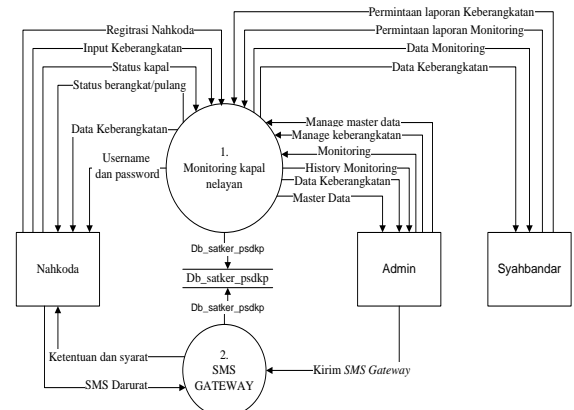


Figure 3 . DFD Level 0 system.

Figure 3. shows the data flow diagram of the proposed system, where the proposed system design consists of two sub-systems, namely the fishing vessel monitoring sub-system and the *SMS Gateway* and three external entities associated with the system.

RESULTS AND DISCUSSION

Results of the Fishing Vessel Monitoring Information System in the Marine and Fishery Resources Supervision Work Unit are as follows :

1. Index / Main Page

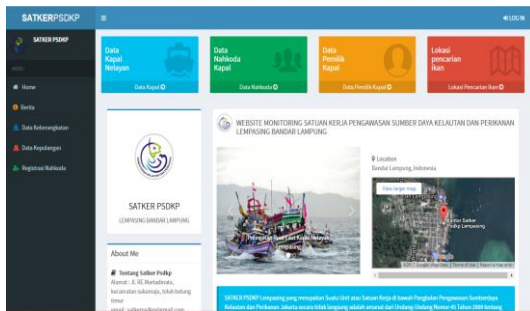


Figure 4. Index / Main page

The picture above is the main page of the Fishing Vessel Monitoring Information System in the Marine and Fishery Resources Supervision Work Unit. On the main page, various menus provide information about the website.

2. Page Admin

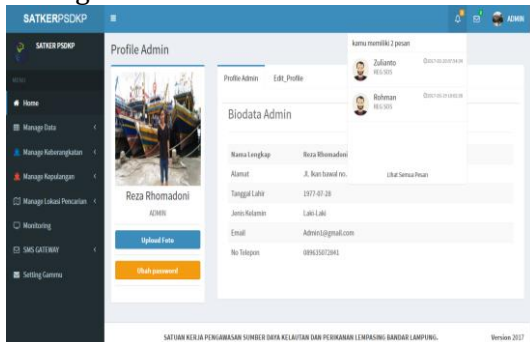


Figure 5. Page Admin

In Figure 5 above, it explains that when logging in successfully as an admin, enter the admin home

3. Master's Page



Figure 6. Page Skipper

In Figure 6 above, it explains that when the login is successful as the

captain, then you enter the home captain

4. Page Ship data

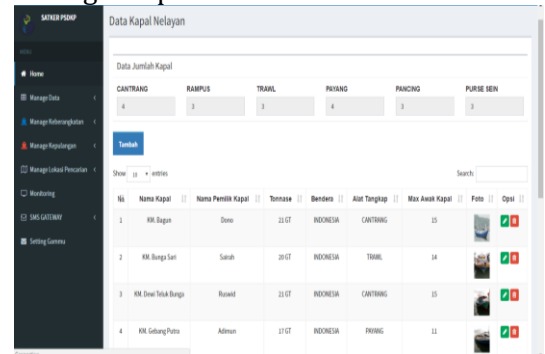


Figure 7. Page Ship data

In Figure 7 above, the master ship data is managed by the admin to manage ship data

3. Monitoring Data Page

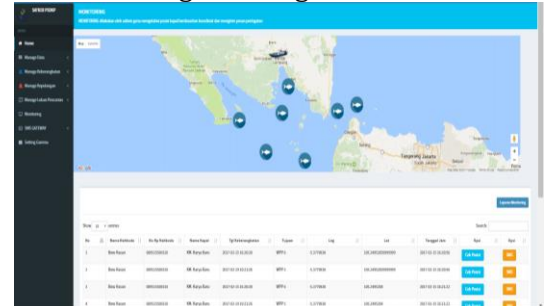


Figure 8 . Monitoring Data Page

In Figure 8 above, the Master data monitoring is managed by the admin to monitor data on the location of the ship's destination and ship's departure.

4. SMS Gateway page

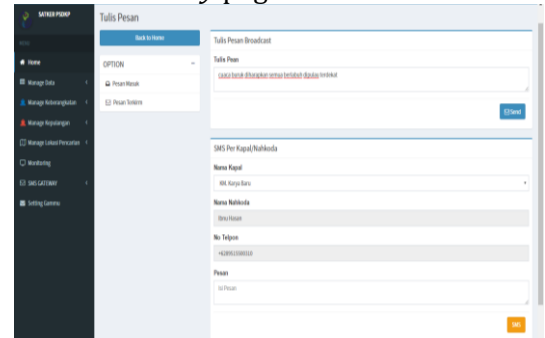


Figure 9 . SMS Gateway page

In Figure 9 above, the SMS gateway is carried out by the admin to send information in the form of messages to the captain.

CONCLUSION

1. This Lempasing Bandar Lampung fishing boat monitoring website is a solution to the information system for monitoring fishing vessels through information technology media and Gatewa SMS messages.

2. The Lempasing Bandar Lampung fishing boat monitoring website makes it easier for the PSDKP SATKER Office and fishermen to find out the location of fishing boats through personal devices and also smartphone devices connected to the internet network.

REFERENCES

- [1] I. Perikanan and D. I. Indonesia, "TEKNOLOGI VESSEL MONITORING SYSTEM (VMS) SEBAGAI STRATEGI PERLINDUNGAN DAN PEMBANGUNAN," no. 3, 2020.
- [2] S. Monalisa *et al.*, "SISTEM INFORMASI MONITORING PERJALANAN KAPAL," vol. 5, no. 2, pp. 171–183, 2019.
- [3] N. D. I. Wakatobi, "Desain teknologi pemantauan kapal laut berbasis sistem identifikasi otomatis untuk pengamanan nelayan di wakatobi," no. November 2017, pp. 1–2.
- [4] P. Studi, P. Sumberdaya, and U. S. Ratulangi, "Pelaksanaan monitoring , controlling , surveillance kapal pengangkut ikan di atas 30 GT di Pelabuhan Perikanan Samudera Bitung," vol. 2, no. 4, pp. 135–139, 2016.
- [5] A. Sumarudin, B. R. Raga, W. P. Putra, F. Pralienka, B. Muhamad, and A. E. Putro, "Aplikasi Tracking Perahu Nelayan dan Titik Ikan berbasis Automatic Identification System," vol. 11, pp. 83–89, 2013.
- [6] J. Nasional, S. Informasi, T. Couchdb, and P. Barutama, "Sistem Monitoring Kendaraan Secara Real Time Berbasis Android menggunakan," vol. 02, pp. 53–60, 2018.
- [7] R. M. Siringoringo, "Design and Implementation Vehicle Monitoring Based on GPS and SMS Abstrak," vol. 1, no. 1, pp. 868–875, 2015.
- [8] M. Kesuma, F. Mathar, F. E. M. Agustin, W. Farah, M. Brilliant, and T. W. Astuti, "PERANCANGAN DAN IMPLEMENTASI APLIKASI PENUNJANG DALAM MELAKUKAN AUDIT (STUDI KASUS UIN SYARIF HIDAYATULLAH JAKARTA)," *J. Sist. Inf.*, vol. 14, no. 1, pp. 2473–2488, 2022.
- [9] M. R. Romahdoni and Winardi, "PENERAPAN METODE PIECES DALAM MENINGKATKAN KEPUASAN CUSTOMER TERHADAP SISTEM INFORMASI PENJUALAN," *SEAT*, vol. 1, no. 1, pp. 15–21, 2021, [Online]. Available: <http://journal.institdla.ac.id/index.php/seat/article/view/15>.
- [10] J. Fitra, D. Ramadaniah, and M. el-K. Kesuma, "SISTEM PENDUKUNG KEPUTUSAN PENENTUAN JURUSAN," *SEAT*, vol. 1, no. 1, pp. 7–14, 2021, [Online]. Available: <http://journal.institdla.ac.id/index.php/seat/article/view/14>.