Roles of Early Warning in Sea and Coast Guard Activity in Indonesia: Bakorkamla Integrated Information System

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Abstract—This paper will define the system that minimize the risk of the ship accidents because of high or dangerous waves namely early warning system. Since Indonesia is located in a strategic position, many internasional vessels pass by the Indonesian Sea Lanes. Therefore many issues often occur in Indonesian waters, one of the issues is the shipwreck because of dangerous waves. In order to do the preventive action for the vessels that indicated exposed the dangerous waves, Indonesian Maritime Security Coordinating Board or Bakorkamla, has built up and implemented an early warning system through integrated system, called Bakorkamla Integrated Information System (BIIS). By implementing BIIS means that Bakorkamla has already done one of the Five Principles of Sea and Coast Guard Agency, which is safety and security, and Bakorkamla also has already saved the lives of many people on the ship that will have an accident due to high waves.

Keywords—Early Warning System, Integrated Information System, Sea and Coast Guard, Principles.

I. INTRODUCTION

INDONESIA is located in a strategic position. It lies between two continents and two oceans, with ten countries border. Indonesia is also an archipelagic state that has thousands of islands approximately 13.466 islands [1] spread out from Sabang to Merauke. Furthermore, Indonesia passes through Archipelagic Sea Lanes [2], it means that Indonesian waters can be crossed by vessels from other countries to cruise peacefully.

Indonesian water can be said as arteries of the world, because it is used for naval movement, projection of maritime interest and the most important seaborne trade. As party to the LOSC (The United Nations Convention on the Law of the Sea), Indonesia has obligation to provide passage for ships and aircrafts, such as innocent passage, transit passage and archipelagic sea lanes passage [3] and Indonesia has to ensure that these sea lanes are navigable, safe, secure and do not endanger the marine environment, therefore Indonesia needs to establish aids to navigation.

Conversely because of many activities take place in the Indonesian waters and many international vessels pass by the Indonesian Sea Lanes, many major issues such as crimes and violations are possibly happened in Indonesian waters. The major crimes and violations that often occur in Indonesian waters such as Illegal Logging, Illegal Fishing, Sea Robbery,

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Maritime Environment Issues, Illicit Trafficking, and so on. One of the issues that often occur is shipwreck because of high or dangerous waves.

In Order to do the preventive action to the vessels that indicated exposed the dangerous waves, Bakorkamla as a coordinator of The Maritime Security Agencies in Indonesia, has implemented an Early Warning System through Integrated System that has been built up by Bakorkamla, called *Bakorkamla Integrated Information System (BIIS)*.

By doing this task, it means that Bakorkamla has done one of the five Principles of Sea and Coast Guard generally, namely *Security and Safety*.

The purpose of this paper is to explain the system in minimizing the risk of the ship accidents because of high or dangerous waves namely early warning system. In this paper we will also discuss about The Roles of Early Warning System in Sea and Coast Guard Activities that has been implemented by Indonesian Maritime Security Coordinating Board (Bakorkamla) as a coordinator of The Maritime Security Agencies in Indonesia through the implementation of Bakorkamla Integrated Information System (BIIS). This is in line with Bakorkamla's obligations in terms of securing Indonesian sea lanes.

II. INDONESIAN MARITIME SECURITY COORDINATING BOARD (BAKORKAMLA)

In Indonesia, before 2005, there are so many institutions that have authority to do law enforcement and to maintain security at sea [4]. It means that overlapping of authority in doing law enforcement and maintaining security at sea could be possibly happened. Therefore based on Act No. 6 Year 1996 about Indonesian Water and Presidential Regulation No. 81 Year 2005 about Indonesian Maritime Scurity Coordinating Board (Bakorkamla), Indonesian Maritime Security Coordinating Board was established on December, 29th, 2006 as coordinator of all agencies that doing law enfocement at sea in Indonesia.

Actually as a coordinator of all law enforcement agencies at sea in Indonesia, Bakorkamla has already implemented five principle of Sea and Coast Guard Agency which are Security and Safety, Law Enforcement, Search and Rescue, Protection of Natural Resources and Defence Assistance. Moreover, in order to enhance the institutional capacity, based on Presidential Regulation Regulation No. 39 Year 2013 about The Government Working Plan 2014, In Book-2 of The Government Working Plan 2014 in chapter 7 clearly stated

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that in 2014, Indonesia has to have an agency (Badan Keamanan Laut) or Indonesian Maritime Security Coordinating Board, it is a kind of Coast Guard Agency and has to do intensification and extensification of maritime security patrols that will be supported by Early Warning System of maritime security. It means that Bakorkamla will not only do the patrol at sea but also providing and diseminating the important information through the Early Warning System of maritime security by implementing the Integrated System that has been built up by Bakorkamla named *Bakorkamla Integrated Information System*.

III. EARLY WARNING SYSTEM

Early Warning System is defined as an early warning report to the ship that will be identified through a region with a wave that categorized as a dangerous wave.

This system has the objective to minimize the risk of the ship accidents because of high or dangerous waves.
In order to provide an early warning system for the users at sea, Bakorkamla has developed an Information Integrated System which is called BIIS or Bakorkamla Integrated Information System. So, by implementing BIIS, it can also support the early warning system that implemented by Bakorkamla. In implementing early warning system, Bakorkamla has to do four steps as follows:

A. Monitor the Vessels

Bakorkamla should monitor the vessels through Bakorkamla AIS and Public Web (to track the vessel and to monitor the traffic at sea).

B. Monitor the Weather Condition

Bakorkamla also should monitor the weather condition in Indonesian water. It can be done through website http://www.indokamla.com or can be seen through http://maritim.bmkg.go.id that provides the weather information in Indonesian water.

C. Identify the Vessels

Identify the vessels that will pass through the dangerous area (Early Warning).

D. Send Early Warning Report

The Early Warning Report will be sent to related institutions such as Port Administration, National Search and Rescue Agency, Sea Transport and the nearest Rescue Coordinating Center (RCC) or Maritime Rescue Coordinating Center (MRCC).

IV. BAKORKAMLA INTEGRATED INFORMATION SYSTEM (BIIS)

By utilizing BIIS, Bakorkamla is developing the surveillance system in Indonesian Maritime Region by integrating IT system, in order to make easier for law enforcement efforts at sea to work more effective and efficient.

BIIS has many capabilities such as providing Early Warning System to the vessels that will be identified through a region with a wave that categorized as dangerous or high waves. The objective of this system is to minimize the risk of the ship accidents because of dangerous waves. This early warning information that produced by the equipment of BIIS located in several areas in Indonesia also will be sent to the stakeholders who have the authority and the ability to contact the ship indicated. It means that Bakorkamla has conducted the Principles of Coast Guard: *Security and Safety*. Eventhough it is a simple task but the effect of the early warning system is very crucial, especially for the human life-saving, because through this simple system we can save the vessels that will have an accident due to high waves. BIIS is also adapted by the Indonesian waters characteristics that allow potential hiding places for perpetrators of crimes, including Transnational Crimes which often use such crime modes. BIIS also works using satellite-base computerized.

Furthermore, BIIS has many capabilities to support the monitoring and detection, especially in the area of Indonesian Sea Lanes waters, including:

A. Bakorkamla MRCC and RCC (Maritime Rescue Coordinating Center and Rescue Coordinating Center)

1) In Sea Lane 1 Region, there are MRCC Batam, RCC Aceh, RCC Tanjung Balai Karimun, RCC Natuna and RCC Sambas.
2) In Sea Lane 2 Region, there are MRCC Manado, RCC Kema, RCC Tarakan and RCC Bali.
3) In Sea Lane 3 Region, there are MRCC Ambon, RCC Tual, RCC Kupang, RCC Jayapura and RCC Merauke.

B. MRCCs and RCCs that We Have Already Discussed, Are the Facility to Obtain Data on Shipping Traffic Monitoring and Detection of Water in Each Area of Sea Lanes. They Are in the Form of Surveillance Station and Are Equipped by:

1) ENC or Electronic Navigation Chart is an official database or vector electronic chart created by The National Hydrographic Center for use with Electronic Chart Display and Information System (ECDIS) based on International Maritime Organization (IMO) and also can be used in compatible Electronic Chart System [5]. ENC contains all the necessary information to map the safety of shipping.
2) Automatic Identification System or AIS database that serves as a data monitoring vessel of 300 GT and upwards. AIS in Bakorkamla is using the principle of Integrated Maritime Surveillance System which is integrated with the Maritime and Long Range RADAR Camera. AIS are also designed to be able to provide or diseminate information about the ship automatically to other ships and to the coastal authorities [6].
3) Radio Detection and Ranging or RADAR, is an equipment that used to monitor object that are on the water surface, the data used for detection of small boats and vessels above 300 GT that does not turn on AIS.
4) Long Range Camera that can be used to conduct visual observation of the ships and events at sea around MRCC and RCC that are detected by AIS and RADAR.

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5) Global Maritime Distress and Safety System or GMDSS, is the International Communication System mandated by the International Maritime Organization (IMO) to support monitoring the safety of passing ships in Indonesian waters with the integrated satellite and terrestrial radio communication [7].
6) Control Command Center or Puskodal Bakorkamla which is located in Bakorkamla Headquarter, coordinates the data from each of RCC and MRCC that can be accessed by the public and stakeholders as follows:

a) Early Warning

Control Command Center or Puskodal which is located in Bakorkamla Headquarter, has responsibility to provide early warning information to the ship that will move towards regions with high waves, this early warning information is being sent to the stakeholders who have the authority and the ability to contact the ship indicated.

b) Breach Security and Law Enforcement Data

The data contains information on violations relating to security and law enforcement that obtained from inside and outside the country.

c) AIS Daily Data of MRCC and RCC on Foreign Ships

Ships or vessels that pass in the area of Indonesian Archipelagic Sea Lanes and monitored by each MRCC and RCC are sent to Control Command Center or Puskodal Bakorkamla, the data will be managed by The Control Command Center followed by filtering against foreign vessels and this data is sent to stakeholders, by now the data is still delivered to the Navy and Police.

d) AIS Integration and Long Range Camera

Integration means a merger of some of the equipments, in this case merger of monitoring equipment AIS and Long Range Camera in one centralized equipment. By using this integration tools, Bakorkamla may also conduct monitoring in certain areas immediately that will facilitate the coordination task and detect violation at sea

e) Indokamla

Indokamla is a public service that can be accessed by public and contain data of vessels monitored by MRCCs and RCCs. Indokamla also provides weather forecasts information and wave heights in Indonesian waters.

MRCC and RCC in the BIIS have several tasks such as doing maritime Search and Rescue, Traffic Monitoring, Fisheries Protection, Maritime Safety Information Broadcast and Maritime Pollution Monitoring.

In the field of Fisheries Protection, through BIIS, Bakorkamla can provide the information about the chlorophyll levels in the water that can be tracked by the satellite (Modis Terra Satellite). The information can be useful to determine the fishing area, besides monitoring fisheries activities.

Moreover, in the field of Maritime Pollution Monitoring, BIIS also has ability to do marine pollution monitoring through satellite, for example, it can detect the vessels that commit oil spill pollution in Indonesian water.

BIIS also provide the information about traffic monitoring at sea and it can also provide Search and Rescue activities through RCC and MRCC personel. From the description about what Bakorkamla has been done through the task of MRCCs and RCCs, it can be concluded that Bakorkamla has implemented The Five Principle of Sea and Coast Guard in Indonesia, especially in Security and Safety by implementing Early Warning System through Bakorkamla Integrated Information System (BIIS).

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