IT SECURITY REQUIREMENT ANALYSIS FOR MARITIME INDUSTRY –
COMMERCIAL SHIPPING


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# DEDICATION

To my beloved mother and father whom have been my pillar of strength.

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# ABSTRACT

Maritime industry is one of the oldest industries known to mankind. The maritime industry has evolved into a complex network of over 4000 ports around the world with about 56000 ships trading within the commercial shipping industry. However, the security gap within the maritime industry is always a big problem to commercial ship owners. The threat of armed piracy, hijacking of commercial ships and terrorism have brought new fear to the maritime world. Although there are various standards defined within SOLAS, UNCLOS, ISPS and SUA, it is still not enough and effective to overcome security issues within the maritime industry. Organizations such as IMO, UN, USGC, EU and other maritime countries have implemented various security frameworks but the issue of security remains a black spot within the maritime industry. The proposed IT Security Requirement Analysis will study the best practices from existing standards and to incorporate latest IT technologies to improve the level of security within the maritime industry. The main idea of this research is to conduct detailed study on the maritime security and to develop a comprehensive IT Security Requirement Analysis which can be used within the maritime. This study will identify and analyze the security issues within the maritime industry and the root cause why the current standards and frameworks fail to address the issues. Finally, the outcome of this research is to successfully propose an IT Security Requirement Analysis to reduce security problems caused by external forces such as terrorists, pirates and hijackers. However, it may require further review and modification by the maritime experts.

# ABSTRAK

Industri maritim adalah salah satu industri yang tertua di dalam sejarah manusia. Industri maritim ini telah mengalami revolusi yang kompleks di mana terdapat lebih daripada 4000 pelabuhan di seluruh dunia dan jumlah kapal-kapal yang industri ini adalah lebih kurang dalam lingkungan 56000 buah kapal. Walau bagaimanapun, isu keselamatan dalam industri ini sentiasa menjadi satu masalah kepada pemilik kapal-kapal komersil. Ancaman-ancaman daripada kumpulan lanun, perampas and pengganas mengugat industri maritim sedunia. Walaupun terdapat pelbagai piawai seperti yang tertera di dalam SOLAS, UNCLOS, ISPS dan SUA tidak mencukupi dan efektif dalam menangani masalah keselamatan dalam industri maritim. Organisasi-organisasi seperti IMO, UN, USGC, EU dan negara-negara maritim telah melaksanakan pelbagai rangka kerja keselamatan tetapi isu keselamatan ini masih menjadi titik hitam dalam industri maritim. Analisis Keperluan Keselamatan Teknologi Maklumat (TM) yang dicadangkan akan mengkaji praktis-praktis terbaik daripada piawai-piawai maritime yang sedia ada dan juga melibatkan teknologi maklumat terbaru untuk meningkatkan tahap keselamatan dalam industri maritim. Idea utama penyelidikan ini adalah untuk mengkaji secara terperinci tentang keselamatan maritim dan juga untuk membina sebuah analisis keperluan keselamatan teknologi maklumat (TM) yang boleh digunakan dalam industri maritim. Kajian ini akan mengenalpasti dan menganalisis isu keselamatan dalam industri maritim dan juga kenalpasti mengapa piawai-piawai dan rangka kerja yang sedia ada gagal mengatasi isu-isu tersebut. Akhir kata, hasil dari kajian ini cadangan analisis keperluan keselamatan teknologi maklumat (TM) dapat mengurangkan masalah-masalah keselamatan yang berpunca daripada kegiatan pengganas, lanun dan perampas. Walau bagaimanapun, cadangan ini memerlukan pandangan yang lebih menyeluruh daripada pakar-pakar maritim.

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# CHAPTER 1

## INTRODUCTION

## 1.1 Overview

Maritime industry is one of the oldest industries in the world. Early humans started to trade using the "Barter system" by exchanging basic necessities among each other. Over the ages, the trading system evolved and was integrated into the great civilizations such as the Roman Empire, Greek Empire, Egyptian Empire and many more. However, today the maritime industry has been divided into two (2), commercial shipping and enforcement (military & marine forces).

The focus of this project is to critically analyze, understand and to create a comprehensive IT security Requirement Analysis for the maritime industry. The integration of IT will also be discussed in detail to develop IT Security Requirement Analysis which can be used for the maritime industry. The following section will discuss on the project background.

## 1.2 Project Background

Over the years, many organizations such the UN, US, EU, IMO (International Maritime Organization) and many more has done extensive study on security issues within the maritime industry. In 2006, a report has been prepared by United Nations

(2006). *Maritime Security: Elements of an Analytical Requirement Analysis for Compliance Measurement and Risk Measurement*. New York and Geneva: United Nations. This describes the importance of ISPS (International Ship & Port Facility Security) code which was adopted by IMO as a standard. This is to comply with the SOLAS (Safety of Life at Sea) requirements Chapter XI-2. "Another report which was carried out by RAND Corporation discussed the various security issues that exist within the maritime world. It also describes the actions and challenges which may occur. Although the study was done on a broad scale it was centered towards the role of United States of America within the maritime world. The project was federally funded by the US Air Force and published in 2008 (Chalk, 2008)." However the reports lack the idea of integrating IT with the maritime industry security measures.

This proposed project will look into ways to develop an effective and comprehensive IT Security Requirement Analysis for the maritime industry. For example, after September 11 attack on US soil, terrorism is considered the biggest threat for many industries which includes the maritime. However for Malaysia we consider piracy and arm robbery/hijacking of vessel the biggest threat to our maritime business. As such the proposed IT Security Requirement Analysis for maritime industry would be advantageous as it will incorporate not only best practices of the other standards but also our own standards. The use of IT is vital as we are in the digital age and maritime industry is also moving into VSaT (Virtual Satellite) and FBB (Fleet Broadband) connections.

Today IT has become the way of life. So it is only fair to look at existing maritime standards and define how IT can fit to resolve or improve further the level of security within the industry mainly for commercial shipping. The next section will discuss more on the project problem statement.

### 1.3 Project Problem Statement

Many studies and researches have been carried out by various organizations, governments and even by shipping companies but the desired outcome was not met. Although IMO governs the standards and policies for maritime industry there are many other national and regional standards which have varied for each country. However shipping companies tend to be very secretive and prefer to keep any information or events among their community and some do not even update IMO in fear of losing business, thus jeopardizing their organization's global image and brand. This has caused some issues within the standards that are already in existence in regards to maritime industry.

The other problem is most of the standards in existence are suited for powerful countries such as US, UK, Australia, Japan, China and other traditional maritime nations. These countries have the capability and ability to enforce the existing standards onto smaller maritime countries. The ever increasing problem of piracy is another factor as there seems to be no end to this problem. The gap in socio-economic and weak governance in certain countries such as in Somalia, Indonesia, Papua New Guinea, the Philippines and other third world countries have forced people to become pirates to survive. Most of the pirates are fishermen who have great knowledge of the sea which is passed down from generations to generations. Piracy has caused losses in the millions of dollars within the maritime industry. Although efforts to curb this problem have been taken among the maritime nations with the assistance of the United Nations Security Council, the problem still exist.

This is due to the fact that there is no proper security Requirement Analysis in place. It is a global problem and to overcome it there is a need for global collaboration between nations and governments. The failure of not having a global collaborative channel between nations and governments has given the upper hand to those parties who want to cause severe damage to the maritime industry. The next section will discuss more on the project objectives.

## 1.4    Project Objectives

The objective of undertaking this proposed project is as follows:

- To identify the necessary security components for Maritime industry
- To design the proposed IT Security Requirement Analysis List for maritime industry
- To develop the IT Security Requirement Analysis

The following section will define the boundaries of this project which is mainly within the confinement of commercial shipping.

## 1.5    Project Scope

The maritime industry is one of the largest industries of our time.  There are many components that can be studied within the maritime industry; however the main scope of this proposed project will focus on security issues within the commercial shipping.

The need to review the existing security standards which is in existence within maritime industries due to the increased piracy, hijacking, armed robbery and also extortion cases around the world.

In order to improve, the proposed project will look into the integration of IT technologies with maritime standards.  IT technologies have been integrated with many other industries such as manufacturing, defense, tourism and many more to improve the level of security.  IT technologies are so flexible it can be integrated with any industry in the world.  It will not only improve the level of security within the maritime industry but also increase the percentage of survival of people while at sea.

This project is confined within the commercial shipping which makes up the bulk of global maritime industry besides the enforcement side. However it is important to note that this project is purely research base and there will not be an implementation of system or application for demonstration purpose. A comparative study will be carried out on the available IT technologies in the market today which can be used within the commercial shipping.

## 1.6 Project Importance

This research project is important as it will look at the existing loopholes within the maritime industry in terms of security issues. Although the maritime industry is taken care by various organization and governments around the world but it lacks behind in terms of research.

Many studies and paperwork have been done but most of it is not accessible by the mass due to the document sensitivity and privacy. Based on the study done, the research project will identify areas of concern where improvement or introduction of new components to enhance the level of security within the maritime industry. The major expectation of this research project is to design and develop a comprehensive and effective Requirement Analysis which can be used as a guideline for the maritime industry.

By undertaking this research project, it will provide a platform to look at the existing security issues within the maritime industry which has gained momentum due to increase threat from external parties such as armed hijackers, terrorists, rogue nations and extremists. The study will be able to provide maritime experts the chance to improve and to introduce some vital components in order to increase the security domain to a reasonable level so business operations are not disrupted. It is important to note this proposed IT Security Requirement Analysis will not replace the existing

standards or Requirement Analysis but it will compliment those through integration using ICT technologies.

**1.7     Summary**

This chapter is aimed to give a brief summary of the overall introduction of the proposed project, the project scope, background of the project and what is the problem within the maritime industry.  The proposed solution will be a Requirement Analysis of which can be used as a standard guideline for shipping companies.  The following chapter will look at the various literatures on maritime security.