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WORLD MARITIME UNIVERSITY

Dalian, China

A STUDY ON IMPROVING CHINA'S CAPABILITY FOR SEARCH AND RESCUE IN DISTANT SEA AREAS

By

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The People's Republic of China

A research paper submitted to the World Maritime University in partial Fulfillment of the requirements for the award of the degree of

MASTER OF SCIENCE

(MARITIME SAFETY AND ENVIRONMENTAL MANAGEMENT)

2015

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DECLARATION

I certify that all the materials in this research paper that are not my own work have been identified, and that no material is included for which a degree has previously been conferred on me.

The contents of this research paper reflect my own personal views, and are not necessarily endorsed by the University.

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I would like to express that this research paper was developed as an important part of my studies to apply for the master's degree of Maritime Safety and Environment at WMU and DMU. I have learnt a lot in this program. It is not only in the field of the maritime background for me, but also I have an open scan on my life and study in the future.

First of all, I'd like to appreciate my senior Deputy Directors and my senior Staffs in South Sea Search and Rescue Bureau for giving me this opportunity to attend this program.

Secondly, needless to say, my deep appreciation to Dr. Zhu Yuzhu, my tutor, gives me a lot of help on this research paper. To be honest, I have on ideas on this research paper firstly. Professor Zhu gave my some advice and materials about this field and guided me to finish this research paper.

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ABSTRACT

Title of Research Paper: **A Study on Improving China's Capability for Search and Rescue in Distant Sea Areas**

Degree: **MSC**

This research paper aims at studying the present situation on the Chinese Search and Rescue in the open sea. And the author gives some measures for improving the capability of the Search and Rescue in the open sea area of China.

China is a maritime power country, with a vast sea areas and maritime trade activities frequently. 94% of China's foreign import and export trade volume depend on shipping. Every year, there are more than 100 countries and regions of ships sailing around China Sea. So it is necessary to establish the perfect salvage system in China's coastal and navigable waters surrounding the production and the safety of operation is very important. It is necessary to establish of all-weather operation, quick reaction water rescue security system which can guarantee the operation safety which happened in our Search and rescue service areas and involved in distant sea areas. China’s salvage power embodies China's international image. Especially our country as the IMO Class A member of the international image, it is our obligation to shoulder the responsibility for search and rescue in our responsible areas and distant sea areas. We should make contribution to the world's economic development. Property of life at sea, maritime environment increasingly receives the attention of many countries and regions. The maritime search and rescue technology is enhanced gradually; international SAR cooperation in the distant sea areas has become more and more important. Rescue agencies are becoming more and more perfect and the

relief work program is gradually formed in China.

Especially since 2003, it is approved by the state council in China, the Salvage Bureau strypped-down of the Ministry of Transport. It has been clear about the responsibility of life at sea for the purpose of public welfare by the state. China Search and rescue ability has got a rapidly developed. Under the unified leadership of the Ministry of Transport salvage bureau, our SAR system gradually formed the trinitarian search and rescue system. Maritime rescue team puts forward the construction of sophisticated equipment, personnel, capable, technology refined, at a crucial moment play a key job, has achieved outstanding results, especially the coastal waters of jurisdiction in our country.

Salvage is complex and systematic work, sea accidents with randomness and unpredictability, along with our China's country economy and the rising power of science and technology, our country should not only guarantee persons and property safety who are in our SAR service sea areas at the same time, it will also be necessary for us to continue to improve the level of search and rescue in coastal of China, especially in open sea rescue capacity building, with neighboring countries to carry out international cooperation of China to guarantee of life at sea, property safety and marine environment. While the sea perils which happens in the long distant sea areas, though the number of the air crash is not big, but it is significant, disastrous, and it can attracted worldwide attention and suffer great losses. Especially the air plane of Malaysia MH370 passenger lost events which caused the attention of the world far from the sea to improve rescue ability construction and look forward to establish a professional and capability SAR team.

This research paper introduces the overall level of search and rescue in our c

ountry, especially the analysis to assess the current ability construction in our country, and also briefly introduces the ability of developed country of United State, After the air plane of Malaysia MH370 event happened which indicate d that it is necessity to construct a professional and with ability SAR team in long distant sea areas for China. Finally the author shows how to build som e measures and Suggestions to China's ability to distant sea areas.

Keywords: Search and Rescue at sea; Capability; in distant sea areas; Necessary; International cooperation agreement

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LIST OF ABBREVIATIONS

ASPs	Application Service Providers
CDT	Chinese Department of Transportation
CSPs	Communications Service Providers
CMC	Council and Central Military Commission
CMSARC	China Maritime Search and Rescue Center
DDP	Data Distribution Plan
DSC	Digital Select Call
GMDSS	Global Maritime Distress and Safety System
GPS	Global Position System
GSO	Global Security Organization
ICAO	International Civil Aviation Organization
ICOMSAR	International Convention On Maritime Search And Rescue
IMO	International Maritime Organization
LRIT	Long Range Identify Tracking
MMSI	Maritime Mobile Service Identity
MSA	Maritime Safety Administration
MSH	Maritime Safety Headquarters
NDC	National Data Center
NSARC	Nation Search and Rescue Committee
RCC	Rescue Coordination Center
RMB	Ren Min Bi
SALVAGE	International Convention on Salvage

SARP	Search and Rescue Plan
SOA	State Oceanic Adinistration
SOLAS	International Convention for the Safety of Life at Sea
SCS	South China Sea
SRRs	Search and Rescue Regions
UAV	Unmanned Aerial Vehicle
UNCLOS	UN convention on the law of the sea
USCG	United State Coast Guard
VMSs	Vessel Monitoring System(s)
VHF	Very High Frequency
VTS	Vessel Traffic Service

Chapter Ⅰ INTRODUCTION

1.1 The background and significance of this research paper

1.1.1 The research background of this research paper

Some coastal countries have undertaken the task of equipping their coastline with the appropriate sea rescue means, following the guidelines of the International Maritime Organization and in accordance with the International Convention of Search and Rescue. (IMO, 1974, 1999)

The Search and Rescue (SAR) at sea is the government to coordinate all public and private resources. It is important constituent parts to implement distress detects, communication, carrying out the SAR work and make sure the position where the distress happens. Sea search is an international social public welfare activity. It is the responsibility of governments at all levels and shall perform the public function (Wang, Zhuangping, 2013).

The capability of China's SAR has improved a lot since the Salvage Bureau had strypped-down in 2003. A professional SAR team has been formed with at sea, aerial and underwater. It has played an important role in protecting the safety of transport at sea especially in protecting the lives at sea, priority and the maritime environment. The performance of China SAR has been praised by the international parties and the

IMO.

However, with the development of international trade of the word, it puts forward high requirements for establishing the SAR of China. It is not only necessary to establish a complete and efficient SAR team in the SAR service areas, but also the China SAR should improve the capability in the long distant sea areas, especially after the air crash accidents MH370, QZ8501 in 2014. The range of China SAR should be extent in order to take the responsibility as a shipping country, and perfect implement the international obligation on guarantee maritime safety in distant sea areas. The research paper elaborates as following:

(1). the concept rose of SAR of China in the distant sea areas;

(2). the capability of the China's SAR in recently;

(3). the developed foreign country's SAR capability assessment;

(4).the necessary establishment of the SAR of China in long distant sea areas;

(5). the measures which can be adopted for improving the capability in distant sea areas;

1.1.2 The significance of the research paper

It is the first ten years of the establishment of China maritime search and rescue inter-ministerial joint conference system since the past 2014. According to relevant official in charge of the ministry of transport give the report, Coordinate maritime search and rescue operations in China last year, SAR success rate of 96.6%. However, there are still many deficiencies of China SAR system especially in long distant sea

areas. According to the data released the ministry of transport in 2014, China Maritime Search and Rescue Center (CMSARC) had coordinateed plane 297 sorties, all kinds of boat dispatch more than 7400, successful search and rescue success rate is 96.6%(Jin Song, 2015). At present, China's maritime rescue capabilities of air is still a gap compared with developed countries, mainly in equipment lack, talent shortage, shortage of funds, etc. Transport salvage bureau deputy director Zhang said that the future will be taken from three aspects: strengthening the construction of naval and air three-dimensional rescue ability, "first of all, to strengthen the construction of equipment, as planned in 2015 salvage system will have eight U.S. rescue helicopters of S -76 D, with our existing 12 planes coastal air rescue task. Second, focuses on the scientific management, extends the scope of our SAR ability. Third, focus on strengthening the construction of internal, according to the characteristics of the sea, targeted training of ship machine cooperation, night training, constantly improve the complicated conditions and situations at night aircraft rescue ability. Nowadays, China is implementing "area" and "going out" strategy, the vessels and plane can be seen any corner of the word in the future. the government has the obligation to make sure the safety of the vessel and plane. In November last year, China's BeiDou satellite navigation system formally entered the international maritime organization global navigation system, the BeiDou system has become after the US GPS and Russian Glonass after the third global satellite navigation system, which can give the technical and equipment support.

It is very important to improve the capability SAR of China in distant sea areas. It can manifest the China maritime image. And it protects security of Chinese citizens and enterprises in overseas production activities meantime it can promote China's ability of maritime practice ability.

The operation of SAR in long distant sea areas is very difficult and complex which is always beyond a country's coast areas. It needs many aspects which can assist in the process of the SAR in the distant sea areas including the technical assistance, advanced equipment assistance, reliable shore-based assistance, last but not least, it establish the multiple international cooperation at SAR in the aspect ministry ,government and civil organization cooperation. It plays a very significant role in improving the capability of SAR for China.

1.2 Concept of SAR at sea

Search and rescue (SAR) is the search for and provision of aid to people who are in distress or imminent danger. The general field of search and rescue includes many specialty sub-fields, typically determined by the type of terrain the search is conducted over. These include mountain rescue; ground search and rescue, including the use of search and rescue dogs; urban search and rescue in cities; combat search and rescue on the battlefield and air-sea rescue over water(Wikipedia, n.d).

The system of SAR is the use of aircraft, surface craft, submarines, specialized rescue teams, and equipment to search for and rescue personnel in distress on land or at sea. Search and Rescue services consist of the performance of distress monitoring, communication, coordination and SAR functions, including provision of medical advice, initial medical assistance, or medical evacuation, through the use of public and private resources including cooperating aircraft, vessels and other craft and installations(Global Security Organization, n.d). The term of SAR at sea derives from the salvage in the beginning. In fact the term of SAR is an abbreviation of Search and Rescue at sea. For a long time the most international conventions did not define the SAR in detail. It is recognized as some point that the SAR means the operations of using the unified coordination and command under the main maritime

administration to the emergency and dangerous events at sea. After the International Convention on Maritime Search and Rescue at sea, 1979, when it came into force, the "Search", an operation, normally coordinated by a rescue co-ordination centre or rescue sub-centre, use available personnel and facilities to locate person in distress. And the "Rescue", an operation to retrieve persons in distress, provides for their initial medical or other needs, and delivers them to a place of safety (International Convention on Maritime Search and Rescue at sea, 1979).

1.2.1 China's SAR's historical development.

The Chinese government established the first professional search and rescue force at sea in 1953. The State Council and Central Military Commission(CMC) jointly issued the notice of establishment the Maritime Safety Headquarters(MSH).The Chinese government attended the International Convention on Maritime Search and Rescue at sea, 1979. Then the State Council repealed the Maritime Safety Headquarters (MSH). The Chinese Department of Transportation (CDT) issued the establishment the China 's Maritime Search and Rescue Center (CMSARC) at sea in June, 1990. The CMSARC was regarded as the very institution of the Ministry of transport, and Unified organization and coordination of the National Maritime Search and rescue work. China's Maritime Safety Administration (MSA) took charge of the route work. It required that the relative department of the State Council and the military department to assist the CMSARC doing the work. Since then the local government also established the corresponding SAR mechanism.

1.2.2 The Maritime Search and Rescue organization framework of China

In recently, the maritime SAR contains the professional rescue force and military force, the other facilities and groups of individuals which can be used. Its civil power

is very little and the capability of the search and rescue is limited.

So far now, the professional mechanism which takes charge with the mission MSR is the CMSARC. The salvage bureau of Ministry Transport implements it. There are three sub-bureaus in China which take specific the actions for SAR at sea. When some local areas have not enough force for SAR, the CMSAR can request the military force to give the assistance according to the principle of the emergency rescue and disaster relief. The main responsibilities of SAR are as follows.(Fig.1)

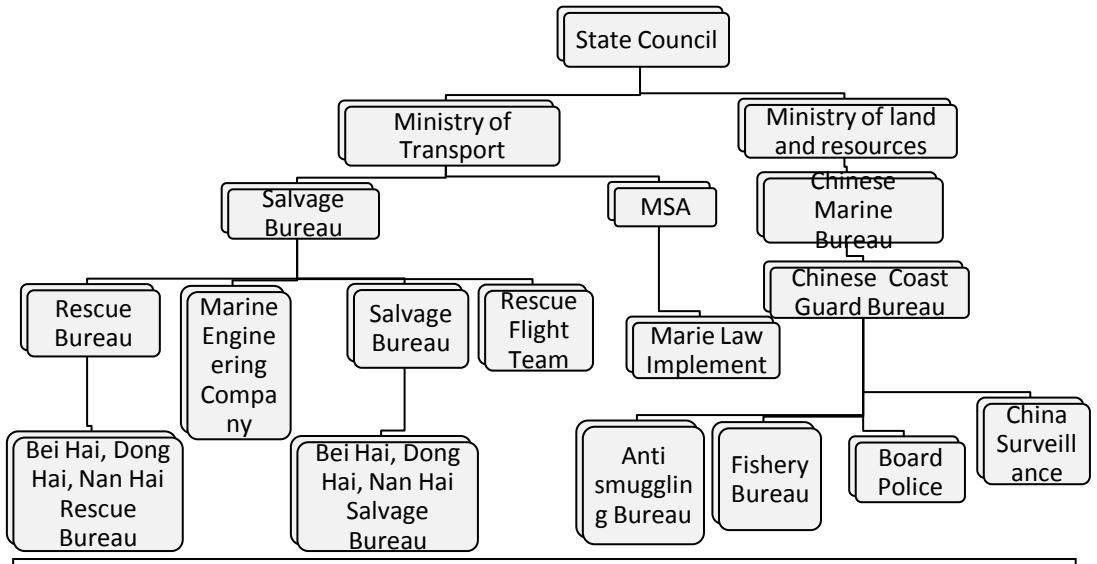

Figure. 1.2.2 The SAR force me diagram of China
Compiled by the author on May, 10, 2015
Source: Dang Hainan. (2013). The Improvement of the Law Functions and Powers of the Ministry of Transport in Maritime Search and Rescue, China.

In China the most important professional SAR force is the Salvage Bureau. The main responsibilities of the Ministry of transport Salvage Bureau are to rescue lives and property which happens in China coast on the Chinese ships and foreign ships (Salvage Bureau of China, 1951).

1.3 The requirement of modern SAR

Although the SAR of China has made a great contributions on the China Coast areas since it was be established. The rate of success SAR can reach above 90% in the Chinese coast areas. It has made great improvement in recent years especially after the Salvage Bureau strypped-down of Ministry of Transport. But the development of trend of large-sized vessel, it carry a lot of difficulties for SAR of China especially in long distant sea areas. The modern SAR should establish a SAR team with at sea, aerial and underwater sea trinity rescue team. And the modern SAR also should be better with high technical personnel level, but also it should establish a quick-response SAR team, it is necessary to establish a long distant sea-area SAR system with modern rescue facilities and remote assistant base.

1.4 The definition of the long distant SAR system of China

The long distance of China Sea areas is relative marginal sea of China. There is not an exactly definition of the long distant SAR until recently. It is different at the different domain field. The author would like to introduce some relative definition of the distant sea areas in the different fields or different departments.

The marginal sea of China can also be called offshore of China; it can be recognized the BoHai Sea, the Yellow Sea, the East China Sea and the South China sea. China offshore is located in the western edge of the north Pacific. (Sogou encyclopedia,n.d)

1.4.1 The SAR service sea areas at sea

A country perform the action of SAR at sea is not only the obligation as a big maritime country, but also is the responsibility of the humanitarian.

In current the SAR service areas in China mainly involve the Yellow Sea, Bo Hai Sea, the East China Sea and South China Sea which is inside of the "first island chain". And the Chinese government has set up the North Sea, the East Sea and the South Sea rescue bureau, which have a number of rescue bases respectively. According to IMO international convention on maritime SAR, our country locates SAR coordination service areas in the northwest Pacific. Hereby, the Chinese government released the existing scope of maritime SAR service areas including: Bo Hai Sea and the Yellow Sea of the West of 124℃; The west 126 ° E of the East China Sea; The west of 120 ° E, 12 ° N of the north of South China Sea; North SAR service areas which covers north of Xiu Zhen He Kou to Ping Shan island waters and the north of 35 ° N; The east China sea SAR service areas is from the northern of Xiu Zhen He Kou to Ping Shan island of south of 35 ° N and south to Guan Kou Tou north of 135 ° E. The South China Sea SAR service areas covers Zhu Jiang Kou waters. Overall, China SAR service areas space are limited, especially the "first island chain" to the east and south areas of open sea SAR, which is unable to effectively deal with such as Malaysian MH370 important paroxysmal event such as the emergency events which happened far from the mainland in long distant sea areas(Wang Jian, Li Rong & Zhang Hongyu, 2014).

1.4.2 The definition of the distant sea areas comes from MSA

In the legal inspection rules for ships and offshore facilities, the MSA make sure taking some inspect and guarantee the ships safety and navigation safety, it has defined some areas division and operating limits. The areas are divided into the following four categories:

(1) Open sea areas (Long distant sea areas): it refers to the domestic voyages beyond the offshore area of the sea.

(2) The offshore area: it refers to the China's BoHai sea, yellow sea and east China sea shore away less than 200 n mile area; The south China sea from the shore no more than 120 n miles (east coast of the island, the east coast of Han Nan island and along the south coast of shore not more than 50 n mile) waters.

(3) Coastal navigation areas: it refers to the east coast of the Taiwan island, Taiwan's strait coasts, east coast of Hainan island and along the south coast of no more than from coast 10 n miles waters from and in addition to the above sea shore of no more than 20 n mile area; or from a shelter conditions and an ability to rescue the coastal islands more than 20 n miles areas. But for more than 20 n miles from the shore of the island, it will be narrowed according to the actual situation.

(4) Sheltered navigation areas: it refers to in the coastal area. It is sheltered by the coast and the islands, the island and the island of shading sheltered areas, where the wave is small. The distance should be not more than 10 n miles between islands and coastal. (MSA, 2004)

1.4.3 The definition of the distant sea areas from the Oceanic Administration of China.

The Oceanic Administration of China also gives the definition of the long distant sea areas from the perspective of the marine service development and the aspect of maritime supervise at sea. Usually, it divides into coastal sea and the distant water. The distant of sea areas are that it refers to a near shore parallel to the outer limit of 20 nautical miles outward the waters of the sea. It also refers to the outer limit of the offshore all outward side of the sea areas under the jurisdiction of our country.

1.4.4 The definition of the distant sea areas from the Navy of China.

The Navy of China takes the mission of maritime safety, the national security and safeguard territorial integrity. It also takes the mission of anti-piracy and escorts the Chinese merchant vessels. First of all, we must introduce the concept of "island chain". The mostly "first island chain" is from mainland China within 200 nautical miles. It refers to from the Japanese archipelago, the Ryukyu Islands, in the south to the Philippines, chain-shaped island with Greater Sunda Islands. (See the figure1.4.4) In a word, the offshore means in waters within 200 nautical miles closet to the land. The middle distant sea areas mean in water within 200 to 600 nautical miles closet to the land. The long distant sea areas mean beyond the 600 nautical miles closet to the land.

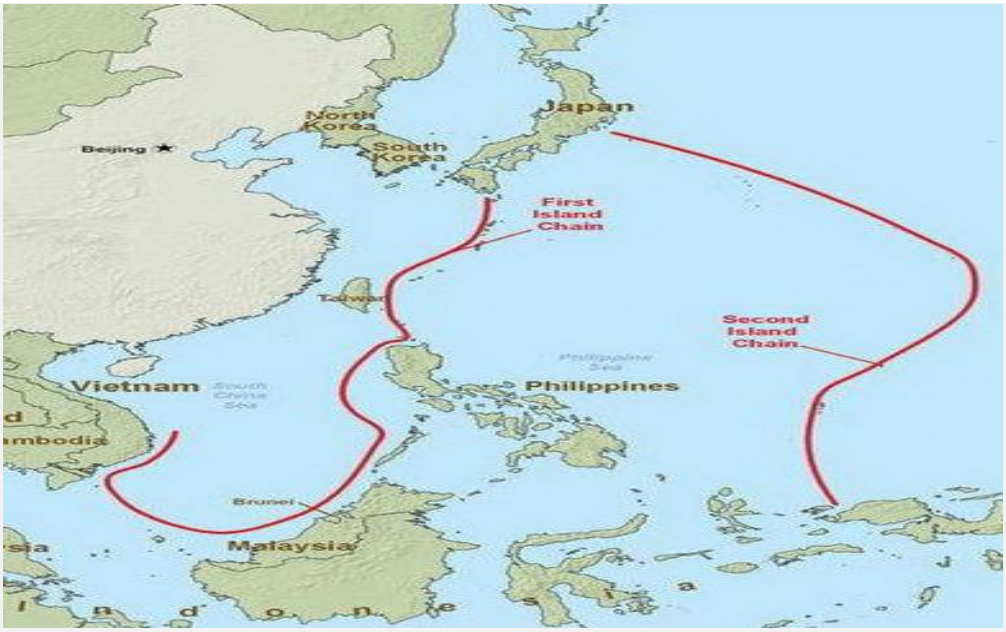

Figure 1.4.4 The "first island chain" distribution diagram.

- Source: PRC military theorisis conceive of two island "chains"as forming a geographic basis for China's maritime defensive perimeter

To sum up, the SAR systems are divided into two parts in China. One part is governed by the Ministry of Transport, and another is governed by the Navy of China. Generally speaking, the Ministry of Transport takes charge of the common SAR at sea, when it happens the large accident at sea, the Ministry of Transport can request the Navy of China engaging at SAR at sea. Currently, the main task of SAR in long distant sea areas is taken by Navy of China. However, the author believes that the Ministry of Transport will take charge of SAR in the distant sea areas, which can carry out cooperation easily between other country and regions.

So the definition of distant sea areas of SAR should be defined as: it is beyond the "first island chain" where the most beyond the 600 nautical miles closet to the land. And some countries and regions always should cooperate together to respond to the emergency accident which occurs beyond the coastal at sea. We can guarantee to save the safety of life and property, protect the marine environment as the ultimate aim.

Summary: This chapter mainly introduces the concept of SAR and the SAR's history development of China. Then the author describes the framework of SAR in China. There are still more challenges implementing the SAR in long distant sea areas in modern society. So it carries new challenges to government of China for carrying out the SAR in long distant sea areas. The service SAR zone of China is be introduced. At last the author discusses and analyzes the definition of distant sea areas from differed departments, then the author gives himself understand on the distant sea areas and his view.

Chapter Ⅱ The SAR system of China and analysis of its capability

2.1 The present situation of the SAR system in China

Recently, the SAR force in China is dispersive. It is not only one independent maritime search and rescue team. There are four rescue teams of China maritime rescue net. The first SAR force is the social rescue force. These forces at ordinary times are mainly engaged in production, transportation, port engineering work, etc. After the marine perils happen, these forces are engaged in taking part in rescuing under the coordination of CMSARC. This kind of power is scattered, but sometimes it can arrived at the position of the accident happened quickly. This force plays an important role when the accident happens especially in the coastal sea areas. The second is professional search and rescue forces. It refers to the countries and all have exclusively or mainly engaged in the work of the search and rescue bureau, Salvage Company. For instance, the Ministry of Transport of China set up East Sea, South Sea and the North Sea rescue bureau, these forces is one of the strongest forces. From June 25, 2003 to June 30, 2006, these three sea areas had cumulative executed 1547 marine rescue activities. There are 9013 persons including 1362 foreigners who were rescued in distress at sea, rescued the vessels in distress were 458(the foreign vessels 85). The values of property were 15 billion RMB. The more detail we can see the figure 2.1.

Table 2.1 The Statistical of SAR in China from 2001 to 2006

Years	Number of SAR	Numbers of Salved Distress
2001	375	8113
2002	262	7973
2003	1889	14243
2004	1493	15597
2005	1889	14243
2006	1620	16753

Source: (Peng Xinfa, 2007)

The third kind rescue forces are also government departments, such as Maritime Safety Administration (MSA), Customs Department, China Coastal Guard. These three forces can be commanded and invoked by the government. There is a fourth SAR force that is the army and armed police forces. It was established by maritime security headquarters in 1973. We established the military strength to participate in the SAR at sea. The military force is the main force for SAR at sea especially in the long distant sea areas. There are still some disadvantages for our professional SAR forces in the aspects currently.

2.1.1 The distribution of the SAR bases of China

Focusing the characters of the responsibilities of the SAR, the Ministry of Transport leads the three sub -SAR department, establishing 18 the rescue base and 5 flight rescue bases.

The force of the SAR distribution is as follows (See figure 2.1.1):

Figure 2.1.1 the distribution of the force China SAR.
(Source: Salvage Bureau of China, 2014)

So to speak, there are many rescue bases and the layout is widely. However it cannot satisfy the requirement of "first island chain" to rescue in the long distant sea areas especially in the vast South China Sea, the mission of SAR is implemented by the South Sea Search and Rescue Bureau. It cannot cope with the situation of South China Sea with the density transport and more accidents at sea. Such as the in the accident of the MH370, it last 35 days that the China SAR force arrived the objective sea areas from the Zhan Jiang port, which missed the prime time of SAR at sea.

2.1.2 The equipment and facilities of China SAR

In order to expand the range of maritime SAR, the main objective is developing the capability in the distant sea areas, which is the main responsibility of the Ministry of Transport and initially formed in coastal sea rescue network. The professional SAR of China has 160 kinds of salvage ships including 15 300 kW to 1940 kW ocean-going salvage tug, and 3 of 57, 2500 kW z-propeller tugs. And there are 400

marine law implement vessels in MSA. The salvage bureau is equipped with 20 rescue helicopter and 1 fixed wing air flight.

However, as rich in Marine resources, China has a coastline of 18 000 km, its sea areas are more than 300 km^2, and is near the Malacca and the Taiwan strait which are more density of shipping channels (Chen Bingfeng, Luan Minghao & Yang Changqing, 2005) . China SAR is equipped with lots of rescue facilities. There is still little advanced equipment which can take the SAR mission at sea in long distant sea areas and the equipment's performance is not so good. Existing rescue forces in China cannot adapt to the new era and new development of sea. Salvage power, compared to the prosperity of shipping trade, has a great gap in the SAR with others developed countries in the long distant sea areas. From the SAR for accident of MH370 it can reflect the lack of the high technical equipment in SAR at distant sea. In this air accident, it was the SAR at long distant sea areas. But it also reflects the backwardness of the professional equipment in the distant sea areas. Although the Navy of China dispatched the powerful warships taking part in this accident and the China's most advanced professional rescue ships. However, the Navy of US dispatched the destroyer of "Kidd" and "SH-60" air helicopter. It also contained the "P-8A", "P3-C" sea patrol and the "Tuna unmanned coupled device". It was the first time for China taking part in the SAR at the long distant sea areas. There are inferiorities of many aspects especially in the equipment.

2.1.3 The SAR coordination and cooperation of China with other countries and regions in long distant sea areas

The implementation of the SAR behavior always is a complex cooperation between multiple departments of countries and regions especially in the long distant sea areas. It is always relative the CMSARC Ministry of Transport, Ministry of

Agriculture, National Ocean Service of Ministry of Land and Resources, Navy of China and Foreign Ministry in the process of SAR at long distant sea areas. With the development of the finance, our finance is more and more dependent on the marine economy. Meantime, the Japan and South Korea are export-oriented economy countries. So it is necessary to establish the coordination and cooperation of SAR at long distant sea areas between other countries and regions to jointly maintain maritime transport safety.

Duty to render assistance of Article 98 IN UNCLOS, in paragraph 2: Every coastal State shall promote the establishment, operation and maintenance of an adequate and effective search and rescue service regarding safety on and over the sea and, where circumstances so require, by way of mutual regional arrangements cooperate with neighboring States for this purpose. And the article 146, With respect to activities in the Area, necessary measures shall be taken to ensure effective protection of human life. To this end the Authority shall adopt appropriate rules, regulations and procedures to supplement existing international law as embodied in relevant treaties. (UNCLOS, 1982)

At these stages, China has reached the agreement of the SAR at sea with Korea, Japan and the Southeast Asian countries.

2.2 The achievement of the China SAR in current

In current, it has set up 15 departments and units of the national SAR contact inter-ministerial meeting system and it sets up the China maritime search and rescue center and total station undue the joint inter-ministerial meeting at the same time the local SAR also is established. China positively participates in the international cooperation and joins the International Convention on Maritime Search and Rescue,

1979. The CMSARC organized and coordinated the activity of SAR in our service SAR sea areas. In 2006, CMSARC and Maritime Department organized and coordinated the SAR at sea 1620 accidents, coordinate 5322 vessels and 245 rescue helicopters. The rate of success rescue is 95.7% in our SAR service sea areas. (Geng Xiangkui, 2008)

Summary: This chapter mainly introduces the overview SAR system of China and the procedure in the process of the SAR activity. Then the author elaborates the distribution of the SAR forces of the China. The equipment of the SAR at sea especially in distant sea areas was used in the air accident of the MH370 comparing with the Navy of US. The important of international cooperation in the process of the long distant SAR and advocated this cooperation in the NUCLOS. At last the author introduces the achievement of the China SAR recently.

Chapter Ⅲ The SAR system in the United State at sea

3.1 An Overview of US SAR system

The continental United States (including Alaska) covers coastline of 12400 kilometers, including the Atlantic, Pacific, Mexico Bay and the great lakes of North America. The SAR areas of the United States are very broad, mainly dividing into the Pacific rescue areas the Atlantic and the rescue area, as shown in Figure 3.1. In order to strengthen the international Cooperation between maritime SAR, the United States and rescue areas adjacent to each other many countries signed a SAR cooperation agreement or memorandum.

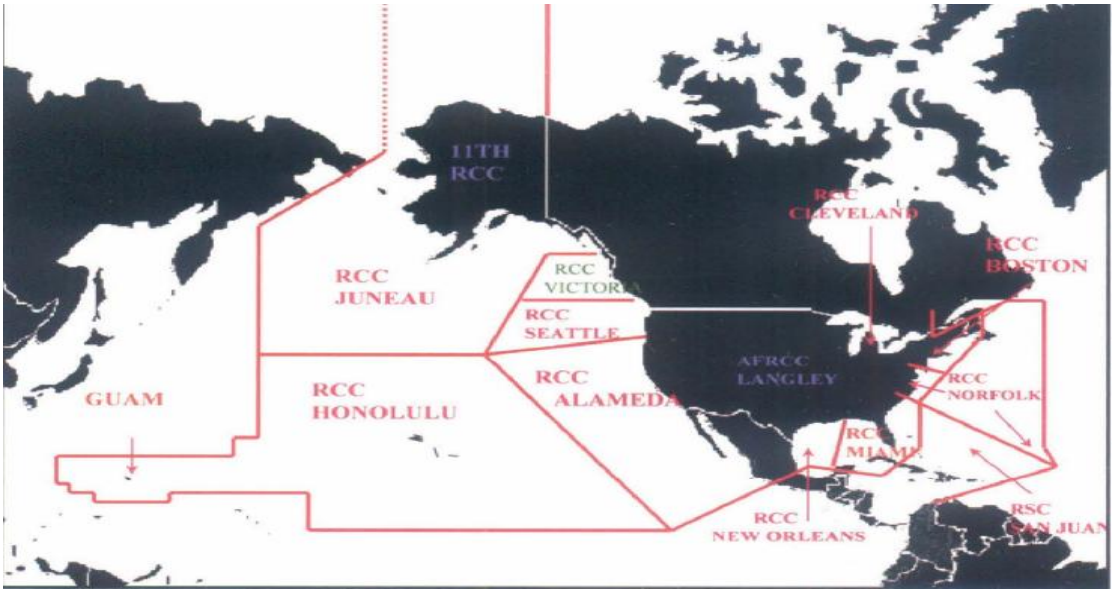

Figure 3.1 the distribution of US SAR force.
Source: (Zhang Ze & Zhang Shouyue, 2011)

3.2 The SAR system mode of US

The National Search and Rescue Committee (NSARC) and the US Coast Guard (USCG) compose the SAR system of US. The NSARC not only takes the actual SAR, but also makes the national SAR policy and coordinates the federal agency cooperation. The SAR system of the US is implemented by the classification. The USCG is in charge of Maritime SAR policy making and Search Mission Coordination (SMC) at the same time it also takes charge of collecting the message of the distress. Then SMC divides the distress events into uncertain event, alert condition and dangerous condition according to the position of distress, the weather condition, and sea condition, the persons' condition in distress, the vessels' condition in distress and the potential risk. Since then, the SAR coordinator scales the

classification again according to the development of the distress events. At last the SMC will take actions to rescue the persons or vessels according to the character of the accident immediately.

3.3 The goal of the US SAR system

The scope of SAR is the coastal water within the 200 nautical miles. Search and Rescue (SAR) is one of the Coast Guard's oldest missions. Minimizing the loss of life, injury, property damage or loss by rendering aid to persons in distress and property in the maritime environment has always been a Coast Guard priority. Coast Guard SAR response involves multi-mission stations, cutters, aircraft and boats linked by communications networks. The National SAR Plan divides the U.S. area of SAR responsibility into internationally recognized inland and maritime SAR regions. The Coast Guard is the Maritime SAR Coordinator. To meet this responsibility, the Coast Guard maintains SAR facilities on the East, West and Gulf coasts; in Alaska, Hawaii, Guam, and Puerto Rico, as well as on the Great Lakes and inland U.S. waterways. The Coast Guard is recognized worldwide as a leader in the field of search and rescue. (USCG, n.d)

Here are the statistics of USCG rescue at sea.

Table 3.3 salvage of statistics of US

years	number of crisis occurs	Number of search and rescue operations	Number person rescued	the number of victims		
				After USCG received notice	Before USCG received notice	Total
2001	39457	59015	4010	297	413	710
2002	36763	54609	3661	236	399	635
2003	31562	36471	5104	246	409	655
2004	32511	33107	6530	183	502	685
2005	29785	29841	6294	129	521	650
2006	28288	29047	4403	207	452	659

Source: (Chen Minjun & Yang Yinqi, 2011)

3.4 The equipment of the US SAR and the situation of its SAR forces

The US coast guard has 68 fixed wing aircraft for cruise rescue, 136 helicopters for rescue. Rapid response is a very important factor for coast guard rescue. The coast guard has 1 headquarters aviation management institution, 26 air base managements. Configuration of the air base principle is in the harbor, fishing area, recreation areas, densely populated areas and other accident incidence happens easily areas. The helicopter is the first choice for SAR in the United States; it arrived at the accident position within 2 hours. Thus it improved a lot the success of the SAR.

The USCG has many kinds of the vessels used to SAR mainly containing patrol

boats, icebreaker, patrol Ships sailing, training vessels, beacon vessels, engineering ships, tugboats, etc The length at 65 feet (19.8 meters) above are 1918; The length at below 65 feet (19.8 meters) are 1800 ships, which are mainly perform coastal or inland waters. According to the requirements of headquarter, there are five districts, each district has a number of bases, there are total of 41 bases and 191 search and rescue stations. Each rescue boat station is equipped with 21 crews, for all the year duty, it requires that set up in 30 minutes after the receipt of notification. With equipped 106 Patrol boats, which is the mainly method for USCG to patrol at sea., The coast guard Type of rescue boat are basically standardized craft, is conducive to work, training and testing, maintenance And management, which can guarantee that the USCG can take the SAR efficiency.

3.5 The United States National SAR Plan

It is the policy of the signatory federal agencies to provide a National Search and Rescue Plan for coordination civil SAR services to meet domestic needs and international commitments. This Plan continues, by interagency agreement, the effective use of all available facilities in all types of SAR missions. (United States National Search and Rescue Plan, 1999)

This Plan provides an overall plan for coordination of SAR operations, effective use of all available resources, mutual assistance, and efforts to improve such cooperation and services. All Search and Rescue Regions (SRRs) of the US are established in cooperation with neighboring nations, are internationally recognized, and described in pertinent documents of IMO or ICAO. (United States National Search and Rescue Plan, 1999)

It also provides a national plan for coordinating SAR services to meet domestic

needs and international commitments, and to document related basic national policies. It gives a guidance for coordination and cooperation in the process of SAR operation especially in the long distant sea areas where the accident happened relative other countries and regions.

Summary: This article mainly introduces the SAR system of United State including the distribution of the SAR forces and the equipment used in the process of the SAR operation. The author also emphasizes the model SAR of system of the US and its achievements in recent years. At last, author states the United State National SARP is very important for SAR operation especially between the other countries and regions. From the above introduction, we can see the differences about the institutions and the managements system between the United State and China on the SAR system. It is very obvious that there is still a gap in the equipment and the management's aspect. So we can see the drawbacks of China on the SAR system. Next step, we should improve these drawbacks and optimize the management system.

Chapter Ⅳ The drawbacks of the China SAR system in the long distant sea areas

We have positive participated the MH370 accident SAR in 2014. We not only dispatched our powerful Navy force but also the professional SAR force immediately after the airplane missed. Our SAR force got the recognized between the 26 countries and regions participation and we have got more achievement through overcome the strange sea condition and climate. At last we successful finished this mission, and show the image to all of the word. However, there are still some drawbacks for SAR systems of China in this international rescue event, which included the aspect of organization, equipments, communication and technical comparing others SAR systems. The author would like to give some following drawbacks.

4.1 Weaknesses in the SAR force mechanism

Although the force of SAR in China had acquired the great achievements until the SAR system established. At present, there are 20 rescue bases and 11 rescue flight bases. It at least takes 4-5 hours to arrive at the position where the accidents happen by the rescue vessels. It may need more time for the SAR to get to the distant sea areas. According to the statistics, it needs takes 5-15 hours to get to the sea areas where the accident happens with the distant 60-180 nautical miles. For instance in the sea areas which is more density of the fish vessel, it must need much time for sailing. So it will waste a lot of time to go to rescue. Another example, such as in the

South China Sea, it is about 3000 kilometers long, 1700 kilometer wide and the area is 3.59 million square meters. And these areas are busy and more density of sailing regions. So the reasonable rescue base configuration is a necessary condition to ensure the safety of navigation. But there is only San Ya rescue base used to take the actions for SAR. It cannot satisfy SAR in long distant sea areas. In the MH30 SAR process, our professional SAR force set up from San Ya which spent more time. So the distribution of the rescue base is very important for SAR at sea.

4.2 The SAR equipment and technology need to be improved

We have invested a lot of money in optimizing the equipment to SAR of China recently. It gradually forms a strong navy-air three dimensional SAR net and assumes the responsibility to ensure SAR mission at sea. However, there is still a lot of aspects to be improved compared with other countries in the equipment and technology. The rescue air flights are successfully used for SAR at sea. It can take rescue actions quickly and effectively. There are many advantages of introducing the rescue helicopters in the process of the SAR at sea. But the common helicopter search radius is limited; the distance of SAR is always no more than 150 nautical miles. So the rescue helicopters require more strictly the bases distribution at the long distant SAR at sea. The rescue base and facilities should be optimized in the future for SAR in distant sea areas. There is still some old equipment in the professional SAR mechanisms compared with the US or other countries.

The technical support is very significant when SAR takes in distant sea areas. For instance the meteorological and the advance search equipment support for in long distant SAR such as the equipment “tunny” which is equipped to the US Coastal Guard. And it can take SAR quickly and accurately. Subsequent supplies and the satellites support play a key role in the process of SAR. Other technology support are

the Long Range Identification and Tracking (LRIT) system in the marine shipping and the black box in the air plane always which can give the key message and important details. The United States, having agreed to provide the International LRIT data exchange on an interim basis, is invited to bring the present circular to the attention of those involved in the operation of the International LRIT Data Exchange (IMO, 2008).

So it is important for SAR mechanism to get the information of the vessels in distress in the first place.

4.3 The coordination and cooperation with other countries need strengthen

As we all know, the coordination and cooperation are essential in the multinational or across regions SAR at sea, which contains hardware and software. The hardware is the aspect of sharing the advanced equipment and the latest information with each other who participate in the SAR. In the Malaysian MH370 airplane accident, there are Chinese Academy of Sciences, China's satellite control center, Boeing company, The plane crash investigations, the Inmarsat maritime satellite company, the Digital Globe Satellite company of US and FBI etc together collecting the effective information. But information between the organizations is independent; the technology is diversity but lack of the information sharing (Fan Yemin, 2014).

If this information can be effectively shared each other, it is of great significance to this SAR between the international SAR. So the effective cooperation between each other decides the outcome of the SAR.

Summary: This chapter mainly discusses the drawbacks of the China SAR recently especially in long distant sea areas as shown in the MH370 accident happening in March 16, 2014, including the hardware and software aspects. From these deficiencies in China SAR, we can perfect the regime and gradually improve the technology on the equipment used in the process of SAR. And these drawbacks can be key improved in the aspects next stages of SAR.

Chapter Ⅴ the measures for improving the capability of SAR in long distant sea areas

The last decade saw a steady increase in air traffic over the oceanic areas of the Asia/Pacific regions which forecast to grow significantly by 2030. Importantly, marine traffic is also increasing with further urgency to ensuring that states with oceanic SAR responsibilities meet the requirements of both International Civil Aviation Organization (ICAO) and IMO for the provision of aviation and maritime SAR services.(ICAO, 2013) So we will face a big challenge as a shipping country when strategy of marine country is proposed. It is necessary to improve the capability of the SAR in distant sea areas for the safety of shipping and humanitarian rescue at sea. It is complex work with the challenge strategy. The author will give some suggestions from the aspects of hardware and software in this research paper.

5.1 Strengthening the existing professional SAR forces in distant sea areas

At the present stage, it is mainly the army who takes charge of the mission for SAR in long distant sea areas for most states. There are some advantages for the army to take this mission with advanced equipment, well trained and rapid response. However, the SAR in long distance always is transnational and beyond regions cooperation; it may happen in other countries' territorial. It is always with the political color when the army takes part in the SAR. At the same time, it would cost a lot of time and need complex red tape to set up the army. As we all know it may miss

the best rescue time. So it is not so practical for the SAR in long distant sea areas.

So it should establish a mighty and professional well-equipped SAR team which does not belongs to the military and not with the political color role. It is a purely humanitarian SAR agency. The agency should get the national financial support and with well-trained professionals. It is the salvage bureau under the Ministry of Transport, so the next stage we should intensify efforts to establish this force to take charge of the SAR at sea for ensuring the safety of shipping around China especially in South China Sea

5.2 Establishing a long-term international SAR cooperation mechanism

The SAR in distant sea areas itself has many difficulties; it must conquer the complex sea conditions, face unfamiliar environments, different climate and conquer the difficulty of communication. It is a big challenge for every country in the aspect of maritime forces. It also reveals that a country whether it emphasizes the maritime safety and the level of economiy investment or not. As a big marine country we should establish a powerful SAR team for humanitarian rescue and make sure the shipping safety and protection the marine environment. The characteristic of SAR in distant sea is always beyond a country's territorial sea most time we should go to the high sea or enter into the other countries' sea areas. So the establishment of international agreement SAR with the surrounding countries is an effective way for China. There is a successful example that the Chinese Navy has taken the actions to anti-pirate for the merchant ships in Gulf of Aden since 2008. It has done a good effect. It not only makes big contribution to Chinese shipping, but also to the world financial development. We can improve the capability of SAR in distant sea areas emulating by this model. So it is very important for us to take multilateral cooperation with other countries or regions for improving the capability of SAR in

distant sea areas. We can take the following detailed measures.

5.2.1 Strengthening the regional cooperation and optimization of the construction of the existing maritime rescue base

The SAR force of China has obtained a rapid development including the equipment construction, personnel management and trained since it was established. The rescue bases can satisfy the SAR at the coast of China now, but in some areas it cannot satisfy to take the mission of SAR in long distant sea areas. The Chinese government requires the success rate of SAR. The influence factors of success rate are relative to the radius of SAR, the condition of rescue vessels and facilities, and the quality of salvagers, the level of managements, nature condition and the characteristic of distress. The distace between the rescue vessels and the vessels in distress depends on the density of distribution of rescue vessels. Assume that other factors remain unchanged, we further qualitatively analyze the success rate of rescue and salvage radius. The shorter radius in a certain sea areas, there are more big density of rescue vessels, the success rate is higher. Based on the above analysis, the density of rescue vessel distribution (or the radius of rescue) is the important factor which can influence the rate of rescue success. We can see the relationship between the radius of fescue and the rate of success. It can intuitively reflect the relationship from Figure5.2.1.

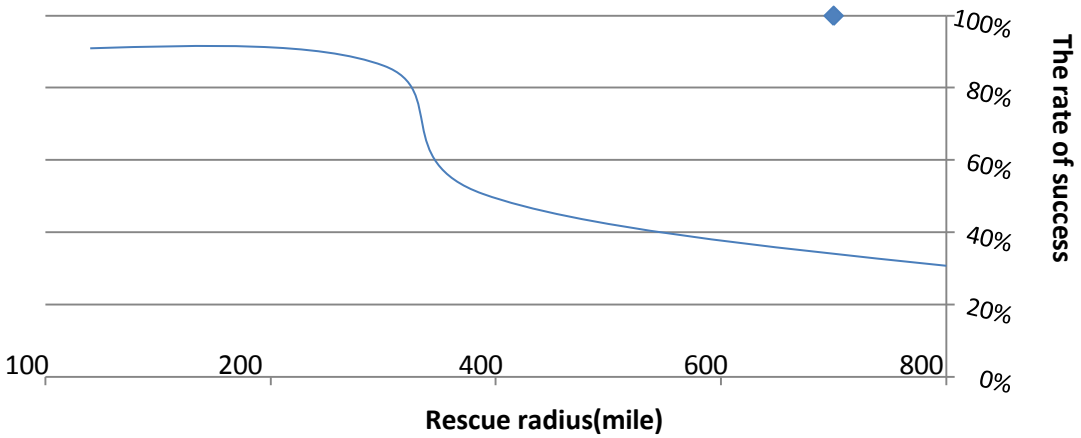

Figure 5.2.1 the relationship between the rate of success and rescue radius
Source: (Li Shidong, 2001)

It is a successful example for Chinese troops to be sent to the Gulf Aden for anti-pirate and protect the merchant ships. So the professional SAR forces of China can emulate the cooperation between China Navy and the other countries. The SAR action should be expanding to the long sea areas especially optimized the distribution of the rescue bases. Let's take the South China Sea for an example; the south sea of China has 3.5 million km^2, which takes up 3/4 of China Sea area. It is the biggest sea area of China. This sea area is complex with frequent tropical cyclones. There are 11 tropical cyclones affecting these sea areas each year (Lin Tawei, 2014).

In addition, the south of the Taiwan Strait and Xisha are listed high risk sea areas by the state, which bears the biggest quality cargo transmit, and the busy sea area. So the South China Sea Sea security task is very heavy, only improving the capability of SAR can satisfy safety of these areas.

Recently, we established the Xisha rescue bases, which can burden the mission of protecting the safety of shipping. And it can match up the Sanya rescue base and then perform the obligation of SAR in long distant sea areas. After this rescue base was

established, the original rescue base forward 200 nautical miles. We can strive for 10 hours for SAR which happens far away from the coastal accident. It is not only used for SAR in the China's sea areas, but also it can be used for SAR which happens in the high sea. This base played a great role in the Xisha rescue in 2013. It saved a great of time for SAR to rescue 300 fisher men successfully. It is gained international reorganization. Nowadays, we are constructing the Fiery Cross Reef, meantime some navigation light and aid facilities which would be established. The most important are the rescue bases, which can improve the capability of SAR for China especially in long distant sea areas.

5.2.2 Establishing the legal cooperation mechanism of SAR with other countries and regions

The salvage ability of each country is not identical, and there is the limitation of the SAR in long distant sea areas for any countries. Take the South China Sea for an example. It has special geographical position of the South China Sea and has extremely important geographical location in the economic resources and transportation hub (Yang Renfei, 2004). The East Asian countries are highly dependent on the South China Sea. At present it is low level of SAR for most countries on the whole. It is very difficult to ensure the safety of life at sea by only one country. In these countries surrounding the South China Sea, China has strong SAR forces, but there are still some problems including the mechanism chaos, backward equipment and the low quality personnel. The SAR forces from other countries surrounding the South China Sea are backward due to its economy, equipment and the personnel. For instance the SAR of Indonesia takes this mission by the Navy, but the equipments is backward due to its economy. It is very difficult to take charge of the SAR mission which happens in South China Sea alone.

Another example is the country of Brunei, there is little quality of SAR forces, its equipment is old and smaller, so it cannot deal with the accidents which happen in a long distant from the Brunei. Therefore it is necessary to establish the legal SAR cooperation mechanism with other countries which can perform the SAR obligation. This kind of cooperation is support and affirmation under the International Convention on Maritime Search and Rescue and the UNCLOS. It is an effective way to establish the bilateral agreement between the two neighboring countries to take the SAR in distant sea areas. It can overcome the lack of equipment and unfamiliar the sea areas, guarantee the successful rate of rescue. At present, the bilateral agreement between the China and Vietnam is estiblished. These two countries have signed the bilateral agreement of Vietnamese dragon to China Fang Cheng port under high-speed liner route search and rescue cooperation agreement. This is a specialized SAR mechanism; it makes the rules on the establishment of the mechanism and the way of contact. These two countries takes joint SAR after the establishment of the bilateral agreement. It has acquired good result. So we can expand the bilateral agreement with more countries for further improving the capability of SAR in distant sea areas.

5.2.3 Strengthening cooperation and promoting the information sharing with other countries and regions

It is very important for SAR to get the distress alarm immediately, which includes the original position and the information of the distress types. It is the first data for the rescue department to take the following action quickly and accurately. It can get more time for the further rescue especially for in long distant rescue. There are some communication systems for the vessels engaged in international maritime transport. It includes Global Maritime Distress and Safety System (GMDSS) and LRIT systems.

The GMDSS system is used on the merchant vessels in order to improve the rescue rate success. When the vessels are in distress, if the Distress Button is started, the distress alarm starts work. Then the position and the distress types will be transferred in every 4 minutes until it is confirmed. The effective alarm can reach a distance of 200-800 nautical miles. If it is beyond this distance the alarm will be transferred to RCC by station or another vessel until it is confirmed. The Long Range Identification and Tracking (LRIT) system is a designated International Maritime Organization (IMO) system designed to collect and disseminate vessel position information received from IMO member States ships that are subject to the International Convention for the Safety of Life at Sea (SOLAS). The LRIT system consists of the ship borne LRIT information transmitting equipment, Communications Service Providers (CSPs), Application Service Providers (ASPs), LRIT Data Centers, including any related Vessel Monitoring System(s) (VMSs), the LRIT Data Distribution Plan (DDP) and the International LRIT Data Exchange. LRIT provides an enhanced level of Maritime Domain Awareness that is the first of its kind. (USCG, n.d)

LRIT is a satellite-based, real-time reporting mechanism that allows unique visibility to position reports of vessels that would otherwise be invisible. For example, the USCG maintains a National Data Center (NDC) system. The NDC monitors IMO member state ships that are 300 gross tons or greater on international voyages and either bound for a U.S port of traveling within 1000 nm of the U.S coast. The US NDC stores all of the positions from any LRIT ship, foreign or domestic, that enters our coastal water polygons. This information is available in real time to the BHD watch stander after performing a basic search for a vessel using the vessel name, IMO number, or MMSI (Maritime Mobile Service Identity) number. So we can establish a information sharing platform of GMDSS and LRIT with our surrounding

countries and regions. When the accident happened it is quickly sent to RCC for SAR. The RCC can quickly get the information of the accident, then the RCC also can coordinate the surrounding other merchant vessels immediately to rescue. This kind of rescue can coordinate lots of merchant vessels which are in passing to take rescue. It can save a lot of time and give a accuracy position where the accident happens, it is great help for carrying the subsequent rescue.

In addition to this, the Chinese government should strengthen monitoring the information collection from the LRIT system in the rescue obligation zones of China. When necessary, this information can be shared with other countries which have cooperated with China in SAR in long distant sea areas.

5.3 Optimizing the existing rescue equipments and the three-dimensional rescue ability

Based on the experience of the developed countries, China should strengthen the rescue equipment and develop the air rescue force which is base requirement for SAR in long distant sea areas. Although the SAR forces have acquired great development in the aspect of equipments since the professional SAR team was set up. There are still gaps compared with other countries in the equipment. China has 3 millions km^2 sea areas under jurisdiction. There just are 51 professional rescue vessels and 132 salvage vessels, which cannot satisfy the need of SAR missions in so big sea areas once an accident happens. (Cheng Mingyuan, 2011) In recent years, the Chinese government was invested a lot of money in the improving the rescue equipments and facilities. However, there are still some disparities compared with the developed countries. We should continue to establish the 8000 KW rescue vessels; these vessels have good performance especially in long distant sea areas. In practice it is an effective method to coordinate with the rescue vessels and the rescue aircraft.

So it is necessary to build some facilities for the aircraft on the rescue vessels. We can dispatch the aircraft and rescue vessels so that the two can cooperate for SAR in long distant sea areas. We can equip the Unmanned Aerial Vehicle (UAV) with rescue vessels which can perform the SAR missions at sea. The UAV can engage in searching quickly and can provide the image data in real time.

5.4 Strengthening the personnel training and constructing professional rescue teams

We can organize and invite the professors to study the foreign advanced technique of the SAR and the emergency rescue, and longitudinal study the SAR of the decision making system. So we can realize modernization of decision-making, digitization and informatization. Based on the experience of the college of education and training from the US Coast Guard, we can innovate the mechanism of training personnel of SAR. It is a good example that it has set up the major of rescue and salvage in the universities. We can cultivate groups of persons who master the advanced SAR technical knowledge and familiar with the advanced SAR equipment. At last, we can organize the training and drill from the maritime SAR system, analyze and discuss the typical SAR case, it can gather the experience and innovate the SAR methods. It can establish a professional SAR team with the solid professional technical and actual experience.

Summary: This chapter mainly provides some suggestions and measures for improving the capability of the SAR in distant sea areas. These measures can be divided into two aspects software and hardware. Generally speaking, we can optimize the existing mechanism and consummate the rescue coordination mechanism. It must be cleared the rights and command for the departments who are responsible the SAR mission and the right of coordination for RCC. It is necessary to establish a centralized leadership, graded responsibility and army-civilian professional SAR team. Then we can strengthen the cooperation with our surrounding countries and regions and signed the SAR agreement at sea. If possible, the party members can share the rescue bases and information to take effective SAR action. In addition, we can improve the rescue equipment and invest the advanced technique used in SAR. The last measures are that we can optimize the personnel training and establish a high quality rescue team.

Chapter Ⅵ Conclusion

To conclude, we have got to understand the importance of the SAR in long distant sea areas in China through this research paper especially in recent years when Chinese international trade is growing steadily. The safety of shipping receives more and more attention and the protection of the maritime is required for establishing a clean, safety and effective maritime environment. It has enacted many conventions and regulations for SAR by the IMO and the Chinese government. IMO attaches importance to the SAR and drafts some conventions to regulate its member states to obey them such as the ICOMSAR, 1979 and International Convention on Salvage, 1989. The two conventions regulate some obligations and rights to every member state and encourage the relative states to confirm the SAR responsibility zone and to guarantee to deploy the sufficient SAR forces.

This research paper firstly analyzes and discusses the concept of the SAR and gives the definition of the distant sea areas at present for China. Then author also introduces the SAR responsibility zone which the Chinese government claims. The author illustrates the actuality of the SAR forces and the framework of the SAR of China. The author discusses and analyzes the present distribution of SAR forces and the equipment. Next, there are still some aspects that needs to improve especially the capability of SAR in long distant sea areas by analyzing the accident of MH370 which happened in March, 2014. The SAR forces and capability of the United State

are introduced including the equipment and the legal and coordination mechanism.

At last, the author contraposes how to improve the ability of China's SAR in long distant sea areas. The author analyzes and discusses it then gives some measures in order to improve this object. It is the most important to cooperate with the surrounding countries and regions, sharing information of distress immediately with each other is another vital method. To sign the agreement of the SAR at sea between the adjacent countries and regions is an effective measure for China. It proves that this kind of bilateral SAR agreement is an effective method for improving the capability of SAR in long distant sea areas. There are other measures that we can ameliorate the SAR equipment and introduction the advanced equipments from the foreign countries. Of course, the professional personnel training is also essential, we should pay more attention to the personnel trained for establishing a capable personnel, well equipped and skilled professional SAR team of China.

In short, the work of SAR at sea is a great humanitarian project, which has made lots of contribution in guaranteeing the safety of shipping and promoting the economic growth of world. However, this work is also a complex and challenging mission, it needs the support and the cooperation from the governments especially in the long distant sea areas. So it is the obligation to establish a safe, healthy, sustainable and clear maritime environment for each government.

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