



**HARMONISING AERONAUTICAL AND MARITIME
SEARCH & RESCUE (SAR)**

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HARMONISING AERONAUTICAL AND MARITIME SEARCH & RESCUE (SAR)

Abstract

International Aeronautical and Maritime Search and Rescue (IAMSAR) manuals call for a Global SAR system. However, ICAO Convention of Civil Aviation 1944 Annex 12 (SAR) and IMO SAR Convention 1978 has created distinct approaches on SAR. In light of that, the ICAO-IMO Joint Working Group (JWG) was established in 1993, with the objective of assisting ICAO and IMO in developing provisions regarding new search and rescue techniques and procedures where both aeronautical and maritime interests were involved. The JWG is currently working on a new version of IAMSAR to be published in 2016. The Asia Pacific has as well created the Asia Pacific SAR (APSAR) Task Force where APSAR TF has met three times on issues relating to Aeronautical and Maritime SAR. Separately, ASEAN concluded a meeting within the ASEAN Transport Ministers Working Group in March 2014 to draft a regional aeronautical and maritime SAR agreement. In spite of international, extra regional and regional efforts, many States in the region are yet to harmonise aeronautical and maritime SAR architectures as there are no policy recommendations to do so. Malaysia has the opportunity to conduct studies into the benefits and the way forward to harmonising SAR.

1.0 Introduction

In these modern days where human and cargos are transiting frequently from one destination to another one, the mode of transportation has rapidly changed towards the maritime and aeronautical sector. Due to this matter, there is significance increment in number for both transportations mode. While aeronautical and maritime transports are considered safe to the passenger, no one can neglect that any incident happens that is mishandled by relevant party will bring this matter into catastrophe scenario. Search and Rescue (SAR) is the unneglectable element to ensure the longevity for both industry namely aeronautical and maritime transportation. SAR can define as the use of available resources to assist persons and property in potential or actual distress.¹

The year of 2014 has witnessed the game changer in SAR aspect for the whole world community especially Malaysia. MH370 and QZ8501 incidents have stamped an important milestone for Malaysia and ASEAN especially in term of operation and cooperation of SAR. During the MH370 SAR operation, Malaysia has government has been criticize by the global community due to the inefficient in handling the SAR operation. CNN has stated six major mistakes done by Malaysia Government in handling this incident² while The Guardian has reported that the passenger relatives both in China and Malaysia were furious by the way our government tackled this issue especially on declaration on flight lost.³

In term of managing the SAR aspect, there are two main relevant bodies involve which is International Civil Aviation Organisation (ICAO) and International Maritime Organisation (IMO). While both bodies are shelter under United Nations (UN), they show a great cooperativeness among them especially in SAR aspect. Annex 12 to the Convention on International Civil Aviation has been made in

¹ <http://www.uscg.mil/international/affairs/Publications/MMSCode/english/Chap9.htm>

² <http://edition.cnn.com/2014/04/01/world/asia/malaysia-plane-missteps/>

³ <http://www.theguardian.com/world/2014/mar/25/mh370-relatives-anger-malaysia-building-weeks-protests-china>

1946 which underlined a set of internationally agreed Standards and Recommended Practices for SAR which is complemented in IAMSAR Manual Volume 1, 2 and 3. IMO has complemented the ICAO effort by establishing SAR Convention in 1979 which mention the need for proper preparedness and effective operation in SAR in lieu with aeronautical effort.

It is clearly seems that both aeronautical and maritime SAR are related to each other in most of the aspect. Unfortunately, some of the main element involve are align with each other. ICAO is managing their SAR services by using Flight Information Region (FIR) which also use for Air Traffic Management (ATM). This area is airspace of defined dimensions within which flight information service and alerting service are provided.⁴ This region established mainly based on geographical and technological capability of host state.



Figure 1: Kuala Lumpur, Kota Kinabalu and Singapore Flight Information Region (FIR)
Source: ICAO Website

⁴ ICAO, official definition, AN 2 Rules of the Air 2005

Contrast with the area implemented by ICAO, IMO has established SAR region (SRR) to be adhere by the coastal states in providing SAR Services for user states. It is an area of defined dimensions within which search and rescue services are provide.⁵ This area may bounded by national boundary or any relevant consideration among littoral states. Both said area (FIR and SRR) are not reflecting the national boundary or sovereignty but often misjudge by states who consider this aspect as an effective vitae element especially in disputed area.

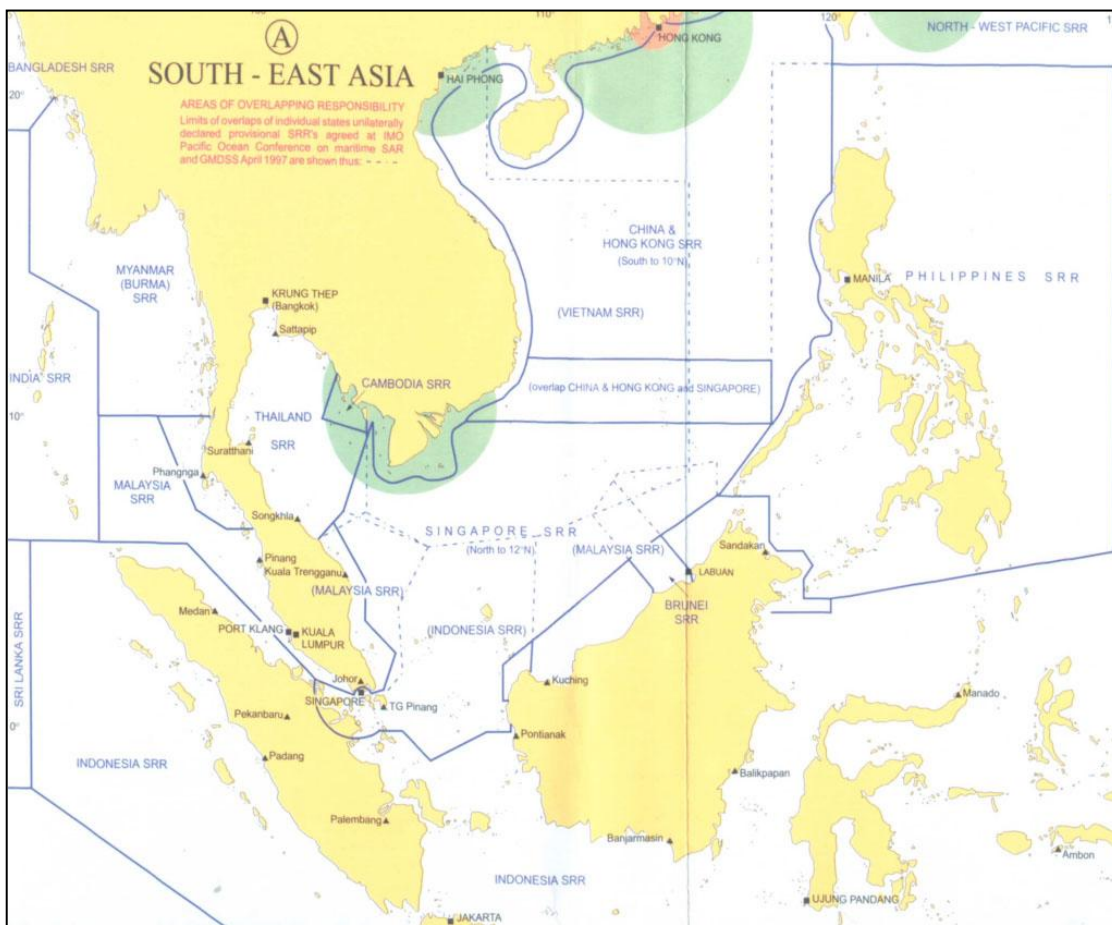


Figure 2: Southeast Asia SAR Region (SRR)
Source: IMO website

⁵ International Convention on Maritime Search and Rescue, 1979

2.0 Problem Statement

In spite of international, extra regional and regional efforts, many states in the region are yet to harmonise aeronautical and maritime SAR architectures as there are no policy recommendations to do so. Malaysia has the opportunity to conduct studies into the benefits and the way forward to harmonising SAR.

3.0 Area of Study

The area of study covers maritime SAR and aeronautical SAR including all supporting system to the SAR services.

4.0 Objectives of study

The development of policy approaches to address management of scarce resources, duplication of efforts and a single reference point for SAR efforts. It is also to improve coordination and cooperation within the national SAR system as well as with neighboring States.

5.0 Significance of the study

The IAMSAR Manual calls for a comprehensive approach to the Global SAR Plan. Since ASEAN has already embarked on Harmonising SAR as taken upon by APSAR TF and ICAO/IMO JWG, it will be necessary for Malaysia to study the benefits of one single Rescue Coordination Centre or Joint RCC (JRCC). This will entail managing of scarce resources, address duplications of efforts and ensure a single repository of information or point of reference in a Malaysia.

6.0 Methodology

There were several methods used to achieve the objectives of this study. Literature reviews were used to gain knowledge of the subject matter. In addition, field visits were conducted to related agencies to gain firsthand knowledge. Furthermore, brainstorming session also been conducted among stakeholders.

7.0 Limitations

The information for this study is limited to open sources, interviews with relevant agencies and data received on restricted basis.

8.0 Literature Review

8.1 International Aeronautical and Maritime Search & Rescue Manual (IAMSAR) 2013 Edition – Volume 1, 2, and 3.

IAMSAR were specifically tailored by the International Civil Aviation Organisation (ICAO) and International Maritime Organisation to assist states in identifying their own requirement for Search & Rescue (SAR) in term of organisation, legislation, and guidance to provide efficient SAR services within their SAR region (SRR).⁶ The manual also calls for cooperative manner among neighboring states to maximize the effectiveness of their scarce asset in handling any SAR operation and each national SAR plan shall be developed in tandem with the global system to support interoperability among the states.

⁶ ICAO – IMO (2013). *IAMSAR Vol I*. IMO Publication. pg V.



Figure 3: IAMSAR 2013 Edition – Volume 1, 2, and 3.
Source: Google Image

In order to assist every state in achieving required standard of SAR plan, IAMSAR has underlined several compulsory requirement and self assessment for every state to be fulfilled.⁷ Malaysia achievement as follows; General System Concept 64.7%, System Component 47.6%, Training 21.1%, Communication 65.5%, System Management 80% and Improving Services 60%. Total score for Malaysia is 57.8% and it is an indicator of our readiness level in handling SAR scenario.

These manuals will be reviewed every three years by contemplating previous edition amendments. Every related incident happen such as MH370, MH17 and QZ 8501 will be studied and will be made benefit towards the improvement of this manual. Prior to that, these manuals maintain its position as a main reference for every state to compose their own national SAR plan respectively.

⁷ ICAO – IMO (2013). *IAMSAR Vol I*. IMO Publication. Appendix H – National Self-Assessment on Search and Rescue. pg H-1.

8.2 Asia Pacific SAR Task Force (APSAR TF)

The establishment of the Asia Pacific SAR Task Force was mainly based on temporary basis. It has undergone four meeting session as follows; APSAR/TF/1 Bangkok (5-8 Feb 2013), APSAR/TF/2 Singapore (27-30 Jan 2014), APSAR/TF/3 Maldives (25-29 Jan 2015), APSAR/TF/4 Bangkok (6-10 Jul 2015) and it is more likely to be end as far as the fourth session in Bangkok. ⁸

Initiatives to bring up this task force were made during the 23rd Asia Pacific Air Navigation Planning and Implementation Regional Group (APANPIRG/23) which held at Bangkok on 10-14 September 2012. The idea of this establishment is to deliver a plan within two years of establishment for enhancement of SAR capability within Asia Pacific region, including enhancement of SAR services with neighboring states. ⁹

Throughout the session, this task force has analysed each aspect on SAR capability among states within Asia Pacific region. These series of meeting also witnessed significance increment in participating states from first meeting until fourth one which both held at Bangkok. Based on the last meeting, all states were ranked based on their capability in SAR services. According to the ranking, Malaysia is ranked at number 17 out of 43 countries.

⁸ Agenda Item 8: 4th Meeting of APSAR Task Force Report.

⁹ A2 Decision ATM/AIS/SAR/SG/22-12 – Establishment of APSAR Task Force.

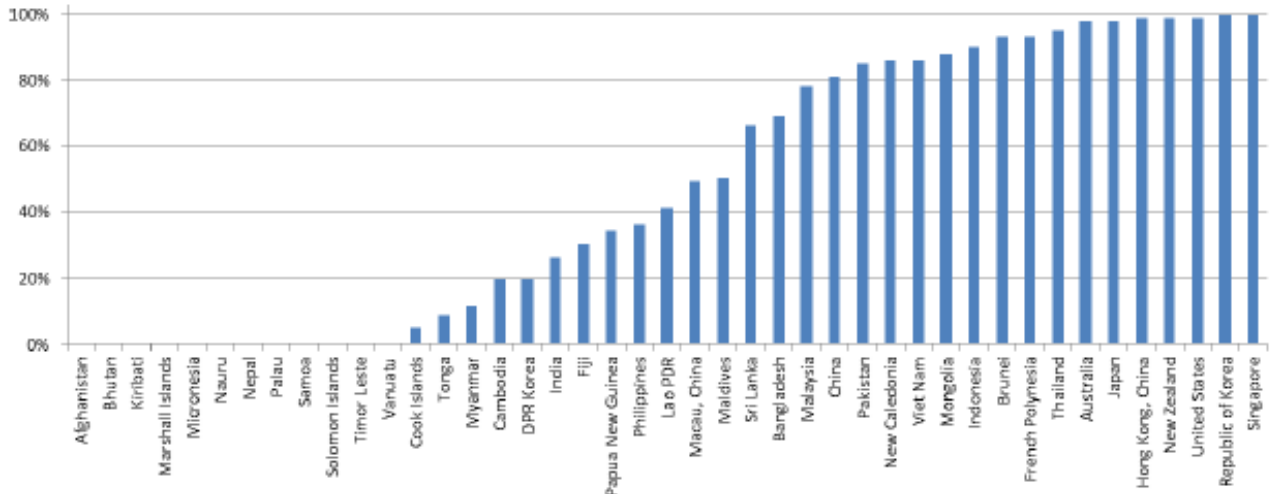


Figure 4: Asia Pacific SAR Capability Ranking
 Source: 4th Meeting of APSAR Task Force Report

8.3 Asia Pacific SAR Plan (Draft)

Asia Pacific SAR Plan (Draft) were proposed by the APSAR Task Force who completed its series of meeting in Bangkok to provide a framework to assist Asia Pacific states to meet their SAR needs and obligations accepted under the convention of ICAO.¹⁰ This plan has identified the arrangement and status of SAR preparedness among Asia Pacific Region States and it also underline the recommendations for SAR planning and preparedness enhancement.

In order to keep this plan concurrent with the changes in all related procedure, APANPIRG will conduct a complete review on this plan every three years from 2019.¹¹ This review will be conducted in the similar cycle as IAMSAR Manual and Global Air Navigation Plan (GANP) then it will be guided by relevant International Organisations. During the reviewing process, all involving states will require to give their feedback and input to improve the plan effectiveness in the future.

¹⁰ Asia/Pacific SAR Plan DRAFT V1.0. para 2.9, pg 3.

¹¹ Asia/Pacific SAR Plan DRAFT V1.0. para 1.5, pg 1.

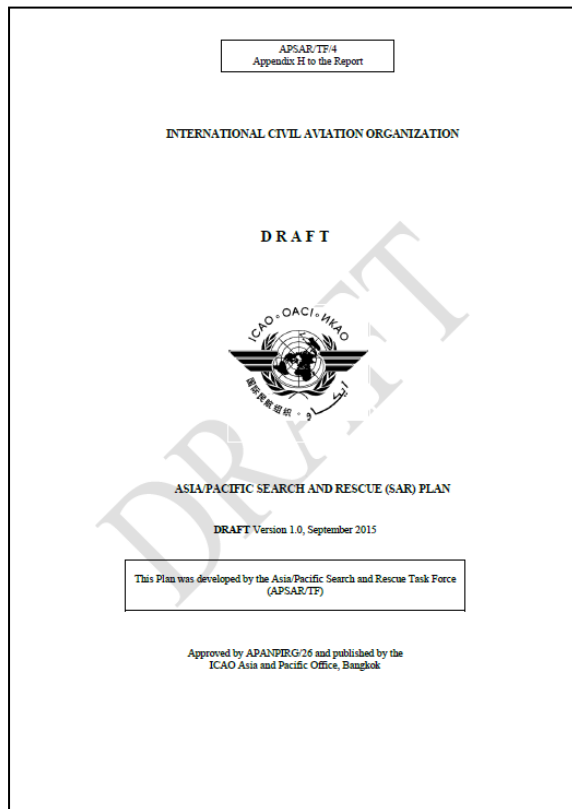


Figure 5: Asia Pacific SAR Plan (Draft)
Source: Appendix H, APSAR TF/4 Report

8.4 Malaysia's National SAR Plan

In Malaysia, our national SAR plan is underlined under the IAMSAR Manual Volume 4 which is produced by National Security Council. This manual were authored based on IAMSAR Manual Edition 1998 and were released after the implementation National Security Council (NSC) Directive No. 20 on 11 May 1997.¹²

This manual has mentioned the responsibilities carried by each agency mainly Department of Civil Aviation (DCA) for Aeronautical SAR (ASAR) and Malaysian Maritime Enforcement Agency (MMEA) for Maritime SAR (MSAR).

¹² IAMSAR Vol 4, Page 1 – 1, Para 1.2

The purpose of this manual is direct, co-ordinate and control ASAR and MSAR missions within Malaysia SRR. It also aimed to provide the organizational basis for co-operation between different agencies.¹³ The introduction of this manual has been an important element for National Aeronautical and Maritime SAR plan. The plan is an initial guidance for the NSC and all relevant agencies who sit in the SAR structure.

The structure for Malaysia SAR organisation is underlined in this plan which consists of two different types of SAR incidents as follow:

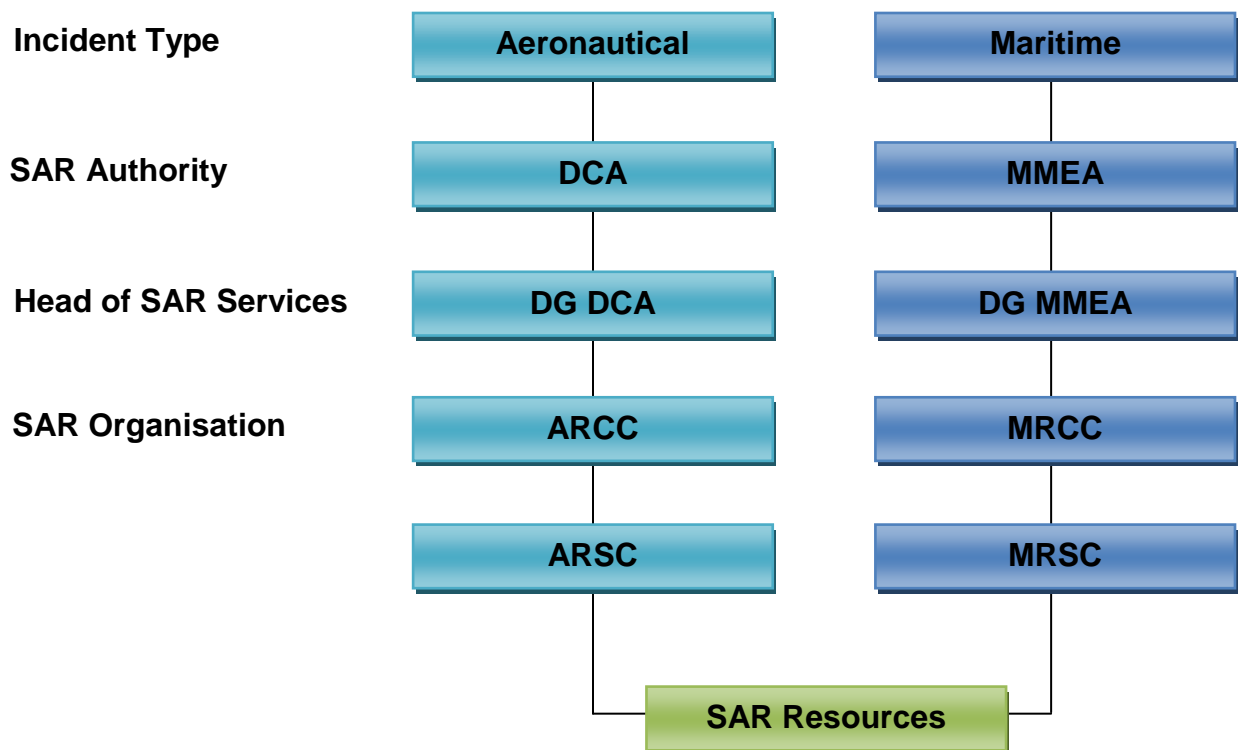


Figure 6: Malaysian SAR Organisation Structure
Source: IAMSAR Volume 4

¹³ IAMSAR Vol 4, Page 1 – 2, Para 2.1

8.5 National Security Council (NSC) Directive No. 20: Policy and Mechanism of National Disaster Management and Relief

NSC Directive No. 20 were initiated by NSC due to the many accidents and disaster occurred in Malaysia especially with incident of Highland Towers in 11 December 1993 which bring up all Cabinet Ministers to come up with the special directive on mechanism for natural disaster management. Following the decision is the introduction of Directive No. 20 by NSC on 11 May 1997.

Search and Rescue (SAR) aspect has been mention only on the surface aspect and it will be govern by this directive if the incident happens in the area with the civilian building. According to this directives, maritime disaster can be describe as any accident occurred at the sea which involves lives and properties, will be handled by Malaysian Maritime Enforcement Agency (MMEA) in accordance with IAMSAR Volume IV (National SAR Plan).¹⁴ Meanwhile, air disaster can be described as an accident involving aircraft and it will be handled by Department of Civil Aviation (DCA) unless the crash site are within populated area then it will be under NSC jurisdiction.¹⁵

¹⁴ Directive No. 20, Page 4, Para 7

¹⁵ Directive No. 20, Page 4, Para 8 - 9

9.0 Area to be Harmonised

In order to harmonise both aeronautical and maritime SAR, there are several important elements that shall be considered as key areas of harmonizing. These areas are essential to support the planning and implementation phase of successful SAR operation.

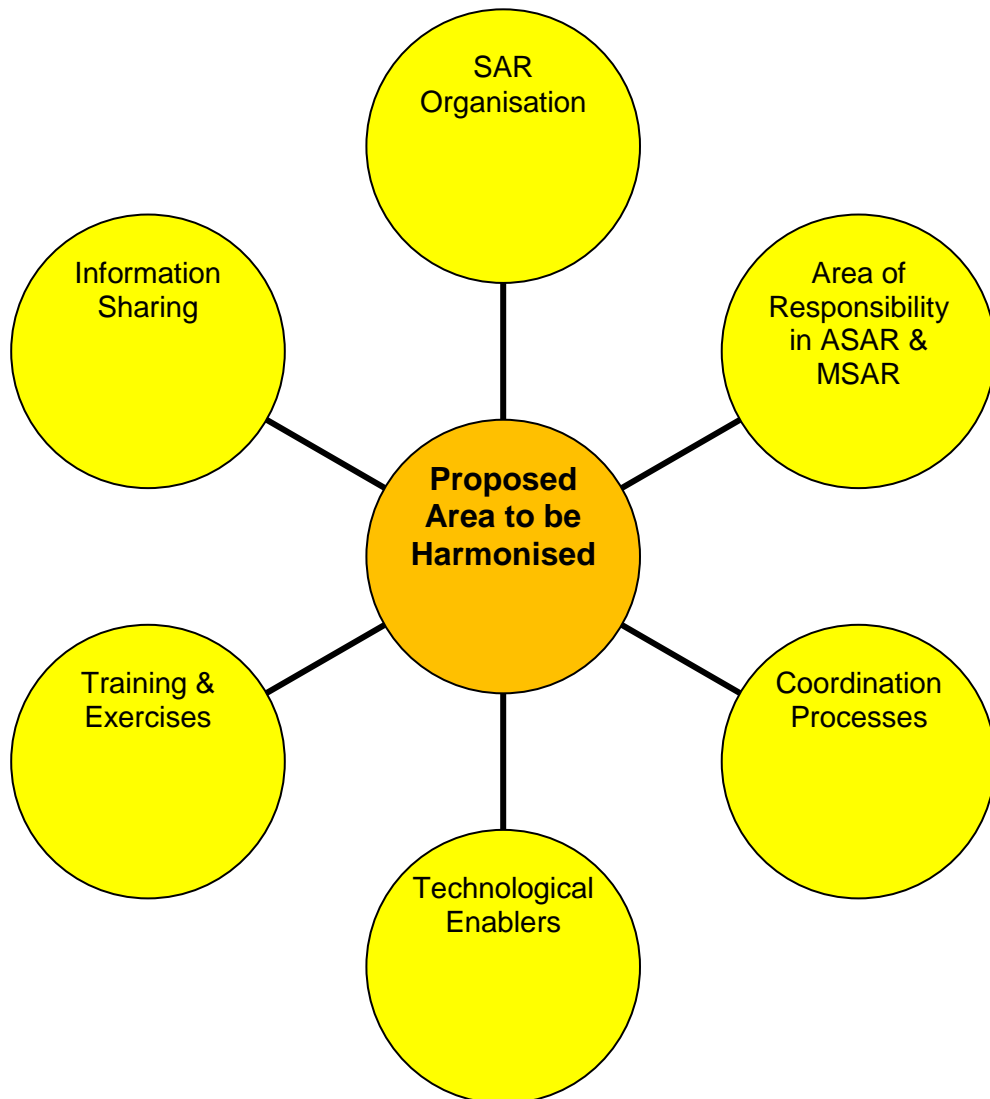


Figure 7: Proposed Areas to be Harmonised

9.1 SAR Organisation

To ensure a smooth and effective SAR operation, it is important to have a credible and competent SAR organisation which may cope with the uncertainty of SAR scenarios. As we know, SAR operation will involve parties from various organisation, expertise, and background hence it is compulsory to ensure this organisation understand each of its components.

There are two different structure of SAR organisation practice around the globe namely Joint Rescue Coordination Centre (JRCC) and Aeronautical Rescue Coordination Centre (ARCC) together with Maritime Rescue Coordination Centre (MRCC). In Malaysia, we have been practice the SAR operation via two centre which is ARCC managed by DCA and MRCC by MMEA. The existence of these two different centres has made us look ASAR and MSAR as a different scenario even it is happen in the same area and require the same asset for both SAR operations.

Interoperability challenges looks more disrupting in ARCC & MRCC model compared to the JRCC model which carried each element under the same roof of command structure. By having the JRCC, it is an advantage for the SAR expert within the centre to share their expertise either in aeronautical aspect or maritime aspect. It also helps to feed the commander in the centre with valid information in each of the incident thus improving effectiveness and efficiency of the coordination centre.

Through the establishment of JRCC also, they will be a single authority who responsible for meeting the International Civil Aviation Organisation (ICAO) and International Maritime Organisation (IMO) requirements in the SAR aspect. Today, we still require two representatives from different agencies (DCA and MMEA) for each meeting to meet ICAO and IMO requirement for an example meeting for ICAO/IMO Joint Working Group.

The establishment of JRCC also can give a great boost in the SAR operation by having a national SAR point of contact. This improvement will contribute to the less complexity for alerting post and enhance the effectiveness of SAR Person of Contact (SPOC). Bilateral cooperation in SAR can be achieved in a simpler manner by establishment of JRCC which align with regional JRCC's such as BASARNAS of Indonesia and AMSA of Australia.

9.2 Area of Responsibility

Malaysia as a littoral state as give us such a unique geographical interface which consist of two land masses with large sea area between them. SAR Region (SRR) for MSAR has been control by MMEA since its inception on 2005. This SRR covered up to Andaman Island to the west peninsular and Malaysia EEZ on East Coast and West Malaysia side.

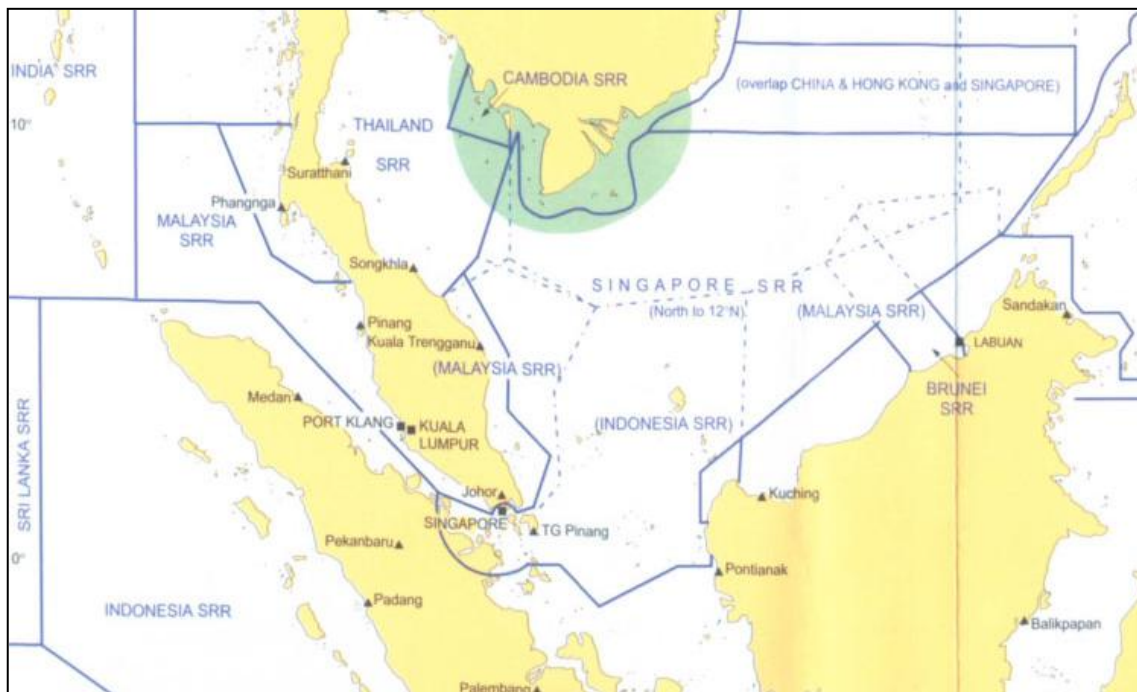


Figure XX: Malaysian Search and Rescue Region (SRR)
Source: Malaysian Maritime Enforcement Agency (MMEA)

Meanwhile, Malaysia FIR comprises two different FIR which is FIR Kuala Lumpur and Kota Kinabalu FIR. Vast area of South China Sea is put under Singapore FIR hence it also declares the same area for SRR.

Via this study, it is understood that the enforcement of FIR and SRR does not affect the sovereignty status of each country but it may be used as an element of effective vitae in the disputed area by some countries. The decisive factors on each region mainly based on geographical and technological aspect belong to each country. It is a main reason why vast area on the South China Sea are belong to the Singapore and it is clear intention from Malaysia and Indonesia to take over those area as their FIR in the future.

Both regions represent the areas of responsibilities for MSAR and ASAR and in order to harmonise both SAR, we need to look onto rationalisation of the FIR and SRR. While doing this effort, we also need to accede to international convention from ICAO and IMO thus maintaining the effectivity of SLOC and ALOC in this region. The effort on rationalizing both region can be achieved if the need for agreements, arrangements or MOU among states is been focused on.

9.3 Coordination Processes

Since coordination is the key to SAR, it will be vital for Malaysia to harmonise existing structures in strengthening cooperation and coordination especially where interoperability is concerned. The IAMSAR Manual provides guidance to states through a 'self-assessment' form. States may wish to conduct their own self assessment in recognising the need to strengthen cooperation and coordination of SAR.

In a SAR situation, there will be a number of important coordination activities indirectly related to the main SAR effort. These include SAR logistics and regulation of information flow to the media. These processes may need to be

harmonised to ensure timely and calibrated responses. This would involve a coherent SAR response to contingencies within the state, and involving inter-state cooperation, particularly in terms of synergizing the existing processes for aeronautical and maritime SAR, and the relevant civilian and military institutions. It would also involve considerations to cut-down reaction time for timely SAR response, and logistics arrangements for sustenance of SAR forces during a mission.

SAR capacities in Malaysia are largely on military and para military based equipment or platform. This is also supported by varies number of civilian asset such as aircraft and vessel. By having various types of platform and staff, it is important to have an excellent coordination among these assets to ensure maximum effectiveness of deployment.

There are needs for calibration of response between aeronautical – maritime and civil – mechanism. This can be achieved by proposing a SOP and apply it onto Tabletop Exercise (TTX) before been applied on Field Training Exercise (FTX). This exercise can be a good field to monitor the coordination processes and the opportunity for improvement of this kind of operation.

SAR operation is not solely a searching activity in the sea but it requires a lot of background works. There are growing numbers of organisation such as MERCY, St John, etc which have volunteers as part of the SAR System. Their roles, capacities and capabilities are vital to be harmonised into the National SAR system where every entity complements each other. Volunteers may fill gaps in civilian and military cooperative mechanisms. It will be a good addition towards existing structure if these sources are coordinated nicely in the current system.

9.4 Technological Enablers

Technology is a great enabler in the SAR Operation either been fitted onboard SAR Unit (SRU) or shore based such as JRCC. It will catalyze the process of searching and information dissemination between SRUs and RCC. They are various kind of high technology involves such as communication equipment, tracking devices and integrated management system.

Due to the involvement of various assets from multiple agencies, it is considerable potential challenges of interoperability's among SRUs. The challenges for technological aspects may come in the shape of communication alignment, sensors interference, and difficulties in establishing a valid common operating picture.

For example, the usage of datalink has been widely used in SAR operation among developed country but in Malaysia, its usage still limits towards military utilization. This situation occurs due to the lapse exists between military and other government agency due to the certain technology requirement which is not available among government agency.

Harmonization on technological enablers can be achieved from the early stage of the procurements. Government shall emphasize all ministries and agencies to adhere with the standard requirement on SAR capabilities at least on the minimum requirement. This may come in the aspect of technical specification, interoperability among different platforms and suitability to be operated with the older or previous equipment. This steps not just taking the operational aspect into account but it will takes benefit in term of budgetary elements.

9.5 Information Sharing

In handling SAR Operation, one of the most important elements that cannot be neglected is information element. There are multiple efforts in gathering information and also to disseminate it thus it requires a comprehensive approach. At the most of the situation, the information given is not reaching its target location or person.

The correct information is essential in order to establish a valid Common Operating Picture which can be displayed aboard all SRUs. This accessibility may assist the ground commanders in sharing the same situational awareness in the SAR operation. The sharing of information is not essential for the ground commanders only, it is also having a similar importance for the shore based commanders which in Rescue Coordinating Centre (RCC). This valuable sharing may lead towards the effective decision making processes especially in doing assets mobilization and recovery purposes.

Information sharing is a compulsory need not only among the SRUs but also among the RCCs in handling multinational SAR operation. It is an unhealthy practice to keep some of the relevant information within the same party for the reason of security or national interest. All parties shall keep the highest transparency in exchanging the relevant information to ensure the effectiveness of SAR operation.

One element which cannot be left aside by SAR Authority is a media consideration. Media has been a tool in bridging the information related with SAR operation to the public. RCCs shall have a properly train media liaison officer to ensure only necessary information been released to the public. Besides that, RCCs also need to monitor all the news published because it will reflect directly to the credibility of the SAR authority.

9.6 Capacity and Capability Building

The final area to be harmonized is the Capacity and Capability Building for Aeronautical and Maritime SAR. Both capacity and capability building shall be building upon the best practices especially in this region. Some of the countries in this region have a very distinct experience in doing SAR operation. For an example, BASARNAS of Indonesia, in many years they face a lot of incident in aeronautical and maritime sector which became a stage for them to establish themselves as SAR authority to be reckoned with in this region.

We shall not neglect the aspect of training and exercises as this aspect plays a major role towards the successes of the operation. Our approach on these aspects must be reviewed as the element of SAR must be seen as a composite entity and not standing alone as previously. These aspects can be harmonised by enhancing the SAR Mission Coordinator cross competency both in ASAR and MSAR. This step will improve the competency of the mission coordinator in handling both types of SAR.

Besides that, we shall look into harmonizing the cross training for civilian and military stakeholders as for years we tend to see SAR operation as military or para-military like operations. Civilian element even without the high sophisticated equipment also can contribute a lot to the operations as they are play a major role especially in supporting the operations mainly in logistic arrangement and community related (COMREL) activity. In order to achieve this objective, relevant agency or authority need to extend the SAR training to the volunteers as it can prepare them to face this kind of situation.

By having the SAR exercise especially at the regional level, it is a major milestone towards the improvement in SAR services especially for this region. Once cannot be forgotten is to have a maximum output from each of the exercise. To make this thing be realized, it is advisable to incorporate more

realism in exercises in term of scenario, SRUs platform, and application of current procedures. By having this kind of exercises, we will see if there is any loop exists in the operation and proceed with the relevant measures in the future.

In order to have a smooth and reliable SAR operation, the major requirement shall be the human capital. In this case, the SAR expertise who has the experience and well trained to handle any kind of the SAR incident. It requires a lot of money and time to train the SAR expert hence it will be a major disadvantage towards the organisation if these kind of expert been transferred out of SAR circle for the reason of administration or promotion. The retention of SAR experts within the SAR circle is important especially in dealing with SAR scenario and training the new lads in the SAR circle.

Around the globe, every country has their own experience and expertise in handling SAR incidents. ASEAN region are not exempted on this. It is advisable for the whole ASEAN nation to exchange their expertise and share their experience among the nation in this region. This arrangement can be made possible by having suitable agreement on these matters. The agreement for capacity building can essential towards the more cooperative efforts in dealing on SAR incident in the future.

10.0 Recommendation

By having this study, it is understood and recommended for the evolvement of National SAR Committee into National SAR Council. By having this evolvement, it will catalyze the urgency and the importance on SAR aspect at the national level.

Furthermore, the current arrangement of MRCC and ARCC is no longer suitable to be operated in today's' environment and it is positive steps to

establish JRCC to handle all kind of SAR scenario which been known as the fundamental aspect on the safety aspect especially for the related industry.

We also have to look into the improvement on cooperation between Government and Non Government entity is SAR operation as this operation cannot be widely consider as a sole military or para-military anymore. Non government entity can contribute not only on the matters of logistic arrangement but also in technological aspect especially from industrial player.

In term of area of responsibilities, it is understood that the both said area which is FIR and SSR are not contemplating with each other thus inviting some conflict when the incident arises. Further study of this region shall be undertaken to rationalize both region in catering the SAR needs.

Finally, to achieve the most in the interoperability aspect, it is recommended to have a proper guideline on any new assets procurement to support the interoperability among agency involved in SAR. This recommendation covers on platforms, equipment and also on the software part without neglecting the needs of each agency involved.

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