International Civil Aviation Organization

The Third Meeting of the APANPIRG ATM Sub-Group (ATM /SG/3)

Bangkok, Thailand, 03-07 August 2015

Agenda Item 6: AOP, MET, AIM, SAR

APSAR/TF OUTCOMES

(Presented by the Secretariat)

SUMMARY

This paper presents the outcomes of the Third Meeting of the Asia/Pacific Regional Search and Rescue Task Force (APSAR/TF/3, Maldives, 25 to 29 January 2015) and the Fourth Meeting of the Asia/Pacific Regional Search and Rescue Task Force (APSAR/TF/4, Bangkok, Thailand06 to 10 July 2015).

1. INTRODUCTION

1.1 The Third Meeting of the Asia/Pacific Regional Search and Rescue Task Force (APSAR/TF/3) was graciously hosted by the Maldives from Sunday 25 to Thursday 29 January 2015 at Hulhulé Island (location of Malé International Airport). The APSAR/TF/3 meeting included an International SAR Workshop (SAREX) focused on the Indian Ocean, which was conducted on 25 January 2015. After the APSAR/TF/3 meeting, stakeholders involved in the Australian Indian Ocean Area SAR Capability Partnership Program met on 29 January 2015 to discuss arrangements.

1.2 The Fourth Meeting of the Asia/Pacific Regional Search and Rescue Task Force (APSAR/TF/4) was held from 06 to 10 July 2015 at Bangkok, Thailand. On 06 July 2015 a SAREX Planning Workshop was also held, immediately prior to the APSAR/TF/4 meeting. The Workshop discussed various suggestions for planning and conducting a regional SAREX in late 2015, which would include an ICAO human performance seminar/workshop (reference *Conclusion APANPIRG/25-11: Human Performance Initiatives*) and SAR Plan implementation activity that would precede the SAREX.

2. DISCUSSION

Air Navigation Report Form

2.1 The APSAR/TF/3 meeting reviewed the draft SAR Air Navigation Report Form (ANRF, **Appendix A**). The APSAR/TF agreed to the following Draft Conclusion for consideration by the ATM/SG and APANPIRG:

Draft Conclusion APSAR/TF/3-1 SAR Air Navigation Report Form

That, the Search and Rescue (SAR) Air Navigation Report Form (ANRF) as appended in **Appendix X to the Report** be utilised by Asia/Pacific States as a means of regional strategic SAR planning and implementation in the Asia/Pacific Region.

ICAO HQ SAR Technical Officer Secondee

2.2 In response to the recommendation from the APSAR/TF/2 (resulting in Conclusion APANPIRG/25-20: *Global SAR Coordination*), the APSAR/TF/3 were informed that Australia had offered one of its Aeronautical Joint Rescue Coordinator Centre (JRCC Australia) Chiefs as a secondee at ICAO Headquarters for a 2 year period, fully funded by Australia. This expertise would allow ICAO to review options for a long term solution. ICAO thanked Australia for its initiative to assist the global SAR effort.

SAR Response to MH370

2.3 ICAO provided a brief on the SAR response to the disappearance of Malaysia Airlines Flight 370 (MH370) on 08 March 2014, while flying from Kuala Lumpur, Malaysia to Beijing, China with 239 people on board. The APSAR/TF/3 meeting noted the following issues as being possible lessons learnt that could be incorporated into the Asia/Pacific Plan:

a) The time lapses of more than 16 minutes between the transfer of control point at IGARI and the advisory to Kuala Lumpur ACC that MH370 had disappeared, 38 minutes for the declaration of an INCERFA SAR phase and 7 hours and 21 minutes for the declaration of an ALERFA/DETRESFA SAR phase by Viet Nam indicates that there was a need to divert more resources and/or urgency in the ATC response;

b) It is apparent that a higher degree of civil/military coordination may have revealed the MH370 course reversal much earlier, and as the track also crossed Thailand's PSR coverage, advice to Thailand may have also proved beneficial. Considerable time had been lost in the initial search, partly due to poor civil/military cooperation;

c) Annex 11 and Annex 12 SAR phases and actions needed to be revised (Annex 11, Section 5.2, and Annex 12, Section 5.2 refer) to take into account the expectations and capabilities of an ATS surveillance environment, the need for civil/military coordination where appropriate, and advisories to all neighbouring ACCs in the case of uncertainty of the aircraft's track; and

d) Poor SAR preparedness and ad hoc SAR coordination between States, including the intervention by political decision-makers needs to be addressed if an optimal operational response was that it was difficult to reconcile the primary radar trace with an airliner's capability, adding further doubt at the time.

2.4 The following recommendations were made by Malaysia for consideration by the APSAR/TF in terms of SAR system improvements:

a) extend the transmission life of Underwater Locator Beacons (ULBs) installed in flight recorders on all commercial aircraft;

b) closer civil/military airspace coordination and communication;

c) clearly defined division of responsibilities between the SAR functions (Annex 12) and the air accident investigation search and recovery functions (Annex 13); and

d) establishment of a legal framework to support the roles and responsibilities in handling various SAR missions.

2.5 Malaysia commented that the Rescue Coordination Centre (RCC) did not have dedicated SAR officers, but utilised SAR-trained air traffic controllers. APSAR/TF/3 agreed that this may not be optimal, as SAR was an increasingly specialised task that required expert knowledge. In addition, Malaysia stated that lack of English proficiency between RCCs played a part in the difficulty of understanding information that was being conveyed, especially with the Ho Chi Minh RCC.

2.6 The APSAR/TF/3 had an extensive discussion about the lessons that might be learnt from the MH370 event. Considering APANPIRG *Conclusion APANPIRG/25-22: Provision of MH370 Feedback*, the Task Force expressed its disappointment at the unfortunate lack of participation by Viet Nam at APSAR/TF/3. In addition to those already provided in WP05, the lessons included the following points regarding the need for:

a) adequate testing of systems (regular testing, or during SAREX to ensure an efficient Annex 11/12 response;

b) States (or sub-regional/regional bodies) to minimise the 'grey areas' over unclear aeronautical-aeronautical and aeronautical - maritime SRR boundary responsibilities, especially in the latter case regarding an aircraft ditching into the sea;

c) improvements in the cooperation between international bodies such as Iridium, Cospas-Sarsat and Inmarsat to enhance technical data availability and analysis;

d) improvements in cooperation between States and State entities through ICAO Standards and State legislation (*note: Annex 12 paragraph 5.1.1. merely refers to 'SAR organisations' being compelled to provide information to RCCs, whereas the scope of cooperation should be much wider*);

e) air traffic controllers to have relief or a supervisor for emergency response support;

f) familiarisation of ATC unit and airline operating systems through regular visits/liaison by RCC personnel to relevant ATC units and Airline Operating Centres (AOCs);

g) RCC staff to be full-time specialised officers expert in the field of SAR;

h) appropriate training of military responders regarding civilian SAR systems and standards and recommended practices.

i) English language proficiency in all RCCs to ensure correct understanding of communications;

j) regular reports and access to information for key stakeholders (SITREPS and media such as the Internet);

k) providing authority and empowerment to SAR agencies and therefore SAR Mission Coordinators to effectively coordinate SAR responses through State legislative Acts;

l) management of undue external influences (such as political entities) on efficient RCC responses; and

m) a means of handling media/next-of-kin enquiries.

2.7 Considering the lessons learnt from the MH370 tragedy (paragraphs 4.2 and 4.19), and other relevant information on recent SAR events, APSAR/TF/3 agreed to the following Draft Conclusion for consideration by the ATM/SG and APANPIRG:

Draft Conclusion APSAR/TF/3-2 SAR Lessons Learnt

That, considering the implications for Search and Rescue standards from the MH370 and other related events, ICAO, in coordination with the IMO through the ICAO/IMO Joint Working Group on Harmonisation of Aeronautical and Maritime SAR (JWG), should consider urgently updating global SAR documents from the lessons learnt.

Air Asia QZ 8501

2.8 Indonesia provided initial information regarding the Air Traffic Control (ATC) and SAR operation for Air Asia QZ 8501, which lost contact with ATC on 28 December 2014. The last known position of the aircraft was over the Karimata Strait, Java Sea. BASARNAS, as Indonesia's SAR organisation, had been conducting a SAR operation since the declaration of emergency phase until the wreckage was recently found.

2.9 The APSAR/TF/3 commended Indonesia on the conduct of the SAR operation, noting that the post-incident analysis and reporting was on-going. The Task Force discussed whether military SRUs were adequately trained in specific SAR procedures (such as the need to operate at optimal search altitudes). Indonesia stated that regular SAREX and liaison with the military had developed an adequate knowledge among SAR responders, and this was noted as a key lesson for other States.

2.10 Indonesia commented that the enhanced cooperation they had received by civil and military agencies was greatly assisted by their legislation (Act 29/2014) and also the presence of high ranking political officers, who reiterated the need to support BASARNAS.

Third Joint Mongolia-Russia Aviation SAR Exercises

2.11 Mongolia presented an IP to the APSAR/TF/3 on the Third Joint Mongolia-Russia SAREX. The Task Force noted the continuing exercises were an excellent example of cross-border cooperation that involved a realistic search which truly tested the system, allowing lessons to be learnt and systems to be refined.

Electronic Air Navigation Plan

2.12 The following electronic Air Navigation Plan (eANP) SAR elements in **Table 1** were presented for the APSAR/TF/4's review, consideration and discussion as required:

Reference	Detail	Appendix
Vol. I, Part VI	Incl. SAR Special Regional Requirements, if any	**B**
Vol. I, Part VI	Table SAR I-1 Search and Rescue Regions	**C**
Vol. II, Part VI	Incl. SAR Special Regional Facility Requirements, if any	**B**
Vol. II, Part VI	Table SAR II-1 Search and Rescue Facilities	**D**

Table 1: SAR Air Navigation Plan (eANP) Elements

2.13 The IMO noted that, whilst agreement on the delimitation of SRRs by the parties concerned were encouraged in order to avoid the overlap or gap of the SRRs, the decision on the declaration on individual State's definition of the SRR rested with the Government concerned. The facility to upload such information would be provided in a website facility at the COMSAR module of the Global Integrated Shipping Information System (GISIS, https://gisis.imo.org), much the same as the aeronautical SRRs were currently. The APSAR/TF/4 noted that the change in the status of SRR designation to one whereby the Council approved the eANP Vol I amendment may require a consequential change to Annex 12 to reflect this:

> *2.2.1 Contracting States shall delineate the search and rescue regions within which they will provide search and rescue services. Such regions shall not overlap and neighbouring regions shall be contiguous.*

Global SAR Update

2.14 The APSAR/TF/4 was provided with a briefing on matters related to the global progress of SAR improvement and SAR standards development. Of particular note were the following issues:

a) the High Level Safety Conference (HLSC) 2015 recommendations regarding global flight tracking and SAR to develop a Global Aeronautical Distress and Safety System (GADSS) for flight tracking, SAR activities and retrieval of Cockpit Voice Recorders (CVRs) and Flight Data Recorders (FDRs) data;

b) as recommended by the HLSC, the ICAO Secretariat was working to implement a regime of Regional SAREXs over the coming two years and beyond;

c) ICAO was reviewing Annex 12 — *Search and Rescue* and Annex 13 — *Aircraft Accident and Incident Investigation* to clarify the relevant provisions, including the interaction between the SAR phase and the investigation phase;

d) the evolving Medium Earth Orbit SAR (MEOSAR) system and the development of specifications for Next Generation Emergency Locator Transmitter (ELT) Beacons; and

e) the JWG focus this year would change from amendment to the IAMSAR Manual to issues associated with the GADSS, Normal Aircraft Tracking Implementation Initiative (NATII) and SAR deficiencies. The JWG Chair encouraged States to raise global issues for submission to the next meeting in Trenton, Canada, 14-18 September 2015.

2.15 The meeting noted that the GADSS was enabled by System Wide Information Management (SWIM) and an Information Repository Service, and consisted of the following main system components:

a) an aircraft Tracking System that provided a four dimensional position of individual aircraft at least every 15 minutes (but in abnormal situations, the system triggered an alert and increased the reporting rate of the aircraft's position to at least once per minute); and

b) Autonomous Distress Tracking System (ADT), in the event of a distress situation which can be activated on-board, manually, or from a ground station; and

c) Flight Data Recovery in the event of an accident to help locate the aircraft wreckage with an automatically deployable flight recorder or an alternative solution such as streaming technology.

2.16 APSAR/TF/4 noted that SWIM consisted of standards, infrastructure and governance enabling the management of ATM related information and its exchange between qualified parties via interoperable services. The Information Repository Service was intended to assist with correlation of an aircraft position with the applicable ATS unit and Rescue Coordination Centre (RCC) areas of responsibility together with their points of contact.

2.17 The CONOPS stated that the effectiveness of the current alerting of SAR services should be increased by addressing a number of key improvement areas and by developing and implementing a globally integrated system, the GADSS, which addressed all phases of flight under all circumstances including distress. The system was intended to maintain an up-to-date record of aircraft progress and, in case of a forced landing or ditching, provide the location of the aircraft and recoverable flight data. The APSAR/TF Chair noted that the GADSS would have an effect on RCCs, especially the need to improve RCCs systems to support GADSS. The meeting noted that it was important for States to remain engaged and contribute to the development of the SAR elements in the GADSS concept.

Status and Developments in Cospas-Sarsat

2.18 Cospas-Sarsat provided a status report on the Cospas-Sarsat (Cosmicheskaya Sistema Poiska Avariynyh Sudov Search and Rescue Satellite-Aided Tracking) System, including system operations, significant developments, space and ground segments, beacons, false alerts and results of Mission Control Centre (MCC) - SAR Point of Contact (SPOC) communication tests.

2.19 ELTs remained a significantly disproportionate contributor to false alerts compared to maritime Emergency Position Indicating Radio Beacon (EPIRB). This appears to be due to training and information issues for cockpit crews and maintenance personnel, who activate beacons for testing without realizing that all transmitted alert signals are treated as real. In part as a result of incidents where ELTs fail to transmit a burst before destruction in fire or submersion in water, the delay for the beacon's first-burst transmission was being reduced from 50 seconds to three seconds in the next generation of beacons. However, without proper training of cockpit crews and maintenance personnel, this could lead to an increase in false aviation-related alerts.

2.20 Cospas-Sarsat recalled that they operated the International 406 MHz Beacon Registration Database (IBRD, www.406registration.com) which was freely available to users with no access to national registration facilities. As at 1 December 2014, there were 48,341 beacons registered in the IBRD (38,991 at 1 August 2013) from 132 Administrations. On average, 326 SAR users per month logged into the IBRD to search for beacon registration information.

2.21 APSAR/TF/4 noted that as at 26 June 2015, five Low Earth Orbit SAR (LEOSAR) spacecraft were in operation. There were also seven geosynchronous SAR (GEOSAR) satellites operating at full operational capability: two Indian, two U.S., two Eumetsat, and one Russian geostationary satellite. Russia's Louch-5A remained under test at position 167ºE, with New Zealand, the United States and Australia supporting Russia in evaluating the Louch GEOSAR performance, with an aim of commissioning the satellite into the GEOSAR constellation. As at 26 June 2015, 53 Low Earth Orbit Local User Terminals (LEOLUTs), 23 geosynchronous Local User Terminals (GEOLUTs) and 31 MCCs were in operation.

2.22 Tests showed that about 25% of all tested SPOCs remained insufficiently responsive or non-responsive. The majority of less responsive SPOCs were from the African region. However, many Asia/Pacific administrations region indicated a deficiency with respect to Cospas-Sarsat alert facilities and procedures in the SAR Capability Matrix.

2.23 The MEOSAR constellation currently included three operational L-band satellites (Glonass-K1, and Galileo IOV-3 and IOV-4) and 17 GPS II satellites carrying experimental repeaters with an S-band downlink used by Cospas-Sarsat. The following Asia/Pacific States have announced the planned implementation of an operational MEOSAR ground segment: Australia, China, India, Japan, New Zealand and Pakistan. Singapore asked if the Initial Operational Capability (IOC) was on target for January 2017. Cospas-Sarsat confirmed that there was a significant resolve within Cospas-Sarsat to have IOC by early 2017.

2.24 It was reported that Galileo IOV-4 had been taken out of service following a problem that rendered it unable to use two frequencies [that may have been caused by a defective antenna]. The future disposition of this spacecraft was uncertain. The first two fully operational Galileo satellites carrying L-band SAR payloads were launched on 22 August 2014, however a launch anomaly occurred. In late November one of these satellites (FM-1) was successfully moved into a higher orbit with sufficient fuel to operate for 12 years. A similar orbital manoeuvre for FM-2 was concluded in March 2015. Satellites FM-3 and FM-4 were launched successfully on 27 March 2015.

2.25 The USA planned to carry Canadian L-band SAR repeaters on 24 GPS satellites starting with the launch of the ninth GPS Block III satellite, anticipated for deployment as early as 2020.

Asia/Pacific SAR Status

2.26 An analysis of the 35 Universal Safety Oversight Audit Programme (USOAP) SAR-related Protocol Questions (PQs) in June 2015 indicated an overall Effective Implementation (EI) of only **50.7%** for the Asia/Pacific Region. When analysed for the 35 Asia/Pacific States and administrations [that the USOAP programme had evaluated], 14 SAR-related questions indicated EIs below 50% that should be the focus of priority correction action plans (**Figure 1**):

- 23% - PQ 7.517 (SAR coordination with neighbouring States);
- 29% - PQ 7.505 (effective SAR safety oversight);
- 31% - PQ 7.495 (SAR inspectorate training programme);
- 34% - PQs 7.497, 7.501 (SAR inspectorate periodic training plan and OJT);
- 40% - PQs 7.499, 7.545 (SAR inspectorate training implemented; and SAR personnel regular training and appropriate SAR exercises arranged);
- 43% - PQ 7.507 (elimination of deficiencies identified by SAR inspectors);
- 46% - PQs 7.493, 7.533 (SAR inspector minimum qualifications and experience and RCC and RSC training programme); and
- 49% - PQs 7.487, 7.489, 7.491, 7.503 (sufficient SAR safety oversight staff, functions and responsibilities of the SAR inspectorate, SAR inspector job descriptions and SAR inspectorate training records system).

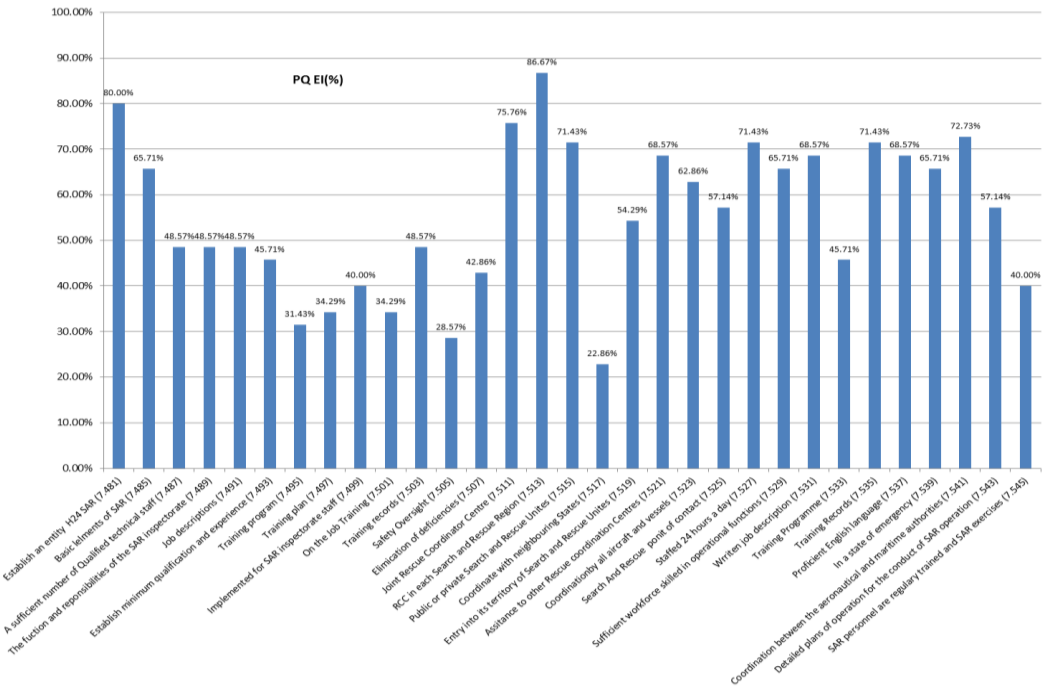

Figure 1: APAC USOAP CMA SAR PQ Compliance (average: 50.7%)

2.27 From this analysis, it appeared that the major areas of weakness is in areas of coordination with adjacent States, effective SAR oversight, and training of both SAR inspectors and staff that provide the SAR services. Therefore, regarding coordination with other States, a focus on the minimisation of barriers associated with the efficient cross-border coordination of SRU (such as pre-arranged approval) and other RCC coordination mechanisms was vital. In addition, there was a need for improved systemic approaches (possibly on a sub-regional or regional basis) to training for both SAR inspectors and personnel responsible for the provision of SAR services, including the regular organisation of effective SAREX that actually test systems and personnel.

2.28 Many States appeared to have unclear regulatory oversight of SAR services, due in part to a lack of certification and independent SAR regulation. It was recognised that many States had SAR services provided by a non-aeronautical entity (such as a maritime safety authority), so there may be some legal difficulties in developing a SAR inspectorate oversight system within the aeronautical system (i.e.: the Civil Aviation Authority of the State concerned). In this case, the State needed to demonstrate an independent safety oversight and compliance mechanism of the SAR services. States with low EI (below 50%) within the priority group of 14 PQs analysed were:

- 0% - Bangladesh, Bhutan, Micronesia (Federated States of), Cambodia, Nauru, Palau, Solomon Islands, Timor-Leste, Tonga, Viet Nam, Samoa,
- 7% - India, Nepal, Papua New Guinea;
- 14% - Indonesia, Philippines;
- 21% - New Zealand;
- 35% - Myanmar, Democratic People's Republic of Korea; and
- 43% - Fiji, Maldives.

2.29 The APSAR/TF/4 recognised that the PQ results were difficult to reconcile with the reality of challenges faced by many States, which had a priority to provide basic SAR services. The meeting was concerned that the imposition of a SAR inspectorate could reduce specialist SAR staff resources from States that were hard pressed to provide enough personnel for the provision of SAR services.

2.30 The meeting recognised that while an independent regulatory oversight was necessary, the PQs intimated that SAR inspectors needed to be SAR experts, and were a separate inspectorate to other ANS inspectorates then this appeared to be an onerous situation. APSAR/TF/4 recognised that the task of regulatory inspection for any ANS field (e.g.: ATC, AIS, MET, etc.) did not require the inspector to be an expert in the field itself but rather, it was necessary for inspectors to be experts in regulatory inspection skills, which were generic. Thus a generic ANS inspectorate could mean that inspectors could be utilised in an efficient manner and not draw too many resources away from the primary service functions such as SAR.

2.31 The current List of SAR Agreements is presented in **Appendix E**.

2.32 A SAR Agreement Matrix is provided in **Appendix F**.

2.33 The SAR Capability Matrix Table is appended as **Appendix G**.

2.34 **Figure 2** provides the updated overview for APSAR/TF/4. Five administrations had notified of substantial improvements in SAR capability in the past year: Bangladesh, India, Indonesia, New Caledonia, Pakistan and Viet Nam.

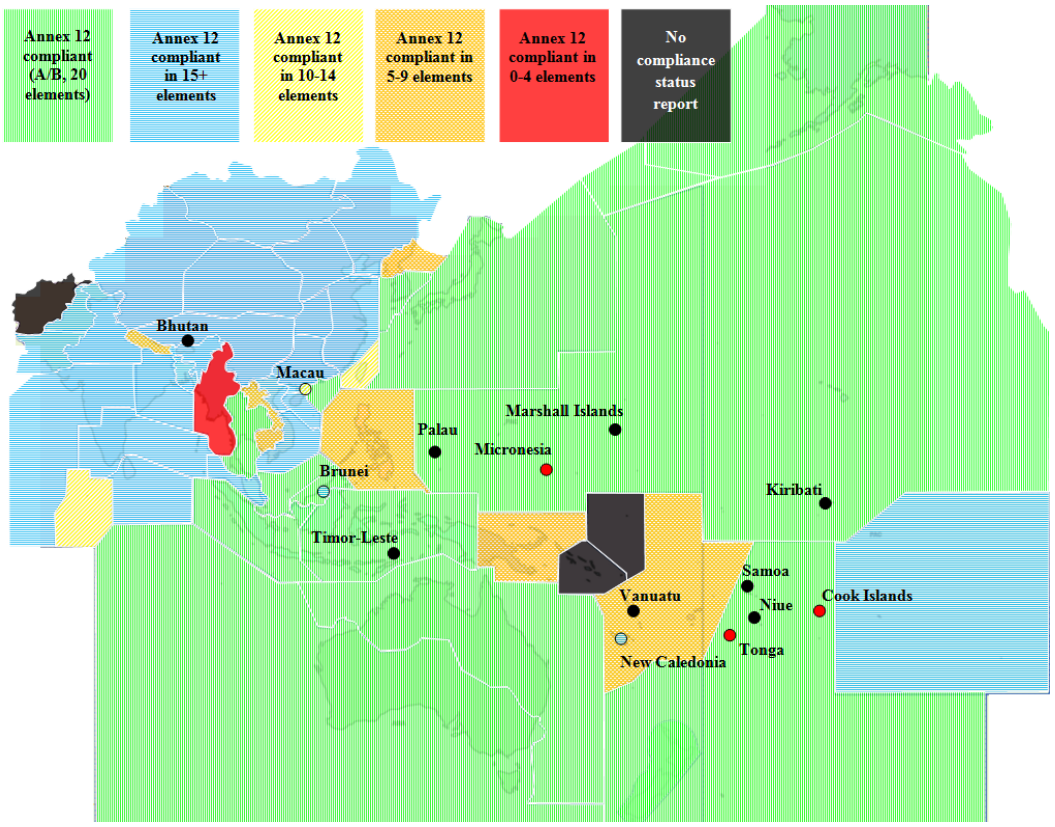

Figure 2: APSAR/TF/4 Asia/Pacific Regional SAR Overview

2.35 This data indicated that only seven Asia/Pacific administrations had a high level of Annex 12 compliance in all twenty assessed elements (Australia, Hong Kong China, Japan, New Zealand, Republic of Korea, Singapore and the United States of America).

2.36 The analysis indicated significant Annex 12 compliance weaknesses remained in the South Asia area (where Sri Lanka reported a decrease in SAR capability) and the Southwest Pacific (improvements had been noted in Fiji since APSAR/TF/2). In addition, there were parts of Southeast Asia and East Asia that indicated a need for compliance improvement.

2.37 The APSAR/TF/4 meeting acknowledged the appraisal made by Sri Lanka that had resulted in a reduced capability score. ICAO noted that integrity and honesty in self-appraisal was crucial to ensure that a State recognised its areas of improvement and applied resources to remedy this. The meeting appreciated Sri Lana's efforts in this regard.

2.38 In summary, the Asia/Pacific still appeared to have made only marginal progress in the past two years in the SAR area since the APSAR/TF/1 was held. There remained significant risk of poor SAR responses unless major changes, including increased resources and effort, were applied to this important area of safety. It is expected that the combination of notifying States to APANPIRG for remedial action, the development of sub-regional SAR capacity-building projects and the Asia/Pacific SAR Plan would provide the impetus for dramatic improvement by 2016.

2.39 The overall SAR capability ranking of Asia/Pacific States (using a metric of 5% for an A and 4% for a B as assessed in the SAR Capability Matrix) is indicated in **Figure 2**:

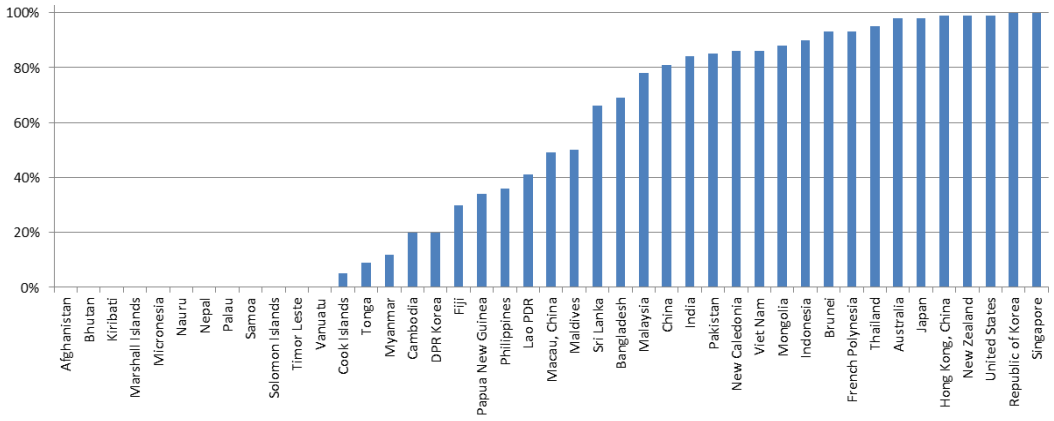

Figure 2: Asia/Pacific SAR Capability Ranking

2.40 APANPIRG/25 noted that there would be a number of States proposed for remedial action in the area of SAR capability (**Appendix H**). States and administrations should review and discuss the complete list of SAR compliance deficiencies proposed for APANPIRG/26's attention as follows: Afghanistan, Bhutan, Cambodia, Cook Islands, DPR Korea, Fiji, Kiribati, Lao PDR, Macau China, Maldives, Marshall Islands, Micronesia, Myanmar, Nauru, Nepal, New Caledonia, Palau, Papua New Guinea, Philippines, Samoa, Solomon Islands, Timor Leste, Tonga and Vanuatu.

2.41 The APSAR/TF/4 meeting agreed to the proposed APANPIRG SAR Deficiencies in accordance with the following Draft Conclusion and appended as follows for consideration by the ATM/SG and APANPIRG:

Draft Conclusion APSAR/TF/4-1: APANPIRG SAR Deficiencies

That, the ATM/AIS/SAR List of Deficiencies is updated in accordance with **Appendix X to the Report**.

SAR Coordination System

2.42 Japan provided an update of the Japanese Internet-based SAR coordination system and a live demonstration of the system at the ICAO Regional Office. With this improvement, organizations were able to monitor SAR information directly from anywhere in the world, and the headquarters of organisations can communicate with related personnel by using other new functions of the system such as 'video conference' and 'chat'.

SAR Letters of Agreement

2.43 Viet Nam highlighted the need for new SAR LOAs where required to improve SAR coordination between neighbouring States, and that existing SAR LOAs should be frequently reviewed. The APSAR/TF encouraged participants to utilise the opportunity in order to conduct side meetings to facilitate the update of SAR agreements.

2.44 It was agreed that a SAR agreement could be in the form of 'Letter of Agreement' (LOA) or a Memorandum of Understanding or other acceptable term indicating a lower form of arrangement for operational matters between SAR service providers (such as RCCs and/or RSCs) or a more formal agreement for arrangements between governments concerned.

Indonesia-Singapore SAREX

2.45 Indonesia and Singapore presented information on the successful conduct of the 32nd Joint Indonesia-Singapore SAREX codenamed SAREX INDOPURA XXXII/2014 on 08 October 2014. ASEAN Member States were invited to participate in the SAREX as observers (two representatives from the Philippines attended). Indonesia and Singapore had been conducting joint SAREX annually since 1982, involving the National SAR Agency of Indonesia, BASARNAS and Singapore RCC involving the various SAR Offices and SAR Posts located within Indonesia.

2.46 The APSAR/TF/4 meeting noted that the SAREX involved a realistic search, was part of regular testing and improved cross-boundary facilitation so these were all positive aspects. In responding to a question about the lessons learnt, Singapore noted that radio contact had been lost with one of the SRUs, so it was necessary to pay as much attention to the SRUs as it was to the search. In addition, SAR Mission Coordinators (SMCs) needed to provide accurate and verified information to media, and also provide regular briefs to RCC personnel.

2.47 APSAR/TF/4 agreed that, where practical, it was always good practice to include observers from other Asia/Pacific or adjoining States when SAREX were being conducted, so that lessons could be shared. Singapore thanked Indonesia for their facilitation of the SAREX.

Indian Ocean SAR Capability Partnership Program

2.48 Australia provided an update on progress of the recently established program between Australia, the Maldives, Mauritius and Sri Lanka to improve and enhance regional SAR capability in the central Indian Ocean area, the Search and Rescue Capability Partnership Program (SCPP). The Australian Government was providing approximately AUD3 million to fund this program from January 2015 and June 2017.

2.49 Recommendations include providing assistance with the development of different elements, or the enhancement of existing elements, in broad areas such as SAR system governance, SAR Agreements, ARCC and MRCC coordination, procedures and documentation, SAR system/information technology support, training, mobile SAR unit set-up, SAR exercises and safety education. The recommendations also include examining the merits of a JRCC model.

2.50 On behalf of Mauritius and the Maldives, Sri Lanka thanked Australia for their assistance to enhance the SAR capability in aeronautical and maritime environments of the three Indian Ocean nations, which was greatly appreciated.

Benefits to the SAR System of States Assisting Other States

2.51 New Zealand provided APSAR/TF/4 with examples of how both the donor nations and recipient nations could benefit from assistance provided by States. New Zealand thanked Australia for assistance in preparing the paper. The United States emphasised that assistance could also be provided to improve provision of shared resources such as search planning operational information (computing of search area, weather, ship reporting data, etc.). The meeting agreed that the information in this paper would be useful to include as an example for other ‘champion’ States in the Draft Asia/Pacific SAR Plan as an Appendix. The APSAR/TF Chair encouraged other regional States with the capacity to assist their less developed neighbours to consider similar sub-regional initiatives.

2.52 The IMO emphasised the possible assistance that IMO may be able to provide to IMO member States through their Integrated Technical Cooperation Programme (ITCP) to support activities for improvements in maritime SAR in the harmonization of aeronautical SAR systems with maritime sector through their Fund, and invited States to express their needs in the IMO’s Country Maritime Profile in their online GISIS system for consideration in IMO’s future ITCP activities.

Draft Asia Pacific SAR Plan

2.53 ICAO presented information on the development of the Asia/Pacific SAR Plan (**Appendix I**), including the latest draft for consideration by the APSAR/TF. The draft SAR Plan was extensively reviewed by the meeting over the course of two days of discussion. One of the key points discussed was the status of SAR agreements.

2.54 In accordance with the TOR, the following Draft Conclusion was agreed for consideration by the ATM/SG/3 and APANPIRG/26:

Draft Conclusion APSAR/TF/4-2 Asia/Pacific SAR Plan

That, regarding the Asia/Pacific Search and Rescue (SAR) Plan Version 1.0 attached as **Appendix X to the Report**, ICAO be requested to:

a) make the SAR Plan available on the ICAO Asia/Pacific Regional Office web site;

b) reference the SAR Plan within the Asia/Pacific Seamless ATM Plan;

c) add the following elements to the Asia/Pacific Seamless ATM monitoring and reporting scheme:

- SAR Regulatory and Coordination Mechanisms;
- SAR Facilities and Assets;
- SAR Information;
- SAR Improvement; and

d) conduct Asia/Pacific SAR Planning and Implementation Seminars/ Workshops for Asia/Pacific States.

Draft Conclusion APSAR/TF/4-3: State SAR Planning

That, States should be urged to:

a) review Version 1.0 of the Asia/Pacific SAR Plan and utilise the SAR Plan to develop planning for State implementation of applicable SAR elements;

b) ensure relevant decision-makers are briefed on the SAR Plan;

c) submit the first SAR Plan Seamless ATM monitoring information to the ICAO Regional Office by 01 March 2016; and

d) where possible, participate and contribute to SAR Plan system collaborative training and research initiatives.

2.55 The APSAR/TF/4 expressed its appreciation to Sri Lanka for its initial drafting of three RCC/SAR agency job description templates and agreed that a Small Working Group of Sri Lanka, USA, Australia and ICAO would review and refine these for inclusion into the SAR Plan.

Future of the APSAR/TF

2.56 The United States provided several papers on the future of the APSAT/TF, noting that the APSAR/TF/4 was expected to be its final session. The United States emphasised that ICAO Bangkok Regional Office had limited resources, but discussion should be held to decide possible next steps to ensure momentum is maintained to improve SAR capability and capacity throughout the Asia/Pacific region.

2.57 The APSAR/TF/4 discussed the merits of either strengthening the SAR presence at the ATM/SG (and not continuing with a specialist SAR group), or taking advantage of the greater awareness of SAR and the improvements brought by the APSAR/TF by establishing a SAR Workgroup as an APANPIRG contributing body.

2.58 Noting the emphasis that the ICAO Council had expressed with regard to the importance of SAR development work globally and the Council's acknowledgement of the significant progress and leadership provided by the Asia/Pacific region through the APSAR/TF, Australia, New Zealand, New Caledonia, Sri Lanka, India, Singapore, Malaysia, the USA and the IMO supported the suggestion to establish an ICAO Regional SAR Workgroup.

2.59 The APSAR/TF noted that all APSAR tasks on the Task List were either complete, or could be managed by a SAR/WG, except for one task that was expected to complete by the ATM/SG (draft SAR/WG Terms of Reference are appended at **Appendix J**).

2.60 The following Draft Decision was agreed by the APSAR/TF, for consideration by the ATM/SG/3 and APANPIRG/26:

Draft Decision APSAR/TF/4-4 Asia/Pacific SAR Workgroup

That, the Asia/Pacific Search and Rescue (SAR) Task Force be disestablished and an Asia/Pacific SAR Workgroup (APSAR/WG) be established in accordance with the Terms of Reference at **Appendix X to the Report**.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information contained in this paper;

b) discuss and agree to the following Draft Conclusions:

- *Draft Conclusion APSAR/TF/3-1 SAR Air Navigation Report Form* (paragraph 2.1)
- *Draft Conclusion APSAR/TF/3-2 SAR Lessons Learnt* (paragraph 2.7)
- *Draft Conclusion APSAR/TF/4-1: APANPIRG SAR Deficiencies* (paragraph 2.41)
- *Draft Conclusion APSAR/TF/4-2 Asia/Pacific SAR Plan* (paragraph 2.54)
- *Draft Conclusion APSAR/TF/4-3: State SAR Planning* (paragraph 2.54)
- *Draft Decision APSAR/TF/4-4 Asia/Pacific SAR Workgroup* (paragraph 2.59);

c) Discuss the eANP information provided as attachments to this paper;

d) note that ELTs remained a significantly disproportionate contributor to false alerts compared to maritime EPIRB due to training and information, which would be more problematic in the future as the next generation of ELT would have their first-burst transmission reduced from 50 seconds to three seconds; and

e) discuss any relevant matters as appropriate.

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1. AIR NAVIGATION REPORT FORM (ANRF)

APAC Regional Planning

2. REGIONAL/NATIONAL PERFORMANCE OBJECTIVE – Module B0-SAR: Improved Safety and Efficiency through the initial application of Regional SAR Initiatives Performance Improvement Area 2: Globally Interoperable Systems and Data

3. ASBU B0-SAR: Impact on Main Key Performance Areas (KPA)					
	Access & Equity	**Capacity**	**Efficiency**	**Environment**	**Safety**
Applicable	N	N	Y	Y	Y

4. ASBU B0-SAR: Planning Targets and Implementation Progress	
5. Elements	**6. Targets and implementation progress (Ground and Air)**
SAR Regulatory and Coordination Mechanisms	November 2018: All States should develop statutes and related provisions for a SAR organization and its framework, resources, policies and procedures, including a State SAR Plan, international SAR agreements and SAR exercises (SAREX).
SAR Facilities and Assets	November 2018: All States should establish Rescue Coordination Centres (RCCs) of sufficient size with facilities, tools, and access to SAR Units (SRU) commensurate with the State's responsibilities, or delegate the function as appropriate (all States should investigate the feasibility of establishing Joint Rescue Coordination Centres (JRCCs) and implement where beneficial).
SAR Information	November 2018: All States should establish a centralised SAR information source, which includes data supporting the Aeronautical Information Publication (AIP), SAR Library, 24 hour Contacts database of SAR facilities, assets and lists of SRUs.
SAR Improvement	November 2018: All States should implement Quality Assurance (QA) programmes that include continuous improvement and audit processes, gap and safety/quality indicator analysis, and SAR promotion activities.

7. ASBU B0-SAR: Implementation Challenges				
Elements	**Implementation Area**			
	Ground System Implementation	**Avionics Implementation**	**Procedures Availability**	**Operational Approvals**
SAR Regulatory and Coordination Mechanisms	NA	NA	Legislative restrictions and legal problems enacting SAR agreements. Lack of political support.	NA

7. ASBU B0-SAR: Implementation Challenges				
Elements	**Implementation Area**			
	Ground System Implementation	**Avionics Implementation**	**Procedures Availability**	**Operational Approvals**
SAR Facilities and Assets	Lack of resources to establish appropriate facilities and SRUs. Cospas-Sarsat facilities or sharing access with other States.	Lack of appropriate communications and direction-finding equipment.	Lack of local, State and regional agreements between agencies to facilitate sharing of SAR resources, including SRUs.	Lack of Civil/Military SAR cooperation, including use of military facilities and SRUs.
SAR Information	Lack of computers and software	NA	Lack of established information support processes.	NA
SAR Improvement	NA	NA	Lack of regional and local training of RCC staff and SRUs. Lack of QA and improvement plans and procedures.	NA

8. ASBU B0-SAR: Performance Monitoring and Measurement 8A. ASBU B0-SAR: Implementation Monitoring	
Elements	**Performance Indicators/Supporting Metrics**
SAR Regulatory and Coordination Mechanisms	Indicators: Percentage of States implementing SAR regulatory and coordination mechanisms Supporting metric: Number of States implementing SAR regulatory and coordination mechanisms
SAR Facilities and Assets	Indicators: Percentage of States establishing SAR facilities and assets Supporting metric: Number of States establishing SAR facilities and assets
SAR Information	Indicators: Percentage of States implementing SAR information systems Supporting metric: Number of States implementing SAR information systems
SAR Improvement	Indicators: Percentage of States implementing SAR improvement programmes Supporting metric: Number of States implementing SAR improvement programmes

ASBU B0-SAR: Performance Monitoring and Measurement 8 B. ASBU B0-SAR: Performance Monitoring	
Key Performance Areas	**Metrics (if not indicate qualitative benefits)**
Access & Equity	NA
Capacity	NA
Efficiency	Benefit: enhanced sharing of SRUs and information leading to more efficient responses that involve less time searching.
Environment	Benefit: reduced emissions as a result of reduced fuel burn of airborne, maritime and land based SRUs.
Safety	Benefit: quicker response times to safety of life events, with better information providing SAR Mission Coordinators the opportunity to better match the SRU with the emergency requirement. Improved civil/military cooperation.

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ASIA AND PACIFIC REGIONS ANP, VOLUME I

PART VI - SEARCH AND RESCUE (SAR)

1. INTRODUCTION

1.1 This part of the Asia and Pacific Regions ANP constitutes the agreed regional requirements considered to be the minimum necessary for effective planning and implementation of search and rescue (SAR) facilities and services in the Asia and Pacific Regions and complements the provisions of ICAO SARP's and PANS related to SAR. It contains stable plan elements related to the assignment of responsibilities to States for the provision of SAR facilities and services within the ICAO Asia and Pacific Regions in accordance with Article 28 of the *Convention on International Civil Aviation* (Doc 7300) and mandatory requirements related to the SAR facilities and services to be implemented by States in accordance with regional air navigation agreements.

1.2 The dynamic plan elements related to the assignment of States' responsibilities for the provision of SAR facilities and services and the mandatory requirements based on regional air navigation agreements related to SAR are contained in the Asia and Pacific Regions Volume II, Part VI – SAR.

Standards, Recommended Practices and Procedures

1.3 The Standards, Recommended Practices and Procedures (SARPs) and related guidance material applicable to the provision of SAR are contained in:

a) Annex 12 – *Search and Rescue*;
b) Annex 6 — *Operation of Aircraft*;
c) *Procedures for Air Navigation Services — Air Traffic Management* (PANS-ATM) (Doc 4444);
d) *Regional Supplementary Procedures* (Doc 7030); and
e) *International Aeronautical and Maritime Search and Rescue Manual* (Doc 9731-AN/958).

2. GENERAL REGIONAL REQUIREMENTS

2.1 Each Contracting State should ensure that the provision of search and rescue services covers its own territory and those areas over the high seas for which it is responsible for the provision of those services. The description of the current Search and Rescue Regions (SRRs), as approved by the ICAO Council, are contained in **Table SAR I-1** and depicted in the **Chart SAR I-1**. The list of Rescue Coordination Centres (RCCs) and Rescue Sub-centres (RSCs) in the Region(s) are detailed in Volume II.

2.2 The three volumes of the *IAMSAR Manual* (Doc 9731) provide guidance for a common aviation and maritime approach to organizing and providing SAR services. States are invited to use the *IAMSAR Manual* to ensure the availability of effective aeronautical SAR services and to cooperate with neighbouring States.

2.3 States which rely on military authorities and/or other sources for the provision of SAR facilities should ensure that adequate arrangements are in place for coordination of SAR activities between all entities involved.

2.4 Arrangements should be made to permit a call on any national services likely to be able to render assistance on an ad-hoc basis, in those cases when the scope of SAR operations requires such assistance.

3. SPECIFIC REGIONAL REQUIREMENTS

3.1 TBD (if necessary).

TABLE SAR I-1 – SEARCH AND RESCUE REGIONS (SRR) OF THE (NAME) REGION(S)

EXPLANATION OF THE TABLE

Column:

1 Name of the SRR

2 Description of SRR lateral limits;
3 Remarks — additional information, if necessary.

ASIA AND PACIFIC ANP, VOLUME II

PART VI - SEARCH AND RESCUE (SAR)

1. INTRODUCTION

1.1 This part of the Asia and Pacific ANP, Volume II, complements the provisions in ICAO SARP's and PANS related to search and rescue (SAR). It contains dynamic plan elements related to the assignment of responsibilities to States for the provision of SAR facilities and services within a specified area in accordance with Article 28 of the *Convention on International Civil Aviation* (Doc 7300); and mandatory requirements related to the SAR facilities and services to be implemented by States in accordance with regional air navigation agreements. Such agreement indicates a commitment on the part of the State(s) concerned to implement the requirement(s) specified.

2. GENERAL REGIONAL REQUIREMENTS

2.1 The Rescue Coordination Centres (RCCs) and Rescue Sub-centres (RSCs) for the Asia and Pacific Region are listed in **Table SAR II-1** and depicted in **Chart SAR I-1**.

2.2 In cases where the minimum SAR facilities are temporarily unavailable, alternative suitable means should be made available.

2.3 In cases where a SAR alert is proximate to a search and rescue region (SRR) boundary (e.g. 50 NM or less), or it is unclear if the alert corresponds to a position entirely contained within an SRR, the adjacent RCC or RSC should be notified of the alert immediately.

3. SPECIFIC REGIONAL REQUIREMENTS

3.1. The details of the facilities and/or services to be provided to fulfill the basic requirements of the plan could be found in this part. Such agreement indicates a commitment on the part of the State(s) concerned to implement the requirement(s) specified.

TABLE SAR II-1 - SEARCH AND RESCUE FACILITIES IN THE (NAME) REGION(S)

EXPLANATION OF THE TABLE

Column	
1	State
2	Name of the Rescue Coordination Centre (RCC) and Rescue Sub-centre (RSC).
3	SAR points of contact (SPOC). Name of the SPOC.
4	Remarks. Supplementary information such as the type of RCC (e.g. maritime or aviation or joint).

TABLE SAR I-1 – AERONATICAL SEARCH AND RESCUE REGIONS (SRR) OF THE ASIA AND PACIFIC REGIONS

SRR	Lateral limits coordinates	Remarks
1	2	3
Australia SRR **(Brisbane FIR)**	~~120000S 1143000E~~ ~~120000S 1232000E~~ ~~092000S 1265000E~~ ~~070000S 1350000E~~ ~~095000S 1394000E~~ ~~095000S 1410000E~~ ~~093700S 1410000E~~ ~~thence along COAST~~ ~~091600S 1420300E~~ ~~091900S 1424800E~~ ~~090800S 1435200E~~ ~~092400S 1441400E~~ ~~095700S 1440500E~~ ~~thence along BARRIER REEF, to~~ ~~113000S 1440200E~~ ~~114300S 1440400E~~ ~~120000S 1440000E~~ ~~120000S 1550000E~~ ~~140000S 1550000E~~ ~~140000S 1611500E~~ ~~175000S 1630000E~~ ~~300000S 1630000E~~ ~~450000S 1630000E~~ ~~443400S 1500000E~~ ~~435100S 1504000E~~ ~~430000S 1510000E~~ ~~381100S 1501900E~~ ~~365700S 1504500E~~ ~~thence along the minor arc of a circle of 120.0NM radius centred on~~ ~~351900S 1525600E~~ ~~342100S 1514000E~~ ~~335900S 1520100E~~ ~~333500S 1515400E~~ ~~332800S 1514800E~~ ~~331500S 1512600E~~ ~~331200S 1511400E~~ ~~332000S 1504200E~~ ~~332700S 1503300E~~ ~~320600S 1485000E~~ ~~290000S 1463200E~~ ~~290000S 1433000E~~ ~~261400S 1382300E~~ ~~221800S 1363800E~~ ~~212800S 1360900E~~ ~~211100S 1313400E~~ ~~215100S 1305800E~~ ~~231300S 1282800E~~	

TABLE SAR I-1 – AERONATICAL SEARCH AND RESCUE REGIONS (SRR) OF THE ASIA AND PACIFIC REGIONS

	~~232200S 1262900E~~ ~~232700S 1241500E~~ ~~215300S 1222500E~~ ~~thence along the minor arc of a circle of 15.0 NM radius centred on~~ ~~213300S 1220100E~~ ~~202600S 1204500E~~ ~~182300S 1182500E~~ ~~175300S 1182200E~~ ~~140800S 1150900E~~	
Australia SRR **~~(Melbourne FIR)~~**	~~90 00 00S 163 00 00E~~ ~~900000S 0750000E~~ ~~450000S 0750000E~~ ~~060000S 0750000E~~ ~~020000S 0780000E~~ ~~020000S 0920000E~~ ~~120000S 1070000E~~ ~~120000S 1100000E~~ ~~120000S 1143000E~~ ~~140800S 1150900E~~ ~~175300S 1182200E~~ ~~182300S 1182500E~~ ~~202600S 1204500E~~ ~~213300S 1220100E~~ ~~215300S 1222500E~~ ~~232700S 1241500E~~ ~~232200S 1262900E~~ ~~231300S 1282800E~~ ~~215100S 1305800E~~ ~~211100S 1313400E~~ ~~212800S 1360900E~~ ~~221800S 1363800E~~ ~~261400S 1382300E~~ ~~290000S 1433000E~~ ~~290000S 1463200E~~ ~~320600S 1485000E~~ ~~332700S 1503300E~~ ~~332000S 1504200E~~ ~~331200S 1511400E~~ ~~331500S 1512600E~~ ~~332800S 1514800E~~ ~~333500S 1515400E~~ ~~335900S 1520100E~~ ~~342100S 1514000E~~ ~~351900S 1525600E~~ ~~365700S 1504500E~~ ~~381100S 1501900E~~ ~~430000S 1510000E~~ ~~435100S 1504000E~~ ~~443400S 1500000E~~	

TABLE SAR I-1 – AERONATICAL SEARCH AND RESCUE REGIONS (SRR) OF THE ASIA AND PACIFIC REGIONS

	~~450000S 1630000E~~	
Australia SRR	S 06 00 00, E 075 00 00; S 02 00 00, E 078 00 00; S 02 00 00, E 092 00 00; S 12 00 00, E 107 00 00; S 12 00 00, E 123 20 00; S 09 20 00, E 126 50 00; S 07 00 00, E 135 00 00; S 09 50 00, E 139 40 00; S 09 50 00, E 141 00 00; S 09 37 00, E 141 01 00; S 09 16 00, E 142 03 00; then along the Australian EEA boundary S 09 19 00, E 142 48 00; S 09 08 00, E 143 53 00; S 09 24 00, E 144 14 00; S 09 57 00, E 144 05 00; S 10 05 00, E 143 59 00; S 10 09 00, E 143 57 00; S 10 18 00, E 143 55 00; S 10 23 00, E 143 55 00; S 10 27 00, E 143 54 00; S 10 31 00, E 143 55 00; S 10 35 00, E 143 56 00; S 10 47 00, E 144 00 00; S 11 02 00, E 144 03 00; S 11 07 00, E 144 04 00; S 11 11 00, E 144 04 00; S 11 14 00, E 144 04 00; S 11 15 00, E 144 03 00; S 11 30 00, E 144 02 00; S 11 43 00, E 144 04 00; S 12 00 00, E 144 00 00; S 12 00 00, E 155 00 00; S 14 00 00, E 155 00 00; S 14 00 00, E 161 15 00; S 17 40 00, E 163 00 00; S 90 00 00, E 163 00 00; S 90 00 00, E 075 00 00; S 06 00 00, E 075 00 00.	
Bali SRR	No information on record	
Bangkok SRR	~~095600N 0983300E~~	
Bangkok SRR	N 11 37 00, E 102 55 00; N 10 00 00, E 102 15 00; N 09 30 00, E 103 45 00; N 07 00 00, E 103 00 00; N 06 15 00, E 102 15 00; N 10 00 00, E 096 30 00; N 07 15 00, E 098 00 00; N 06 30 00, E 099 30 00;	

TABLE SAR I-1 – AERONATICAL SEARCH AND RESCUE REGIONS (SRR) OF THE ASIA AND PACIFIC REGIONS

	N 11 37 00, E 102 55 00.	
Beijing SRR	N 45 25 00, E 115 19 00; N 43 15 00, E 117 31 00; N 39 54 00, E 119 21 00; N 39 30 00, E 119 52 00; N 38 15 00, E 120 00 00; N 37 29 00, E 117 30 00; N 36 32 00, E 115 18 00; N 36 21 00, E 114 55 00; N 36 06 00, E 114 21 00; N 34 54 00, E 112 47 00; N 34 00 00, E 110 29 00; N 34 32 00, E 110 15 00; N 35 32 00, E 110 18 00; N 37 28 00, E 110 44 00; N 38 22 00, E 110 36 00; N 38 44 00, E 109 41 00; N 40 20 00, E 107 01 00; N 40 43 00, E 105 55 00; N 41 44 00, E 105 13 00; N 45 25 00, E 115 19 00.	
Biak SRR	No information on record	
Bombay SRR (Mumbai FIR)	S 06 00 00, E 060 00 00; N 10 42 00, E 060 00 00; N 12 00 00, E 060 00 00; N 19 48 00, E 060 00 00; N 23 30 00, E 064 30 00; N 25 00 00, E 070 55 00; N 25 00 00, E 082 00 00; N 17 15 00, E 082 00 00; N 18 00 00, E 081 00 00; N 18 00 00, E 076 00 00; N 15 00 00, E 076 00 00; N 15 00 00, E 072 00 00; N 07 30 00, E 072 00 00; N 07 30 00, E 070 00 00; N 03 05 00, E 070 00 00; S 06 00 00, E 068 00 00; S 06 00 00, E 060 00 00.	
Calcutta SRR (Kolkata FIR)	N 25 38 00, E 089 52 00; N 26 22 00, E 088 02 00; N 21 38 00, E 089 10 00; N 20 00 00, E 092 00 00; N 14 00 00, E 092 00 00; N 16 30 00, E 083 00 00; N 17 15 00, E 082 00 00; N 25 00 00, E 082 00 00; N 25 00 00, E 083 00 00; N 27 10 00, E 083 00 00; N 27 27 00, E 083 40 00;	

TABLE SAR I-1 – AERONATICAL SEARCH AND RESCUE REGIONS (SRR) OF THE ASIA AND PACIFIC REGIONS

	N 27 17 00, E 083 40 00; N 25 38 00, E 089 52 00.	
Colombo FIR	~~064400N 0775700E~~ ~~070000N 0783000E~~ ~~100000N 0800000E~~ ~~100000N 0820000E~~ ~~060000N 0920000E~~ ~~020000S 0920000E~~ ~~020000S 0780000E~~ ~~060000N 0780000E~~ ~~060000N 0763000E~~	
Colombo SRR	N 10 00 00, E 080 00 00; N 10 00 00, E 082 00 00; N 06 00 00, E 092 00 00; S 02 00 00, E 092 00 00; S 02 00 00, E 078 00 00; N 06 00 00, E 078 00 00; N 06 00 00 E 076 30 00; N 07 00 00 E 078 30 00; N 10 00 00 E 080 00 00; N 10 00 00, E 080 00 00.	
Delhi SRR	N 25 00 00, E 083 00 00; N 25 00 00, E 082 00 00; N 25 00 00, E 070 55 00; thence following the national boundary to N 30 00 00, E 073 35 00; N 25 00 00, E 083 00 00.	
Dhaka SRR	~~210000N 0920000E~~ ~~200000N 0920000E~~ ~~213800N 0891000E~~ ~~262200N 0880200E~~ ~~253800N 0895200E~~ ~~215700N 0923200E~~	
Dhaka SRR (Dhaka FIR)	N 21 00 00, E 092 00 00; N 21 38 00, E 089 10 00; thence following the national boundary to N 22 09 00, E 092 37 00; N 21 00 00, E 092 00 00.	
Guangzhou SRR	N 21 25 00, E 111 30 00; N 20 30 00, E 111 30 00; N 20 30 00, E 108 03 00; thence following the national boundary to N 23 11 00, E 105 32 00; N 24 39 00, E 105 48 00; N 25 25 00, E 107 53 00; N 26 41 00, E 109 12 00; N 27 53 00, E 109 19 00; N 29 31 00, E 109 24 00; N 29 23 00, E 113 06 00; N 29 02 00, E 114 34 00;	

TABLE SAR I-1 – AERONATICAL SEARCH AND RESCUE REGIONS (SRR) OF THE ASIA AND PACIFIC REGIONS

	N 26 42 00, E 113 57 00; N 26 03 00, E 114 07 00; N 25 07 00, E 114 18 00; N 24 46 00, E 115 01 00; N 24 22 00, E 116 42 00; N 23 42 00, E 117 11 00; N 23 41 00, E 117 13 00; thence following the national boundary to N 20 30 00, E 108 03 00; N 20 30 00, E 111 30 00; N 19 30 00, E 111 30 00; N 16 40 00, E 114 00 00; N 14 30 00, E 114 00 00; N 14 30 00, E 112 00 00; N 17 25 00, E 108 43 00; N 18 20 00, E 107 41 00; N 19 16 00, E 107 11 00; N 19 57 00, E 107 56 00; N 21 25 00, E 111 30 00.	
Hanoi SRR	N 20 30 00, E 108 03 00; N 19 57 00, E 107 56 00; N 19 16 00, E 107 11 00; N 18 20 00, E 107 41 00; N 17 25 00, E 108 43 00; N 17 13 00, E 108 00 00; N 17 00 00, E 106 34 00; thence following the national boundary to N 23 11 00, E 105 32 00; thence following the national boundary to N 20 30 00, E 108 03 00.	
Ho Chi Minh SRR	N 09 00 00, E 102 40 00; N 10 14 00, E 103 38 00; thence following the national boundary to N 17 00 00, E 106 34 00; N 17 13 00, E 108 00 00; N 17 25 00, E 108 43 00; N 14 30 00, E 112 00 00; N 14 30 00, E 114 00 00; N 10 30 00, E 114 00 00; N 07 00 00, E 108 00 00; N 07 00 00, E 103 00 00; N 09 00 00, E 102 40 00.	
Hong Kong SRR	~~N 23 00 00, E 117 30 00;~~ ~~N 21 00 00, E 117 30 00;~~ ~~N 19 30 00, E 111 30 00;~~ ~~N 21 25 00, E 111 30 00;~~ ~~thence following the SAR boundary to~~ ~~N 23 41 00, E 117 13 00;~~ ~~N 23 30 00, E 117 30 00;~~ ~~N 23 10 00, E 117 30 00;~~	

TABLE SAR I-1 – AERONATICAL SEARCH AND RESCUE REGIONS (SRR) OF THE ASIA AND PACIFIC REGIONS

Hong Kong SRR	N 23 40 00, E 117 30 00; N 21 00 00, E 117 30 00; N 16 40 00, E 114 00 00; N 19 30 00, E 111 30 00; N 21 25 00, E 111 30 00; thence following the Special Administrative Region boundary to 3NM off-shore and the northern boundary of Macao and the Hong Kong Special Administrative Region to N 23 40 00, E 117 30 00	
Honiara SRR	S 10 30 00, E 166 45 00; S 11 48 00, E 166 52 00; S 14 00 00, E 163 00 00; S 14 00 00, E 161 15 00; S 14 00 00, E 155 00 00; S 12 00 00, E 155 00 00; S 07 19 00, E 155 00 00; S 06 56 00, E 155 36 00; S 06 56 00, E 155 42 00; S 06 51 00, E 155 55 00; S 06 40 00, E 156 02 00; E 06 33 00, E 156 02 00; S 10 30 00, E 166 45 00; S 10 30 00, E 166 45 00.	
Honolulu SRR	N 40 00 00, E 165 00 00; N 27 00 00, E 165 00 00; N 27 00 00, E 155 00 00; N 21 00 00, E 155 00 00; N 21 00 00, E 137 00 00; N 21 00 00, E 137 00 00; N 21 00 00, E 130 00 00; N 21 00 00, E 130 00 00; N 07 00 00, E 130 00 00; N 04 01 24, E 132 32 58; N 04 01 24, E 132 32 58; N 03 30 00, E 133 00 00; N 03 30 00, E 141 00 00; N/S 00 00 00, E 141 00 00; N/S 00 00 00, E 141 00 00; N/S 00 00 00, E 160 00 00; N/S 00 00 00, E 160 00 00; N 03 30 00, E 160 00 00; N 03 30 00, E 170 00 00; N 03 30 00, E 170 00 00; N 03 30 00, W/E 180 00 00; S 05 00 00, W/E 180 00 00; S 05 00 00, W/E 180 00 00; S 05 00 00, W 157 00 00; S 05 00 00, W 157 00 00; S 05 00 00, W 155 00 00;	

TABLE SAR I-1 – AERONATICAL SEARCH AND RESCUE REGIONS (SRR) OF THE ASIA AND PACIFIC REGIONS

	N 03 30 00, W 145 00 00; N 03 30 00, W 120 00 00; N 40 00 00, E 165 00 00.	
Jakarta SRR	N 01 38 00, E 102 20 00; S 00 50 00, E 106 00 00; N 01 00 00, E 108 58 00; N 01 16 00, E 113 37 00; S 03 00 00, E 110 23 00; S 08 20 00, E 110 23 00; S 12 00 00, E 114 30 00; S 12 00 00, E 110 00 00; S 12 00 00, E 107 00 00; S 02 00 00, E 092 00 00; N 06 00 00, E 092 00 00; N 06 00 00, E 094 25 00; N 06 00 00, E 097 30 00; N 01 38 00, E 102 20 00.	
Juneau SRR	N 50 05 00, E 159 00 00; N 43 00 00, E 165 00 00; N 40 00 00, E 165 00 00; N 50 05 00, E 159 00 00.	
Kabul SRR **(Kabul FIR)**	N 30 00 00, E 066 19 00 thence following the national boundary to N 30 00 00, E 066 19 00.	
Karachi SRR	N 23 30 00, E 061 20 00; N 24 40 00, E 061 20 00; N 25 10 00, E 061 20 00; N 30 00 00, E 066 19 00; N 30 00 00, E 073 35 00; N 25 00 00, E 070 55 00; N 23 30 00, E 064 30 00; N 23 30 00, E 061 20 00.	Check this – there should be mention of a national boundary
Kathmandu SRR	N 30 26 00, E 081 37 00; N 27 17 00, E 083 40 00; N 30 26 00, E 081 37 00.	Check this – there should be mention of a national boundary
Kota Kinabalu SRR	~~073000N 1173000E~~ ~~040000N 1200000E~~ ~~Along political boundary to~~ ~~011600N 1133700E~~ ~~Along political boundary to~~ ~~010000N 1085800E~~ ~~010000N 1083000E~~ ~~020000N 1083000E~~ ~~021500N 1083000E~~ ~~060000N 1131500E~~ ~~082500N 1163000E~~	
Kota Kinabalu SRR	N 08 25 00, E 116 30 00; N 07 30 00, E 117 30 00;	

TABLE SAR I-1 – AERONATICAL SEARCH AND RESCUE REGIONS (SRR) OF THE ASIA AND PACIFIC REGIONS

	N 04 00 00, E 120 00 00; N 04 00 00, E 118 00 00; thence following the national boundary to N 01 00 00, E 108 54 00; N 01 00 00, E 108 30 00; N 02 15 00, E 108 30 00 to N 08 25 00, E 116 30 00.	
Kuala Lumpur SRR	~~100000N 0942500E~~ ~~100000N 0960000E~~ ~~100000N 0963000E~~ ~~071500N 0980000E~~ ~~062700N 0993600E~~ ~~Along political boundary to~~ ~~064500N 1024000E~~ ~~060000N 1030500E~~ ~~045000N 1034400E~~ ~~034000N 1034000E~~ ~~023600N 1044500E~~ ~~012000N 1042000E~~ ~~Along political boundary to~~ ~~011300N 1033000E~~ ~~013800N 1022000E~~ ~~060000N 0973000E~~ ~~060000N 0942500E~~	
Kuala Lumpur SRR	N 06 45 00, E 102 40 00; N 04 50 00, E 103 44 00; N 03 40 00, E 103 40 00; N 02 36 00, E 104 45 00; N 01 20 00, E 104 20 00; thence following the national boundary to N 01 17 00, E 103 36 00; N 01 13 00, E 103 30 00; N 01 39 00, E 102 10 00; N 06 00 00, E 097 30 00; N 06 00 00, E 094 25 00; N 10 00 00, E 094 25 00; N 10 00 00, E 096 30 00; N 07 15 00, E 098 00 00; N 06 30 00, E 099 30 00; thence following the national boundary to N 06 15 00, E 102 15 00; N 06 45 00, E 102 40 00.	
Kunming SRR	N 31 54 00, E 109 31 00; N 30 17 00, E 109 29 00; N 29 31 00, E 109 24 00; N 27 53 00, E 109 19 00; N 26 41 00, E 109 12 00; N 25 25 00, E 107 53 00; N 24 39 00, E 105 48 00; N 23 11 00, E 105 32 00;	

TABLE SAR I-1 – AERONATICAL SEARCH AND RESCUE REGIONS (SRR) OF THE ASIA AND PACIFIC REGIONS

	N 31 54 00, E 109 31 00.	
Lahore SRR	N 30 00 00, E 066 19 00; thence following the national boundary to N 30 00 00, E 073 35 00; N 30 00 00, E 066 19 00.	
Lazhou SRR	N 41 44 00, E 105 13 00; N 40 43 00, E 105 55 00; N 40 20 00, E 107 01 00; N 38 44 00, E 109 41 00; N 38 22 00, E 110 36 00; N 37 28 00, E 110 44 00; N 35 32 00, E 110 18 00; N 34 32 00, E 110 15 00; N 34 00 00, E 110 29 00; N 33 32 00, E 110 52 00; N 31 54 00, E 109 31 00; N 32 14 00, E 107 24 00; N 32 27 00, E 105 49 00; N 32 55 00, E 101 42 00; N 31 49 00, E 098 35 00; N 32 00 00, E 097 00 00; N 32 52 00, E 091 55 00; N 36 02 00, E 089 01 00; N 36 25 00, E 087 23 00; N 38 21 00, E 090 13 00; N 41 48 00, E 095 08 00; N 42 55 00, E 096 20 00; N 32 32 00, E 103 53 00; N 41 44 00, E 105 13 00.	
Madras SRR **(Chennai FIR)**	N 17 15 00, E 082 00 00; N 16 30 00, E 083 00 00; N 14 00 00, E 092 00 00; N 13 30 00, E 094 25 00; N 11 00 00, E 094 25 00; N 10 00 00, E 096 00 00; N 10 00 00, E 094 25 00; N 06 00 00, E 094 25 00; N 06 00 00, E 092 00 00; N 10 00 00, E 082 00 00; N 10 00 00, E 080 00 00; N 07 00 00, E 078 30 00; N 06 44 00, E 077 57 00; N 06 00 00, E 076 30 00; N 06 00 00, E 076 00 00; N 06 00 00, E 074 00 00; N 07 30 00, E 074 00 00; N 07 30 00, E 072 00 00; N 15 00 00, E 072 00 00; N 15 00 00, E 076 00 00; N 18 00 00, E 076 00 00;	

TABLE SAR I-1 – AERONATICAL SEARCH AND RESCUE REGIONS (SRR) OF THE ASIA AND PACIFIC REGIONS

	N 18 00 00, E 081 00 00; N 17 15 00, E 082 00 00.	
Male SRR	N 06 00 00, E 076 30 00; N 06 00 00, E 078 00 00; S 02 00 00, E 078 00 00; S 06 00 00, E 075 00 00; S 06 00 00, E 068 00 00; N 03 05 00, E 070 00 00; N 07 30 00, E 070 00 00; N 07 30 00, E 072 00 00; N 07 30 00, E 074 00 00; N 06 00 00, E 074 00 00; N 06 00 00, E 076 00 00; N 06 00 00, E 076 30 00.	
Manila SRR	N 21 00 00, E 117 30 00; N 21 00 00, E 121 30 00; N 21 00 00, E 130 00 00; N 07 00 00, E 130 00 00; N 03 30 00, E 133 00 00; N 03 30 00, E 132 00 00; N 04 00 00, E 132 00 00; N 04 00 00, E 120 00 00; N 07 30 00, E 117 30 00; N 08 25 00, E 116 30 00; N 10 30 00, E 114 00 00; N 14 30 00, E 114 00 00; N 16 40 00, E 114 00 00; N 21 00 00, E 117 30 00.	
Nadi SRR	N 03 30 00, W/E 180 00 00; S 25 00 00, W/E 180 00 00; S 25 00 00, E 171 25 00; S 28 00 00, E 168 00 00; S 30 00 00, E 163 00 00; S 17 50 00, E 163 00 00; S 14 00 00, E 161 15 00; S 14 00 00, E 163 00 00; S 11 48 00, E 166 52 00; S 10 00 00, E 170 00 00; N 03 30 00, E 170 00 00; N 03 30 00, W/E 180 00 00; S 05 00 00, W/E 180 00 00; S 05 00 00, W 172 00 00; S 25 00 00, W/E 180 00 00; N 03 30 00, W/E 180 00 00.	
Nauru SRR	N 03 30 00, E 160 00 00; N 03 30 00, E 170 00 00; N/S 00 00 00, E 170 00 00; S 10 00 00, E 170 00 00; S 11 48 00, E 166 52 00; S 10 30 00, E 166 45 00;	

TABLE SAR I-1 – AERONATICAL SEARCH AND RESCUE REGIONS (SRR) OF THE ASIA AND PACIFIC REGIONS

	S 04 50 00, E 160 00 00; N/S 00 00 00, E 160 00 00; N 03 30 00, E 160 00 00.	
New Zealand SRR	S 90 00 00, E 163 00 00; S 45 00 00, E 163 00 00; S 30 00 00, E 163 00 00; S 28 00 00, E 168 00 00; S 25 00 00, E 171 25 00; S 25 00 00, W/E 180 00 00; S 05 00 00, W/E 180 00 00; S 25 00 00, W/E 180 00 00; S 05 00 00, W 160 00 00; S 05 00 00, W 157 00 00; S 30 00 00, W 157 00 00; S 30 00 00, W 131 00 00; S 90 00 00, W 131 00 00; S 90 00 00, W/E 180 00 00; S 90 00 00, E 163 00 00.	
Phnom Penh SRR	No information on record	
Port Moresby SRR	S 04 50 00, E 160 00 00; S 04 50 00, E 159 00 00; S 06 33 00, E 156 02 00; S 06 40 00, E 156 02 00; S 06 51 00, E 155 55 00; S 06 56 00, E 155 42 00; S 06 56 00, E 155 36 00; S 07 19 00, E 155 00 00; S 12 00 00, E 155 00 00; S 12 00 00, E 144 00 00; S 11 43 00, E 144 04 00; S 11 30 00, E 144 02 00; S 09 57 00, E 144 05 00; S 09 24 00, E 144 14 00; S 09 08 00, E 143 52 00; S 09 19 00, E 142 48 00; S 09 16 00, E 142 03 00; S 09 37 00, E 141 00 00; N 00 00 00, E 141 00 00; N/S 00 00 00, E 160 00 00; S 04 50 00, E 160 00 00.	
Pyongyang SRR	N 42 25 00, E 130 36 00; N 42 09 00, E 130 53 00; N 41 40 00, E 131 31 00; N 40 30 00, E 135 56 00; N 38 38 00, E 133 39 00; N 38 38 00, E 128 25 00; thence following the national boundary to N 38 00 00, E 124 00 00; N 39 51 00, E 124 10 00; thence following the national boundary to	

TABLE SAR I-1 – AERONATICAL SEARCH AND RESCUE REGIONS (SRR) OF THE ASIA AND PACIFIC REGIONS

	N 42 25 00, E 130 36 00.	
Shanghai SRR	N 36 32 00, E 115 18 00; N 37 29 00, E 117 30 00; N 38 15 00, E 120 00 00; N 38 00 00, E 124 00 00; N 30 00 00, E 124 00 00; N 29 00 00, E 124 00 00; N 25 00 00, E 120 00 00; N 23 00 00, E 117 30 00; N 23 10 00, E 117 30 00; N 23 30 00, E 117 30 00; N 23 41 00, E 117 13 00; N 23 42 00, E 117 11 00; N 24 22 00, E 116 42 00; N 24 46 00, E 115 01 00; N 25 07 00, E 114 18 00; N 26 03 00, E 114 07 00; N 26 42 00, E 113 57 00; N 29 02 00, E 114 34 00; N 30 05 00, E 115 56 00; N 32 54 00, E 115 47 00; N 35 15 00, E 115 27 00; N 35 42 00, E 115 01 00; N 36 21 00, E 114 55 00; N 36 32 00, E 115 18 00.	
Shenyang SRR	No information on record	
~~**Singapore SRR**~~	~~N 02 36 00, E 104 45 00~~ ~~N 03 40 00, E 103 40 00~~ ~~N 04 50 00, E 103 44 00~~ ~~N 06 00 00, E 103 05 00~~ ~~N 06 45 00, E 102 40 00~~ ~~N 07 00 00, E 103 00 00~~ ~~N 07 00 00, E 108 00 00~~ ~~N 10 30 00, E 114 00 00~~ ~~N 08 25 00, E 116 30 00~~ ~~N 06 00 00, E 113 15 00~~ ~~N 02 15 00, E 108 30 00~~ ~~N 02 00 00, E 108 30 00~~ ~~N 01 00 00, E 108 30 00~~ ~~N 01 00 00, E 108 58 00~~ ~~N 00 00 00, E 109 10 00~~ ~~N 00 00 00, E 108 00 00~~ ~~S 00 50 00, E 106 00 00~~ ~~N 00 00 00, E 105 10 00~~ ~~S 00 00 00, E 104 57 00~~ ~~N 01 38 00, E 102 20 00~~ ~~N 01 13 00, E 103 30 00~~ ~~N 01 20 00, E 104 20 00~~	
	N 07 00 00, E 103 00 00; N 07 00 00, E 108 00 00;	

TABLE SAR I-1 – AERONATICAL SEARCH AND RESCUE REGIONS (SRR) OF THE ASIA AND PACIFIC REGIONS

	N 10 30 00, E 114 00 00; N 08 25 00, E 116 30 00; N 02 15 00, E 108 30 00; N 01 00 00, E 108 30 00; N 01 00 00, E 108 54 00; thence south along the coastline of Borneo to N 00 15 00, E 109 00 00 to N/S 00 00 00, E 109 00 00; N/S 00 00 00, E 108 00 00; S 0050 00, E 106 00 00; N/S 00 00 00, 105 10 00; N/S 00 00 00, 104 46 00; thence around the arc of a circle radius 100NM centred on Singapore Island to N 01 39 00, E 102 10 00; N 01 13 00, E 103 30 00; N 01 17 00, E 103 36 00; thence following the national boundary to N 01 20 00, E 104 20 00; N 02 36 00, E 104 45 00; N 03 40 00, E 103 40 00; N 04 50 00, E 103 44 00; N 06 45 00, E 102 40 00; N 07 00 00, E 103 00 00.	
Taegu SRR **(Incheon FIR)**	N 38 38 00, E 133 39 00; N 38 00 00, E 133 00 00; N 37 30 00, E 133 00 00; N 34 40 00, E 129 10 00; N 32 30 00, E 127 30 00; N 32 30 00, E 126 50 00; N 30 00 00, E 125 25 00; N 30 00 00, E 124 00 00; N 38 00 00, E 124 00 00; N 38 38 00, E 128 25 00; N 38 38 00, E 133 39 00.	
Tahiti SRR	N 03 30 00, W 145 00 00; N 03 30 00, W 120 00 00; S 30 00 00, W 120 00 00; S 30 00 00, W 130 54 00; S 30 00 00, W 157 00 00; S 05 00 00, W 157 00 00; S 05 00 00, W 155 00 00; N 03 30 00, W 145 00 00.	
Taibei SRR	N 25 00 00, E 120 00 00; N 29 00 00, E 124 00 00; N 23 30 00, E 124 00 00; N 21 00 00, E 121 30 00; N 21 00 00, E 117 30 00; N 23 00 00, E 117 30 00; N 25 00 00, E 120 00 00.	

TABLE SAR I-1 – AERONATICAL SEARCH AND RESCUE REGIONS (SRR) OF THE ASIA AND PACIFIC REGIONS

~~**Tokyo SRR**~~	~~450000N 1500000E~~ ~~500500N 1590000E~~ ~~454200N 1625500E~~ ~~430000N 1650000E~~ ~~270000N 1650000E~~ ~~270000N 1550000E~~ ~~210000N 1550000E~~ ~~210000N 1300000E~~ ~~210000N 1213000E~~ ~~233000N 1240000E~~ ~~290000N 1240000E~~ ~~300000N 1240000E~~ ~~300000N 1252500E~~ ~~323000N 1265000E~~ ~~323000N 1273000E~~ ~~344000N 1291000E~~ ~~373000N 1330000E~~ ~~383800N 1333900E~~ ~~403000N 1355600E~~ ~~454500N 1400000E~~ ~~454500N 1420000E~~ ~~then between Hokkaido and Kunashiri Islands~~ ~~443000N 1454000E~~ ~~442700N 1454400E~~ ~~432000N 1455000E~~ ~~431200N 1461300E~~ ~~430000N 1465000E~~ ~~450000N 1500000E~~	
Tokyo SRR	N 45 45 00, E 142 00 00; N 44 30 00, E 145 40 00; N 43 20 00, E 145 50 00; N 43 00 00, E 146 50 00; N 45 00 00, E 150 00 00; N 50 05 00, E 159 00 00; N 43 00 00, E 165 00 00; N 40 00 00, E 165 00 00; N 27 00 00, E 165 00 00; N 27 00 00, E 155 00 00; N 21 00 00, E 155 00 00; N 21 00 00, E 121 30 00; N 23 30 00, E 124 00 00; N 30 00 00, E 124 00 00; N 30 00 00, E 125 25 00; N 32 30 00, E 126 50 00; N 32 30 00, E 127 30 00; N 34 40 00, E 129 10 00; N 37 30 00, E 133 00 00; N 38 00 00, E 133 00 00; N 38 38 00, E 133 39 00; N 40 30 00, E 135 56 00;	

TABLE SAR I-1 – AERONATICAL SEARCH AND RESCUE REGIONS (SRR) OF THE ASIA AND PACIFIC REGIONS

	N 45 45 00, E 140 00 00; N 45 45 00, E 142 00 00.	
Ujung Pandang SRR	N 03 30 00, E 133 00 00; N 03 30 00, E 141 00 00; S 09 50 00, E 141 00 00; S 09 50 00, E 139 40 00; S 07 00 00, E 135 00 00; S 09 20 00, E 126 50 00; S 12 00 00, E 123 20 00; S 12 00 00, E 114 30 00; S 08 20 00, E 110 23 00; S 03 00 00, E 110 23 00; N 01 16 00, E 113 37 00; thence following the national boundary to N 04 00 00, E 120 00 00; N 04 00 00, E 132 00 00; N 03 30 00, E 132 00 00; N 03 30 00, E 133 00 00.	
~~Ulan Bator~~ Ulaanbaatar SRR	N 49 55 00, E 089 40 00; N 52 06 00, E 099 00 00; N 45 25 00, E 115 19 00; N 41 44 00, E 105 13 00; N 49 55 00, E 089 40 00.	Check this – there should be mention of a national boundary
Urumqi SRR	N 42 55 00, E 096 20 00; N 41 48 00, E 095 08 00; N 38 21 00, E 090 13 00; N 30 26 00, E 081 37 00; thence following the national boundary to N 39 29 00, E 073 40 00; thence following the national boundary to N 40 20 00, E 075 50 00; thence following the national boundary to N 42 11 00, E 080 20 00; N 42 55 00, E 096 20 00.	
Vientiane SRR (Vientiane FIR)	N 17 00 00, E 106 34 00; thence following the national boundary to N 17 00 00, E 106 34 00,	
Wuhan SRR	N 33 32 00, E 110 52 00; N 34 00 00, E 110 29 00; N 34 54 00, E 112 47 00; N 36 06 00, E 114 21 00; N 36 21 00, E 114 55 00; N 35 42 00, E 115 01 00; N 35 15 00, E 115 27 00; N 32 54 00, E 115 47 00; N 30 05 00, E 115 56 00; N 29 02 00, E 114 34 00; N 29 23 00, E 113 06 00; N 29 31 00, E 109 24 00; N 30 17 00, E 109 29 00;	

TABLE SAR I-1 – AERONATICAL SEARCH AND RESCUE REGIONS (SRR) OF THE ASIA AND PACIFIC REGIONS

	N 31 54 00, E 109 31 00; N 33 32 00, E 110 52 00.	
Yangon SRR	N 14 00 00, E 092 00 00; N 20 00 00, E 092 00 00; N 21 00 00, E 092 00 00; N 21 57 00, E 092 32 00; N 14 00 00, E 092 00 00.	Check this – there should be mention of a national boundary

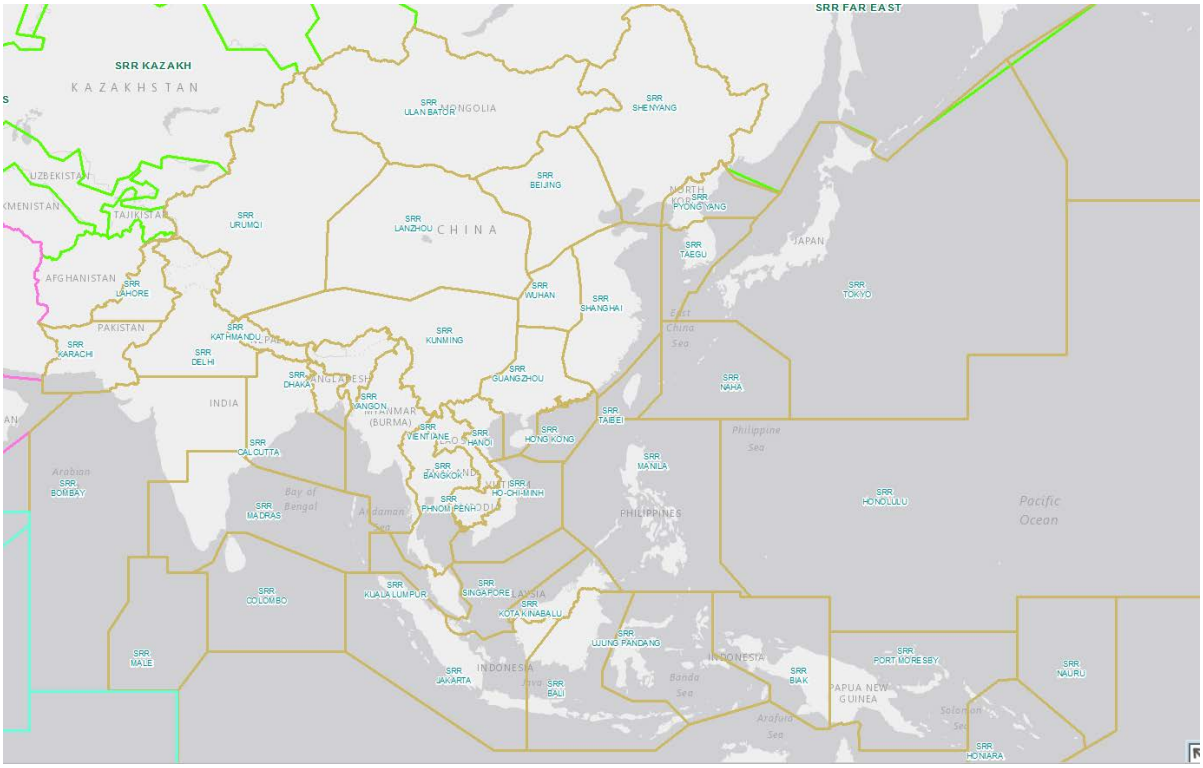

TABLE SAR II-1 - SEARCH AND RESCUE FACILITIES IN THE ASIA AND PACIFIC REGIONS

State	Name of and RCC/RSC	SPOC	Remarks
1	2	3	4 (Abbreviations are clarified at the end of the table)
AFGHANISTAN		Website: N/A Telephone 1: (974) 4503452 Telephone 2: (974) 4364193 Facsimile: (974) 4327382 Mailing Address: N/A	
AUSTRALIA	JRCC Australia (JRCC Australia is a Joint Aeronautical and Maritime RCC located in Canberra)	Website: http://www.amsa.gov.au/search-and-rescue/rcc/index.asp Telephone 1: (61.2) 62306820 Facsimile: (61.2) 62306868 AFTN: YSARYCYX email: rccaus@amsa.gov.au Mailing Address: JRCC Australia, Australian Maritime Safety Authority G.P.O. Box 2181 Canberra, ACT 2601 Australia Phone: +61 2 6230 6899 (Aeronautical) Phone: +61 2 6230 6811 (Maritime)	Thursday Island: HEL-M, RV Cairns: MRG/HEL-M, RV Townsville: VLR/HEL-M, RV Yeppoon: HEL-M, RV Whitsunday Islands: HEL-M, RV Brisbane: ELR/HEL-M, RV Coffs Harbour: RV Newcastle: HEL-M, RV Sydney: ELR/HEL-M, RV Melbourne: MRG/HEL-M, RV Hobart: HEL-M, RV Adelaide: ELR/HEL-M, RV Perth: MRG/HEL-M, RV Port Headland: RV Broome: HEL-H, RB Darwin: ELR/HEL-M, RV
BANGLADESH	Dhaka RCC	Website: http://www.caab.gov.bd Telephone 1: (880.2) 8901462 Telephone 2: (880.2) 8901463 Facsimile: (880.2) 8901924 AFTN: VGHSZQZX email: rcc_dhaka@caab.gov.bd Mailing Address: Dhaka Area Control Centre 3rd Floor Control Tower Building Hazrat Shahjalal International Airport Kurmitola Dhaka-1229, Bangaladash	Dhaka: SRG, RV
BRUNEI DARUSSALAM		Website: N/A Telephone 1: (673) 2332600 Telephone 2: (673) 2344191 Facsimile: (673) 2344191 AFTN: WBSBCYCY email: atc@civil-aviation.gov.bn	

TABLE SAR II-1 - SEARCH AND RESCUE FACILITIES IN THE ASIA AND PACIFIC REGIONS

		Mailing Address: Department of Civil Aviation Ministry of Communications Brunei International Airport Bandar Seri Begawan BB2513 Brunei Darussalam	
CAMBODIA	Phnom-Penh RCC	Website: N/A Telephone 1: (855) 12994878 Telephone 2: (855) 888736 919 Facsimile: (855) 23224259 Telex: 064411469 AFTN: VDPPYAYC email: sieng.ssca@ymail.com Mailing Address: #62, Preah Norodom Blvd, Phnom Penh, Cambodia	Phnom-Penh: MRG, RV
CHINA	Beijing RCC Guangzhou RCC Kunming RCC Lanzhou RCC Shanghai RCC Shenyang RCC Taibei RCC Uramqi RCC Wuhan RCC	Website: N/A Telephone 1: (86.10) 65293298 Telephone 2: (86.10) 65292221 Facsimile: (86.10) 65293296 AFTN: ZBBBZSZX email: cnmcc@mail.eastnet.com.cn Mailing Address: CNMCC China Maritime Search and Rescue Centre 11 Jianguomennei Avenue Beijing,100736 China (P.R. of)	Beijing: MRG/SRG, RV Tianjin: RV Guangzhou: MRG/SRG, RV Sanya: RV Shantou: RV Zhanjiang: RV Kunming: SRG, RV Lanzhou: SRG, RV Fuzhou: RV Lianyungang: RV Shanghai: MRG/SRG, RV/ RB Qingdao: RV Yantai: RV Wenzhou: RV Xiamen: RV Dalian: RV Qinhuangdao: RV Chiayi: LRG/HEL-M Chilung: RV Hsinghu: LRG/HEL-M Hualien: RV Uramqi: SRG Wuhan: SRG
DEMOCRATCI PEOPLE'S REPUBLIC OF KOREA (DPRK)	Pyongyang RCC	Website: N/A Telephone 1: +872-765058157 Telephone 2: +850-2-18111 ext 8059 Facsimile: +872-765058158 AFTN: ZKKKYCYX email: mrcc.dprk@sealink.net Mailing Address: P.O.Box 416, Pyongyang, DPR Korea	Pyongyang: MRG/HEL-M, RV
FIJI	Nadi RCC	Website: N/A Telephone 1: (679) 6725777	Nadi: ELR/HEL-M, RV/RB

TABLE SAR II-1 - SEARCH AND RESCUE FACILITIES IN THE ASIA AND PACIFIC REGIONS

		Ext 4184, 418382 Telephone 2: +679 9983233 Facsimile: (679) 6722470 (20:00-04:30Z Mon-Fri) AFTN: NFFNYCYX email: NADRCC@afl.com.fj Mailing Address: Airports Fiji Limited Private Mail Bag Nadi Airport Fiji Islands	
FRENCH POLYNESIA	Tahiti RCC	Website: N/A Telephone 1: (689) 40861153 Telephone 2: (689) 40861151 Facsimile: (689) 40855126 AFTN: NTAAYCYX email: bria@seac.pf Mailing Address: N/A	Papeete: ~~ELR~~MRG/HEL-M, RV/RB
HONG KONG, CHINA	Hong Kong RCC	Website: N/A Telephone 1: (852) 22337999 Facsimile: (852) 25417714 AFTN: VHHHYKYX email: hkmrcc@mardep.gov.hk Mailing Address: Marine Department Search and Rescue Section G.P.O.Box 4155 Hong Kong, China	Hong Kong: MRG/HEL-M, RV/RB
INDIA	Mumbai RCC Kolkata RCC Delhi RCC Chennai RCC	Website: https://inmcc.istrac.org Telephone 1: (91.80) 28094546 Telephone 2: (91.80) 28371857 Facsimile: (91.80) 28371857 AFTN: VOBGZSZX email: inmcc@istrac.org Mailing Address: ISTRAC/ISRO Department of Space Plot No.12, Peenya Industrial Estate Bangalore-560058, India	Mumbai: ELR/HEL-M, RV/RB Kolkata: ELR/HEL-M Delhi: ELR/HEL-M, RV/RB Chennai: ELR/HEL-M
INDONESIA	Biak RCC Jakarta RCC Surabaya RCC Ujung Pandang RCC	Website: http://www.basarnas.go.id Telephone 1: (6221) 65701172 Telephone 2: (6221) 65867510 Facsimile: (6221) 65867512 AFTN: WIIIYCYL email: indonesia_mcc@yahoo.com Mailing Address: National Search and Rescue Agency (Badan SAR Nasional) Jln Angkasa Block B15 Kav, 2-3 Jakarta Posat 10720 Indonesia	Biak: LRG Jayapura: SRG/HEL-M, RB Merauke: RB Sorong: SRG/HEL-M, RB Jakarta: LRG/HEL-M, RB Medan RSC: LRG/HEL-M, RV/RB Padang RSC: SRG, RV/RB Pekanbaru RSC: SRG/HEL-L, RB Pontianak RSC:

TABLE SAR II-1 - SEARCH AND RESCUE FACILITIES IN THE ASIA AND PACIFIC REGIONS

			SRG/HEL-L, RB Tanjung RSC: SRG, RB Pinang RSC: Surabaya: LRG/HEL-L, RV/RB Balikpapan RSC: SRG/HEL-M, RV/RB Banjarmasin RSC: SRG, RB Denpasar RSC: LRG, RV/RB Kupang RSC: SRG/HRL-M, RB Ujung Pandang: LRG/HEL-L, RV/RB Ambon RSC: SRG, RV/RB Manado RSC: SRG/HEL-L, RV/RB
JAPAN	Tokyo RCC	Website: N/A Telephone 1: (81.3) 35916106 Facsimile: (81.3) 35916107 AFTN: RJTTYKYY email: jcg-jamcc@mlit.go.jp Mailing Address: Japan Coast Guard (JCG) Operation Centre – JAMCC, 2-1-3 Kasumiga- Seki, Chiyodaku, Tokyo 100-8989 Japan	Kushiro: HEL-M, RV Hakodate: HEL-M, RV Hachinohe: LRG, RV Niigata: HEL-M, RV Tokyo: LRG/HEL-M, RV Komatsu: LRG, RV Miho: HEL-M, RV Iwakuni: LRG Fukuoka: MRG/HEL-M, RV Nagasaki; HEL-M, RV Kagoshima: HEL-M Naha: LRG/MRG, RV Ishigaki: HEL-M, RV
		Website: N/A Telephone 1: (81.3) 5756 1522 Telephone 2: (81.3) 5757 3037 Facsimile: (81.3) 5756 7310 AFTN: RJTTYCYX Email: N/A Mailing Address: Tokyo Airport Office 3-3-1, Haneda-kuko, Ota-ku, Tokyo, Japan	Kushiro: HEL-H, RV Chitose: MRG Hakodate: HEL-H, RV Shiogama: HEL-H, RV Niigata: HEL-H, RV Tokyo: MRG, ELR Yokohama: HEL-H, RV Nagoya: HEL-H, RV Kobe: HEL-H, RV Iwakuni: LRG Fukuoka: RV Kagoshima: HEL-H, RV Naha: MRG
LAO PDR	Vientiane RCC	Website: N/A Telephone 1: (856.21) 520478 Facsimile: (856.21) 513041 AFTN: VLVTZRZX Mailing Address: Wattay International Airport Lao Air Traffic Management PO Box	Vientiane: MRG/HEL-M

TABLE SAR II-1 - SEARCH AND RESCUE FACILITIES IN THE ASIA AND PACIFIC REGIONS

		2985 Vientiane, Lao PDR	
MACAO, CHINA	Macao RCC	Website: N/A Telephone 1: (853) 2855 9922 Facsimile: (853) 2851 1986 Telex: 88424 Mailing Address: N/A	RV/RB
MALAYSIA	Kuala Lumpur RCC Kota Kinabaku RCC	Website: N/A Telephone 1: (603) 78465859 Telephone 2: (603) 78465860 Facsimile: (603) 78466839 AFTN: WMFCYCYX email: ARCCKL@dca.gov.noy Mailing Address: N/A ARCC KUALA LUMPUR En. Hood bin Mustapha Kuala Lumpur ARCC Chief Tel : +603 7846 5859 Fax: +603 7846 6839 ARSC BUTTERWORTH Lt Col Mohd Ali bin Ahmad RMAF Butterworth ARSC Chief Tel: +604 323 2078 Fax: +604 323 2122 ARSC KUANTAN Lt Col Azizan bin Md Isa RMAF Kuantan ARSC Chief Tel: +609 538 1298 Fax: +609 538 1693 ARCC KOTA KINABALU En. Saleh bin Samat Kota Kinabalu ARCC Chief Tel: +6088 224 403 Fax: +6088 219 280 ARSC KUCHING En. Haidi bin Ramelan Kuching ARSC Chief Tel: +6082 452 975 Fax: +6082 571 526 ARSC LABUAN Maj Mohd Azman bin Hashim RMAF Tel: +6087 412 236 Fax: +6087 416 560	Alor Setar: SRG Butterworth RSC: ELR/HEL-H, RV/RB Kota Bharu: ELR/HEL-H Kuantan RSC: ELR/HEL-H, RB Klung: HEL-H Kuala Lumpur: ELR/HEL-H, RV/RB Brunei: SRG/HEL-M, RV/RB Kota Kinabalu Kuching RSC: MRG/HEL-H, RV/RB Labuan RSC: MRG/HEL-H, RV Miri: MRG/HEL-M, RB Sandakan: MRG/HEL-M Sibu: MRG/HEL-M Tawau: MRG/HEL-H
MALDIVES	Male RCC	Website: N/A Telephone 1: +872-765058157 Telephone 2: +850-2-18111 ext 8059	Male: SRG/HEL-M, RV/RB

TABLE SAR II-1 - SEARCH AND RESCUE FACILITIES IN THE ASIA AND PACIFIC REGIONS

		Facsimile: +872-765058158 AFTN: ZKKKYCYX email: mrcc.dprk@sealink.net Mailing Address: P.O.Box 416, Pyongyang, DPR Korea	
MONGOLIA	Ulaanbatar RCC	Website: N/A Telephone 1: (976.1) 1281622 Telephone 2: (976.1) 1281691 Facsimile: (976.1) 1281154 AFTN: ZMUBYCYX email: ub_rcc@mcaa.gov.mn Mailing Address: ATS Division Buyant-Ukhaa International Airport Ulaanbataar-34, POB-35, Ulaanbaatar, Mongolia	Ulaanbatar
MYANMAR	Yangon RCC	Website: N/A Telephone 1: +951-533041 Facsimile: +951-653009 Telex: 08321228 AFTN: VYYYYCYX Mailing Address: 08-02 Sakura Tower 339 Bog Yoke Aung San Road Yangon, Myanmar	Yangon: MRG/SRG/HEL-M, RV/RB
NAURU	Nauru RCC	Website: N/A AFTN: ANAUYFYX Mailing Address: Airport Rescue Fire Service Central Pacific Republic of Nauru Comments: Information to be updated by 15 November 2011	Nauru: ELR/VLR/SRG, RV/RB
NEPAL	Kathmandu RCC	Website: N/A Telephone 1: (977) 1227287 Facsimile: (977) 1222416 Telex: (891) 2553 DCA NP AFTN: VNKTYAYX Mailing Address: Director General of Department of Civil Aviation Babar Mahal Kothamandu, Nepal	Kathmandu: MRG/HEL-M
NEW CALEDONIA	New Caledonia RSC	Website: N/A Telephone 1: (687) 352422 Telephone 2: (687) 352421 Facsimile: (687) 352423 AFTN: NWWWYCYX Mailing Address: RSC Tontouta	Noumea: ~~MRG~~SRG/HEL-L, RV/RB
NEW ZEALAND	New Zealand RCC	Website: N/A Telephone 1: (64.4) 5778030 Facsimile: (64.4) 5778041 AFTN: NZWNYCYX	Auckland: ELR/HEL-M, RVRB Christchurch: MRG/HEL, RB

TABLE SAR II-1 - SEARCH AND RESCUE FACILITIES IN THE ASIA AND PACIFIC REGIONS

		email: rccnz@maritimenz.govt.nz Mailing Address: RCCNZ P.O.Box 30050 Lower Hutt, New Zealand Comments: New Zealand SRR Website: N/A Telephone 1: (64.4) 6834000 Facsimile: (64.4) 6834010 AFTN: NZWNYCYX email: rccnz@maritimenz.govt.nz	Wellington: HEL-M, RB
PAKISTAN	Karachi RCC Lahore RCC	Website: N/A Telephone 1: (92.21) 34690793 Telephone 2: (92.21) 34690840 Facsimile: (92.21) 34690797 AFTN: OPKCZSZX email: sckhi@suparco.gov.pk Mailing Address: Space and Atmospheric Sciences Division Space Communication Section P.O.Box 8402, Sector 28, Gulzar-e-Hijri Off University Road SPARCENT, SUPARCO Karachi 75270, Pakistan Comments: Alternative e-mail: pamcc@suparco.gov.pk	Karachi: MRG, RV Lahore: MRG
PAPUA NEW GUINEA	Port Moresby RCC	Website: http://www.nmsa.gov.pg Telephone 1: (675) 321 3033 Telephone 2: (675) 3054 631 Facsimile: (675) 321 3051 (ARCC-24Hrs) AFTN: AYPMYCYXARCCHrs email: mrccpng@nmsa.gov.pg Mailing Address: National Maritime Safety Authority Papua New Guinea P.O.Box 668, Port Moresby N.C.D., Papua New Guinea	Lae: MRG, RB Madang: SRG, RB Port Moresby: ELR, RV Rabaul: RB Wewak: SRG
PHILIPPINES	Manila RCC	Website: N/A Telephone 1: (63.2)8799205 Telephone 2: (63.2) 8799112 Facsimile: (63.2) 8799112 AFTN: RPLLYCYX email: caap_orcc@yahoo.com.ph Mailing Address: Civil Aviation Authority of the Philippines Old MIA Road cor NAIA Road ZIP code: 1300, Philippines	Manila: LRG/HEL-M, RB Mactan: LRG/HEL-L, RV Zamboanga: RV

TABLE SAR II-1 - SEARCH AND RESCUE FACILITIES IN THE ASIA AND PACIFIC REGIONS

		Comments: Cellphones: (63.916) 5156972, 8607245 Additional e-mail: emergpreptransportphl@gmail.com	
REPUBLIC OF KOREA	Incheon RCC	Website: N/A Telephone 1: (82.32) 8352252 Telephone 2: (82.32) 8352594 Facsimile: (82.32) 8352895 Telex: (801) 45502 KOMCC email: komcc2@kornet.net Mailing Address: Search and Rescue Division Guard and Rescue Bureau Korea Coast Guard / KOMCC 3-8, SongDo-Dong YeonSu-Gu Incheon City, Republic of Korea	Chuncheon: SRG Daegu: MRG/HEL-L Gangneung: SRG Gimhae: SRG/HEL-M, RV Gimpo: SRG/HEL-M Gunsan: HEL-M Gwangju: MRG/HEL-M Incheon: MRG/HEL-M, RV Jeju: SRG/HEL-M, RV Mokpo: HEL-M Mukho: RV Osan: MRG/HEL-H Pohang: HEL-M, RV Yangyang RSC, RB
SINGAPORE	Singapore RCC	Website: ~~N/A~~ www.caas.gov.sg Telephone 1: (65) 65425024 Telephone 2: (65) 65412668 Facsimile: (65) 65422548 AFTN: ~~WSSSZSZX~~ WSJCZGZX or WSJCYCYX email: CAAS_RCC@caas.gov.sg Mailing Address: MCC Singapore Singapore Air Traffic Control Centre (SATCC) 60 Biggin Hill Road, Singapore 509950 Republic of Singapore	Singapore: LRG/HEL-H, RV/RB
SOLOMON IS.	Honiara RCC	Website: N/A Telephone 1: (677) 21609 Telephone 2: (677) 21535 Facsimile: (677) 23798 AFTN: AGGHYCYX email: mrcc@solomon.com.sb Mailing Address: MRCC Honiara P.O.Box G32 Honiara, Solomon Islands Comments: Solomon Islands SRR	Honiara: ELR/VLR/SRG, RV/RB
SRI LANKA	Colombo RCC	Website: N/A Telephone 1: (94.1) 635105/6 Telephone 2: (94.1) 625555 Facsimile: (94.1) 635106 AFTN: VCCCYCYX Mailing Address: RCC Colombo Airport Ratmalana, Sri Lanka	Colombo/Ratmalana: LRG/HEL-M, RV

TABLE SAR II-1 - SEARCH AND RESCUE FACILITIES IN THE ASIA AND PACIFIC REGIONS

THAILAND	Bangkok RCC	Website: N/A Telephone 1: (66 2) 2860506 Telephone 2: (66 2) 2860594 Facsimile: (66 2) 2873186 AFTN: VTBAYCYX email: bkkrcc@aviation.go.th Mailing Address: Flight Standards Bureau Department of Civil Aviation Tung Mahemek Bangkok 10120, Thailand Comments: Optional e-mail: bkkrcc@yahoo.com	Bangkok: MRG/HEL-L Sattahip: MRG/HEL-L Songkhla: SRG/HEL-L Khok Kathiam: SRG/HEL-L Prachuap Kiri-Khan: SRG
UNITED STATES	Elmendorf RCC Honolulu RCC Juneau RCC Langley RCC Long Beach RCC Seattle RCC	Website: N/A Telephone 1: 1-301-817-4576 Facsimile: 1-301-817-4568 AFTN: KCDCZSZA email: usmcc@noaa.gov Mailing Address: USMCC NSOF, E/SPO53 1315 East West Hwy Silver Spring MD 20910 USA Comments: Physical Address: 4231 Suitland Road Suitland Maryland USA	Anchorage: ELR Fairbanks: ELR Guam I: ELR Hito: HEL-M, RV Honolulu: VLR/HEL-L, RV/RB Adak: VLR Juneau: RV Ketchikan: RV Kodiak: VLR/HEL-L/ HEL-M, RV Sitka: HEL-M, RV Eureka: HEL-L Long Beach: VLR Los Angeles: ELR/SRG/ HEL-L, RV Sacramento: VLR Sandiego: ELR/SRG/HEL-L, RV San Francisco: HEL-M, RV Astoria: SRG/HEL-L, RV Port Angeles: HEL-L, RV
VANUATU	Port Vila RCC	Website: N/A Telephone 1: (678) 22108 Telephone 2: (678) 23768 Facsimile: (678) 7743972 AFTN: NVVVYMYX email: plo@vanuatu.com.vu Mailing Address: PMB 9046 Port Vila, Vanuatu Comments: Fuji SRR/MRCC Noumea	Port Vila: SRG, RV/RB
VIET NAM	Ha Noi RCC Ho Chi Minh RCC	Country/Region Code (MID): 574 Website: N/A Telephone 1: (84.4)	Cat Bi: HEL-M, RV/RB Gia Lam: LRG/SRG/HEL-H

TABLE SAR II-1 - SEARCH AND RESCUE FACILITIES IN THE ASIA AND PACIFIC REGIONS

		37683051 Telephone 2: (84.4) 37683050 Facsimile: (84.4) 37683048 Mailing Address: No.8 Pham Hung St., Cau Giay Dist., Hanoi, Vietnam	Hoa Lac: HEL-H/HEL-M Noi Bai: LRG/MRG/HEL-H Vinh:MRG/HEL-M, RV/RB Can Tho: SRG/HEL-M, RV/RB Da Lat/Lien Khuong: SRG/HEL-M Da Nang RSC: LRG/MRG/SRG/HEL-L/HEL-M, RV/RB Nha Trang: MRG/HEL-H, RV/RB Phu Cat: SRG/HEL-H Phu Quoc: SRG/HEL-H/HEL-M, RV/RB Tan Son Nhat: LRG/SRG/HEL-L Vung TauHEL-H, RV

Abbreviations

SPOC – SAR Point of contact for the reception of alert messages detected by the COSPAS-SARSAT system

Minimum requirements for land rescue units (LRU) including mountain rescue units (MRU) and desert rescue units (DRU), parachute rescue units(PRU) and the automated mutual-assistance vessel rescue (AMVER) system.

Extra long-range (ELR) – aircraft with a radius of action of 2 780 km (1 500 NM) or more, plus 2 ½ hours search remaining.

Very long range (VLR) – aircraft with a radius of action of more than 1 850 km (1 000 NM) plus 2 ½ hours search remaining.

Long range (LRG) – aircraft with a radius of action of 1 390 km (750) plus 2 ½ hours search remaining.

Medium range (MRG) – aircraft with a radius of action of 740 km (400 NM) plus 2 ½ hours search remaining.

Short range (SRG) – aircraft with a radius of action of 280 km (150 NM) plus ½ hour search remaining.

Helicopter (HEL-L) – light helicopter with a radius of action for rescue purposes of up to 185 km (100NM) and a capacity for evacuating 1 to 5 persons.

Helicopter (HEL-M) – medium helicopter with a radius of action for rescue purposes of 185 to 370 km (100 to 200 NM) and a capacity for evacuating 6 to 15 persons.

Helicopter (HEL-H) – heavy helicopter with a radius of action for rescue purposes of more than 370 km (200 NM) and a capacity for evacuating more than 15 persons.

Rescue boat (RB) – short-range coastal or river craft with an approximate speed of 14 knots or higher.

Rescue vessel (RV) – vessel possessing sea-going qualities, long range and reasonable speed. Patrol, customs, pilotage and other craft fulfil the purpose if assigned a high priority for search and rescue operations.

TABLE SAR II-1 - SEARCH AND RESCUE FACILITIES IN THE ASIA AND PACIFIC REGIONS

SAR AGREEMENTS

Updated: 10 July 2015

DATE	STATES	REMARKS
14 April 1972	ASEAN States - Indonesia, Malaysia, Philippines, Singapore and Thailand	Multilateral agreement
March 1997	ASEAN - Viet Nam	Viet Nam accession to 1972 ASEAN Agreement (as above)
August/Sept. 2004	Australia/Fiji	
November 1990	Australia / Indonesia	Updated 5 April 2004
April 2006	Australia / Maldives	Letter of Arrangement
2 April 2009	Australia / New Zealand	Notified 2013
February 2001	Australia / Papua New Guinea	
29 July 1999	Australia / New Caledonia	Maritime Arrangement for SAR Cooperation
8 October 1998	Australia / Solomon Islands	SAR Arrangement
29 April 2014	Australia/Sri Lanka	SAR Arrangement
16 December 1998	Brunei Darussalam / Malaysia	
	Bhutan / India	
February 1999	Cambodia / Viet Nam	
1 June 2009	Chile / New Zealand	SAR services coordination
16 May 2007	China / Republic of Korea	
notified 2003	China / United States	
Signed 25 Oct 2013	China/Mongolia	
6 March 2012	Cook Islands / New Zealand	Notified 2012
notified July 2007	French Polynesia (Tahiti) / New Zealand	Final draft agreement being considered by FP authorities
notified January 2013	French Polynesia (Tahiti) / United States	Draft agreement being considered by FP authorities
June 1982	Indonesia / Singapore	
1990	Indonesia / Papua New Guinea	JBC MOU signed
25 August 1986	Indonesia / Philippines	
1988, July 2006	Indonesia / United States	SAR Services Agreement
17 March 2010	Japan/Philippines	SAR Agreement
30 April 2008	Japan / Republic of Korea	
1986	Japan / United States	
1998	Lao PDR / Vietnam	LOA for provision of assistance
05 March 2013	Lao PDR/Myanmar	
29 August 1985	Malaysia / Indonesia	
9 December 1985	Malaysia / Philippines	
11 August 1984	Malaysia / Singapore	
9 September 1985	Malaysia / Thailand	
25 June 2014	Maldives/Sri Lanka	
notified 2003	Marshall Islands / United States	
notified 2003	Micronesia / United States	
11 April 2008	Mongolia/Russian Federation	
22 May 2002	New Caledonia / New Zealand	
notified July 2007	New Zealand/Niue	Government aid agreement
20 August 2003	New Zealand / Samoa	Notified 2005
Notified July 2007	New Zealand/Tokelau	Government aid agreement

DATE	STATES	REMARKS
17 June 2005	New Zealand / Tonga	
16 April 2003	New Zealand / United States	
26 November 2002	Palau / United States	
July 1996	Philippines / Singapore	
20 September 1996	Philippines / Viet Nam	
September 1985	Singapore / Thailand	Updated July 1996
July 1996	Singapore / Viet Nam	
March 2009	Viet Nam / Lao PDR	
March 2009	Viet Nam / Cambodia	

SAR LOA Matrix **Date Last Amended**: 10 July 2015 (√ = SAR Agreement notified, blank cell = SAR Agreement not notified)

Administration	Afghanistan	Australia	Bangladesh	Bhutan	Brunei	Cambodia	China	Hong Kong	Macao	Cook Islands	DPR Korea	Fiji	French Polynesia	India	Indonesia	Japan	Kiribati	Lao PDR	Malaysia	Maldives	Marshall Is	Micronesia	Mongolia	Myanmar	Nauru	Nepal	New Caledonia	New Zealand	Niue (NZ)	Pakistan	Palau	PNG	Philippines	ROK	Samoa	Singapore	Solomon Is	Sri Lanka	Thailand	Timor Leste	Tonga	Vanuatu	Viet Nam	USA
1. Afghanistan												√			√					√								√				√				√	√						√	
2. Australia														√														√																
3. Bangladesh																																												
4. Bhutan														√																														
5. Brunei																			√																									
6. Cambodia																																											√	
7. China																																		√									√
8. Hong Kong, China																																												
9. Macao, China																																												
10. Cook Islands																												√																
11. DPR Korea																																												
12. Fiji		√																																									
13. French Polynesia																												√																
14. India				√																																								
15. Indonesia		√																	√													√	√			√			√			√	√
16. Japan																																√	√										√
17. Kiribati																																												
18. Lao PDR																								√																			√	
19. Malaysia					√										√																	√			√			√			-	
20. Maldives		√																																				√						
21. Marshall Islands																																												√
22. Micronesia																																												√
23. Mongolia																																											Note: has LOA with Russian Federation	
24. Myanmar																		√																										
25. Nauru																																												
26. Nepal																																												
27. New Caledonia																																												
28. New Zealand[1]		√								√			√														√								√								√
29. Niue (NZ)																												√																
30. Pakistan																																												
31. Palau																																												√
32. Papua New Guinea		√													√																													
33. Philippines															√	√			√																		√			√			√	
34. Republic of Korea							√									√																												
35. Samoa																												√																
36. Singapore															√				√														√					√			√		
37. Solomon Islands		√																																									
38. Sri Lanka		√																		√																								
39. Thailand															√				√														√			√						√	
40. Timor Leste																																												
41. Tonga																												√																
42. Vanuatu																																												
43. Viet Nam						√									√			√	-													√			√			√				
44. USA[2]							√								√	√												√			√												

[1] Also has an agreement with the Tokelau Islands and a SAR agreement with SAM State Chile

[2] Includes American Samoa, Guam, Johnston, Kingman, Midway, Mariana, Palmyra, Wake

SAR Capability Matrix (Last Update: 07 July 2015)

	Training	Alerting	Legislative	SAR Committee	SAR Agreements	Relationships	Communications	Quality Control	Civil Military	Resources	SAREX	Library	Computerisation	SAR Programme	Supply Dropping	Special Equipment	SAR aircraft	Navigation	ELTs	COSPAS-SARSAT Alerts	Capability (A=5, B=4) %
Afghanistan																					0
Australia	A	A	A	A	A	B	A	A	A	A	A	A	A	A	A	A	A	A	B	A	98
Bangladesh	D	B	B	E	C	B	B	A	A	B	B	B	C	B	B	B	A	B	A	A	69
Bhutan																					0
Brunei	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	B	A	A	A	E	93
Cambodia	B	B	C	B	C	B	C	E	B	C	C	C	D	C	E	E	D	D	E	B	20
China	A	A	A	A	A	A	B	B	A	B	B	C	D	E	A	A	A	A	A	E	81
Cook Islands	E	D	D	E	E	C	C	C	D	E	D	E	E	E	E	D	D	E	A	E	5
DPR Korea	D	B	D	B	E	D	B	B	B	C	D	E	E	E	D	E	C	C	E	E	20
Fiji	D	A	C	C	C	C	B	C	B	C	B	C	C	B	D	C	C	C	B	A	30
French Polynesia	A	A	A	B	C	A	A	A	A	B	A	A	A	A	A	A	A	A	A	A	93
Hong Kong, China	A	A	A	A	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	99
India	B	A	A	B	C	B	A	D	A	A	A	A	B	B	A	B	A	A	A	A	84
Indonesia	A	A	A	A	A	A	B	B	A	A	A	B	B	B	A	B	B	B	B	B	90
Japan	A	A	A	A	B	A	A	A	A	A	A	A	B	A	A	A	A	A	A	A	98
Kiribati																					0
Lao PDR	C	B	C	B	B	B	B	D	B	B	C	C	C	C	B	D	D	B	D	**A**	41
Macau, China	A	A	A	B	A	-	A	-	-	-	A	-	-	-	-	-	A	-	A	A	49
Malaysia	A	A	C	A	B	A	A	A	A	A	A	B	A	A	A	A	A	A	A	D	78
Maldives	C	A	C	E	B	A	B	C	A	C	B	B	B	A	C	C	C	A	C	A	50
Marshall Islands																					0
Micronesia	C	D		E	E	D	C					E		D	D						0

Mongolia	A	A	B	A	B	B	A	A	A	B	A	A	A	B	D	B	A	B	A	A	88
Myanmar	D	E	D	C	E	B	C	C	B	E	E	E	E	E	C	E	B	C	E	E	12
Nauru																					0
Nepal	B	B	C	D	E	C	C	D	B	D	E	D	E	B	B	C	B	B	B	D	32
New Caledonia	A	B	B	B	C	B	A	B	A	B	A	A	B	E	A	B	A	A	A	A	86
New Zealand	A	A	A	A	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	99
Pakistan	A	B	B	A	C	A	B	A	A	A	A	A	D	B	B	A	A	A	A	A	85
Palau																					0
Papua New Guinea	B	A	B	C	B	B	C	C	B	C	C	B	C	C	C	E	E	E	A	E	34
Philippines	C	B	A	C	B	C	B	C	C	C	C	D	C	C	D	C	B	A	A	A	36
Republic of Korea	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	100
Samoa																					0
Solomon Islands																					0
Singapore	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	100
Sri Lanka	C	B	B	C	B	B	A	B	A	B	B	A	D	D	B	B	C	A	A	A	66
Thailand	B	A	A	A	B	A	A	A	A	A	A	B	B	B	A	A	A	A	A	A	95
Timor Leste																					0
Tonga	C	D	E	E	D	C	C	E	B	E	E	E	E	E	E	E	C	E	A	E	9
United States	A	A	A	A	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	99
Vanuatu																					0
Viet Nam	B	B	A	A	B	A	A	B	A	A	A	B	C	B	B	B	A	B	A	A	86
	Training	Alerting	Legislative	SAR Committee	SAR Agreements	Relationships	Communications	Quality Control	Civil Military	Resources	SAREX	Library	Computerisation	SAR Programme	Supply Dropping	Special Equipment	SAR aircraft	Navigation	ELTs	COSPAS-SARSAT Alerts	

A = Fully meets Annex 12 requirements, B = Meets Annex 12 requirements in most areas,

C = Meets Annex 12 requirements in some areas, D = Initial implementation, E = Not implemented, Blank = No response

SAR Matrix Element Descriptions

Training: The appropriate level and type of training for SAR coordinator, SAR mission coordinator, on-scene coordinator, and operational facilities. (IAMSAR Manual Vol. 1, Chapter 3)

Alerting: Fast and reliable means for the rescue coordination center to receive distress alerts. (IAMSAR Manual Vol. 1, Chapter 2)

Legislative: Statutes and related provisions that establish a legal foundation for establishing a SAR organization and its resources, policies, and procedures. (IAMSAR Manual Vol. I, Chapter 1)

SAR committee: Typically established under a national SAR plan, the SAR coordinating committee is comprised of SAR system stakeholders. (IAMSAR Manual Vol. 1, Chapter 6 and Appendix J)

Agreements : States should enter into agreements with neighboring States to strengthen SAR cooperation and coordination. (Chapter 3 – *Cooperation*, in both Annex 12 – Search and Rescue, and the International Convention on Maritime SAR)

Relationships: Close cooperation between services and organizations which may contribute to improving SAR service in areas such as operations, planning, training, exercises and research and development.

Communications: Communication capability for receipt of distress alerts and operational coordination among the SAR mission coordinator, the on-scene coordinator and SAR facilities. (IAMSAR Manual Vol. 1, Chapter 3)

Quality Control: Procedures to focus on improving the quality of SAR services so as to improve results and reduce costs. (IAMSAR Manual Vol. 1, Chapter 6)

Civil/Military: Close cooperation between the various civilian and military organizations.

Resources: The primary operational facilities made available to the national SAR system by various authorities and arrangements with others. (IAMSAR Manual Vol. 1, Chapter 5 and Appendix C)

SAR Exercise: Exercise to test and improve operational plans, provide learning experience and improve liaison and coordination skills. (IAMSAR Manual Vol. 1, Chapter 3; Annex 12, and Annex 14 regarding Airport Emergency Plan)

Library: Quick access to the applicable international, national, and agency SAR publications that provide standards, policy, procedures and guidance.

Computerization: Use of or access to output of various computer resources including databases, computer aids for SAR system management, search planning software, etc. (IAMSAR Manual Vol. 1, Chapter 2)

SAR programme: National structure to establish, manage and support the provision and coordination of SAR services. (IAMSAR Manual Vol. 1, Chapter 1)

Supply dropping: Supplies and survival equipment carried by air and maritime SAR facilities to aid survivors and facilitate their rescue, as appropriate. (IAMSAR Manual Vol. 1, Chapter 2 and Appendix B)

Special equipment: Equipment created for specific rescue scenarios (such as mountain or desert rescue) and equipment typically carried on designated SAR units to support coordination and locating functions as well as special supplies and survival equipment to aid survivors and facilitate their rescue. (IAMSAR Manual Vol. 1, Chapter 2 and 4)

SAR aircraft: An aircraft provided with specialized equipment suitable for the efficient conduct of SAR missions (Annex 12, Chapter 2 - *Organization*)

Navigation: Suitable means provided within the SAR region to determine position, and the responding SAR facilities have the appropriate equipment on board to determine their position in the SAR region they are likely to operate. (IAMSAR Manual Vol. 1, Chapter 2)

ELT: National regulations for carriage of ELTs, and arrangements for registration of the 406 MHz beacon and rapid access to the beacon registration database. (Annex 6 – Operation of Aircraft and Annex 10 - Aeronautical Telecommunications; and IAMSAR Manual Vol. 1, Chapter 4)

Cospas-Sarsat Distress Alerts: A SAR Point of Contact (SPOC) designated for receipt of Cospas-Sarsat distress data, and arrangements for efficient routing of the distress data to the appropriate SAR authority (the aeronautical emergency locator transmitter ELT), maritime emergency position-indicating beacon (EPIRB), and personal locator beacon (PLB)). (Annex 12, paragraph 3.2.5 and Section 2.4; and, IAMSAR Manual Vol. 1, Chapter 4)

ATM/AIS/SAR Deficiencies List (Abbreviated)

Identification		**Deficiencies**			**Corrective Action**			
Requirements	**States/ facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action****
Requirements of Annex 12	Afghanistan	SAR Capability Matrix	6/07/2015	SAR Capability (no data)		Afghanistan	2016	U
Requirements of Annex 12	Bhutan	SAR Capability Matrix	6/07/2015	SAR Capability (no data)		Bhutan	2016	U
Requirements of Annex 12	Cambodia	SAR Capability Matrix	6/07/2015	SAR Capability (14 of 20)		Cambodia	2016	U
Requirements of Annex 12	Cook Islands	SAR Capability Matrix	6/07/2015	SAR Capability (19 of 20)		Cook Islands	2016	U
Requirements of Annex 12	DPR Korea	SAR Capability Matrix	6/07/2015		SAR Capability (15 of 20 elements non-compliant)	DPR Korea	2016	U
Requirements of Annex 12	Fiji	SAR Capability Matrix	6/07/2015		SAR Capability (13 of 20 elements non-compliant)	Fiji	2016	U
Requirements of Annex 12	Kiribati	SAR Capability Matrix	6/07/2015		SAR Capability (no data)	Kiribati	2016	U
Requirements of Annex 12	Lao PDR	SAR Capability Matrix	6/07/2015		SAR Capability (10 of 20 elements non-compliant)	Lao PDR	2016	U
Requirements of Annex 12	Macau, China	SAR Capability Matrix	6/07/2015		SAR Capability (10 of 20 elements non-compliant)	Macau, China	2016	U
Requirements of Annex 12	Maldives	SAR Capability Matrix	6/07/2015		SAR Capability (9 of 20 elements non-compliant)	Maldives	2016	U

Identification		Deficiencies			Corrective Action			
Requirements	**States/ facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action****
Requirements of Annex 12	Marshall Islands	SAR Capability Matrix	6/07/2015		SAR Capability (no data elements non-compliant)	Marshall Islands	2016	U
Requirements of Annex 12	Micronesia	SAR Capability Matrix	6/07/2015		SAR Capability (20 of 20 elements non-compliant)	Micronesia	2016	U
Requirements of Annex 12	Myanmar	SAR Capability Matrix	6/07/2015		SAR Capability (17 of 20 elements non-compliant)	Myanmar	2016	U
Requirements of Annex 12	Nauru	SAR Capability Matrix	6/07/2015		SAR Capability (no data elements non-compliant)	Nauru	2016	U
Requirements of Annex 12	Nepal	SAR Capability Matrix	6/07/2015		SAR Capability (12 of 20 elements non-compliant)	Nepal	2016	U
Requirements of Annex 12	New Caledonia	SAR Capability Matrix	6/07/2015		SAR Capability (8 of 20 elements non-compliant)	New Caledonia	2016	U
Requirements of Annex 12	Palau	SAR Capability Matrix	6/07/2015		SAR Capability (no data)	Palau	2016	U
Requirements of Annex 12	Papua New Guinea	SAR Capability Matrix	6/07/2015		SAR Capability (11 of 20 elements non-compliant)	Papua New Guinea	2016	U
Requirements of Annex 12	Philippines	SAR Capability Matrix	6/07/2015		SAR Capability (12 of 20 elements non-compliant)	Philippines	2016	U

Identification		Deficiencies			Corrective Action			
Requirements	**States/ facilities**	**Description**	**Date first reported**	**Remarks**	**Description**	**Executing body**	**Target date for completion**	**Priority for action****
Requirements of Annex 12	Samoa	SAR Capability Matrix	6/07/2015		SAR Capability (no data elements non-compliant)	Samoa	2016	U
Requirements of Annex 12	Solomon Islands	SAR Capability Matrix	6/07/2015		SAR Capability (no data)	Solomon Islands	2016	U
Requirements of Annex 12	Timor Leste	SAR Capability Matrix	6/07/2015		SAR Capability (no data)	Timor Leste	2016	U
Requirements of Annex 12	Tonga	SAR Capability Matrix	6/07/2015		SAR Capability (18 of 20 elements non-compliant)	Tonga	2016	U
Requirements of Annex 12	Vanuatu	SAR Capability Matrix	6/07/2015		SAR Capability (no data)	Vanuatu	2016	U

ATM/SG/3 WP31
Appendix I

INTERNATIONAL CIVIL AVIATION ORGANIZATION

D R A F T

ASIA/PACIFIC SEARCH AND RESCUE (SAR) PLAN

DRAFT Version 1.0, September 2015

This Plan was developed by the Asia/Pacific Search and Rescue Task Force (APSAR/TF)

Approved by APANPIRG/26 and published by the
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CONTENTS

SCOPE OF THE PLAN

Plan Structure

1.1 The Asia/Pacific Search and Rescue (SAR) Plan (hereinafter referred to as the 'Plan') references different levels. At the higher level are global requirements established by the ICAO Annex 12 to the ICAO Convention on International Civil Aviation (ICAO Doc 7300). Global guidance material is provided by the International Maritime Organization (IMO) and ICAO's joint publication, the International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual. Beneath this is regional planning guidance primarily provided by this Plan and other regional guidance material, in order to enable States to define the goals and means of meeting objectives for State planning towards improving State SAR System capability, such as Regional Air Navigation Plan (RANP, ICAO Doc 9673) objectives.

1.2 The global air navigation perspective is guided mainly by the *Global Air Navigation Plan* (GANP, Doc 9750), the *Global ATM Operational Concept* (Doc 9854) and the *Global Aviation Safety Plan* (GASP).

1.3 The scope of the Plan is the identification of:

- the current status of SAR preparedness of Asia/Pacific Region States and State SAR arrangements; and
- recommendations for SAR planning and preparedness enhancements, in terms of compliance with Annex 12 of the ICAO Convention, IAMSAR Manual guidance, and accepted best international practice.

1.4 References in the Plan to 'States' are intended to include Special Administrative Regions and territories.

Plan Review

1.5 As an iterative process, the Plan requires regular updating to keep current with changes in ICAO Annexes and guidance material, the IAMSAR manual, regional aviation activity, developments in the Air Traffic Management (ATM) system, new technology, political considerations, human performance and lessons learned from actual SAR responses. Plan updates should also focus on the SAR system being an important component of an integrated regional and global air navigation system. It is intended that APANPIRG and its contributory bodies conduct a complete review every three years from 2019 (or a shorter period determined by APANPIRG) of the Plan to align with the review cycle of the GANP and the IAMSAR Manual. The review should be guided by a consultative process involving States and relevant International Organisations such as the IMO and other technical bodies.

OBJECTIVES

Introduction

2.1 Asia/Pacific States who are signatories to the Chicago Convention accept the responsibility for the provision of SAR services per the requirements of its Annex 12 - Search and Rescue. Increases in both aviation and maritime traffic throughout the Asia/Pacific region places additional importance on the ability for States to be adequately prepared for potentially increased demand for aeronautical and maritime SAR services.

2.2 The world's citizens, who frequently fly over or sail through the Asia/Pacific, expect a timely and adequate SAR response to be provided should it be required. States in the region need to be adequately prepared for the provision of efficient and effective SAR services. To assist in achieving this, it is essential for States to cooperate, collaborate and in some cases assist with resources to neighbouring and sub-regional RCCs.

2.3 ICAO Regional Office maintains a record, as reported to ICAO by the States themselves, of the status of individual State SAR compliance against Annex 12 requirements. There are significant variations in the level of State SAR capability across the region with significant gaps requiring urgent action, especially in oceanic areas. A number of States have not reported their status at all to ICAO. The ICAO Universal Safety Oversight Audit Programme – Continuous Monitoring Approach (USOAP-CMA) also provides a useful tool to States to self-assess their individual SAR system status.

2.4 There is a high risk of negative consequences to a State which does not provide an adequate SAR response to an aircraft or vessel in distress. The primary concern is the higher probability for loss of lives which may have been saved. The ability for news to spread rapidly in today's technologically connected world also provides the opportunity for a poor or ineffective SAR response to quickly reach a global audience resulting in damage to that State's reputation internationally and potential economic loss to sensitive State industries such as tourism and transport. However, the benefits of an effective and reliable SAR service to States offers many advantages. Besides reduction of loss of life and human suffering, other advantages include the following aspects.

a) Safer and more secure environment for aviation and maritime related industries, commerce, recreation and travel. Increased safety may promote use and enjoyment of aviation and maritime environments, tourism and economic development. This is especially true when the SAR system is associated with programmes aimed at preventing or reducing the effects of mishaps, sometimes referred to as "Preventative SAR."

b) Availability of SAR resources often provides the initial response and relief capabilities critical to saving lives in the early stages of natural and man-made disasters. SAR services offer an integral part of local, national and regional emergency management systems.

c) Well performed SAR operations can provide positive publicity about situations which may otherwise be viewed negatively. This can lead to improved public confidence in that State's reputation and commitment to providing a safe environment, leading to increased confidence to conduct activities beneficial to that State's economy.

d) As SAR is a relatively non-controversial and humanitarian mission, it provides an excellent opportunity to enhance cooperation and communication in general between States and organisations, not only for SAR. It can also foster better working relationships between States and organisations at the local, national and international levels, including civil/military cooperation.

2.5 In 2014 Malaysia Airlines flight MH370, a Boeing 777 with 239 persons on board, disappeared when flying from Kuala Lumpur, Malaysia to Beijing, China, and Air Asia QZ8501 was lost on a flight from Surabaya to Singapore. The MH370 event resulted in probably the largest and most expensive search response for a missing aircraft in human history. Together with Air France flight AF447, which crashed into the Atlantic Ocean in 2009, these tragedies have highlighted vulnerabilities in the current air navigation system, including the SAR system, which have hampered timely identification and localisation of aircraft in distress, hindering effective response efforts. ICAO is taking measures to assist with addressing these vulnerabilities through the Global Aeronautical Distress and Safety System (GADSS) concept; however this also requires improvements in global SAR capability.

2.6 The Plan is designed to address both civil and military SAR authorities and has been developed in consultation with Asia/Pacific States, SAR administrations and relevant International Organisations. States should consult with stakeholders nationally, regionally and internationally as appropriate and determine actions in order to commit to achieving the objectives of this Plan in order to meet the minimum SAR service requirements in accordance with ICAO Annex 12. It is noted that where a State is unable to meet minimum SAR Standards and Recommended Practices (SARPs) of ICAO Annex 12, Article 38 to the ICAO Convention requires notification to ICAO of the differences between its own practice and that established by the international standards.

2.7 States should aim to meet their obligations progressively in a strategically structured and planned manner with improvement goals set for short term, medium term and long term implementation. It may be more productive to make gains in small steps commencing with measures that are more easily achievable in the short term and have a minimal cost, progressing to measures which will take longer to implement over the medium to long term. Short term measures that may be implemented relatively easily include the establishment of a national SAR Committee and ensuring SAR Agreements are in place with neighbouring States allowing for seamless cross-border transit of search assets engaged in SAR activity. A SAR agreement can be in the form of 'Letter of Agreement' (LOA) or a Memorandum of Understanding or other acceptable term indicating a lower form of arrangement for operational matters between SAR service providers (such as RCCs and/or RSCs) or a more formal agreement for arrangements between governments concerned.

2.8 All States are encouraged to use the guidance provided within this Plan as a way forward, thus ensuring a timely, well-coordinated response to any SAR incident within their area of responsibility, or during cooperative responses involving more than one Search and Rescue Region (SRR).

Plan Objective

2.9 The objective of this SAR Plan is to provide a framework to assist Asia/Pacific States to meet their SAR needs and obligations accepted under the Convention on International Civil Aviation and for the harmonised and interoperable delivery of both aeronautical and maritime SAR services within the region, and across other ICAO regional boundaries, where practicable.

2.10 The Plan is to be consistent with the SARPs of ICAO Annex 12 - Search and Rescue, and aligned where appropriate with the SAR technical and operational standards and guidance of the IMO.

2.11 The Plan recognizes that ICAO serves as the forum for the implementation of practical and achievable measures to improve SAR services for international civil aviation. The Plan also recognizes that the IMO provides a similar forum for SAR services to maritime shipping.

2.12 Both ICAO and IMO share the same goal of ensuring that SAR services are available globally wherever people sail or fly. The SAR services that ICAO and IMO promote are complementary and offer tangible opportunities to derive mutually beneficial efficiencies for both the aviation and maritime transportation SAR systems globally, regionally and nationally.

2.13 The objective of this Plan includes encouraging States to take advantage of such efficiencies. States should, where practicable, align their SAR systems with the guidance provided by the IAMSAR Manual, which also provides the benefit for standardised SAR coordination between RCCs and across SRR lines of delineation.

2.14 State SAR plans describe how SAR services will be provided, organized and supported in order for States to meet their obligations under the relevant Conventions. Search and Rescue Coordinators (SC) and SAR managers oversee and implement these plans. National SAR plans should be signed by all Government agencies which can provide or support SAR services. These agencies should all be represented on the State's Search and Rescue Coordinating Committee (SCC), which oversees these plans.

Note: The SC should not be confused with the operational nature of the SAR Mission Coordinator (SMC). The primary purpose of the national SC is to enable a whole-of-government approach to make efficient and effective use of a State's capabilities for SAR.

Plan Development

2.15 The Plan was developed as part of a suite of Asia/Pacific air navigation plans, including the Seamless ATM Plan, the Air Traffic Flow Management (ATFM) Framework, and the Regional ATM Contingency Plan, so the Plan should not be considered in isolation.

2.16 The Plan is expected to provide guidelines and recommendations for Asia/Pacific States to consider for the enhancement and improvement of national, sub-regional and regional SAR capability including:

a) compliance with Annex 12 SARPs;

b) identification and addressing of deficiencies in SAR capability;

c) continuous and coherent development of SAR capability;

d) harmonisation of aeronautical and maritime SAR services;

e) civil/military cooperation and coordination (including SAR response, information sharing and use of airspace);

f) remote oceanic SAR response capability (including provision for Mass Rescue Operations (MRO);

g) establishment and review of arrangements between neighbouring States to expeditiously facilitate SAR coordination, operations and cooperation across regional boundaries including contingency procedures;

h) facilitation of the implementation of SAR systems and services including the establishment of JRCCs where suitable and practicable;

i) supporting the sharing of SAR information, data and expertise;

j) integration with ATM systems and future ATS developments, where appropriate;

k) monitoring of outcomes from APANPIRG Sub-Groups, other ICAO Region SAR groups, ICAO/IMO Joint Working Group on Harmonisation of Aeronautical and Maritime SAR (JWG) and related forums for issues that may affect the Plan;

l) facilitation of a continuous reporting mechanism of State SAR capability, Annex 12 compliance and SAR performance data to the APAC Regional Office through the APANPIRG Air Traffic Management Sub-Group (ATM/SG);

m) implementation of a SAR System Improvement and Assessment measures, including Safety Management System, Quality Assurance programme and risk assessment;

n) coordinating the introduction of new technology affecting the regional SAR system;

o) sharing future research and development concepts;

p) seeking efficiencies, through the coordination and facilitation of concurrent regional SAR meetings, seminars, workshops and exercises, including joint ICAO and IMO, and sub-regional forums where practicable; and

q) conducting efficient SAR Exercises (SAREXs) that identify improvements and latent problems.

2.17 The Plan elements should be periodically reviewed by APANPIRG to ensure that they remain relevant to the SAR system, particularly for new technology developments and alignment with other relevant global SAR plans.

EXECUTIVE SUMMARY

3.1 ICAO reported the following statistics regarding global civil aviation in 2014:

- 3.3 billion passengers;
- 50 million tonnes of freight;
- over 1 000 scheduled airlines; and
- 26,700 aircraft in service.

3.2 The Asia/Pacific region was the world's largest air transport market in 2014, with a 32 per cent share in terms of world Revenue Passenger Kilometres (RPKs).

3.3 Maritime traffic in the Asia/Pacific region is also increasing and whilst IMO assists the Parties to the Maritime SAR Convention, particularly their implementation related to the provision of maritime SAR services, the demand for aeronautical SAR services which frequently support responses to maritime SAR incidents is also likely to rise.

3.4 Asia/Pacific States who are signatories to the Chicago Convention accept the responsibility for the provision of SAR services per the requirements of Annex 12 - Search and Rescue. Increases in both aviation and maritime traffic throughout the Asia/Pacific region places additional importance on the ability for States to be adequately prepared for potentially increased demand for aeronautical and maritime SAR services.

3.5 Considering that many of the Asia/Pacific States have the challenging responsibility for providing a SAR service over vast and remote areas, including three of the world's five oceans, the importance for States with oceanic SAR responsibility to cooperate, collaborate and share resources with their neighbouring and regional/sub-regional RCCs is essential.

3.6 High-level support might be necessary from regional bodies that can effectively support the Plan's implementation, such as the:

- Association of Southeast Asian Nations (ASEAN) and ASEAN Regional Forum (ARF);
- Asia Pacific Economic Cooperation (APEC);
- South Asian Association for Regional Cooperation (SAARC);
- Secretariat of the Pacific Community (SPC); and
- Indian Ocean Rim Association (IORA).

<u>SAR System Funding</u>

3.7 The level of funding provided for effective SAR systems is a matter of concern for all senior decision-makers. The resources should be sufficient to develop and/or maintain the required SAR service per their obligations as signatories to the relevant aeronautical and maritime SAR conventions. This may require the development of business cases to governments outlining where additional funding is required.

3.8 Such business cases should include consideration of amendments to existing State SAR arrangements which may provide more efficient delivery of the SAR service by better utilisation of existing resources (for example by establishing Joint RCCs (JRCCs), or additional funding sources where required (for example charging a levy to aircraft operators for providing the SAR service or seeking company sponsorship for SRUs).

Joint Rescue Coordination Centres (JRCCs)

3.9 Where practicable, States are encouraged to examine the potential benefits that may be derived by the establishment of JRCCs to incorporate the aeronautical and maritime SAR activities and/or facilities of ARCCs/ARSCs and MRCC/MRSCs. JRCCs have the potential to not only provide a more effective SAR service to both the aeronautical and maritime industries, but also offer potential financial efficiencies by releasing funds for improvements in other SAR areas.

Note: Where JRCCs are not practicable, development of facilities and procedures which provide and/or enhance effective SAR coordination and collaboration between the ARCCs and MRCCs in support of each other, to provide an efficient and integrated State SAR system for both aeronautical and maritime SAR incident response.

3.10 Where practicable, the JRCC evaluation may consider consolidation of two or more different State RCCs into single sub-regional JRCCs.

Note: a single sub-regional JRCC may be established in partnership with a group of States and serve as a 24 hour nodal JRCC supported by Joint Rescue Sub-Centres (JRSCs) of the other partner States which may not necessarily need to be manned 24 hours but could be activated when required.

ABBREVIATIONS AND ACRONYMS

ADS-B	Automatic Dependent Surveillance-Broadcast
ADS-C	Automatic Dependent Surveillance-Contract
ANSP	Air Navigation Service Provider
APANPIRG	Asia/Pacific Air Navigation Planning and Implementation Regional Group
ARCC	Aeronautical Rescue Coordination Centre
ARSC	Aeronautical Rescue Sub-Centre
A/SMCs	
ASPOCS	Administrative Single Point of Contact for SAR
ATC	Air Traffic Control
ATM	Air Traffic Management
CONOPS	Concept of Operations
COSPAS-SARSAT	**Co**smicheskaya **S**istema **P**oiska **A**variynyh **S**udov-Search and Rescue Satellite-Aided Tracking
GADSS	Global Aeronautical Distress and Safety System
GLONASS	GLObal NAvigation Satellite System
IAMSAR	International Aeronautical and Maritime SAR (Manual)
JRCC	Joint (aeronautical and maritime) Rescue Coordination Centre
JRSC	Joint Rescue Sub-Centre
JWG	ICAO/IMO Joint Working Group on the Harmonisation of Aeronautical and Maritime Search and Rescue
MRCC	Maritime Rescue Coordination Centre
MRSC	Maritime Rescue Sub-Centre
RCC	Rescue Coordination Centre
RPAS	Remotely Piloted Aircraft Systems
SAR	Search and Rescue
SARPs	Standards and Recommended Practices
SC	Search and Rescue Coordinator
SCC	Search and Rescue Coordinating Committee
SMC	Search and Rescue Mission Coordinator
SOLAS	International Convention for the Safety of Life at Sea
SPOC	SAR Point of Contact
SRR	Search and Rescue Region
SRU	Search and Rescue Unit

TO BE COMPLETED ON FINAL EDIT AFTER ATM/SG/3

BACKGROUND INFORMATION

Improvement Drivers

5.1 The ICAO USOAP-CMA focuses on a State's capability in providing safety oversight by assessing whether the State has effectively and consistently implemented the critical elements of a safety oversight system and determining the State's level of implementation of ICAO's safety –related SARPs, including Annex 12 Search and Rescue, and associated procedures and guidance material.

5.2 ICAO APAC Regional Office maintains an Air Navigation Deficiencies List. This list is based on the uniform methodology for identification, assessment and reporting of such deficiencies as described in Part V of the APANPIRG Procedural Handbook. By identifying and addressing specific deficiencies, APANPIRG and its Sub-groups facilitate the development and implementation of action plans by States to resolve identified deficiencies, where necessary.

5.3 The ANS Deficiency information had been populated into the ICAO iSTARS (Integrated Safety Trend Analysis and Reporting System) database and was accessible through the ICAO Secure Portal. The intention is to merge this data with the CMA Data, and manage the deficiencies using a single web-based process.

Asia/Pacific SAR System Monitoring

5.4 Significant Annex 12 compliance weaknesses had been identified within the Asia/Pacific region based upon information provided (and in many cases not provided) by States to the ICAO Regional Office. This regional information status of the SAR capability and SAR agreements was recorded in tables made available to APANPIRG, which was expected to be enhanced with the integration of SAR elements into the Seamless ATM on-line monitoring system.

Recent ICAO SAR Initiatives

5.5 The tragedies of Malaysia Airlines flight MH370 in 2014 and Air France flight AF447 in 2009 had highlighted vulnerabilities in the current air navigation system which had hampered timely identification and location of aircraft in distress, particularly remote oceanic areas. This had significantly hindered effective SAR efforts and recovery operations.

5.6 As part of the response to the Conclusions and Recommendations from the ICAO Multi-disciplinary Meeting on Global Tracking, ICAO developed a Concept of Operations (CONOPS) for a GADSS. The implementation of this target concept will have implications for the provision of services such as air traffic control, SAR and accident investigation. It contained a large number of measures targeting improvements in SAR system response integrated within the wider ATM and aircraft/airline operations systems.

5.7 The CONOPs noted that the effectiveness of the current alerting and SAR services should be increased by addressing a number of key improvement areas. The ICAO GADSS CONOPS also included aspects which potentially involve use of different distress systems, including for example 406 MHz ELTs and the Cospas-Sarsat system as part of the proposed GADSS solution.

Cospas-Sarsat System

5.8 Cospas-Sarsat had been developing two major enhancements to its distress-alerting System of value to all System users, including the aviation industry. One is the introduction over the period of approximately 2016 to 2018, and beyond, of a new space-segment architecture based primarily on Medium-altitude Earth Orbit Search and Rescue (MEOSAR) payloads aboard the European Commission's Galileo system, the Russian Federation's GLObal Navigation Satellite System (GLONASS) and the United States' Global Positioning System (GPS) satellites.

5.9 This architecture would permit determination of a distress incident location (independent of any location data transmitted in the beacon message) beginning with the first burst from the distress beacon. This could mean near real-time and very frequent delivery of distress alerts.

5.10 The SAR/Galileo space segment would also provide a Return Link Service (RLS) that, among other possible future uses, would provide an acknowledgment back to the beacon to confirm when the distress message has been received.

5.11 The other major development was the completion in the next couple of years of specifications for the next generation of 406 MHz distress beacons, including ELTs. This new generation of beacons should further improve speed and accuracy in locating an activated distress beacon. The period from beacon activation to first transmission was expected to be reduced from 50 seconds to three seconds. The specification would consider in-flight activation of ELTs when certain flight parameters were exceeded. The RLS was also being considered as part of the GADSS Concept, being a means of remotely activating an ELT in the case of an unresponsive or uncooperative cockpit.

5.12 States needed to continue to ensure that aviators were aware that 121.5 MHz beacons cannot be detected by the global Cospas-Sarsat System and were only intended as a final homing signal for 406 MHz beacons.

5.13 States also need to ensure the critical requirement to provide for a suitable, clear and simple means for aircraft owners to register and keep updated their 406 MHz distress beacon details.

Note: information on beacon registration is at: http://www.cospas-sarsat.int/en/beacons-pro/beacon-regulations-pro/ibrd-user-information-for-professionals).

5.14 Entries in the beacon register should be available to both aeronautical and maritime RCCs on a 24 hour basis (Annex 12 – *Search and Rescue* refers, although Annex 10 establishes the registration requirement). States should note that Annex 12 should be read in conjunction with elements of the following ICAO Annexes:

Annex 6 – *Operation of Aircraft*;

Annex 10 – *Aeronautical Telecommunications*;

Annex 11 – *Air Traffic Services;* and

Annex 14 – *Aerodromes*.

CURRENT SITUATION

Global Situation

6.1 The ICAO USOAP Report of audit results, 3rd Edition, April 2005 to August 2010 revealed a number of SAR deficiencies during the audits of 165 Member States:

- 38% of States had not laid down provisions for entry into their territory of SAR units (SRU) of other States for the purpose of search for the site of aircraft accidents and rescuing survivors;
- 44% of States had not developed a detailed plan on operation for the conduct of SAR operations within their respective Search and Rescue Regions (SRRs); and
- 67% of States had not established the necessary coordination of their SAR organisations with those of neighbouring States, including the conclusion of bi-lateral SAR agreements in order to coordinate SAR operations; and
- regarding RCCs –
  i. about 40% of States had not developed job descriptions for their technical staff;
  ii. 45% did not ensure that RCC personnel using radiotelephony communications were proficient in the use of the English language; and
  iii. about 56% of States do not regularly train their SAR personnel, and nor did they conduct SAREXs.

Asia/Pacific SAR Analysis

6.2 The last decade has seen a steady increase in air traffic in the Asia/Pacific Region. Maritime traffic is also increasing, adding further urgency to ensure that States with oceanic SAR responsibilities in the region meet the requirements of both ICAO and IMO for the provision of aviation and maritime SAR services.

6.3 An analysis of the 35 USOAP Protocol Questions (PQs) in June 2015 that involved SAR (7.182, 7.184, 7.481, 7.483, 7.485, 7.487, 7.489, 7.491, 7.493, 7.494, 7.495, 7.497, 7.499, 7.501, 7.503, 7.505, 7.507, 7.511, 7.513, 7.515, 7.517, 7.519, 7.521, 7.523, 7.525, 7.527, 7.529, 7.531, 7.533, 7.535, 7.537, 7.539, 7.541, 7.543, 7.545) resulted in an overall Effective Implementation (EI) of 50.68% for the Asia/Pacific Region. When analysed for 35 Asia/Pacific States and administrations, 14 SAR-related questions indicated EIs of below 50% (**Figure 1** refers):

- 23% - PQ 7.517 (SAR coordination with neighbouring States);
- 29% - PQ 7.505 (effective SAR safety oversight);
- 31% - PQ 7.495 (SAR inspectorate training programme);
- 34% - PQs 7.497, 7.501 (SAR inspectorate periodic training plan and OJT);
- 40% - PQs 7.499, 7.545 (SAR inspectorate training implemented; and SAR personnel regular training and appropriate SAR exercises arranged);
- 43% - PQ 7.507 (elimination of deficiencies identified by SAR inspectors);
- 46% - PQs 7.493, 7.533 (SAR inspector minimum qualifications and experience and RCC and RSC training programme); and
- 49% - PQs 7.487, 7.489, 7.491, 7.503 (sufficient SAR safety oversight staff, functions and responsibilities of the SAR inspectorate, SAR inspector job descriptions and SAR inspectorate training records system).

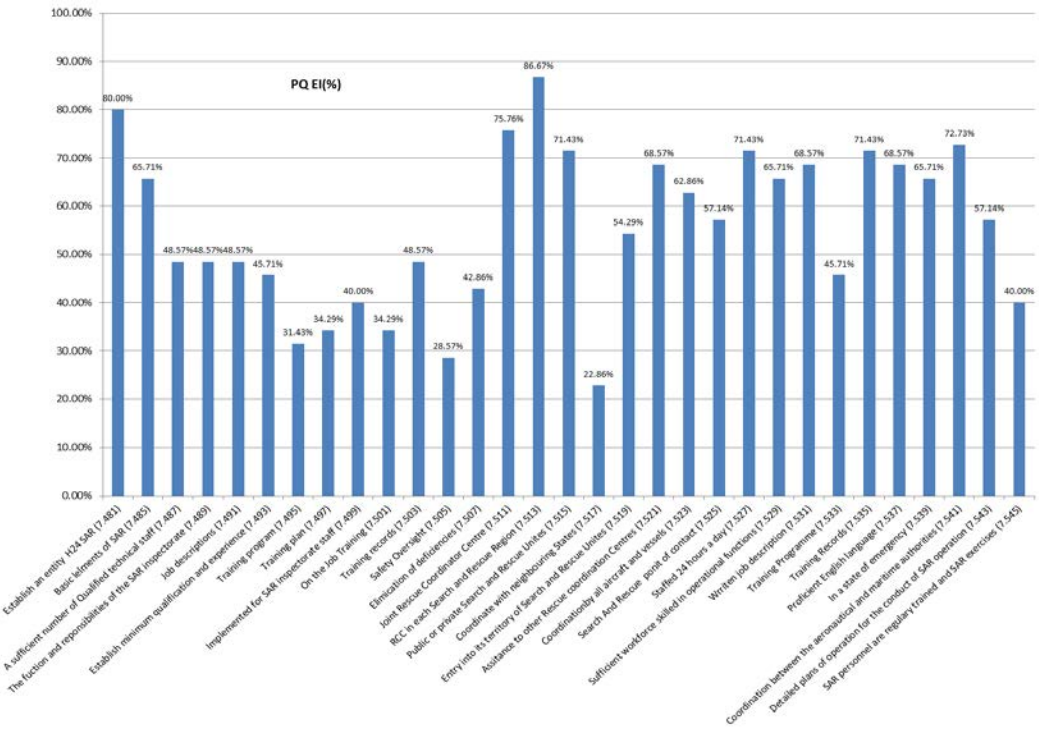

Figure 1: SAR-related questions indicated EIs of below 50% (as at June 2015)

6.4 From this analysis, it appeared that the major areas of weakness is in coordination with adjacent States, effective SAR oversight, and training of SAR staff that provide the SAR services. Therefore, a focus on the minimisation of barriers associated with the efficient cross-border coordination of SRU (such as pre-arranged approval) and other coordination mechanisms, including updates of SAR agreements (whatever their form) was vital. Finally, there was a need for improved systemic approaches to training for both SAR inspectors and personnel responsible for the provision of SAR services, including the regular organisation of effective SAR exercises that test systems and personnel. It should be noted that the training of SAR inspectors did not require SAR-specific technical training, but was more focused on effective audit and inspection techniques, etc.

6.5 The 2015 SAR/TF/4 analysis indicated significant Annex 12 compliance weaknesses remained in the South Asia area and the Southwest Pacific. In addition, there were parts of Southeast Asia and East Asia that indicated a need for compliance improvement.

6.6 The overall SAR capability ranking of Asia/Pacific States (using a metric of 5% for an A = full Annex 12 compliance as advised by the State and 4% for a B = meets Annex 12 requirements in most areas) is indicated in **Figure 2**:

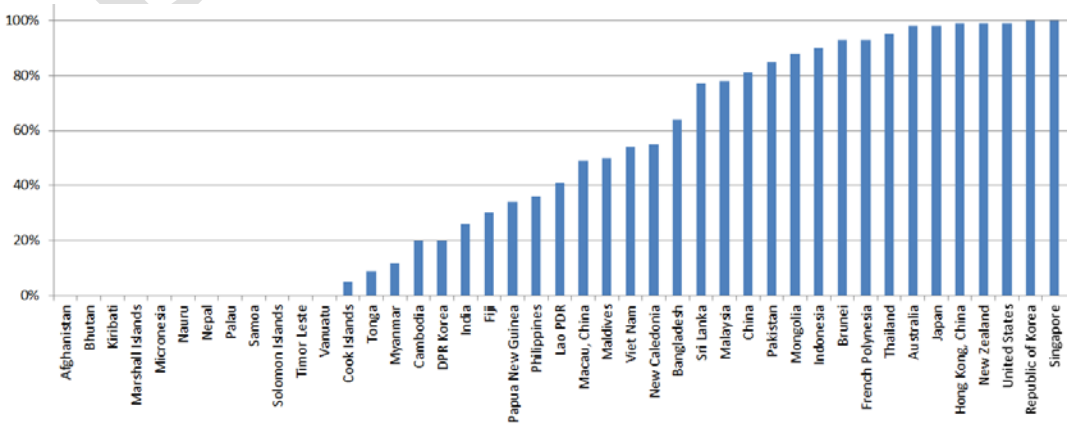

Figure 2: Asia/Pacific SAR Capability Ranking (as at June 2015)

Asia/Pacific SAR Coordination Forums

6.7 The Asia/Pacific Region will benefit from the cooperation and coordination of States and International Organizations involved in the APSAR/TF. After the APSAR/TF completes its tasks, the establishment of permanent joint ICAO/IMO Regional SAR Forums to enable collaboration and cooperation on oceanic SAR matters across the specific oceanic regions and including adjacent ICAO regions should be considered, such as:

a) Pacific Ocean SAR Forum – including Pacific States of the Asia/Pacific, North American and South American regions;

b) Indian Ocean SAR Forum – including Indian Ocean States of the Asia/Pacific, South and East African and Middle East regions; and

c) Secretariat of the Pacific Community (SPC) – an existing forum which could include these matters on its work programme.

6.8 There were several regional initiatives for cooperative support and development already being undertaken in the Asia/Pacific Region to assist with SAR capability enhancement. For example Australia was sponsoring programmes in partnership with Indonesia through the Indonesian Transport Safety Advancement Program (ITSAP) and with the Maldives, Mauritius and Sri Lanka through a SAR Capability Partnership Program (SCPP).

6.9 Such improvement programmes could result from a request by a State needing assistance, ICAO/IMO oversight, the users of the SAR system itself, an audit or following a SAR 'Go-Team' visit that identifies weaknesses in the State's SAR capability (a 'Go Team' normally consists of external SAR experts from ICAO/IMO, more advanced 'champion' States or external agencies such as Cospas-Sarsat). The programs can be conducted by experts from a 'champion' State, or through a cooperative effort by several States or a regional body.

Barriers

6.10 The following potential issues should be considered to ensure they do not become barriers to the achievement of the expected SAR capability:

a) absence of established appropriate legal framework designating, recognizing, supporting and giving authority to national SAR authorities, RCCs and SMCs;

b) inadequate funding and equipping of SAR authorities and in particular, resourcing of RCCs;

c) absence of an appropriate SAR organizational framework;

d) absence of a national SAR committee;

e) lack of clarity of responsibilities for each component of the SAR system;

f) absence of bilateral/multi-lateral/international SAR Agreements;

g) inadequate civil/military cooperation; and

h) complacency about, or lack of recognition of, the importance or priority given to SAR.

Global and Regional SAR Issues

6.11 States should monitor outcomes from global and regional ICAO and IMO SAR forums to ensure their State SAR authorities are updated on relevant SAR developments, otherwise State planning may not be synchronized with external international expectations, including users. Such forums may include APANPIRG and its Sub-Groups, other ICAO Region SAR groups, the JWG, ICAO High Level Safety Conferences, etc.

6.12 The provision of sufficient resources was critical in a number of areas, including:

a) Financial-

- funding for 24 hour RCC facility and staff;
- funding for use/hire of search and rescue units; and
- Provision of a suitable administrative process enabling financial support including the ability for SAR authorities to quickly authorise payments required for emergency response aircraft, vessels and supporting logistics such as fuel.

b) RCC personnel- a suitable number of trained and skilled staff, supplemented by a pool of trained RCC support staff where appropriate;

c) RCC facilities-

- appropriate RCC facility space;
- minimum RCC tools (such as current charts, plotting equipment, documentation, etc.);
- identify and task available SRUs;
- Aircraft and vessel tracking information including ADS-B, Automatic Identification System, etc.;
- reliable and rapid H24 communications, and a suitable means to-
  - receive and communicate distress alerts
  - communicate with ATS units, other RCCs/RSCs, Coast Radio Stations, COSPAS-SARSAT Mission Control Centres (MCCs), military units, medical services, meteorological offices, etc.;
- information technology-
  - RCC workstation computers;
  - Software including basic databases, drift modelling, incident management, etc.;

d) Contingency- back-up RCC facility, or arrangement with another RCC as a contingency against inability to operate from the primary RCC due to the need to evacuate or loss of systems, etc.;

e) Search and Rescue Units (SRUs)-

- available and suitable SAR aircraft and crews;
- funding arrangements/agreements for hiring/payment/sharing of SRUs to permit rapid deployment; and
- Available and suitable SAR survival equipment for delivery by aircraft to survivors and to assist SAR coordination efforts (e.g.: SAR Datum Buoys, droppable life rafts and survival supplies, etc.);

f) Training support-

- RCC staff – basic and ongoing;
- SRU crews – pilots, air crew and air observers; and
- RCC support staff – basic and refresher.

PERFORMANCE IMPROVEMENT PLAN

Preferred SAR Capability Specifications (PSCS)

Note: PSCS are the non-mandatory expectations on all Asia/Pacific Region States to enhance SAR systems in order to meet a minimum level of SAR capability, with a high degree of interoperability and harmonisation, and interoperability with other ATM components such as Air Navigation Service Providers (ANSPs) and aerodrome operators. PSCS were not expected to contravene existing Annex 12 standards.

PSCS (expected implementation by 08 November 2018)

Note: Guidance Material for the implementation and monitoring of PSCS is expected to be developed by APANPIRG to align with the established Asia/Pacific Seamless ATM Implementation Guidance Material.

7.1 *Legal Framework and Structure Planning*: All States should develop statutes and related provisions that establish or enhance the legal foundation for a State SAR organization and its framework, resources, policies and procedures to, where appropriate to:

a) ensure that it is party to, and/or aligned with the following Conventions, as applicable –

   iv. Convention on International Civil Aviation 1944;

   v. International Convention on Maritime Search and Rescue, 1979;

   vi. International Convention for the Safety of Life at Sea (SOLAS), 1974;

   vii. Convention on the High Seas, 1958; and

   viii. United Nations Convention on the Law of the Sea (UNCLOS), 1982;

b) unless delegated by written agreement, establish an entity that provides, on a 24-hour basis, SAR services within its territories and designated area of responsibility/SRR;

c) establish a national SAR committee consisting of civil and where appropriate, military members to enable a whole-of-government approach;

d) empower SAR Mission Coordinators with the authority to adequately carry out their responsibilities;

e) establish an Administrative Single Point of Contact for SAR (ASPOCS) for non-urgent, administrative matters, such details to be submitted to the ICAO Regional Office;

f) conduct studies to check the feasibility for, and develop an implementation plan if practicable, the integration of aviation and maritime SAR activities, and as far as practicable, civil and military activities, including joint training and familiarisation of staff and review of documentation to ensure harmonisation of procedures, and joint exercises;

g) conduct studies to align, as far as practicable, aeronautical and maritime Search and Rescue Regions (SRRs); and SRRs and Flight Information Regions (FIRs); and

h) establish a single State SAR Plan that –

   i. designates the responsible RCC(s), RSC(s) and 24-hour SPOC/ASPOC;

   ii. describes the relevant SRRs, including the coordinates and geographical chart depiction of the SRR and neighbouring SRRs;

iii. details the National SAR Committee;

iv. details the governmental and non-governmental agencies with authority and responsibility for SAR coordination within its territories and designated area of responsibility;

v. details required and available SAR facilities, personnel, and equipment;

vi. details the SAR manuals, plans and procedures for national and regional cooperative SAR response arrangements;

vii. details the SAR personnel training and competency programme, qualification standards, SAR certification if applicable and SAR cooperation training;

viii. details the SAR agreements required;

ix. is electronic and accessible on the Internet, such details to be submitted to the ICAO Asia/Pacific Regional Office; and

x. is monitored by quality assurance processes.

7.2 *SAR Standards and Procedures*: All States should:

a) establish aerodrome emergency plans that provide for co-operation and co-ordination with RCCs;

b) establish SAR agreements with States having adjoining SRRS or FIRs, including trans-regional neighbours (the agreements should include clear responsibilities for overlapping or non-adjoining aeronautical and maritime SRRs);

c) provide up to date cross-border information on SAR capability (this should be included in bilateral SAR agreements);

d) pre-arrange procedures for cross-border SAR responses (this should be included in bilateral SAR agreements);

e) establish contingency procedures for delegation of SAR responsibility where such service is not able to be provided, or in contingency (temporary) circumstances;

f) establish a program for regular SAREX, which may be a desktop communications exercise, with each alternate SAREX being a full exercise (this expectation may be fulfilled by participating in a sub-regional SAREX that tests the State's SAR system; and

g) establish RCC plans for response to Mass Rescue Operations (MROs) integrated with national disaster plans; and

h) establish SAR Alerting procedures which:

i. are tested and fully integrated with RCC procedures so that RCCs are rapidly notified of any SAR event 24 hours a day;

ii. include procedures for joint aeronautical and maritime distress alert notification, including reliable delivery and acknowledgement of Cospas-Sarsat distress alerts, support and response to both aviation and maritime SAR incidents; and

iii. where applicable, include protocols for civil and military support and sharing of information.

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SAR Facilities and Resources

7.3 *RCC Facility*: All States should ensure that RCCs are of sufficient size with adequate provision for operational positions designed in accordance with human factors principles (such as human machine interface) for a major search involving civil and military assets where applicable, and facilities such as:

a) Workstations, telephones (with international access), plotting tables, wall notice/status boards, computer~~,~~ and communications equipment and systems, briefing/debriefing areas room for storage including incident records and recorders, RCC staff break and rest facilities;

b) computer resources which may provide support to RCCs with incident management, plotting, search planning, mapping, contact databases, web-based information, etc.;

c) charts, electronic or paper, which:

   i. apply to SAR (aeronautical, nautical, topographic and hydrographic);

   ii. depict SRR, neighbouring SRRs, FIR(s), SAR resources and made available for all relevant aeronautical and maritime RCCs, ATS units, aircraft operators; and

   iii. provide a means of plotting;

d) ability to reliably receive and acknowledge distress alerts 24 hours a day;

e) maritime broadcast facilities;

f) a means of recording, playback and archiving of communications;

g) shipping/vessel communications and maritime broadcast facilities such as Coast Radio Stations, RCC radio and satellite communications, marine radio networks;

h) aircraft communications – via ATS units, aircraft operators, satellite communications or direct between RCC and aircraft;

i) access to aircraft and ship tracking data, e.g. ADS-B, Automatic Identification System and Long Range Identification and Tracking of Ships (LRIT) allowing rapid identification of potential aircraft and vessels that may divert to assist;

j) a means of obtaining meteorological information – forecast, present and historical data;

k) if applicable drift modelling software;

l) if applicable, ocean data including sea temperature, currents, winds, tides, etc.;

m) if applicable, SAR Datum Buoys, preferably with satellite tracking capability; and

n) RCC documentation and reference material such as plans of operation, procedures manuals, guidance material, ICAO and IMO references, SAR agreements; and

o) Cospas-Sarsat equipment and reference material.

7.4 *Personnel and Training* All States should, where applicable to maintain a 24 hour service:

a) provide adequate ATC resources (either an ATS supervisor or other staff) that can provide relief within Area Control Centres (ACCs) to allow timely SAR alerts and information to RCCs;

b) provide sufficient RCC staffing;

c) provide a sufficient number of trained specialist RCC officers including SMCs and Assistant SMCs (A/SMCs);

d) provide availability of a pool of RCC support staff who are familiar with RCC operations, but not trained as coordinators, that can assist with the functioning of the RCC during SAR incident response;

e) develop SAR personnel position descriptions that detail responsibilities and eligibility criteria for recruitment of operational staff;

f) develop a comprehensive training programme that includes SAR training for:

i. RCC SAR Coordinators (SCs) based on a competency-based assessment approach to ensure technical and English language proficiency, cyclical (periodic) instruction that provides continuous training to ensure competency is maintained, and a system for maintaining training records; and

ii. SRU staff, including military personnel.

g) facilitate RCC staff to be proficient in the English language; and

h) facilitate a programme of regular liaison visits between relevant RCCs, ATC units and airline operating centres in order to understand those organizations, facilities and capabilities (reference Annex 12, paragraph 3.1.9).

7.5 *Oceanic Capability*: Where applicable, States should establish additional oceanic SAR capability as far as practicable to ensure a timely and adequate SAR response is available to all oceanic areas of their SRRs. This may be met through cooperative arrangements with neighbouring States or other RCCs.

7.6 *Search and Rescue Units*: All States should establish capabilities enabling:

a) availability and deployment of suitably crewed, trained and equipped SRUs (including a pool of air search observers trained in visual search techniques), public and/or private, civil and military, for rapid SAR response;

b) availability and deployment of SRU craft that may be in use for another primary purpose but made available to RCCs for SAR purposes on an as needed emergency basis (vessels, aircraft and land units);

c) protocols for civil SAR authorities to request the assistance of military assets, and similarly military SAR authorities to request civil assets;

d) a communication means and information protocols between the State's Aeronautical and Maritime SAR Authorities;

e) cooperative use and/or sharing of SAR assets with protocols incorporated within National SAR Plans and bilateral SAR Agreements;

f) pre-arranged government authority for funding of costs associated with hiring of SRUs, and payment for critical supporting logistics such as fuel, to avoid any delays in response availability;

g) aircraft with the ability and regulatory approval to safely conduct SAR missions.

Note: guidance material on SAR aircraft capability is found in the IAMSAR.

7.7 *Distress Beacons*: All States should :

a) where separate ARCCs and MRCCs exist with responsibility for coincident aviation and maritime SRRs, coordinate distress beacon alert procedures to ensure both RCCs are aware of any distress beacon activations within their areas to avoid duplication of response. For example, MRCCs should ensure their procedures alert ARCCs and ATS units to any EPIRB activations;

b) have a reliable distress beacon registration system that:

i) provides a readily-accessible mechanism (preferably one that is available by Internet as well as other conventional means) to enable distress beacon owners to fulfil their obligation to register ELTs, EPIRBs and PLBs, and update the registration data as information changes (e.g., change in ownership);

ii) is available to RCCs 24 hours a day and includes up-to-date registration details for all national civil and military ELTs, EPIRBs and PLBs;

c) take steps (including education) required to prepare for, and to implement changes related to, the introduction of next generation beacons (e.g.: update beacon registration systems to be compatible with new beacon hexadecimal identifications) and the transition to the MEOSAR satellite architecture (e.g.: update local user terminals and mission control centres to properly receive and manage MEOSAR data), in accordance with Cospas-Sarsat specification documents (http://www.cospas-sarsat.int/en/documents-pro/system-documents); and

d) establish an appropriate nationwide means of disposal for old distress beacons.

Note 1: Information on beacon registration is at: http://www.cospas-sarsat.int/en/beacons-pro/beacon-regulations-pro/ibrd-user-information-for-professionals.)

Note 2: Incorrect disposal of distress beacons often causes the deployment of scarce and often expensive SAR resources only to have the beacon located as a non-distress event in a rubbish dump or similar location. This also creates the risk of SAR resources being diverted away from a real emergency should it arise at the time. Beacon batteries are hazardous items which should be disposed of in an environmentally friendly manner.

7.8 *Contingency Facilities*: All States should ensure there are established contingency facilities, or when a SAR service is not able to be provided, procedures in place for the temporary delegation of the SAR responsibility to another appropriate national body or State. All States should test their contingency arrangements periodically, but not less than once every six months.

SAR Information

7.9 *Provision of Information*: All States should ensure the:

a) establishment of a centralised information source publishing all Asia/Pacific State Aeronautical Information Publication (AIP) information as required by ICAO Annex 15 Appendix 1, page APP 1-8 including:

i. The agency responsible for providing SAR services;

ii. The area of SAR responsibility where SAR services are provided;

iii. The type of SAR services and facilities provided including indications where SAR aerial coverage is dependent upon significant deployment of aircraft;

iv. SAR agreements;

v. The conditions of SAR facility and service availability; and

vi. SAR procedures and signals used;

b) establishment of an Internet-based SAR information sharing system (with security protocols as required and in accordance with the emerging System Wide Information Management – SWIM concept as applicable) to share SAR activity with States and key stakeholders participating in a SAR activity (the information sharing system should include a means of handling media and next of kin enquiries, and recognise the need to avoid premature media statements); and

c) maximum practicable cooperation between State entities in the provision of accurate and timely information when required, including from military sources except where national security could be adversely affected.

7.10 *SAR Facilities and Equipment Lists*: All States should develop and maintain a current, comprehensive electronic list of State SAR Facilities, SAR Equipment, and SAR Units (SRUs), including joint or shared facilities and equipment, and provide the Internet link to that list to the ICAO Asia/Pacific Regional Office.

7.11 *SAR Library*: All States should:

establish a web-based SAR Library, or cooperate by contributing to an Internet-based Asia/Pacific resource (such as *www.uscg.mil/nsarc)*; and

a) ensure that each RCC and SAR Authority has ready access to a current copy (either electronic or hard copy) of the following reference documents at a minimum:

i. ICAO Annex 12;

ii. IAMSAR Manual Volumes I, II and II;

iii. SOLAS; and

iv. Asia/Pacific SAR Plan.

Note: The Asia/Pacific SAR Library hosted by the US Coast Guard contains a list of documents that may be held by RCCs and JRCCs as appropriate. In addition, a list of documents (SAR.7/Circ.12) would be available on the IMO web site at: (http://www.imo.org/en/OurWork/Safety/RadioCommunicationsAndSearchAndRescue/SearchAndRescue/Pages/Default.aspx).

SAR Improvement

7.12 *Search and Rescue Exercises (SAREX)*: All States should conduct regular SAREX (at least once every two years) to test and evaluate existing coordination procedures, data and information sharing and SAR response arrangements involving:

a) both aeronautical and maritime SAR authorities including both civil and military agencies as applicable, and related bodies such as Air Navigation Service Providers (ANSPs) and Airline Operations Centres (AOCs);

b) where appropriate, cross-aeronautical SRR coordination (SAREX should routinely involve SAR authorities of adjacent SRRs, especially if the SAREX area concerned is within 50NM of the adjoining SRR); and

c) SAREX effectiveness through a post-SAREX review and written report, completed to ensure that deficient areas or latent problems are identified and remedied.

Note 1: a SAREX template is provided at ***Appendix 1****.*

Note 2: SAREX should test the SAR system, including unannounced alerts that allow an actual search (whether it is a desktop or a physical operation), to be conducted which will indicate weaknesses in the system. SAREX should not be confused with, or take the form of, simulated crash fire exercises such as for Aerodrome Emergency Procedures that do not have a search component.

Note 3: Real SAR incident responses which include an adequate post-response review and evaluation with lessons learned may replace the need for a SAREX.

7.13 *SAR Quality Assurance*: All States should implement SAR System Improvement and Assessment measures, including Safety Management and Quality Assurance systems, that:

a) provide performance and safety indicators, including post-incident/accident lessons learned and management reviews (RCC and SAR System Continuous Improvement process), and feedback from RCC staff, SAR system users or SAR stakeholders;

b) identifies risk and corrective and preventive actions that prevent or minimise risk and the possibility of substandard SAR performance;

c) establishes an internal quality assurance programme, which includes regular internal audits of the RCC, SAR operations, SAR facilities and procedures that are conducted by trained auditors;

d) ensures the person responsible for internal quality assurance within the entity responsible for SAR services has direct access to report to the Head of the entity responsible for SAR services on matters of quality assurance; and

e) where appropriate, provides submissions to the JWG to share lessons learned and experiences with other global States for the continuous improvement of the worldwide SAR system.

Note 1: Resourcing of SAR system audit arrangements could be mitigated by States entering cooperative arrangements, including sub-regional regulation, between States for auditing of each other's SAR systems to share expertise and costs.

Note 2: Provisions of Annex 19 for a Safety Management System (SMS) may apply where a SAR service is provided under the authority of an ATS provider (Annex 19, Chapter 3, 3.1.3 e refers).

Note 3: Peer review, either external or internal, may provide a useful internal quality assurance tool.

7.14 *SAR Management Review*: All States should conduct an annual or more frequent analysis of their current State SAR system to identify specific gaps in capability against the minimum requirements of Annex 12 and the guidelines of the IAMSAR Manual to:

a) enable the ICAO Asia/Pacific SAR data to be updated to accurately reflect the State's capability;

b) be informed regarding the availability and capability of SAR services in neighbouring States;

c) identify SAR research and development programmes, especially those which could be conducted if possible in cooperation with other States;

d) establish a common set of basic SAR system statistics, which include-

i. number of SAR incidents per year;

ii. number of lives at risk versus number of lives saved;

iii. time from first alert to tasking the SRU;

iv. time from first alert to arrival on scene of first SRU; and

v. time from first alert to rescue.

e) plan for any necessary improvements to gradually build and improve capability over time, which would be detailed in the State SAR Plan; and

f) regularly review and update SAR agreements as appropriate.

Note 1: The National Self-Assessment found in IAMSAR Manual Vol I Appendix H and the ICAO USOAP-CMA Protocol Questions for SAR may assist States with their reviews.

Note 2: The number of incidents should identify the type (e.g.: Cospas-Sarsat alert, ATS alerts, etc.) and outcome of SAR incidents.

7.15 *SAR Promotion*: All States should conduct SAR promotional programs (e.g. Seminars, Workshops and public safety campaigns) to:

a) encourage higher SAR preparedness by persons that may require SAR services through public safety campaigns aimed at preventing persons getting into distress situations (i.e.: 'preventative SAR');

b) ensure the support of government decision-makers for SAR facilities and improvements, in particular adequate funding availability;

c) assist media to understand SAR operations in order to minimise the need for explanations during SAR responses;

d) recognise improvement in State SAR systems;

e) enhance cooperation between SAR services and –

i. civil, military and police agencies;

ii. ANSPs;

iii. aerodrome and port operators;

iv. aircraft and shipping operators;

v. meteorological agencies;

vi. accident investigation agencies;

vii. government and non-government agencies affected by SAR operations, in particular large scale national and international responses involving whole of government agencies and

viii. other States.

Note: social media may be an effective means of SAR promotion that reduces the workload of SAR staff during major SAR responses.

RESEARCH AND FUTURE DEVELOPMENT

Research and Development

8.1 To develop the tools and systems required to meet foreseeable long-term requirements, there is a need for States to undertake planning and co-operation on SAR matters. This includes major efforts to define concepts, to extend knowledge and invent new solutions to future SAR challenges so these new concepts are selected and applied in an appropriate timely manner. Such efforts could be forged through collaborative partnerships between, States, ANSPs, International Organizations, institutes of higher learning and specialised technical agencies. This concept is consistent with Seamless ATM Principle 36 (*Inter-regional cooperation ('clustering') for the research, development and implementation of ATM projects*), and may manifest itself in joint projects such as:

- ICAO and/or IMO regional SAR training opportunities where provided to assist States that are unable to provide their own SAR training;
- Joint Sub-regional RCCs (ASEAN States in particular may be candidates for a single centre of excellence that brings together civil and military SAR experts from all ASEAN States and provides a single SAR facility that is cost-effective and has a level of resources and facilities that would be difficult for all States to maintain by themselves); and
- Regional online eLearning packages.

Note: Appendix 2 provides a summary of benefits to the SAR System of States assisting other States.

8.2 With the end goal of a globally interoperable SAR system in mind, the region will have to consider planning for a long term supporting concept and infrastructure. The following are possible areas that should be considered for future SAR research and development, in order to promote the maximum possible harmonisation and interoperability of SAR systems:

a) data sharing such as aircraft and ship tracking information;

b) automated data link communication to RCCs when an aircraft or ship exceeds a Variable Set Parameter (VSP) in terms of its operating envelope, or activation of an emergency status (could be displayed as a symbol, and the data could include certain operating parameters such as acceleration and altitude for an aircraft) – note the ICAO GADSS includes this concept;

c) regional Remotely Piloted Aircraft Systems (RPAS) SAR capability;

d) inclusion of the SAR system and RCC access as a component of the new ICAO SWIM concept of operation and implementation;

e) on-going development of standardised SAR training objectives and advanced training systems, including the use of high fidelity simulators; and

f) enhanced technology oriented systems to improve SAR system effectiveness.

MILESTONES, TIMELINES, PRIORITIES AND ACTIONS

Milestones

9.1 Section 7 (*Performance Improvement Plan*) provides a scheme for the implementation of a collective set of enhancements for a number of elements in the PSCS, effective 08 November 2018 .

9.2 States should commence planning for the various PSCS elements from the approval of this Plan, to ensure a smooth transition by 08 November 2018, and should include consideration of issues such as:

- safety/operational analysis and assessment;
- cost-effectiveness;
- budgetary issues;
- development of operational procedures; and
- training.

9.3 Section 8 (*Research and Future Development*) provides, subject to future agreement by concerned parties, possible SAR improvements beyond 2018 until 2028.

Priorities

9.4 It is a matter for each State to determine priorities in accordance with its own economic, environmental, safety and administrative drivers.

Actions

9.5 This Plan necessitates a number of implementation actions. It is expected that each Asia/Pacific State report progress on each applicable element to APANPIRG. All States should note the importance of SAR status monitoring, which is expected to be conducted as part of the Seamless ATM on-line monitoring. Reporting of implementation progress of SAR elements from this Plan is expected to be conducted by the on-line Seamless ATM Reporting and Monitoring system, using the following categories in accordance with the SAR Air Navigation Reporting Form (ANRF) B0-SAR:

- SAR Regulatory and Coordination Mechanisms ;
- SAR Facilities and Assets;
- SAR Information; and
- SAR Improvement.

9.6 Section 6 (*Current Situation*) provides analysis and major concerns in the region, which should be considered in the formulation of specific State plans.

9.7 SAR Coordination Forums, which are likely to be based on sub-regional development (such as a Pacific Ocean SAR Forum and Indian Ocean SAR Forum) need to be promoted, established and supported to ensure the on-going implementation work and future review of SAR expectations linked to this Plan are conducted.

SAREX

9.8 A program is expected to be established for an annual SAREX in each sub-region (South Asia, Southeast Asia, East Asia and the Pacific), with every second year being a desktop communications exercise, and alternate years being a full exercise. The SAREX outcomes and lessons learned should be reported to APANPIRG through the ATM Sub-Group.

9.9 The ICAO Asia and Pacific Regional Office was responsible for taking actions that assist the implementation of SAR within its accredited States, in cooperation with the IMO. In addition, the Asia and Pacific Regional Office was responsible for coordinating with adjacent ICAO regional offices on an ad hoc basis or at relevant trans-regional meetings.

APPENDIX 1: WORK PLAN FOR THE [[JOINT]] SAREX COORDINATION MEETING

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1. OBJECTIVES

State the objectives of the [joint] SAREX and what are to be achieved out of the SAREX by all participants.

1.1 The objectives of the [joint] SAREX are:

a) To provide continuation of SAR exercise and improve cooperation between …… (participating agencies or State RCC) and …….. (participating agencies or State RCC).

b) To provide continuation training for personnel of SAR organisations from both …… (participating agencies or State RCC) and ……. (participating agencies or State RCC)

c) To test the communication facilities and procedures between ……. (participating agencies or State RCC) and …… (participating agencies or State RCC); and

d) To test and determine the effectiveness of the Search and Rescue Units of …… (participating agencies or State RCC) and …… (participating agencies or State RCC).

2 DATE AND TIMING OF SAREX

State the agreed date, time and year for the [joint] SAREX. Have alternate or contingency plan in the event that the full scale SAREX cannot be conducted due to weather or any unforeseen circumstances. It is recommended that a pre-SAREX brief be conducted to ensure all participants understand their roles and the required actions to be taken. State the agreed time for a pre-SAREX brief to be carried out for all participants and States may conduct simultaneous pre-SAREX brief at their own location for their local participants. For standardization and to avoid confusion, it is recommended that all timing and dates used should be in UTC as there may be difference in time and day for different States. After the SAREX, it is also recommended to conduct a de-brief for all participants.

For example:

2.1 Table Top SAREX or A Full Scale Exercise will be held between …….. (participating agencies or States) and …… (participating agencies or State) on …….(date/month/year according to UTC) ……..(day of the week according to UTC) from …… (time in UTC) to ……. (time in UTC).

2.2 In the event of bad weather, the Full Scale SAREX will be converted into a Table Top SAREX. The cut off time will be at …….. (time in UTC).

2.3 A Pre-SAREX brief will be held on …… (day/month/year according to UTC) ……. (day of the week according to UTC) in ……. (location of the pre-SAREX brief) at …….. (time in UTC).

2.4 De-Brief will be held on …… (day/month/year according to UTC) …….. (day of the week according to UTC) in ……. (location of the de-brief) at …….. (time in UTC).

3 SCENARIO

Discussion and development of exercise scenario with participating State or States and agencies involved. Scenario created should be as realistic as possible to simulate close to a real incident. A fictitious flight plan can be included to provide additional information pertaining to the distressed aircraft as required by the RCCs. Using fictitious call signs or airlines for distressed aircraft will avoid complication or confusion especially if it involves the social media.

For example:

3.1 At …… (time in UTC), a chartered …….(type of aircraft) …… (callsign of distressed aircraft) departed from ……. (point of departure) to ……. (destination) with ……. (POB). At ……. (time in UTC), aircraft declared **"MAY DAY"** due to …… (nature of emergency) at …….. (location in Lat and Long or with reference to a prominent location known to all). ……..

3.2 Other information like Pilot-in-command …..... equipment carried on board ……, colour of aircraft fuselage or tail.

4 PARTICIPATING ORGANISATIONS OR UNITS

Identify and list all participating agencies or agencies from both States. Agencies should include both government and private. ANSP, Aircraft Investigation Bureau, Airlines etc should be involved in a SAREX as they are directly involved in any real air incident

For example:

4.1 From …….. (participating local agencies or States)

1) Civil Aviation Authority of ……
2) Local Air Force
3) Local Navy
4) …….
5) …….

From …….. (the other participating local or States):

1) Civil Aviation Authority of ……..
2) Local Air Force
3) Local Navy
5) ……
6) …….

5 DEPLOYMENT OF EXERCISE SAR UNITS (SRUs) AND CALLSIGNS

State all the SAR assets that will take part in the SAREX. It is recommended that the callsigns of the SRUs should be pre-fixed with the word "SAREX" to indicate that it is an exercise aircraft or surface vessel. This will not create any confusion between a SAREX and a real incident. Callsign assigned to a particular SAR asset should not be changed and to be used throughout the exercise. Different SAR asset should be assigned with an individual flight number.

5.1 SRUs from …… (participating State) and their callsigns are as follows:

Type of SRUs	Callsign	Remarks
Fokker 50	SAREX 01	Search
C130	SAREX 02	Search
Dolphin Helicopter	SAREX 03	Search and Rescue
……	SAREX……..	……..
……	SAREX……..	……..
……	SAREX……..	……..

5.2 SRUs from …… (the other participating State) and their callsigns are as follows:

Type of SRUs	Callsign	Remarks
Helicopter	SAREX 04	Search and Rescue
Ship	SAREX 05	Search and rescue
…….	SAREX….	……..

6 COMMUNICATIONS

State the agreed radio frequencies to be used in the SAREX. Make communication arrangements between the two RCCs as well as between the RCCs and the SRUs. It is recommended that a communication check be conducted between all parties before the SAREX to ensure serviceability of communication equipment. A standby day may be necessary if the communication check is found not satisfactory or unsuccessful.

6.1 The communications arrangement will be as follows:

a) Between ……. (participating agency or State RCC) and ……. (the other agencies or participating State RCC)

Primary communication	-	…….KHz or …..Mhz or landlines
Secondary communication	-	…….KHz or …..Mhz or landlines
Standby communication	-	…….KHz or …..Mhz or landlines

b) Between ……(participating agencies or State RCC) and SRUs)

Primary communication	-	……. KHz or …….MHz
Secondary communication	-	……. KHz or …….MHz
Standby communication	-	……KHz or ….....MHz

6.2 A communication test between …… (participating agency or State RCC) and …… (the other participating agencies or State RCC) will be conducted prior to the SAREX. The date for the test is on ……. (date/month/year according to UTC) between …… (time in UTC) to ……..….. (time in UTC).

6.3 In the case of unsatisfactory communication test, another test will be conducted on ……. (date/month/year according to UTC) between …… (time in UTC) to ……..….. (time in UTC). .

6.4 All messages pertaining to the exercise shall be prefixed with the words “SAREX SAREX SAREX”

7 SEARCH OBJECT

In a Full Scale SAREX, States can consider the deployment of a search object to add realism to the exercise. This will enable participating SRUs to practice visual search from air as well as on from the surface of the sea. If the homing capability of the SRUs is desired, a beacon can be placed on the search object for electronic search. Arrangement can be made for the search object to be deployed at the proposed distress location at the activation time of the SAREX. A search object with some significant marking or markings on it will enable easier visual sighting of search target on land or on water.

7.1 The search object will be provided by …… (one of the participating agency or State RCC) and will be deployed at ……. (time in UTC) on ……..(date of the SAREX according to UTC) at the position in which the distressed aircraft is assumed to have crashed.

7.2 Search target is marked with.…… (bright colour or with the words "SAREX" or some significant marking).

8 ALERTING AND ACTIVATION

State clearly on the alert and activation processes for the SAREX. Decide on which agency or State would initiate the distress phase and notify the other participating agencies or State or States so that [joint] SAR effort can be carried out. In a joint SAREX, if the distressed location is within the area of responsibility of a particular State, the State concern should carry out the alerting and activation phase. The other participating State or States should be notified and [joint] SAR operations can be carried out.

8.1 Since the crash will occur in …… (location or name the State FIR) or area of responsibility, …… (State concern) RCC will notify …….. (participating State) . Both RCCs will coordinate the SAR Operations.

9 SEARCH AREA

Discuss on how to determine the search area or which State should determine the search area. In a joint SAR effort, the two RCCs can determine their own search areas and agree on a common search area.

9.1 The respective Search Mission Coordinators (SMCs) will work out a search area upon receipt of the distress location or crash report.

9.2 The two SMCs shall discuss with each other and agree on a common search area.

9.3 If there is a great difference between the two search areas, the controlling RCC shall decide on the most probable area and take the necessary action to promulgate the area as a restricted area for SAR operations accordingly.

10 DIPLOMATIC CLEARANCE

In a joint SAREX, make necessary arrangement for the application of Diplomatic Clearance required if State assets may or are required to enter into another State's territorial airspace or waters. The process for application should be made known or if there is an agreement in place between the two States, then the agreed procedure should be followed. Provide information regarding the SRUs and particulars of the personnel on board. It is recommended that particulars of the SRUs be provided to the State concern prior to the SAREX. This will assist in the Diplomatic Clearance process.

10.1 …… (State) SMC will request to …… (State) for diplomatic clearance to allow …… (State's) SRUs to enter ……. (State's) territorial airspace and waters.

10.2 To obtain diplomatic clearance for …….. (State's) SRU, …….. (State) SMC shall provide the following particulars:

a) Registration of SRU

b) Type of aircraft or vessel

c) Name of Captain/Pilot in Command

d) Names of crew on board (not required for sea asset)

e) Area of operation

f) Date and time of operation

10.3 The details of the ……. (State's) SRU shall be provided to …….. (State) one or two weeks before the exercise. Application for diplomatic clearances through the normal channel via the …… (agency for the process of the Diplomatic Clearance) is advised in order to accelerate the diplomatic clearance process.

11 SEARCH OPERATIONS

Note: Ensure the safe conduct of the SAREX especially with the air assets. It is recommended that there should be one controlling RCC providing instructions to search aircraft prior to entering the search area. It is also recommended that an Air Coordinator be deployed to provide instructions to search aircraft during transit to and fro from the search area as well as within the search area if the RCC personnel have no knowledge of Air Traffic Control.

11.1 All SRUs shall report to the controlling RCC or On Scene Coordinator (OSC) prior to entering the Search Area and while conducting search in the Search Area to ensure safety and efficiency in the [joint] SAR effort. All air search assets must observe and adhered to ATC instructions.

11.2 Non exercise aircraft shall keep clear of the search area unless clearance has been obtained for these aircraft to transit through.

12 RESCUE OPERATIONS

Note: Discuss on how the rescue operation is to be executed. Agency or States can decide on a simulated rescue operation by taking photographs of the search object once sighted or if actual personnel are deployed at the distressed location as survivors, actual rescue operations can be conducted. Actual rescue operation will provide training for the rescue of survivors from sea or land to hospitals or landing sites. If possible, recover the search object from the land or sea after the exercise, this will help to avoid the search object becoming an obstacle to others on land or sea. If recovering is not possible, make a general broadcast to warn others of the objects.

12.1 When the search object is sighted, the SRU shall inform the …… (State) RCC. The …… (State) RCC will disseminate the information to all other SRUs.

12.2 The SRUs to take photographs of the search object to simulate the rescue of the survivors.

12.3 Recovery of the search object will be by …….. (agency that is recovering the search object).

12.4 If the search object is unable to be recovered due to sea state or weather, an Urgent Marine Information Broadcast is provided by …….. (maritime agency responsible for the area).

13 EMERGENCY LANDING OF SEARCH AIRCRAFT

Note: In a joint SAREX, make arrangement for search aircraft to land in airport or airfield of another State in the event of an emergency encountered by the search aircraft where immediate landing is required.

13.1 …… (State's) search aircraft will be given permission to land in …….. (name of airport or airfield) if an emergency landing is required.

14 TERMINATION OF SAREX

Note: State the requirements or under what circumstances that will terminate the SAREX. Make arrangement in the event of a real incident that might occur during the SAREX. Consideration can be given to have a code word or words which are understood by all participating agencies and SRUs in the event of a real incident. Once the code word is broadcast to all concern, it will be understood by all participants and the SAREX will be converted into real SAR operations.

14.1 The SAREX will be terminated under any one of the following circumstances:

a) When the all the SRUs have returned to base.

b) When the time for the SAREX has expired and no search object is sighted.

c) When there is an actual emergency.

14.2 In the case of a real emergency, the exercise will be converted into a real SAR Operations. The code word **"NO DUFF NO DUFF"** will be broadcast and all agencies to terminate the exercise immediately and prepare and convert it into a real SAR Operations.

15 SAREX De-brief

Note: Conduct of a SAREX de-brief is important as this is where the evaluation process of the exercise is presented by evaluation experts who observed the exercise and observations by people who actually participated in the exercise scenarios. This is the final step to identify weaknesses and development of recommendations for improvement. Agree on a date and venue to conduct a SAREX de-brief to all participants from both States.

15.1 SAREX Debrief will be held in on …….. (date/month/year according to UTC) at ……. (time in UTC).

15.2 The venue for the SAREX De-brief will be at ……. (name the venue).

16 SAREX CONTROLLERS/EVALUTORS/OBSERVERS

Note: Name the personnel who will be involved in the SAREX as observers, evaluators and controllers. As for evaluators and controllers, they must have expertise in the areas of SAR as they will understand what is to be evaluated and how to control the exercise to maximize the training value.

16.1 Personnel involved in the SAREX will be as follows:

From	SAREX Controllers/Evaluators/Observers
……. (Agency or State)	…….. (name of personnel and their role)

17 INVITATION TO FOREIGN OBSERVERS

Note: Agency or States may consider inviting observers from other agencies or foreign countries or international organizations to attend and observe the SAREX. These personnel can provide valuable feedbacks for improvement to the system. Arrangement to be made as to which State will do the invitation and who should be invited to attend.

17.1 Invitation to foreign observers to observe the SAREX at …… (state the venue for the observation of the SAREX) will be provided …… (State that is providing the invitation) on behalf of ……. (the other State).

17.2 The following countries and organizations will be invited to attend:

a) ……. (name of country or organization)

b) ……. (name of country or organization)

c) ……. (name of country or organization)

d) ……. (name of country or organization)

18 PRESS COVERAGE

Note: If there provision for any press coverage for the SAREX, made the arrangement for drafting of press release.

18.1 If there is a requirement for a [joint] press release on the SAREX to be issued, ……...(Agency or State that will produce the draft) will draft the press release and forward to …… (the other participating agencies or State) for concurrence.

19 SAREX REPORT

Note: SAREX Report is important as it serve as a permanent record of the exercise. Each element of the exercise is recorded and lesson learnt during the exercise is captured. Make arrangement on who should produce the SAREX Report for dissemination to all participating agencies as well as others who may be interested.

19.1 …….. (Agency or State) will produce the SAREX Report with assistance from ……. (the other participating agencies or State). Photographs will be made available for the SAREX Report.

19.2 A copy of the report will be sent to each of the following countries and International Organizations.

a) ……..….. (agency or country or International Organization)

b) ……..….. (agency or country or International Organization)

20 VENUE FOR THE NEXT SAREX

Note: It will be good to plan for an annual [joint] SAREX with relevant agencies or neighbouring State or States. State the tentative date and venue if possible for the next SAREX coordination meeting and SAREX.

20.1 The next SAREX Coordination Meeting will be held at ……. (venue) on …….. (date/month/year).

20.2 The next Full Scale SAREX will be held on …… (date/month/year).

APPENDIX 2: BENEFITS TO THE SAR SYSTEM OF STATES ASSISTING OTHER STATES

APAC States Face Demanding SAR Responsibilities with Few Resources

2.1 Many APAC States have the challenging responsibility of providing SAR services over vast and remote land and oceanic areas and several have few resources available to meet Annex 12 requirements.

Taking A Regional Approach Improves Effectiveness and Efficiency

2.2 To provide an effective and efficient SAR service in the region it is important that States focus not only on meeting their own national obligations, but also take the broader view that their State SAR system is only one part of the wider regional SAR system. States therefore need to cooperate, collaborate and share resources and technical expertise with their neighbouring and regional RCCs, with the more developed SAR States in particular looking for opportunities to assist their lesser developed State neighbours.

When Developed SAR States Support Less Developed Neighbours, Everyone Wins

2.3 Sometimes simple measures can reduce the incidence of SAR operations in a State's Area of Responsibility.

2.4 An example of this is where New Zealand has been regularly requested to send resources to Kiribati, which is not in New Zealand's SRR, to conduct aerial searches for people missing in small vessels at sea. New Zealand recognised that with the provision of basic aids, the number of people going missing at sea could be reduced. The work was completed through an aid program and the benefit was immediate and twofold. There has been a large reduction in the number of people going missing at sea and New Zealand has reduced costs through less aerial searches being required.

2.5 Another example is where Australia has recognised that increasing aircraft and vessel traffic in the north and western areas of its SRR in the Indian Ocean region comes with increased likelihood of more frequent SAR responses in that region. As a result, Australia has commenced a new project in partnership with the Maldives, Mauritius and Sri Lanka to fund and provide technical assistance to improve the SAR capabilities of those countries that will also assist Australia's SAR response obligations in that area of its SRR. Similarly, since 2008 Australia has been providing funding and development assistance to Indonesia to improve SAR capability and cooperation.

2.6 States who aren't compliant with Annex 12 SARP's and who are unable to meet the minimum SAR service requirements could consult and seek assistance from 'champion' States who are compliant and have well developed SAR systems in place.

2.7 Examples of assistance that could be provided by States, International Organisations (such as IMO/ICAO) or multi-lateral initiatives include:

a) conduct of a SAR Gap Analysis;

b) advice on the establishment of a SAR organisational framework;

c) advice for the establishment of a National SAR Committee;

d) technical assistance in the development of a National SAR Plan;

e) providing copies of relevant SAR documents to be used as templates;

f) technical assistance on the establishment of SAR agreements;

g) technical assistance in the development of RCC position descriptions;

h) training of SAR personnel;

i) provision of SRU where appropriate and training of SRU crews;

j) provision/sharing of computerised SAR tools including incident management systems, databases, maritime drift modelling software, etc.;

k) establishing data and information sharing agreements between RCCs;

l) the provision of operational search plan data;

m) provide advice on how to conduct a SAREX and post-SAREX analysis; and

n) set up of SAR system publicity and safety awareness campaigns.

Terms of Reference

Asia/Pacific Search and Rescue Workgroup (APSAR/WG)

Objective

1 In collaboration with affected stakeholders and in close cooperation with the International Maritime Organization (IMO), the objective of the Asia/Pacific Search and Rescue Workgroup is to promote the enhancement and improvement of SAR facilities and services within the Asia/Pacific Region and adjacent regions, in accordance with:

a) Annex 12 to the Convention on International Civil Aviation; and

b) the International Aeronautical and Maritime SAR Manual (IAMSAR).

2 The APSAR/WG will be expected to enhance SAR capability within the Asia/Pacific Region by:

a) making recommendations for improvement to the Asia/Pacific SAR Plan; and

b) providing advice and information, including recommendations for effective implementation of SAR improvements.

Tasks

3 To meet its objectives, the APSAR/WG shall:

a) review the current status of SAR preparedness of Asia and Pacific Region States;

b) review State SAR Arrangements for commonality with those of neighbouring States to facilitate SAR coordination and cooperation across regional boundaries;

c) monitor outcomes from APANPIRG ATM/SG, other ICAO Region SAR groups, ICAO/IMO Joint Working Group (JWG) and related forums for issues that may affect the APAC Region;

d) monitor sub-regional and/or regional SAREX as appropriate;

e) analyse procedures in use in other ICAO Regions, and cooperate with other groups which are involved with similar work in adjacent airspaces, in order to achieve harmonized inter-regional solutions;

f) identify areas where SAR planning and preparedness requires improvement in terms of compliance with Annex 12, the IAMSAR Manual and accepted best practice; and

g) make recommendations for improvement and implementation of SAR systems.

Reporting

4 The APSAR/WG reports to the ATM Sub-group of APANPIRG. A line of communication will be provided to the IMO on APSAR/WG outcomes where necessary.

Membership

5 The membership of the APSAR/WG is open to States and administrations that have the responsibility for the provision of SAR services and facilities within the Asia/Pacific, related international organizations, IMO and ICAO. The membership is also open to participants from outside the Asia/Pacific or organisations that can contribute to APSAR/WG by invitation from APSAR/WG (such as Cospas-Sarsat and military organizations that can facilitate SAR operations).