International Civil Aviation Organization
CAR/SAM Regional Planning Implementation Group (GREPECAS)
First Meeting of the Communications, Navigation and Surveillance / Air Traffic Management Subgroup (CNS/ATM/SG/1)
(Lima, Peru, 15 to 19 March 2010)

Agenda Item 6: Other matters

QUALITY ASSURANCE MANUAL ON SEARCH AND RESCUE SERVICES

(Presented by the Secretariat)

Summary

This working paper presents for revision by the meeting, the proposal for a quality assurance manual on SAR services, as approved by the CAR/SAM Search and Rescue (SAR), carried out in Puntarenas, Costa Rica, from 18 to 22 May 2009.

References:

- Report of the First Meeting of Air Traffic Management/Communications, Navigation and Surveillance Subgroup (ATM/CNS/SG/1)
- Report of the Search and Rescue Services Informal Meeting for the SAM Region (SAM 90/03 SAR), Lima, Peru, 8 to 12 September 2003
- Report of the CAR/SAM Second Informal Meeting (CAR/SAM 01/04 – SAR)
- Report of the CAR/SAM Search and Rescue Services Meeting (SAR) (Puntarenas, Costa Rica, 18 to 22 May 2009

ICAO Strategic Objectives:	*A - Safety* *D - Efficiency*

1. Introduction

1.1. Recognising the evident advantages of implementing quality programmes in ATS services, the First Meeting of the ATM Committee of the GREPECAS ATM/CNS Subgroup, Redondo Beach, United States, July 2001, approved for its work programme, Task N° ATM-SAR/502. This task consisted of developing a Quality Assurance programme for Search and Rescue services in accordance with IAMSAR Manual, for its future implementation in the CAR/SAM Regions.

1.2. In view that the ATM Committee did not have sufficient contribution of SAR experts, the SAM SAR Informal Meeting (SAM 90/03 – SAR), Lima, Peru, September 2003, keeping in mind ATM Committee Task 502 and after discussing different points of view on this respect, agreed to create a Task Force for the preparation of guidance material quality assurance programmes for SAR units (QA SAR/TF), in order to present it to the ATM Committee for its evaluation.

1.3. The following search and rescue meetings for the SAM Region progressively reviewed the drafts of the CAR/SAM regional guidance material on search and rescue services quality assurance programmes, agreeing that the resulting text be reviewed by SAM States, and then that the latter submit to the Secretariat their observations and/or comments to this respect.

1.4. The Fourth SAM SAR Implementation Meeting (SAM 97/06 – SAR) carried out in Bogota, Colombia, from 18 to 22 September 2006, reviewed the changes proposed by some States, agreeing that both the SAR Quality Assurance Manual and the CAR/SAM regional guidance material on search and rescue services quality assurance programmes (QMS SAR) will be available for its use by States through the Secretariat.

1.5. The CAR/SAM SAR QAS Manual was presented during the CAR/SAM SAR Meeting (Puntarenas, Costa Rica, 18 to 22 May 2009), for analysis and pertinent actions.

1.6. Such meeting agreed that each participating delegation should make a draft QAS SAR Manual, agreeing that, not later than **30 August 2009**, observations and/or comments were submitted on this respect, in order to present it to GREPECAS in compliance with this task.

2. **Analysis**

2.1. The mission of SAR services is to find, assist and transport people in distress to a safe place where they will be properly taken care of. The key to organising and having successful SAR services lies in top management, whose mission is to perform managerial functions that will result in improved SAR operations, that is, having an organised, trained and available SAR system for the provision of effective assistance to people in distress.

2.2. The most common reasons why SAR top management fails in its mission are: deficient management of the SAR system under its responsibility, incorrect application of correct measures, attempting to do everything on its own using personal or sectoral criteria which are not always applicable, or lack of prior knowledge of the actual status of the SAR system being managed.

2.3. Initiatives aimed at enhancing the quality of SAR services will bring about substantially improved results and reduced costs, mainly by the elimination of the causes of unnecessary expenditures. These are important objectives of any administration, regardless of the amount of resources available.

2.4. Quality assurance is a dynamic process used for continuous improvement of a SAR system. Although service quality will continue to be measured by some historical data method, such as the number of search and/or rescue missions conducted by air or maritime SAR units, delays in operations or communications established, or feedback from employees and customers, consideration should also be given to other factors that may not be so readily measured, such as the desire to work as a team, training, and action taken to support the SAR goal.

2.5. All these factors are also an important part of quality assurance. The success of the quality assurance effort depends on the recognition that all SAR providers in the CAR/SAM Regions, individually and collectively, must strive to provide the best possible service.

2.6. Thus, for its successful application, quality assurance in SAR services must include important functions such as: the selection, development and training of employees, communication, and the implementation of a participatory management.

2.7. In view of the above, and taking into consideration that up to date no comments have been presented, as requested in the CAR/SAM SAR Meeting, a copy of the quality assurance manual on search and rescue services is presented in **Appendix** to this working paper as mentioned in the summary of this document.

2.8. The objective for the preparation of this manual and guidance documents is to present in a simple and objective manner a series of guidelines as a response to the doubts that may arise during the implementation process of the documentation of a quality management system and as a whole, they are tools at the disposal of States to be used in the implementation of their respective quality assurance programmes for search and rescue services, harmonized with ISO Standard 9001.

3. **Suggested action**

3.1. The meeting is invited to:

a) Review the quality assurance manual in SAR services, as shown in the **Appendix** to this working paper; and

b) If deemed pertinent, the quality assurance manual in SAR services, with the amendments to be introduced, be submitted to GREPECAS for its application in the CAR/SAM Regions.

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APPENDIX

CAR/SAM REGIONAL GUIDANCE MATERIAL ON SEARCH AND RESCUE SERVICES QUALITY ASSURANCE PROGRAMMES

Version 2.0

May 2009

INTERNATIONAL CIVIL AVIATION ORGANIZATION

CAR/SAM REGIONAL GUIDANCE MATERIAL ON SEARCH AND RESCUE SERVICES QUALITY ASSURANCE PROGRAMMES

Version 2.0

May 2009

AMENDMENTS

The issue of amendments is announced regularly by ICAO through regular correspondence with States, and the ICAO NACC and SAM Offices' websites, which holders of this publication should consult. The space below is provided to keep a record of such amendments

RECORD OF AMENDMENTS AND CORRIGENDA

AMENDMENTS			
No.	Date applicable	Date Entered	Entered by

CORRIGENDA			
No.	Date applicable	Date Entered	Entered by

Contents

Chapter 1. DEFINITIONS

Accident. Any event related to the use of an aircraft which takes place in the period running from the moment a person comes on board for purposes of some flight, to the moment when all people have disembarked, during which:

a) any individual is mortally or seriously injured as a consequence of:
- being on board the aircraft, or
- in direct contact with any part of the aircraft, including parts which may have detached from the aircraft, or
- being directly exposed to the jet of a reactor,

except when the injuries are due to natural causes, have been self inflicted or caused by other individuals, or are injuries suffered by stowaways hiding in areas other than those destined for normal use by passengers and crew, or

b) the aircraft suffers structural damage or breakage which:
- adversely affect its structural strength, its performance or flight characteristics, and
- normally require major repair or replacement of the affected component,

except for engine failure or damage, when damages are limited to the engine, its cowling or its accessories; or for limited damage to the propellers, wing tips, antennas, tires, brakes or fairings, small dents or holes in the skin of the aircraft; or

c) the aircraft disappears or is totally inaccessible.

Note 1. – *Solely for statistical uniformity purposes, any injury causing death within the 30 days following the date in which the accident occurred is classified by ICAO as mortal injury.*
Note 2. – *An aircraft is taken as disappeared when the official search is terminated and no wreckage has been found.*
{Copied from ICAO Annex 13}

Human action. Human skills and limitations which affect the safety and efficiency of aeronautical operations.
{Copied from ICAO Annex 11}

***Unnecessary SAR Alert (UNSAR*).** Message which an RCC sends to the appropriate authorities subsequent to an unnecessary activation of the SAR system due to a false alarm.

Desktop audit. Follow-up evaluation performed off-site. It may be carried out through phone interviews of SAR unit personnel and/or through the revision of recordings/data and documentation.

Search. Operation usually coordinated by an RCC o an RSC, in which available staff and means are used to locate individuals in distress.

Update training. Repeated training implemented to maintain and update previously acquired knowledge and skills.

SAR proficiency training. Training carried out to maintain and update the knowledge and skills needed for a safe and efficient application of search and rescue procedures. Proficiency training includes update, supplementary, skill enhancement and corrective training.

Simulation training. Training conducted in a classroom/lab setting training which is aimed at helping the controller apply basic skills and knowledge.

Competence-building training. Training designed to enhance a controller's competence in a skill or in some operational position which the controller is qualified to hold.

Supplementary training. Training implemented whenever there are changes in procedures, regulations or new or revised equipment.

Area Control Centre (ACC). A unit established to provide air traffic control service to controlled flights in control areas under its jurisdiction.

Flight Information Centre (FIC). A unit established to provide flight information service and alerting service.

Rescue co-ordination centre (RCC). A unit responsible for promoting efficient organisation of SAR service within a search and rescue region.

Joint rescue co-ordination centre (JRCC). A rescue co-ordination centre responsible for both aeronautical and maritime search and rescue operations.

Mission Control Centre (MCC). A part of the Cospas-Sarsat system which accepts alerting messages from local user terminals and other mission control centres and distributes them among the appropriate rescue co-ordination centres or other search and rescue points of contact.

General communications. Operational and public correspondence communications and message traffic unrelated to assistance, emergency, or safety, sent or received *via* radioelectric waves.

Search and rescue co-ordination communications. Communications required to co-ordinate the means that participate in a search and rescue operation.

Aircraft co-ordinator. A person who co-ordinates the participation of several aircraft in SAR operations.

Search and rescue mission co-ordinator. an official on temporary assignment to co-ordinate the response to an actual or apparent danger.

Search and rescue co-ordinator (CS). A person(s) or body(ies) belonging to an Administration charged with the general responsibility of setting up and providing SAR services and of making sure that the planning of such services is duly co-ordinated.

Accident site coordinator. A person appointed to co-ordinate search and rescue operations in a given area.

Delivery of a distress alert. A report of a dangerous situation sent to a unit which could provide or co-ordinate assistance.

Coastal earth station (CES). Maritime denomination of an INMARSAT ground station which links ship earth stations to ground communication networks.

Full evaluation of the SAR unit. Full evaluation of the SAR unit conducted on-site using the national checklist to assess the performance of the SAR unit in all areas.

SAR follow-up evaluation. Follow-up evaluation conducted on-site or through a desktop audit to make sure that the specific issues detected during the full evaluation of the SAR unit have been corrected.

Special evaluations. Evaluations to assess specific areas or problems as directed by the SAR authority. These evaluations may be scheduled or unscheduled.

SAR operational functions. Functions concerning the provision of a SAR service or the monitoring of such functions.

Means for search and rescue. Any mobile resource, including the units designated for search and rescue, which is used in search and rescue operations.

Search and rescue plan. General term used to describe the documents existing at all levels of national and international search and rescue structures, which detail the objectives, measures and procedures that support the provision of search and rescue services.

Three-step closure process. The three-step closure process is the method whereby the unsatisfactory points of an evaluation must be corrected and closed. The required response must be available after 60 and 180 calendar days and must describe the following three steps:

a) Corrective action. The initial action taken by the SAR unit to correct the discrepancy;

b) Follow-up action. Action taken during some period of time to confirm that the initial action did correct the discrepancy. It includes the date(s) when it was taken and the results obtained; and

c) Managerial control. Action taken by the SAR authority or unit for purposes of making sure that the problem will not happen again. Such action must identify those positions within the SAR unit that are responsible for periodically checking on the corrected discrepancy and deciding when such review will take place.

Search and rescue data supplier. A source with which an RCC gets in touch to obtain data to support search and rescue operations, including emergency information originating from communication equipment data bases, ship reporting systems and environmental data systems (e.g. meteorological data, marine currents or ELT 406 MHz data bases).

Alerting post. Any means designated to serve as an intermediate post between an individual reporting an incident and a rescue co-ordination centre or sub-centre.

SAR point of contact (SPOC). Rescue co-ordination centres or other established and recognised national contact points which can accept the responsibility for receiving Cospas-Sarsat alerting data for purposes of saving people in distress.

Person locator beacon (PLB). Personal assistance beacon which broadcasts alerts and issues signals for the homing radio.

Emergency position-indicating radio beacon (EPIRB). Device usually carried on board a ship which serves to broadcast a signal to alert search and rescue authorities and to allow rescue units to locate the site of the accident.

Distance-finding (DF). Radio homing on signals to determine a position.

Search and rescue region (SRR). An area of defined dimensions associated to an RCC within which search and rescue service is provided.

Chapter 2. BACKGROUND

2.1 The mission of SAR services is to find, assist and transport people in distress to a safe place where they will be properly taken care of. The key to organising and having successful SAR services lies in top management, whose mission is to perform managerial functions that will result in improved SAR operations, that is, having an organised, trained and available SAR system for the provision of effective assistance to people in distress.

2.2 The most common reasons why SAR top management fails in its mission are: deficient management of the SAR system under its responsibiltity, incorrect application of correct measures, attempting to do everything on its own using personal or sectoral criteria which are not always applicable, or lack of prior knowledge of the actual status of the SAR system being managed.

2.3 Initiatives aimed at enhancing the quality of SAR services will bring about substantially improved results and reduced costs, mainly by the elimination of the causes of unnecessary expenditures. These are important objectives of any administration, regardless of the amount of resources available. When top management assigns importance to quality, it tends to:

- carry out more activities, and make less mistakes;
- develop a good reputation; and
- raise the necessary resources for the growth and better performance of the system.

2.4 On the other hand, SAR organisations that neglect quality are subject to errors which may result in:

- a reduced number of lives saved;

- the adoption of wrong or late operational decisions that contribute to:

    1) confusion, accidents and equipment failures;
    2) incorrect or insufficient use of resources; and
    3) unnecessary spending of financial resources.

2.5 Due to increased air traffic activity and the use of large aircraft capable of carrying a large number of passengers, and its relationship with the responsibility of CAR/SAM States/Territories/International Organisations of safeguarding the safety of human lives, it was deemed important to develop a Search and Rescue (SAR) Services Quality Assurance programme with guidelines for the States on the implementation of such programme, so that it could be a useful quality management tool to ensure compliance with the objective of the National SAR Plan of each CAR/SAM State of saving lives by improving SAR preparedness.

2.6 The programme would also provide efficient SAR services within their respective SAR areas of responsibility, so that the needs arising in the event of accident of a large aircraft may be foreseen and met.

2.7 Prompt notification to a SAR unit of a danger threatening crews and passengers, as well as the planning of the operations required to assist them, are essential to ensure high safety standards in air and maritime activities, since they expedite the adoption of actions for their prompt resolution. It is also important for the results to be available to States, international organisations and ICAO, so as to have a better dissemination of lessons learned.

2.8 Quality assurance is a dynamic process used for continuous improvement of a SAR system. Although service quality will continue to be measured by some historical data method, such as the number of search and/or rescue missions conducted by air or maritime SAR units, delays in operations or communications established, or feedback from employees and customers, consideration should also be given to other factors that may not be so readily measured, such as the desire to work as a team, training, and action taken to support the SAR goal.

2.9 All these factors are also an important part of quality assurance. The success of the quality assurance effort depends on the recognition that all SAR providers in the CAR/SAM Regions, individually and collectively, must strive to provide the best possible service.

2.10 Thus, for its successful application, quality assurance in SAR services must include important functions such as: the selection, development and training of employees, communication, and the implementation of a participatory management.

2.11 Personnel **selection** is important because the new members of the SAR organisation must have skills consistent with the quality assurance philosophy (team work, responsibility, participation and commitment). It is desirable that individuals entering the organisation be highly capable of solving problems and that they have special skills (capable of working as a team, accountability, spirit of participation).

2.12 The area of **training** will also be essential in order to have personnel duly trained so that it can participate and introduce quality improvements. When hiring new personnel, an effort is made so that they may attain the foreseen objectives; the time and training devoted to the team and its development are an investment rather than a financial loss. There is a need to train both employees and managers, not only on quality improvement methods, but also on institutional processes and procedures, and to instill on them a quality culture.

2.13 Lack of training is an obstacle for participation programmes, which are a basic element of quality assurance. If the context is to support a participatory attitude, employees need to receive proper training. It should also be considered that, without the basic knowledge, the staff will not be able to carry out their job. The knowledge that employees require is basically that related to inter-personal and group relations and job skills.

2.14 On the other hand, the primary method that is used to motivate employees to adopt and participate in a quality assurance programme is a training programme where all the members of the organisation, at all levels, receive initial training on basic quality assurance concepts, in order to facilitate their understanding and encourage them to receive training and improve their communication skills, team work and participation at meetings.

2.15 Quality training and participation are closely linked. The improvement of SAR services is the responsibility of all its members. Therefore, training should be provided so that suggestions may come from every operational or managerial position. The idea is that they acquire a vision that is broad enough to allow them to improve the process as a whole and not just the one that corresponds to each individual post.

2.16 **Communication** should include the necessary methods to provide useful information for performing a good job and for better adaptation to the organisational culture. Personnel participation requires both training and information.

2.17 The communication of positive results obtained in the provision of services improve the morale and motivation of the personnel, while negative results should elicit efforts to overcome them. When relating participation to quality assurance, the importance of having good communication channels throughout the SAR organisation is highlighted.

2.18 In order to improve quality, the staff needs information on their performance, results obtained, and the contribution they make. Based on this information, people improve their knowledge and propose improvements which can represent, through the appropriate channels and **participation**, important innovations to the SAR organisation that has decided to take advantage of the motivation and commitment of all its members.

Chapter 3. SAR QUALITY ASSURANCE PROGRAMMES

3.1. INTRODUCTION

3.1.1 Quality assurance programmes should focus on the identification and correction of deficiencies ("disconformities" for the ISO standard) before they give rise to disorderly, imprecise and, therefore, inefficient search and rescue operations of a high and unnecessary economic cost. They should be planned and implemented in such a way that they contribute to the efforts made by administrations to improve the quality of search and rescue services as a whole. This chapter contains some quality assurance strategies that should be developed to ensure the results of quality assurance programmes.

3.2. SCOPE AND OBJECTIVE

3.2.1 The objectives established to support SAR goals are normally expressed in terms of a given response time, the percentage of people in distress or goods under threat of being destroyed that are saved. These objectives are logical and relatively easy to quantify. Other objectives may also be used, such as avoiding injuries and material damage, or alleviating anxiety, although they are more difficult to measure.

3.2.2 One of the purposes of the quality assurance programme is to provide specific guidelines for reporting, investigating and resolving different types of events which affect the quality of SAR services. The programme should be designed to work in conjunction with ICAO standards and recommended practices, as well as with State regulations.

3.2.3 However, the first objective of the programme should be to avoid errors that might lead to a reduction in the number of lives saved, the adoption of wrong or late operational measures, confusion when following the instructions issued during operations, equipment failures, or incorrect or inadequate use of the resources available to the SAR system.

3.2.4 The second objective of a SAR quality assurance programme should be to improve the quality of the services provided by SAR units.

3.3. STRUCTURE

3.3.1 The structure of the SAR quality assurance programme depends on the size and composition of the SAR system. An acceptable and productive structure of this programme generally requires that SAR management designate or select an expert with sufficient experience in the search and rescue (SAR) field as to become the quality assurance specialist of the SAR unit (SAR QA). The SAR QA specialist will assume quality assurance (QA) responsibilities for the unit and report directly to the head of the SAR unit.

3.3.2 For larger SAR units, the head of the SAR unit will establish a SAR quality assurance department with various specialists and a sub-chief with sufficient SAR experience, who would take on quality assurance tasks and responsibilities for the unit and report directly to the head of the SAR unit.

3.4. IMPLEMENTATION AND RESPONSIBILITIES

3.4.1 For purposes of developing SAR quality assurance programmes, the ICAO NACC and SAM Regional Offices will provide assistance and advice to SAR service providers of the CAR/SAM Regions.

3.4.2 All CAR/SAM States/SAR providers should implement a SAR quality assurance programme, with documentation on the subject. The programme should explain its purpose, objectives and responsibilities. The State or SAR service provider and each SAR unit should establish such programme.

3.4.3 CAR/SAM States/SAR service providers should keep their National SAR QA Plans updated, and assess their effectiveness.

3.4.4 The heads of SAR units should be aware of, and be involved in, the operations/programmes of their SAR units so as to ensure the highest level of quality and efficiency.

3.4.5 All employees are responsible for maintaining the highest level of quality in their performance.

3.5. CONTENTS OF THE PROGRAMME

3.5.1 The SAR QA programme should establish methods to identify and correct shortcomings and deficiencies, and to recognise progress made in the following areas:

a) SAR system management

- SAR update training
- Improvement of aeronautical and SAR phraseology
- English proficiency
- SAR communications
- Study of reviews/conclusions of SAR incidents or missions
- Incentives/recognition
- List of appropriate operational practices
- Assessment of (oral and written) communications/instructions that have taken place in the course of SAR missions
- Training through communication or co-ordination exercises, as well as comprehensive or field exercises
- Lessons learned from personal anecdotes
- Periodic quality assurance reports for SAR units containing trends, customer feedback, evaluations, etc.
- Resolution of identified problems
- Incorporation of actual SAR mission or operation scenarios into the new training programmes
- Internal, national and regional SAR assessment programmes.

b) Teamwork

The following list may be used to promote teamwork within search and rescue organisations:

- Training on teamwork with air traffic service personnel
- Teamwork incentive/recognition programmes
- Roles of the different positions
- Proposals for improving the respective operational manuals of each SAR unit
- Training course for SAR operational supervisors
- Team meetings/reports
- Clearly communicate the expectations of all employees
- Troubleshooting and analyses and measures for problem resolution
- Proposals for improving the respective SAR operational plans.

c) Communications

The following list of ideas may be used to improve communications among all the employees, in order to create a climate conducive to the exchange of information:

- Meetings of all the personnel (all levels) to address QA matters of common interest
- Electronic bulletin board system
- Access to information *via* internet/intranet
- National database containing domestic and local SAR QA data
- Information bulletins
- SAR QA seminars, conferences and workshops
- Reports from international SAR organisations such as: the International Maritime Organization (IMO); COSPAS-SARSAT; INMARSAT, etc., and other safety reports of the industry.

d) Customer service/feedback

The following is a list of ideas to request feedback from SAR personnel and customers (internal/external) concerning the quality of the service provided by the SAR unit and its impact on other organisations, customers and individuals:

- Training programmes for pilots
- Internal and external customer surveys
- Interaction with other aviation-related organisations
- Performance evaluation during the duty shift of the SAR operator/operational supervisor of the unit
- Meetings between SAR personnel and that of enterprises/organisations/bodies that contribute to SAR
- Familiarisation trips
- Contact with customer associations (for example, local flight schools, airlines, aviation organisations, etc.)
- Safety seminars for pilots and groups engaged in rescue
- Survival seminars/courses.

Chapter 4. VERIFYING THE COMPETENCIES OF SAR PERSONNEL

4.1 INTRODUCTION

4.1.1 In order to improve 14the technical competencies of search and rescue services on an ongoing basis, individual technical training requirements for technical performance purposes shall be identified and met.

4.1.2 The verification of personnel competencies is intended to provide operational personnel and supervisors feedback from SAR supervisors and quality assurance officials/specialists regarding their competencies. This feedback should also be used to develop plans to improve competencies, as applicable.

4.2 RESPONSIBILITIES

4.2.1 The head of the SAR unit is responsible for establishing and maintaining competence standards in the SAR unit. The SAR authority shall formulate guidelines specifying the required level of knowledge, both theoretical and practical.

4.2.2 All of the operational personnel of the SAR unit shall be required to periodically demonstrate that their performance meets the required competence standards. The SAR competencies of each SAR operator and supervisor shall be verified.

4.2.3 In large SAR units, SAR personnel specialised in on-the-job supervision and personnel training and evaluation (officials/specialists in quality assurance of search and rescue services) should be hired to perform this task within the unit.. SAR quality assurance officials/specialists shall prepare personnel competence verification shifts so that all operational staff is regularly investigated.

4.2.4 It is suggested that competence verifications be made at least twice a year. Advance notice of the conduction of competence verifications shall be given to search and rescue operational personnel and supervisors so that they may be mentally and functionally prepared. A sample checklist for personnel competence verifications is shown in the **Appendix** to this chapter.

4.2.5 In small SAR units, the head of the SAR unit or whoever he/she designates, shall fulfill these tasks. However, where arrangements are less formal due to the size of the SAR unit and the number of personnel, they must make sure that competence verifications are complete and thorough.

4.2.6 The official quality assurance operational supervisor shall continuously evaluate personnel performance using both direct and indirect methods. Indirect methods may include remote monitoring, review of recordings, written documentation, observations by other supervisors, SAR quality assurance officers, etc.

4.2.7 If, upon verifying the competence of a SAR operator, it is found that he/she would benefit from individual competence-building training, the following references may be used as guidance to determine the type of training required:

a) CAR/SAM Regional Guidance Material for Search and Rescue Services Quality Assurance Programmes, Chapter 7 – Training programmes;

b) ICAO Doc 9731, International aeronautical and maritime search and rescue services manual, Volume I, Chapter 3 – Training, qualification, certification and exercises.

4.2.8 Matters concerning SAR personnel performance cover technical performance areas which might benefit from technical update training. These matters are not necessarily deficiency areas. A SAR operator may, in general, have an acceptable technical performance and, nevertheless, benefit from training on some particular skill or task.

4.2.9 Once completed the verification of an operator's competencies, the official quality assurance operational supervisor that conducted the verification shall discuss the results with the operator.

4.2.10 Although competence verifications are not intended to be graded as pass/fail or satisfactory/not satisfactory, there may be occasions in which the performance of a SAR operator is found not to be satisfactory. In such cases, the certification shall be suspended and the operator shall receive appropriate update training, followed by a re-grading process. Under no circumstance shall a person who has been rated as "not satisfactory" be allowed to keep on working without supervision. If, after a reasonable period of time, a SAR operator is not capable of passing the competence verification, all details pertaining to the not satisfactory grading shall be collected and sent to the administrative authority.

4.2.11 Each SAR unit shall review, at least once a year, all personnel competence verifications conducted, so as to identify recurring and major competence needs. The results of this review shall be reflected in a report to the head of the SAR unit for purposes of developing effective future training plans.

4.3 DOCUMENTATION

4.3.1 Each competence verification of a SAR operator shall be discussed with said operator and be duly documented in the corresponding training record.

Appendix

Sample checklist for conducting personnel proficiency checks

PERSONNEL PROFICIENCY CHECK			**SAR Unit Name**
Name		Date	Position/Sector:
Weather ☐ VMC ☐ IMC ☐ Other	Workload ☐ Light ☐ Moderate ☐ Heavy	Complexity of SAR Case ☐ Not difficult ☐ Occasionally difficult ☐ Mostly difficult ☐ Very difficult	
Purpose: ☐ Proficiency check ☐ Follow-up ☐ Other			Review period: From: To:

Performance category	Performance indicator	More than Satisfactory	Satisfactory	Needs Improvement	Unsatisfactory
A. Separation	1. Separation is ensured.				
	2. Safety alerts are provided.				
B. Coordination	3. Performs handoffs/point-outs.				
	4. Required coordinations are performed.				
C. Control judgment	5. Good control judgment is applied.				
	6. Priority of duties is understood.				
	7. Positive control is provided.				
	8. Effective traffic flow is maintained.				
D. Methods and procedures	9. Aircraft identity is maintained.				
	10. Strip posting is complete/correct.				
	11. Clearance delivery is complete/correct and timely.				
	12. LOAs/directives are adhered to.				
	13. Additional services are provided.				
	14. Rapidly recovers from equipment failures and emergencies.				
	15. Scans entire control environment.				
	16. Effective working speed is maintained.				
E. Equipment	17. Equipment status information is maintained.				
	18. Equipment capabilities are utilized/understood.				
F. Communication	19. Functions effectively as a team.				
	20. Communication is clear and concise.				
	21. Uses prescribed phraseology.				
	22. Makes only necessary transmissions.				
	23. Uses appropriate communications method.				
	24. Relief briefings are complete and accurate.				
G. Other					

Comments:	
Recommendation for Improvement:	
Signature of person conducting check:	Date:
Personnel Comments:	
This report has been Discussed with me Personnel's signature	Date

Sample checklist for conducting SAR Mission Coordinator (SMC) proficiency checks

SAR MISSION COORDINATOR (SMC) PROFICIENCY CHECK			**Name of the SAR Unit**
Name		Date	
Meteorological conditions in the search area ☐ VMC ☐ IMC ☐ Other	Workload ☐ Light ☐ Moderate ☐ Heavy	Complexity of SAR Case ☐ Not difficult ☐ Occasionally difficult ☐ Mostly difficult ☐ Very difficult	
Purpose: ☐ Proficiency check ☐ Follow-up ☐ Other			Review period: From: To:

Performance Category	Performance Indicator	More than satisfactory	Reaches the level required	Has knowledge but needs improvement	Unsatisfactory
A. Reception of emergency alerts	1. Acknowledge receipt of emergency alerts, if necessary				
	2. Obtaining and assessment of all data on the emergency case				
	3. Determines the type of emergency equipment of the aircraft / disappeared vessel or in an emergency situation				
	4. Establishes personnel shift and/or through radio in appropriate frequencies to facilitate communications with SAR means				
	4. Verifies and keeps corresponding records of all procedures with a graph, if necessary				
B. Coordination of SAR services	5. Retransmits emergency alerts to RCC involved, if necessary				
	6. Delimits the area subject of search and decided the methods and means required				
	7. Designates the OSC (and ACO, if necessary), alert to SAR means and assigns the frequencies for communications in the search area				
	8. Organizes the delivery of instructions to SAR personnel affected to the search and further interrogation				
	9. Organizes the delivery of provisions for subsistence of survivors. If necessary				
	10. Informs the RCC Head of the search action plan				
	11. Coordinates the operation with adjacent RCC. When applicable				
C. Control criteria	12. Evaluates all the reports from any source and modifies the search action plan, if necessary.				
	13. Adopts previsions for the fuel provision of aircraft / vessels in long searches, organizes SAR personnel accommodation				
	14. Has positive control of the actions in course				
	15. Analyzes the order and result of events, in order to evaluate the need to recommend the RCC head to suspend the search				
D. Methods and procedures	16. Keeps in mind the RCC Operational Plan				

SAR MISSION COORDINATOR (SMC) PROFICIENCY CHECK		Name of the SAR Unit			
	17. Complies with letters of agreement / internal directives				
	18. Coordinates flight safety aspects for SAR aircraft with corresponding ATC units				
	19. Formulates the search action plan (and rescue plan, if applicable) assigns the search areas, sends the SAR means and designates the frequencies for communications in the accident scenario and watches for the compliance of instructions				
	20. Writes or takes necessary previsions to write reports on the running of operations				
	21. Expedites instructions in a timely, precisely and complete manner.				
	22. Permanently works with the OSC and makes sure to receive and assess all reports of the same and from the ACO (if case it has been designated)				
	23. Maintains an effective working rhythm				
	24. Releases SAR means in a timely manner when the assistance is no longer required.				
	25. Notifies and coordinates with accident investigative authorities and with security personnel the surveillance of the accident location.				
	26. If such were the case, notify the State of the aircraft / vessel registry in accordance with the established standards				
	27. Takes provisions for the writing of the final report on the results of the operation				
G. Others					

Comments:

Recommendations for the improvement:	
Signature of the person conducting check:	Date
SMC Comments:	
This report **has** **has not** been discussed with me	
SMC signature	Date

Chapter 5 – SEARCH AND RESCUE SERVICE EVALUATION PROGRAMME

5.1 INTRODUCTION

5.1.1 The standardisation of procedures and methods is essential for any service that has international commitments and which uses procedures affecting more than one unit. The degree of standardisation achieved is directly related to the proficiency with which individuals perform their tasks. This, in turn, determines the efficiency of the SAR service provided to users.

5.1.2 In search and rescue services, personal proficiency and the standardisation of procedures and methods are achieved and maintained through training, certification, verification of competencies, evaluations and audits and, more importantly, through the deliberate and conscientious participation of all SAR personnel.

5.1.3 This chapter deals with the need to carry out an ongoing evaluation of each SAR unit and of the SAR system in general. This task is normally performed by personnel which have been properly trained so as to understand all aspects of the organisation and which are charged with appraising personnel proficiency and with making a critical evaluation of SAR's general efficiency.

5.2 PURPOSE AND SCOPE OF THE EVALUATION

5.2.1 The SAR evaluation includes a review of each SAR unit, such as the search and rescue centre (RCC), the search and rescue sub-centre (RSC), or some other activity of the SAR, or an overall review of several units or of the whole domestic SAR system. The evaluation of the SAR units is necessary to guarantee that:

a) the service always be top quality; and

b) all units and staff apply criteria, standards, rules and procedures in the authorised manner.

Whatever the scope of the evaluation may be, it should be noted that some common objectives shall apply.

5.2.2 It must be kept in mind that evaluations must cover the management and implementation of SAR service procedures, while the "internal audit" is carried out to determine whether the quality management system complies with the provisions foreseen in the quality management requirements established by the organisation and whether it has been implemented and maintained in an efficient manner.

5.2.3 The audit programme must be planned taking into account the status and importance of the processes and areas to be audited; as well as the criteria, scope, frequency and methodology of audits. The selection of auditors and the conduction of audits must guarantee the objectivity and impartiality of the auditing process. Auditors may not audit their own performance.

5.2.4 SAR evaluation covers all or part of the following aspects:

a) Determining the standardisation, quality and suitability of services provided to users;
b) Making sure that operational procedures are consistent with the Letters of Agreement in force, and with domestic and international standards and legislation;
c) Determining and making recommendations regarding operational requirements;
d) Detecting any potentially unsafe operational procedure or practice, so as to permit the adoption of immediate corrective/preventive measures;
e) Detecting problem areas or deficiencies; determining their probable cause and recommending the immediate corrective/preventive measures as may deemed appropriate;
f) Examining the efficiency of communications and coordination among and within units; and
g) Examining the utilisation of staff, the work required in each position and unit payrolls, with a view to achieving the desired compatibility.

5.2.5 Once the SAR evaluation has been completed, the conclusions should be fully documented, making the relevant recommendations whenever changes are needed. The aspects requiring immediate correction should be reported and corrected as soon as possible, preferably before submitting the corresponding official report.

5.2.6 The management of the area being evaluated must make sure that action is taken without unjustified delay in order to correct the deficiencies detected and their causes. Follow-up activities must include verification of action taken, and reporting on the results of such verification.

5.3 PERFORMING THE EVALUATION

5.3.1 The designated staff should perform a periodic evaluation of the SAR, based on a minimum recommended frequency of at least once every two years. In those units where the evaluation team is part of the permanent staff, the evaluation should be an on-going process, particularly as regards personnel competence. Whenever necessary, it might be desirable to carry out interim evaluations of selected units, approximately midway between scheduled evaluations.

5.3.2 Before starting the SAR evaluation, it is common practice to notify the head or the person in charge of the unit involved. This person should obtain the assistance which might be required to properly conduct the evaluation, even getting in contact with other interested parties, such as agencies with which Letters of Agreement for the use of means and personnel during SAR operations have been signed. Perhaps it might also be necessary to organise consultations with the operators, other civil aviation groups or with military authorities. In this latter case, it might be necessary to give them advance notice of the nature of the aspects contemplated.

5.3.3 Once the SAR evaluation has been completed, a meeting should be called to report all important results and recommendations to the head or person in charge of the unit. The purpose of this meeting shall be to:

a) review the conclusions;
b) identify problem areas;
c) discuss other alternate solutions proposed;

d) appoint the person in charge of subsequent measures;
e) co-ordinate corrective/preventive measures; and
f) set provisional deadlines for completion of the measures deemed necessary.

5.3.4 Should there be the need to review some given aspect or function, special evaluations may need to be carried out at any point in time.

5.4 DOCUMENTATION

5.4.1 Once the evaluation of the SAR unit has been completed, the person in charge shall:

a) draft a report on each of the evaluated units which are part of the system;
b) prepare a written report on the in-flight test, as the case may be;
c) send the evaluation reports to the competent authorities.

5.4.2 The evaluation reports of the SAR units must be written as a narrative and include, at least, the data listed below with respect to each routine observation or evaluation:

a) a description of the deficiency or problem areas found;
b) recommendations for correcting the situation;
c) the agency, individual or persons in charge of implementing the subsequent measures, if applicable; and
d) the dates foreseen for the implementation of the necessary corrective measures.

5.4.3 The relevant sections of the evaluation report should be sent to units not belonging to the SAR, as the case may be, so that they may be duly advised and be able to adopt the required measures.

5.4.4 The SAR unit should notify the competent authority regarding the measures taken with respect to the problems found. This should preferably be done within the 30 days after receiving the report and then at regular intervals until all pending points have been resolved.

5.5 SEARCH AND RESCUE SERVICE EVALUATION PROCEDURES

5.5.1 This section offers standard procedures to evaluate compliance with ICAO SARPs as well as the specified guidelines and procedures at national and local SAR units within a State.

5.6 EVALUATION PROCESS

5.6.1 Full evaluation of the SAR unit

5.6.1.1 ***Preparation and notification***. A full evaluation of each of the SAR unit, using the checklist included in this Appendix to this chapter, must be carried out every two years. The SAR authority must notify the head of the SAR unit at least 30 days before carrying out a full evaluation. This notice may request data for the pre-evaluation review, and will request subjects of special interest for the evaluation.

5.6.1.2 ***Information meeting***. Should involve introducing the members of the team, and discussing the evaluation programme and activities with the head of the SAR unit and other staff related to the unit.

5.6.1.3 ***Conducting the evaluation***. The evaluation staff shall perform a full evaluation of the SAR unit through one or all of the following elements: -direct observations, operations room and/or monitoring the Operations Plan/SAR unit Operational Manual/data, attendance to staff meetings, observing training activities, reviewing administrative records, interviews/discussions and a review of previous SAR missions or exercise reports. If possible, items classified as not compliant should be discussed with the SAR unit staff to determine how much they know about the item. If a satisfactory answer is received, the item may be classified as satisfactory. If no satisfactory answer is received, the item must then be suitably classified. Interviews shall normally be held with the heads, supervisors, operation supervisors, and specialist staff of the SAR unit, SAR operators, etc. Additionally, representatives of agencies which contribute to the SAR service and who have letters of agreement signed with the SAR unit involved for the use of means, personnel and/or survival material, representatives of ATS units associated with the SAR unit, etc., may be interviewed.

5.6.1.4 ***Daily report meeting.*** The person acting as a leader will normally hold a daily meeting with the head of the SAR unit to report on the progress made with the evaluation.

5.6.1.5 ***Meeting to report on results***. The head of the SAR unit must be kept advised on the findings of the evaluating person/team once the evaluation is concluded. It is recommended that all available SAR unit personnel attend this results reporting meeting. At that time, or as soon as possible, a draft copy of the SAR evaluation report shall be delivered to the head of the SAR unit.

5.6.1.6 ***Review of the evaluation***. The leader of the evaluation team should deliver an evaluation review form to be filled in by the head of the SAR unit.

5.6.1.7 ***Re-identified items***. Items re-identified as “not satisfactory” in the evaluation of a SAR unit must be recorded under the same designation.

5.6.2 **SAR follow-up evaluations**

5.6.2.1 ***Preparation and notification***. Follow-up of SAR evaluations should normally be carried out unannounced or with a minimum notice of on-site evaluation, desktop audit or combination of both. These evaluations shall normally be carried out no less than six months after the date of the meeting reporting the results of the full evaluation of the SAR unit, or as may be determined by the SAR service authority. The head of the SAR unit may be requested to supply data for the pre-evaluation review. The on-site SAR follow-up evaluation must follow the same procedure as described in paragraphs 7.6.1.2 to 7.6.1.6.

5.6.2.2 ***Pending items***. Items previously classified as unsatisfactory should be considered as pending if the three-step closure procedure has not been carried out and/or the discrepancy can still be detected. Each item must be addressed in the evaluation report with an explanation as to why it had to be re-opened.

5.6.2.3 ***New items***. The new items identified during the SAR follow-up evaluation must be properly documented.

5.6.2.4 ***Closed items***. Items may be taken as closed when the discrepancy can no longer be detected, and:

a) the initial action adopted by the SAR unit to correct the discrepancy has been completed;

b) the action that has been taken for some period of time to make sure that the initial action has corrected the discrepancy has been completed; and

c) some action and/or programme has been implemented to make sure that the problem does not arise again.

5.6.3 **Special evaluations**

5.6.3.1 A special evaluation may be carried out whenever the SAR authority deems it necessary or upon request by the SAR unit.

5.6.4 **Evaluation reports**

5.6.4.1 ***Completion of the report***. The results of all evaluations must be documented so as to make sure that all the involved offices continue fully advised as regards the effectiveness of the search and rescue service system. All final reports must be completed and distributed within 30 days following the date of the meeting where the results were reported.

5.6.4.2 The SAR unit full evaluation reports should:

a) contain the results of the evaluations of regards the areas involved;
b) describe all the points which were reported; and
c) assign tracking control numbers to all the identified points.

Example of tracking control number of the SAR unit evaluation:

00-RC-XXXX-01D-FE
Legend

"00" refers to the year of the evaluation	"RC, RS" refer the type of SAR unit RC = RCC; RS = RSC, etc.
"XXXX" refers to the identification of the SAR unit	
"01" refers to the tracking number and "D" is the classification	"I" = unsatisfactory "S" = satisfactory
"FE" refers to the type of evaluation	"FE" = of the whole SAR unit "DA" = desktop audit "FU" = follow-up evaluation "SP" = special evaluation

5.6.4.3 ***Executive summaries***. Executive summaries of all SAR unit evaluations must be prepared.

5.6.5 **Response to SAR unit evaluations**

5.6.5.1 All items classified as unsatisfactory in SAR unit evaluations require a response which must comply with the three-step closure procedure: Corrective action, follow-up action and management control. Additionally, the following criterion applies:

a) **Action Plan**. Action plans for all items classified as unsatisfactory must be developed and made known to the corresponding SAR authority within 30 days following reception of the SAR unit final evaluation report;

b) **First response**. The head of the SAR unit must complete and send one first response to the SAR authority 60 days after the meeting where the results of the evaluation of the SAR unit were reported; and

c) **Second response**. The head of the SAR unit must complete and send the second response to the SAR authority 180 days after the meeting where the results of the evaluation of the SAR unit were reported and every 180 days henceforth, until all points have been closed.

APPENDIX
SAR UNIT ASSESSMENT CHECKLIST

SAR Unit: _____

SUBJECT	ASPECTS TO BE ASSESSED OR QUESTIONS TO REPLIER	SITUATION	COMMENTS	ICAO Ref.
A. ADMINISTRATION				
SAR Organization	1. Which official bodies have authority and responsibility to coordinate the aeronautical SAR services? 2. ¿Is the same body responsible to coordinate aeronautical and maritime SAR services? 3. Is there a national SAR committee, which coordinates SAR matters with other national official or private bodies and with SAR bodies of other States? 4. Does current organization meet SAR requirements?	☐ Satisfactory ☐ Unsatisfactory ☐ Not applicable ☐ Not assessed		Doc 9731- IAMSAR (Part I)
ICAO and States documents	1. Review availability and status of amendment (Annex 12, Doc. 9731 Parts I, II and III, SAR National Plan, Unit Plans of Operation, Manuals, guidelines, Circulars). 2. Are the documents updated?	☐ Satisfactory ☐ Unsatisfactory ☐ Not applicable ☐ Not assessed		ICAO Regional Offices Manual

SUBJECT	ASPECTS TO BE ASSESSED OR QUESTIONS TO REPLIER	SITUATION	COMMENTS	ICAO Ref.
Status of differences to SARPS	1. Are there any differences with Annex 12? 2. ¿Has the state notified ICAO of these differences? 3. Have the differences been published in the AIP?	☐ Satisfactory ☐ Unsatisfactory ☐ Not applicable ☐ Not assessed		Annex 15 Manual de ICAO Regional Offices
Air Navigation Plan	1. Review the status of implementation of the CAR/SAM ANP in the SAR area.	☐ Satisfactory ☐ Unsatisfactory ☐ Not applicable ☐ Not assessed		Annex 12 Chap. 2, para 2.5.1 and Note ANP CAR/SAM Doc. 9749
RAN CAR/SAM/3	1. Review the status of implementation of CAR/SAM/3 RAN Meeting Recommendations and Conclusions	☐ Satisfactory ☐ Unsatisfactory ☐ Not applicable ☐ Not assessed		Report CAR/SAM/3 Doc- 9749
SAR personnel training	1. Does the RCC or RSC staff get training, qualification, titles or official certification? 2. Does SAR responsible body assess the status of training of personnel and does it take the necessary measures to correct the training needs detected?	☐ Satisfactory ☐ Unsatisfactory ☐ Not applicable ☐ Not assessed		Doc 9731- IAMSAR (Part I – Chap 3) Annex 12 Chap. 2, para. 2.1.1.3
B. OPERATIONS				

SUBJECT	ASPECTS TO BE ASSESSED OR QUESTIONS TO REPLIER	SITUATION	COMMENTS	ICAO Ref.
Capacity to attend responsibilities related to search and rescue	1. Are the units assigned to perform other tasks, which might detract from their ability to handle SAR responsibilities?	☐ Satisfactory ☐ Unsatisfactory ☐ Not applicable ☐ Not assessed		Doc 9731- IAMSAR (Part I Appendix H)
Operational Documentation	1. Does the unit have Plan of Operations duly updated, which provides guidance to comply with SAR situations foreseen in all the area under jurisdiction? 2. Is there an updated and accessible filing of permanent availability for SAR Unit personnel consultations with all SAR agreements with other adjacent RCC/RSC and/or with the SAR provider means?	☐ Satisfactory ☐ Unsatisfactory ☐ Not applicable ☐ Not assessed		Annex 12 Chap. 4, para. 4.2.1 until 4.2.4 inclusive Doc 9731- IAMSAR (Part II – Chap. 1, para. 1.5)
Operational Teamwork	1. Do you observe if SAR shift personnel work as a teamwork? 2. Is personnel foreseen to cover service shifts in the unit sufficient and is it ready to initiate and continue carrying out operational tasks on a 24-hours basis?	☐ Satisfactory ☐ Unsatisfactory ☐ Not applicable ☐ Not assessed		Doc 9731- IAMSAR (Part I – Chap. 2, para. 2.3.11) Annex 12 (Chap. 2, para 2.1.1 and para. 2.3.3
Operational Supervisor / SAR personnel	1. Is there an operational supervisor or a SAR staff in charge of the operational shift? 2. Is the supervisor / operator in charge trained to plan and coordinate SAR operations until the SMC takes over and/or perform other tasks that the SMC may assign during the development of a search or rescue?	☐ Satisfactory ☐ Unsatisfactory ☐ Not applicable ☐ Not assessed		Doc 9731- IAMSAR (Part I – Chap. 2, para. 2.3.11)

SUBJECT	ASPECTS TO BE ASSESSED OR QUESTIONS TO REPLIER	SITUATION	COMMENTS	ICAO Ref.
Communications available in the unit	1. Does the RCC have a two-way rapid and reliable communications with: (i) Associated ATS units; (ii) Associated RSC; (iii) The appropriate direction-finding and position-fixing stations; (iv) Where appropriate, coastal radio stations capable of alerting and communicating with surface vessels in the region; (v) Headquarters search and rescue (vi) All Maritime RCC located at the maritime SRR and RCC or joint RCC in adjacent SRR; (vii) The designated meteorological office or meteorological watch office; (viii) SAR Units (ix) Alerting post (x) The MCC servicing the SRR?	☐ Satisfactory ☐ Unsatisfactory ☐ Not applicable ☐ Not assessed		Annex 12 Chap. 2, para.2.4.1
	2. Does the RSC have two-way rapid and reliable communications with: (i) Adjacent RSC (ii) The meteorological office or meteorological watch office; (iii) Search and rescue units (iv) Alerting posts?	☐ Satisfactory ☐ Unsatisfactory ☐ Not applicable ☐ Not assessed		Annex 12 Chap. 2, para.2.4.2
	3. Does the national ground communication systems provide complete coverage of the jurisdictional area and with a rapid and reliable service?	☐ Satisfactory ☐ Unsatisfactory ☐ Not applicable ☐ Not assessed		Doc 9731- IAMSAR (Part I – Chap. 4, para. 4.5.7)
Communications Procedures	1. Is communications phraseology correctly applied? 2. Are communications procedures with SAR aircraft and ATS associated units correctly applied?	☐ Satisfactory ☐ Unsatisfactory ☐ Not applicable ☐ Not assessed		Annex 10 Annex 12 Chap. 2, para.2.3.3

SUBJECT	ASPECTS TO BE ASSESSED OR QUESTIONS TO REPLIER	SITUATION	COMMENTS	ICAO Ref.
Communications with SAR Units	1. Does the Unit Plan of Operations include procedures to establish communications with the civil search and rescue units provided by concurrent bodies?	☐ Satisfactory ☐ Unsatisfactory ☐ Not applicable ☐ Not assessed		Doc 9731- IAMSAR (Part I Appendix H, N° 37)
Coordination Procedures	1. Are coordination procedures adequately carried out with RCC/RSC, SAR units, and with the associated ATS unit?	☐ Satisfactory ☐ Unsatisfactory ☐ Not applicable ☐ Not assessed		Annex 12 Chap. 2, para.2.3.3
Operational Updating	1. How does the unit ensure that SAR personnel are updated in operational aspects? 2. Does SAR personnel from the main SAR contributory units receive training or participate in SAR exercises on a periodical basis? 3. Is there an official planning and assessment process regarding these exercises? 4. Does the unit have detailed information regarding the capacity (scope, number of persons that may be saved, alert time required to attend an alert, point of contact of the authority authorizing the support for the alert, etc) of all main search and rescue units within its jurisdictional area?	☐ Satisfactory ☐ Unsatisfactory ☐ Not applicable ☐ Not assessed		Annex 12 Chap. 4 Para. 4.4.1 Doc 9731- IAMSAR (Part I Appendix H)

SUBJECT	ASPECTS TO BE ASSESSED OR QUESTIONS TO REPLIER	SITUATION	COMMENTS	ICAO Ref.
Procedures related with medical evacuation	1. Are there any official procedures in the RCC/RSC, in order to make decisions on medical evacuation within its jurisdictional area? 2. Do SAR units have special equipment for medical evacuation? 3. Are there letters of agreement or other coordination tool in the RCC/RSC to receive medical care for all persons evacuated after a medical emergency?	☐ Satisfactory ☐ Unsatisfactory ☐ Not applicable ☐ Not assessed		Doc 9731- IAMSAR (Part I Appendix H)
Emergency Location Transmitter (ELT)	1. Does de RCC/RSC have instructions and means to have round the clock availability to the information contained in the ELT national registry operating in 406 MHz?	☐ Satisfactory ☐ Unsatisfactory ☐ Not applicable ☐ Not assessed		Report CAR/SAM/3 Doc- 9749 Doc 9731- IAMSAR (Part I, Chap. 4, Para.4.5.14 up to para. 4.5.22 inclusive
False alerts	1. Are there instructions to attend RCC/RSC false alerts? 2. Are there instructions to reduce RCC/RSC false alerts? 3. Is a registry kept and is the MCC serving the SRR informed?	☐ Satisfactory ☐ Unsatisfactory ☐ Not applicable ☐ Not assessed		Doc 9731- IAMSAR (Part I Appendix E)
C. OPERATIONAL SUPPORT				
Contingency Procedures	1. Are there any contingency procedures in case of a considerable failure of communications equipment?	☐ Satisfactory ☐ Unsatisfactory ☐ Not applicable ☐ Not assessed		CAR/SAM REGIONAL GUIDANCE MANUAL FOR SEARCH AND RESCUE QUALITY ASSURANCE PROGRAMMES.
Documentation	1. Is there a complete registry (enough to the incident of all SAR events? 2. Is this registry consulted to analyse and improve the system? 3. Does the documentation available in the RCC/RSC satisfy the need for SAR personnel to take all necessary measures to comply with law requirements established?	☐ Satisfactory ☐ Unsatisfactory ☐ Not applicable ☐ Not assessed		Doc 9731- IAMSAR (Part I Appendix H)
D. QUALITY ASSURANCE				

SUBJECT	ASPECTS TO BE ASSESSED OR QUESTIONS TO REPLIER	SITUATION	COMMENTS	ICAO Ref.
SAR Quality Assurance Programme	1. Does the RCC/SRC have a quality assurance programme implemented? (a) Is there any guideline for such programme? (b) Has any SAR officer/SAR quality assurance specialist been designated?	☐ Satisfactory ☐ Unsatisfactory ☐ Not applicable ☐ Not assessed		CAR/SAM REGIONAL GUIDANCE MANUAL FOR SEARCH AND RESCUE QUALITY ASSURANCE PROGRAMMES
Assessments	1. Are there any regional or national assessment programmes implemented? 2. If such were the case, which aspects do they assess? 3. How often are the assessments? 4. Do these assessments result in Action Plans and responsibility to apply the assessments?	☐ Satisfactory ☐ Unsatisfactory ☐ Not applicable ☐ Not assessed		Idem
E. TRAINING				
Certification and refreshment certification	1. Which is the training process and certification? 2. Who determines it?	☐ Satisfactory ☐ Unsatisfactory ☐ Not applicable ☐ Not assessed		Doc 9731- IAMSAR (Part I, Chap. 3)
Training tests	1. Is SAR staff required to demonstrate their performance? (a) Are there abilities tests carried out? (b) If so, how often? 2. Are there training courses? (a) Does the RCC/RSC have annual lists of requirements for training courses? (b) Who and how are training matters determined?	☐ Satisfactory ☐ Unsatisfactory ☐ Not applicable ☐ Not assessed		Doc 9731- IAMSAR (Part I, Chap. 3)

SUBJECT	ASPECTS TO BE ASSESSED OR QUESTIONS TO REPLIER	SITUATION	COMMENTS	ICAO Ref.
Reports to supervisors staff / SAR personnel	1. How are supervisors staff /SAR personnel informed on the changes in procedures? 2. When and who makes sure that all personnel have been informed?	☐ Satisfactory ☐ Unsatisfactory ☐ Not applicable ☐ Not assessed		Doc 9731- IAMSAR (Part I, Chap. 3)
Updating English refreshment courses	1. Is there any English course available to learn the English language? 2. How is any acceptable level of proficiency determined? 3. Are there any updating courses?	☐ Satisfactory ☐ Unsatisfactory ☐ Not applicable ☐ Not assessed		Doc 9731- IAMSAR (Part I, Chap. 3) Report CAR/SAM/3 Doc- 9749
F. EQUIPMENT AND FACILITIES				
Communications system	1. How reliable are communications (ground-ground, air-ground)? a) Aeronautical Fix Service (AFS) - AFTN - Speech Circuit b) Aeronautical Mobile Service (AMS) - VHF - HF 2. Are there procedures to compensate deficiencies? 3. How are SAR registries kept and maintained?	☐ Satisfactory ☐ Unsatisfactory ☐ Not applicable ☐ Not assessed		Doc 9731- IAMSAR (Part I, Chap. 4) (Part II, Chap. 2)

SUBJECT	ASPECTS TO BE ASSESSED OR QUESTIONS TO REPLIER	SITUATION	COMMENTS	ICAO Ref.
Location of the unit	1. Is the RCC/RSC located next to a FIC or an ACC so that the additional communications means may be reduced? 2. Do the dimensions of the locations assigned to the RCC/RSC satisfy the provision of SAR services? 3. What is the status of the RCC/RSC infrastructure? 4. Is there a new location required (indicate reasons, if affirmative) 5. Is there any general office equipment for tracks tracing, or charts showing the area of responsibility of the RCC/RSC and adjacent areas, file cabinets, etc? 6. Is there sufficient comfort contemplating the SAR personnel needs during operational shifts to cover 24-hours capacity (dining room, living room, wardrobe, toilettes, etc.?			Doc 9731- IAMSAR (Part I, Chap. 2, para. 2.3.8)

Assessment Team Name Organisation

Original signed by
Date:

Chapter 6 – QUALITY SERVICE IMPROVEMENT PROGRAMME

6.1 INTRODUCTION

6.1.1 SAR authorities should seek initiatives to improve the overall quality of the search and rescue services they provide. This chapter contains several initiatives that should be taken into account by SAR authorities to improve the quality of SAR.

6.2 PERIODIC REVIEWS OF SAR UNIT RECORDS

6.2.1 The quality assurance official/specialist of the SAR unit should periodically review the SAR mission report records and the time records kept in the operational guard log book and, if available, any voice communications recordings, in order to guarantee that the overall quality of search and rescue services rendered is maintained.

6.3 ICAO TERMINOLOGY FAMILIARISATION PROGRAMME

6.3.1 Administrative and operational tasks are carried out in the RCCs. The administrative tasks involve keeping the RCC in a stage of permanent preparedness. Operational tasks involve the efficient performance of an SAR operation or exercise, and thus are of a temporary nature. Said tasks correspond to the SMC, whose duties may be performed by the head of the RCC or other trained personnel of the RCC. Said personnel may include members of other official or private agencies for purposes of facilitating co-ordination in those events in which use is made of elements belonging to such services but which have no training or a constant relation with aeronautical communications.

6.3.2 In the case of this staff coming from other agencies, SAR authorities and/or units should implement a programme to make them familiar with ICAO phraseology. The implementation of programmes to improve the phraseology of a SAR unit will contribute to avoiding misinterpretation of the messages exchanged between the staff mentioned in the previous paragraph and the professional personnel of the aeronautical SAR. The results of this programme could improve the quality of the services and contribute to avoiding incidents during SAR operations. This may be achieved through random voice recording reviews, voice recording monitoring evaluations, or through direct observation. It is important to follow up on this programme in order to give some type of recognition to SAR unit staff showing outstanding use of phraseology or a significant improvement in the use of ICAO standard phraseology.

6.4 SAR USER SERVICE/FEEDBACK

6.4.1 It is very important to establish good communications among SAR authorities/SAR units and SAR system users. All SAR system users, whether from commercial airlines, business aircraft or general aviation, can provide valuable feedback. Feedback from other aviation departments, for instance airdrome offices and ATS units, and from ATS internal staff is equally important. This feedback can be obtained through surveys and may be used as a method to determine the quality of the services rendered by the SAR unit.

6.4.2 ***SAR quality assurance surveys***

6.4.2.1 SAR units should conduct an internal and external SAR quality assurance survey every year to obtain feedback on the services they provide. A sample SAR quality assurance survey for SAR personnel is shown in the **Appendix** to this chapter.

6.4.2.2 The data collected from these surveys must be analysed and validated, and the results made available to all SAR staff. Based on the review of the collected data, those issues affecting the quality of services should be identified and assigned an order of priority, and an action plan should be developed and implemented to apply these matters. Surveys from previous years could be used as a basis to determine how the SAR unit is doing as regards the quality of the search and rescue services provided.

6.5 PILOT USERS/SAR STAFF FORA

6.5.1 SAR authorities should organize pilot/SAR staff fora at least once a year. These fora can generate good relations and enhance communications between SAR authorities, pilots and SAR staff. The main objective of these fora is to link the pilot in the cockpit with the SAR controller so as to have a better understanding of the responsibilities and functions of each party. It is recommended that these fora not be organised as meetings and that no concrete action be taken. These fora may also be used by SAR authorities/units to introduce and explain information regarding local and domestic SAR system and procedures.

6.6 PARTICIPATION IN PILOT SAFETY SEMINARS

6.6.1 SAR authorities should participate in pilot safety seminars in an effort to submit information on the SAR system related to SAR quality assurance.

6.7 VISITS TO SAR UNITS BY PILOTS

6.7.1 Pilots should be encouraged to visit SAR units (RCC, RSC) and to familiarise themselves with the SAR system. In rare occasions, SAR facilities may be unable to receive visits due to the work load or to other reasons. Consequently, pilots should contact the SAR unit before the planned visit and report the number of people in the group, the time and date of the proposed visit, as well as the main interest of the group. With this information on hand, the SAR facility can prepare a programme and have someone available to guide the group within the unit.

6.8 SAR SYSTEM FAMILIARISATION/TRAINING FOR PILOTS

6.8.1 It is recommended that SAR authorities consider developing a SAR system training programme for pilots. The programme would be intended to train pilots on how to make the best use of the SAR system, its functions, responsibilities, benefits and available services.

6.9 FAMILIARISATION TRAINING FLIGHTS FOR SAR STAFF

6.9.1 SAR authorities should establish a programme with the airlines to have the SAR staff participate in familiarisation flights. SAR supervisors and operators should be encouraged to participate in these flights. This programme would allow the staff of SAR units to have first-hand experience of cockpit activities.

6.9.2 They should also establish a programme for the staff of the SAR unit to participate in familiarisation flights in the area of jurisdiction. In the course of these flights, the radio communication difficulties that arise (generally due to transmitter/receiver equipment range or terrain configuration) in navigation, meteorology, etc., should be tested. These flights should preferably be conducted on aircraft intended to provide support in search and rescue operations.

6.9.3 Familiarisation flights should be considered as skill training for SAR supervisors and operators.

6.10 RECOGNISING QUALITY PERFORMANCE

6.10.1 Positive performance and quality recognition is as important as identifying deficiencies. SAR personnel, individually or as a team, should receive recognition for rendering a high standard of performance and quality of service. It is therefore recommended that SAR authorities/units develop a programme aimed at recognising quality performance.

6.11 MEASURING SAR PERFORMANCE

6.11.1 It is important that SAR providers find ways to continuously improve the safety and efficiency of SAR operations in order to optimise performance in general. This section describes various ways by which SAR performance cay be measured.

6.11.2 The following factors must be taken into account when measuring the performance and the quality of search and rescue services provided:

6.11.3 **Safety**. Safety being the top priority, the number of accidents and incidents handled by the SAR should not be the only thing to be measured. Measurements must include the level of risk which exists during SAR operations for the materials and crews engaged in the search and/or rescue.

6.11.4 **Delay**. It is vital that utmost efforts be made to make sure that emergency alerts, independently of the communications channel used, get to the RCC/RSC with the least delay possible. It is also vital that there be no delays in alerting SAR units of an imminent coming into action.

6.11.5 **Prediction.** Is the variable measure of performance? For example: The predictable measures must be compared with the real times it takes the SAR unit to apply (implement) the Operations Plan as opposed to the optimum times expected from it.

6.11.6 **Flexibility.** Flexibility refers to the ability of SAR personnel to adapt SAR operations to the changing conditions that may arise during the course of said operations. Greater flexibility makes it possible to explore operational opportunities as they arise. This includes guiding search and rescue units to more favorable routes or minimising delays or cancellations in some scheduled SAR operations as a result of unforeseen events affecting capacity such as, for example, bad weather. Flexibility measures will make it possible to review the extent to which the training received by the staff of the SAR unit allows them to make dynamic operational decisions as a result of meteorological changes or operational conditions either before or during SAR unit operations.

6.11.7 **Efficiency.** Efficiency may be measured in terms of a flight deviating from an optimum flight routing. For example: An efficient routing would reduce direct costs of operation by optimising the flight path and eliminating excess flight time, route distance, use of fuel in non optimal velocities and altitudes, time of arrival to the search and/or rescue area, time of search, etc. Efficiency measurements should compare the actual flight path with the ideal path.

6.11.8 **Availability.** Availability in search and rescue services is an indicator of the reliability and quality of the SAR services provided. Failures in key systems may reduce (or annul) the capacity of the system, causing delays, diversion or cancellation of flights scheduled for search and rescue; total or partial lack of fuel and/or lubricants for the timely replenishment of SAR units; health facilities not ready to receive and care for casualties as the case may be, etc.; which increases the costs of SAR service, becomes an added burden to the SAR supplier or, as in the last example, the difference between life and death of a survivor evacuated from the accident site.

6.11.9 **Access**. Access to an airport or to the area designated for search or rescue may increase the value of performance measurements; as in the case of path efficiency, the value of access can increase through the measures agreed upon in this regard with ATC units to obtain the release of the airspace that is inaccessible for SAR operations, airport reduction or limitations of the airspace itself. Access measurements must include the ability of the SAR unit to coordinate passage of SAR air units through restricted areas, the availability and quality of preferred routes, and the skills of the ATS provider, the ATS system and the airport to meet the demands for use.

6.11.10 **Cost of the service**. At the international level, habit and practice stipulate that the State rendering the aeronautical and maritime SAR services shall finance them, even when the assistance given is at the request of some other agency, for example, the RCC of another State. Hence, petitions for reimbursement to the State that requested or received the services are not usually submitted. Thus, the SAR system must have some financial support. Usually, this support increases when the party responsible for the SAR service can explain and demonstrate the importance of the SAR system through some efficient dissemination of the main activities it conducts. Therefore, measuring SAR performance based on its successes and failures acquires great importance for its growth based on what is required from it, while offering valuable information to assess efficiency and to determine the best way to improve.

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SAR QUALITY ASSURANCE INTERNAL SAR UNIT SURVEY

(To be filled out by SAR personnel)

"Name of SAR unit" **QUALITY OF SEARCH AND RESCUE SERVICE EMPLOYEE SURVEY"**

"Name of SAR unit" is very interested in obtaining your feedback on the quality of services that you provide to users of the system and if all the tools you need are available to provide these services. Your comments are very important to us and we would like to thank you in advance for taking the time to complete this survey.

1. Please provide us with the following information (Optional):

Name:
Position:

2. How do you rate the overall quality of search and rescue services provided by your SAR unit?

- ❑ Excellent
- ❑ Good
- ❑ Average
- ❑ Fair
- ❑ Poor

3. How do you rate the quality of equipment that you work with?

- ❑ Excellent
- ❑ Good
- ❑ Average
- ❑ Fair
- ❑ Poor

4. How do you rate the type of training (includes proficiency training, refresher training, initial training, etc.) you received?

- ❑ Excellent
- ❑ Good
- ❑ Average
- ❑ Fair
- ❑ Poor

5. How do you rate the working environment?

- ❑ Excellent
- ❑ Good
- ❑ Average
- ❑ Fair
- ❑ Poor

6. How do you rate the attitude of SAR personnel as it pertains to professionalism and friendliness?

- ❑ Excellent
- ❑ Good
- ❑ Average
- ❑ Fair
- ❑ Poor

7. How do you rate the use of proper aeronautical phraseology in your SAR unit?

- ❑ Excellent
- ❑ Good
- ❑ Average
- ❑ Fair
- ❑ Poor

8. How do you rate the airspace and ATC procedures of your ATS unit?

- ❑ Excellent
- ❑ Good
- ❑ Average
- ❑ Fair
- ❑ Poor

9. How do you rate the availability and quality of local, national, and ICAO directives?

- ❑ Excellent
- ❑ Good
- ❑ Average
- ❑ Fair
- ❑ Poor

10. How do you rate the workload distribution (is the workload distributed evenly?)?

- ❑ Excellent
- ❑ Good
- ❑ Average
- ❑ Fair
- ❑ Poor

11. How do you rate the quality and timeliness of briefings (new procedures, changes to procedures, etc.)?

- ❑ Excellent
- ❑ Good
- ❑ Average
- ❑ Fair
- ❑ Poor

12. How do you rate the communications between SAR personnel (between personnel and personnel, supervisors and personnel, management and personnel, etc.)?

- ❑ Excellent
- ❑ Good
- ❑ Average
- ❑ Fair
- ❑ Poor

13. How do you rate your job satisfaction in your current position?

- ❑ Excellent
- ❑ Good
- ❑ Average
- ❑ Fair
- ❑ Poor

14. Please share with us any comments and/or suggestions pertaining to your SAR unit you believe that may need improvement.

Comments/Suggestions:

Chapter 7. COMPETENCE-BUILDING TRAINING PROGRAMMES

7.1 INTRODUCTION

7.1.1 There is a need for competence-building training in each SAR unit in order to maintain and update the knowledge and skills required to apply search and rescue procedures in a safe and efficient manner. This training includes update and supplementary training, improvement of skills, and corrective training.

7.1.2 Training can be achieved in different ways, using both internal and external methods (local competence-building). The most practical and efficient way of providing competence-building training is by developing a local competence-building training programme. This concept involves sending a limited number of employees to external training and, upon returning to the unit, they would train their colleagues in the areas in which they received training. This concept is known as "training the trainer" and would be useful to assist SAR authorities to complete their competence-building training programmes as required. This type of training may include training videos, discussion/summary of operational procedures, emergency procedures, co-ordination procedures, SAR incidents, contingency procedures, etc. Consideration should be given to preparing a room within the SAR unit to be used for competence-building training. This room must have the appropriate training equipment, that is, video cassette, TV set, white boards for markers, aviation charts, local, national and ICAO reference material, etc.

7.2 COMPETENCE-BUILDING TRAINING

7.2.1 Competence building should be a requirement for all operational personnel, as well as for support personnel that need to maintain their operational level of knowledge. This training is intended to maintain and update the knowledge and skills required for safe and efficient implementation of search and rescue procedures.

7.2.2 Competence-building needs will vary from one SAR unit to the other. Therefore, training should be adjusted to accommodate the requirements and needs of each unit.

7.2.3 Competence-building may include training on issues mandated by SAR authorities and local SAR units.

7.2.4 This type of training programme must be described in the directives for the SAR unit.

7.2.5 SAR authorities/units must make sure they apply an annual mandatory competence-building training programme and that competencies are acquired.

7.2.6 All training related to competence-building must be documented in the personal training record of each SAR official.

7.3 ***Update training***. Each SAR unit must establish an annual update training programme. SAR authorities, managers and supervisors must stress the fact that update training is intended to improve competencies and not to assess performance.

7.3.1 This programme should include, but not be limited to, training in the following topics:

a) ***Unusual situations***, such as adverse weather conditions, on-board equipment failure, pilot's lack of knowledge of the route, or other type of contingencies (for improved learning, training for emergencies must be based on actual incidents);
b) ***Barely used procedures***, for example: cases and planning of parachute jumping, communication with the public and the media, communication with relatives, scope of electronic scanning, interview techniques, rescue procedures, AMVER, receiving medical advice, etc.;
c) SAR agreements,
d) Data collection and evaluation;
e) Allocation of SAR resources;
f) Documentation of incidents;
g) Completion of instruction forms/questionnaires for SAR units;
h) Identification of elements of reference;
i) Risk assessment;
j) SAR communications;
k) End of SAR operations;
l) Emergency phases, SAR stages and components;
m) SAR resource capabilities;
n) SAR technology;
o) Search configurations;
p) Search planning;
q) Selection of SAR units;
r) Survival equipment;
s) Scope of visual scanning;
t) Water currents;
u) Aircraft performance and characteristics;
v) Co-ordination procedures;
w) Civil/militar coordination and joint use of airspace procedures;
x) Aeronautical phraseology;
y) Fire/life safety procedures at the SAR unit;
z) Other issues identified and reported by SAR authorities or local SAR units.

7.4 ***Supplementary training***. Operational personnel must complete the supplementary training prior to the implementation of new/revised procedures, regulations or equipment.

7.5 ***Skill-improvement training***. Training provided by the SAR operation supervisor when a need for improving the skills of a SAR operator is identified. When this happens:

a) the SAR operator must be notified in writing as to the skills in which he/she needs a higher level of training; and
b) the SAR operational supervisor, in co-operation with the operator, is responsible for developing the training to be provided to the SAR operator. The methods and contents will be tailored to the individual needs and will include laboratory scenarios, classroom training, computer lessons and on-the-job training. The SAR operational supervisor will determine the most effective method.

7.6 ***Remedial training***. Training aimed at correcting specific performance deficiencies, such as:

a) a SAR operator who makes mistakes due to a performance deficiency;
b) training provided following bad performance, which should be documented as remedial training.

7.6.1 The SAR controller shall be notified in writing about the topics to be covered and the reasons.

7.6.2 The SAR operator shall have reasonable opportunity to make comments about his/her performance during remedial training.

7.6.3 The methods and contents must be designed to meet the needs of the SAR controller and may include simulated scenarios with theoretical and/or practical laboratory exercises, classroom training and on-the-job training. The SAR operational supervisor must identify the most effective method.

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Chapter 8. HUMAN FACTORS

8.1 The human factor is the essential element for achieving efficiency in any organization. Technology facilitates search and rescue tasks and, in many cases, is indispensable for the successful implementation of SAR operations. But the proper use of the tools which technology puts at SAR's disposal depends on the level of competence of the user is. It is the quality of human resources which makes the difference as regards performance. Thus, to optimise performance, one must try to establish an adequate professional and work environment.

8.2 Exclusively at the professional level, it should be stressed that an aspect which favours performance is motivation. From this point of view, motivation implies the provision of the means needed for professional development and for acquiring the capabilities required by the position. It also implies getting the person involved in achieving an aim which trascends mere individual interests. This can be done by creating a healthy spirit of teamwork and professional identity. The best of an individual emerges when committing to a project or an idea which will be of benefit to society. It is a matter of placing at the disposal of that individual all the means which, from a personal outlook, are required for the achievement of some general objectives.

8.3 From the above it is possible to conclude that a demanding training programme is a basic ingredient for motivation, strictly from its professional side. Furthermore, in activities with an implicit risk, training and professional improve the level of safety. This is an unquestionable reality and is applicable to search and rescue organisations since, due to the nature of their functions and the repercussions which SAR incidents may have, they are under the obligation of not only planning their activities in detail but also of improve all the knowledge acquired in their training as well as the response capabilities of the staff in charge of handling emergencies.

8.4 On the other hand, public opinion in developed societies demands the highest degree of protection and efficiency from emergency services, being quite sensitive to any errors deriving from lack of foresight, deficient planning or poor use of available resources.

8.5 RCCs exercise management and co-ordination functions which require a large diversity of skills as well as a resolute attitude. Their staff has to be highly specialised and, hence, requires theoretical and practical skills training and updating in SAR subjects, ratified through qualification procedures. The international nature of air and maritime activities and, consequently, of SAR activities, also demands certifications proving the levels of competence.

8.6 In a SAR system, administrative and support actions are combined with operational functions. Personnel organisation involves covering all the SAR organisation positions, deciding on personnel requirements and then hiring, selecting, evaluating, promoting, paying and training the necessary staff. Personnel organisation must be closely related to the organisation of functions and positions.

8.7 Staff **selection** should be quite strict, for the new members of the organisation should have skills consistent with the philosophy of Quality Management (teamwork, responsibility, esprit de corps and commitment). It is convenient for people coming into an organisation to show or have shown great capacity to resolve changing situations, as well as a series of particular skills and attitudes (ability to work as a team, responsibility, willingness to participate).

8.8 The **training** area is also fundamental to have a SAR staff which has been duly trained to participate and to introduce quality improvements into the system. If they do not have the necessary knowledge, they will be unable to make their contribution. The fact that personnel is hired means that an effort has been made to have those chosen achieve the desired objectives. The time and the training dedicated to the team and its development should be considered an investment and not an economic cost. The need for training applies both to SAR staff (supervisors and SAR operators) as well as to top and middle management of the service (SAR director, managers, heads of SAR units, etc.), not only in quality improvement methods but also in the processes and procedures of the organisation, and in an indoctrination aiming at a total quality culture.

8.9 Lack of training will make it difficult for participation programmes, which are a basic element in Quality Management, to prevail. Adequate training of employees constitutes the basis for a participatory attitude. Furthermore, without such basic knowledge, the SAR staff will not be able to do a good job. The knowledge they must have is that related to interpersonal and group relations, statistical/quality analysis and awareness of the objective of the SAR service, and the training which the position may demand.

8.10 All of the members of the organisation should receive initial training on Quality Management basics to facilitate their understanding of it and to encourage them to participate. It must be pointed out that the members of the organisation must be trained and increase their skills as regards communications, teamwork and participation at meetings.

8.11 The staff of the SAR system requires training if it is to be responsible for quality. Quality training and participation are closely linked. All members of a system are responsible for improving processes, hence; the training provided must be such that suggestions can be contributed from every position. What is involved is for every person to have a sufficiently broad view so as to improve the whole process, and not be limited to only the specific position of the individual, something which can be achieved through teamwork.

8.12 **Communications** should be taken as just another human resource department task. Methods should be devised to see to it that any information which might be useful for people gets to them so that they can do their jobs properly, and to adapt to the organisational culture. Employee participation requires not only training but information as well.

8.13 Communicating positive results to the staff improves their morale and their motivation, while hearing about the negative ones should encourage their efforts to correct them. Linking participation to quality emphasises the importance of establishing good communication channels throughout the SAR system. To improve quality, SAR staff needs information about its work, its results and its contributions. Thanks to such information, people improve their knowledge and can make suggestions which, through the appropriate participatory channels, may represent major innovations for any enterprise which may have decided to take advantage of the collective intelligence of its entire staff.

8.14 In human resource management under the Quality Management system, it is fundamental to encourage the **participation** of all members of the organisation. Participation, or “empowerment”, means encouraging, favouring and rewarding the SAR staff for behaving at all times in the way it deems convenient to achieve the goals of the SAR service. This means that, for the staff to participate, it has to receive the necessary instructions to make decisions affecting organisational management and results, receive information on the results, information enabling them to understand and contribute to those results and the rewards based on those results.

8.15 For real participation, the staff must receive adequate amounts of these four factors. Only thus will the staff be able to see a direct relationship between its efforts and the results of the organisation. For the participation to be effective, aspects such as the importance of the leadership style must be taken into account. The enterprises which use it consider their employees as professionals capable of fulfilling their tasks in a precise and effective way, and thus delegate on them a large measure of responsibility and allowing them to participate in the decision-making process.

Automation focused on the human element

8.16 A technology-oriented approach automates all possible functions and lets the human element handle the rest. This places the operator in the role of an automation custodian. A human-focused approach offers the operator an automated assistance that helps him/her save time and effort, since automation provides support to, but does not direct, the operator in the performance of his/her tasks. The three high-level automation objectives are: Usefulness, Operational Convenience and Acceptance by the Labour Force.

Status awareness

8.17 Status awareness is defined as perceiving the elements making up the environment within a volume of time and space, understanding their meaning, and projecting their condition in the near future. The elements of status awareness in the SAR service are extremely dynamic and are subject to changes ranging from subtle to significant, which can occur in short notice and which can affect, or do affect, the performance of an operator at a given moment. For example:

- Personal factors
- Meteorological conditions
- Airport infrastructure
- Time needed to get the SAR elements ready
- Availability of rescue personnel
- Work environment
- Geographical locations and preparedness for replenishment of SAR elements
- Aircraft performance
- Rescue operations equipment
- Adjacent units

Error management

8.18 Error management has two components: error reduction and error contention. Error reduction covers measures designed to limit the occurrence of errors. Error contention measures are designed to limit the adverse consequences of any errors which may still occur.

8.19 Error management includes the following:

- Measures to minimise the risk of individual and work team errors;
- Measures to reduce the vulnerability to error of certain tasks or task elements;
- Measures to discover, evaluate and then eliminate the factors which cause errors in the workplace;

- Measures to diagnose organisational aspects which create error-generating factors for the individual, the work team, the task and the workplace;
- Measures to improve troubleshooting;
- Measures to increase error tolerance by the workplace and the system;
- Measures to make sure that latent conditions are visible to those operating and managing the system;
- Measures to improve the intrinsic resistance of the organisation to human fallibility.

8.20 There is a relation among the concepts presented. Application of the concept of Automation centered on the human element will increase the Status Awareness of the SAR operator, which, in turn, becomes a component of the Error Management programme. SAR operators that keep a high degree of Status Awareness are more likely to detect errors and to control their consequences.

8.21 In an effort to further explain human factors related to the work of the SAR operator, the **Appendix** to this Chapter includes an extract of a document entitled "Human Factors for the Air Traffic Control Specialist: Handbook for the User's Brain", published by the United States Federal Aviation Administration in November 1995. Although the document was developed for air traffic controllers, it does include some of the results of research studies on human factors, as well as additional information useful for SAR operators, written in a succinct and easy-to-read format.

8.22 The topics included are: controller-pilot voice communications, memory, fatigue, and the effects of stress on data processing. These recommended techniques aim at helping to reduce the probability of error in voice communications, by remembering specific information, identifying signs of stress which could affect performance, and reducing fatigue.

The human factor and SAR training

8.23 On the other hand, the IAMSAR manual emphasises RCC personnel training and improving professionalism. It stipulates that the head of the SAR service is responsible for the formulation of training programmes for SAR personnel, so that it may reach and maintain a high level of competence. Stressing the above, it states that the directors of the service must make sure that said personnel is as mature and as competent as required to perform the tasks which may be assigned to it.

Appendix

QUALIFICATION OF SAR PERSONNEL

INFORMATION AND CONCLUSIONS ABOUT RCC PRACTICES BASED ON SEVERAL STUDIES CONDUCTED IN THE UNITED STATES

1. **Background**

1.1. To ensure that SAR services endure and improve, the U.S. Coast Guard has conducted studies in recent years that have indicated typical traits of high-performing rescue coordination centers (RCCs) and rescue sub-centers (RSCs). This paper discusses some of these traits.

1.2. The U.S. is addressing shortfalls, especially with regard to perishable skills, excessive workload, recurrent training, and technical and communications capabilities. In this paper we offer conclusions that may be of interest to other SAR authorities as well. Our investigation has been supported in part by other countries as is indicated below.

1.3. RCCs operated by the U.S. Coast Guard are unlike typical international RCCs in some ways. Our RCCs are actually multi-mission command centers that handle a full range of law enforcement and marine safety functions, and are staffed mainly by military officer and enlisted personnel on three-year tours. Communications watches are handled outside the RCCs.

1.4. The following studies examined RCC staff selection and retention, SAR training, staff qualification and recertification, tasks assigned, and workload expectations:

1.4.1. S/V MORNING DEW Case Study: involved the sinking of a sailing vessel off the north jetty of Charleston Harbor, South Carolina in December 1997 that claimed the lives of four persons.

1.4.2. 1999 Command Center Improvement Study: included a resident assessment of work processes and problems at one RCC and one RSC to assess the impact of growing non-SAR workload, since our RCCs are actually multi-mission command centers.

1.4.3. 2001 SAR Mission Coordinator (SMC) Front End Analysis (FEA): intended to help understand the actions and outcomes of accomplished SMCs.

1.4.4. 2002 Research and Development Report on Human Performance for Command Centers: examined command center performance from a human factors and performance perspective.

1.4.5. 2002 Report on Fatigue and Endurance: highlighted workforce and workload concerns associated with the Egypt Air 990 disaster.

1.4.6. 2003 RCC Benchmarking Study: examined the best practices of selected foreign joint or maritime RCCs. Australia (JRCC-civilian), Canada (JRCC-military and

civilian), Hong Kong (MRCC-civilian), the Netherlands (JRCC-civilian), Sweden (JRCC-civilian), and the UK (MRCC-mainly civilian) assisted with this study.

1.5. These studies helped the U.S. to identify areas in which we would like to improve, including:

a) Knowledge and skills for all aspects of SMC duties
b) Refresher training
c) Proficiency in all aspects of search planning software
d) Understanding of search theory
e) Available training time
f) Multi-tasking requirements
g) Staffing levels
h) Standards and policies
i) Technical and communications capabilities
j) Administrative workload
k) Command briefings
l) Length of watches
m) Sleep and sleep/wake cycles

1.6. One study noted that multi-tasking could lead to chronic fatigue and mistakes. Multi-tasking can seriously disrupt integrative and decision-making processes needed to manage a SAR case. Multi-tasking is actually a sequence of serial events rather than work being done in parallel. When attention is diverted from one task to another, performance in both tasks degrades. Attention can be diverted by activities such as administrative tasks, answering non-SAR phone calls, monitoring RCC entrances, fatigue and noise. Attention can be better sustained by limiting the number of cases handled by a single person, adding a supervisor during high caseloads to maintain the big picture, and assigning an extra person to handle non-SAR tasks. A prevalent view is that good staff can multi-task; however, humans can only attend to one task at a time.

1.7. The following list indicates some types of remedial actions that the U.S. has taken or has planned consequential to the studies indicated above:

a) Include some civilian RCC staffing
b) Establish an RCC Standardization Team
c) Standardize common qualification, planning and decision-making processes
d) Standardize SAR checklists
e) Improve the RCC personnel selection process
f) Identify and centralize specialized system skills that require frequent practice
g) Increase the grade levels of enlisted and officer military staff
h) Increase the RCC staffing per watch position
i) Reduce watches from 24 hours to 12 hours
j) Make reference materials available online
k) Revise SAR School class schedule so new staff can attend prior to reporting to the RCC
l) Increase SAR School instructor staff
m) Revise SAR School curriculum to account for additional decision-making skills
n) Develop standard job aids for SAR mission coordinators (SMCs)

o) Develop web-based search planning training to enable 24/7 practice and refresher training
p) Limit the number of active SAR cases worked by a single person to two
q) Provide assistance with active cases at night between 0200-0600 hours
r) Make staff available to augment the watch during times of high operational tempo

1.8. The studies have also led to creation of an integrated distress response communications system called "Rescue 21" to modernize the entire coastal communications infrastructure, and the SAR School curriculum is being revised to account for this new technology.

1.9. A Standardization Team has been established (as an extension of our National SAR School) that visits every RCC and RSC every 18 months to ensure that standard policies and procedures are being followed and to test the search planning knowledge and skills of the RCC staff.

2. **Analysis**

2.1. The following paragraphs based on the studies indicated above (especially the Benchmarking Study) discuss some RCC practices that contribute to optimal proficiency, professionalism and accomplishment of the SAR mission.

2.2. *Optimal RCC staffing seems to be 7 + 1 per watch position.* At a minimum, 6 + 1 is warranted if 8 or 12-hour watches are stood. This issue is independent of the number of watch positions needed; both must be adequate. The term "+1" indicates a supervisor available to assist the watch during surge operations. Based on workload assessments conducted by the U.S. Coast Guard Research and Development Center, an RCC with only two watch positions should have 7 + 1 (or at least 6 + 1) staffing for both positions, except that an RCC with a low caseload might be able to share a supervisor between two watch positions with comparable duties. If staffing is lower than this, say 5 + 1, then the RCC staff should definitely not have any non-SAR or extra administrative duties assigned. Four of the six countries participating in the Benchmarking Study have 7 + 1 staffing standards. Staffing should be such that ample time off watch can be provided for leave, training, sickness, etc.

2.3. *RCCs should be staffed so that no person stands more than a 12-hour watch.* Longer watches lead to fatigue and degraded ability to perform SAR duties. All of the RCCs in the Benchmarking Study stand either 8 or 12-hour watches with 2 or 3 staff on duty at all times.

2.4. *Typical initial RCC formal training should be two months or more, and initial on-the-job training should be 7 months or more.* These durations were the averages for the six RCCs involved in the Benchmarking Study. Many countries provide all or part of their formal SAR training either by sending RCC staff to training institutions in other countries, or by using graduates of such schools to train other staff. The needed formal training may vary with relevant experience levels of new staff, and on-the-job training may be longer if RCC staff also performs primary duties in addition to SAR. One to three weeks of formal training is typically devoted to communications, with three weeks provided for RCCs that perform their own communications watches. Note that hiring of master mariners or air traffic controllers as RCC staff is a common practice of the RCCs of the six countries previously mentioned, and the average RCC experience level is ten years.

2.5. *SAR training should include several days of simulations and exercises.* Ideal facilities for these will include full-scale mock-ups of an actual RCC facility and computers for each person in the classroom. Students usually consider simulations and exercises to be the most effective and meaningful portions of a course. Computers at desks should be used to enable students to practice skills, as they would have to on watch, as soon as they are taught. RCC mock-ups should include real equipment as much as possible.

2.6. *Provisions should be made for recurrent training and re-certification of RCC staff.* Time must be provided to practice SAR proficiency skills. Adequate staffing enables some personnel to receive refresher training outside of their normal watch. Web-based training modules can be used at any time as an extension of SAR training institutions. Such training should keep the staff proficient in determining drift and in use of environmental data, and can include interactivity, immediate feedback, frequently asked questions, practice exercises, and threaded discussions. Annual SAR proficiency tests that include written exams and use of search planning software help with maintenance of important search planning proficiency, which is a technical and fleeting skill. Solving lengthy SAR simulation problems on watch may contribute to fatigue that could affect performance later on watch for an actual SAR case. An RCC Halifax risk-based work review concluded that generally 25% of an SMC's time is required for skill maintenance and updating.

2.7. *Make SAR the only mission of an RCC or RSC.* RCC and RSC staff should not be overburdened with non-SAR and administrative tasks that reduce their vigilance to the SAR mission. At a minimum, an appropriate number of the RCC staff should be SAR experts, not multi-mission managers. For the obvious reason, RCC personnel need to be true SAR professionals, not just fairly good at handling a variety of missions.

2.8. *Steps should be taken to help maintain vigilance and proficiency on communications watches.* Vigilance is the ability to detect, say, a potential distress call out of radio background chatter or out of a large volume of non-distress traffic. Studies have shown that vigilance begins to degrade after only 20 minutes on a radio watch and declines with fatigue, performance of additional unrelated tasks, decrease in the signal-to-noise ratio, low light conditions, and as more channels or antennae sites are monitored.

2.9. Distress call watches should normally be limited to two hours. A person coordinating a SAR case should not also be responsible for maintaining a communications watch, or for answering non-SAR related phone calls during high tempo operations.

2.10. Background noise of 70 dB is disruptive to conversation and levels above 80dB seriously degrade concentration; use of headsets instead of loudspeakers and a sound-absorbing environment can help reduce noise.

2.11. Attempting to work during a normal sleep period degrades performance. Distress calls are more likely to be missed during the period from 0200-0600 when people are most challenged to stay alert; more rest outside this time or more assistance during this time may help.

2.12. Special diligence should be exercised when new equipment is introduced to ensure that use of the equipment is thoroughly understood.

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