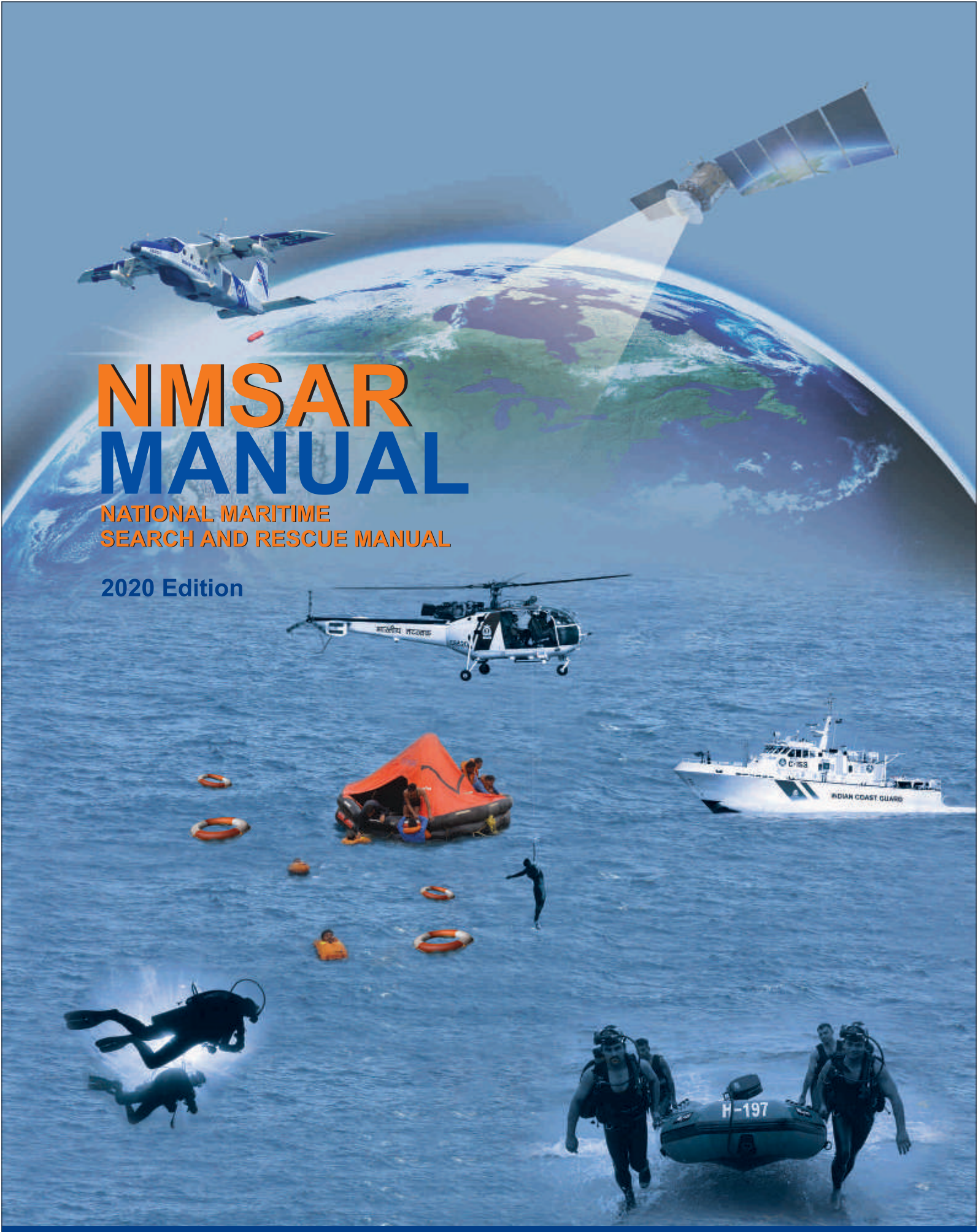

NMSAR MANUAL

NATIONAL MARITIME SEARCH AND RESCUE MANUAL

2020 Edition

NATIONAL MARITIME SEARCH AND RESCUE BOARD

A Publication by

NATIONAL MARITIME SEARCH AND RESCUE BOARD

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PREFACE

1. Maritime Search and Rescue (M-SAR) continues to remain a challenging task despite all the technological advancements. The Indian Coast Guard (ICG) has the overall responsibility for coordinating as well as execution of M-SAR responsibilities in the Indian Search and Rescue Region (ISRR) extending to 4.6 million square kilometres. Given the multiplicity of stakeholders vis-à-vis vast area of responsibility, adherence to best SAR practices, resource pooling, efficient and coordinated approach besides capacity enhancement, will be the key to success.

2. The National Maritime Search and Rescue (NMSAR) Manual is the standard reference document and promulgates the agreed methods of coordination through which M-SAR operations are conducted within India. The Manual is used by all seafarers and those participating in M-SAR operations to supplement the International Aeronautical and Maritime Search and Rescue Manual (IAMSAR). The Manual aims to maximise the efficiency and appropriateness of the organisation of maritime SAR services and provide sufficient information about maritime SAR tasks, structure, planning, coordination, communication systems, coordination centre's duties and cooperation related to SAR at sea.

3. The new edition of NMSAR Manual-2020 is consistent with the relevant International Conventions to which India is a party. It has been developed with due regard to the provisions of the latest editions of International Aviation and Maritime Search and Rescue Manual (IAMSAR). The manual is supplemented by various legal, informative and instructional documents used within and between organisations concerned with M-SAR. This edition also edifices new advancements in M-SAR domain viz. Space Based SAR including MEOSAR.

4. In the dynamic maritime domain, changes are inevitable and the processes are dynamic. Therefore, any requirement of iteration be felt by any agency or organisation, the same may be forwarded to the National M-SAR Board Secretariat, Coast Guard Headquarters, New Delhi. Additional M-SAR policies and procedures specific to the individual agencies should be promulgated by the respective agencies as a separate addendum, with a copy to this office, for promulgation to all concerned.

5. This Manual repeals the National Maritime Search and Rescue Manual 2010.

(K Natarajan)
Director General
Chairman, NMSAR Board
Indian Coast Guard
03 Sep 2020

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Appendices

Abbreviations and Acronyms

ABBREVIATIONS AND ACRONYMS

A	Search Area
AAI	Airport Authority of India
A/C	Aircraft
ACC	Area Control Centre
ACO	Aircraft Coordinator
ADS-B	Automatic Dependent Surveillance - Broadcast
ADT	Autonomous Distress Tracking
AES	Aeronautical Earth Station
AFN	Aeronautical Fixed Network
AFTN	Aeronautical Fixed Telecommunication Network
AIP	Aeronautical Information Publication
AIS	Automatic Identification System
AIS-MOB	Automatic Identification System-Man Overboard
AIS-SART	Automatic Identification System-Search & Rescue Transponder
AM	Amplitude Modulation
ANS	Air Navigation Services
AMVER	Automated Mutual Assistance Vessel Rescue
ARCC	Air Rescue Co-ordination Centre
ATC	Air Traffic Control

ATS	Air Traffic Services
ALRS	Admiralty List of Radio Signals
C	Coverage Factor
CES	Coast Earth Station
CLS	Creeping Line Search
CPR	Cardio Pulmonary Resuscitation
CRS	Coast Radio Station
C/S	Call Sign
CSP	Commence Search Point
CW	Continuous Wave
D	Total drift
DAT	Distress Alert Transmitter
DF	Direction Finder
DME	Distance Measuring Equipment
DMB	Datum Marker Buoy
DR	Deviation Report/ Dead Reckoning
DSC	Digital Selective Calling
ECDIS	Electronic Chart Display and Information System
EGC	Enhanced Group Calling
ELT	Emergency Locator Transmitter
ENR	Entry Report

EPIRB	Emergency Position Indicating Radio Beacon
ETA	Estimated Time of Arrival
ETD	Estimated Time of Departure
EXR	Exit Report
°F	Degree Fahrenheit
FIC	Flight Information Centre
FIR	Flight Information Region
FLIR	Forward Looking Infrared
FM	Frequency Modulation
FR	Final Arrival Report
F/V	Fishing Vessel
GADSS	Global Aeronautical Distress Safety System
GAGAN	GPS Aided Geo Augmented Navigation System
GHz	Giga Hertz
GMDSS	Global Maritime Distress Safety System
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
GS	Ground Speed
GT	Gross Tonnage
IBRD	International 406 Mhz Beacon Registration Database
ICAO	International Civil Aviation Organisation

ICS	Incident Command System
IFR	Instrument Flight Rules
IMAC	Information Management and Analysis Centre
IMC	Instrument Meteorological Conditions
IMD	Indian Meteorological Department
IMO	International Maritime Organisation
IMSO	International Mobile Satellite Organisation
INMARSAT	An IMO Recognised Mobile Satellite Service
INTERCO	International Code of Signals
ISRR	Indian Search and Rescue Region
ITU	International Telecommunication Union
JRCC	Joint (Aeronautical and Maritime) Rescue Coordination Centre
kHz	Kilo Hertz
LCB	Line of Constant Bearing
LEOLUT	Low Earth Orbiting Local User Terminal
LEOSAR	Low Earth Orbiting Search and Rescue
LES	Land Earth Station
LKP	Last Known Position
LPC	Last Port of Call
LRIT	Long Range Identification and Tracking
LUT	Local User Terminal

LW	Leeway
M/V	Merchant Vessel
MCC	Mission Control Centre
MEDEVAC	Medical Evacuation
MEDICO	Medical Advice, By Radio
MF	Medium Frequency
MHz	Mega Hertz
MID	Maritime Identification Digit
MMSI	Maritime Mobile Service Identity
MOB	Man Overboard
MRCC	Maritime Rescue Coordination Centre
MRO	Mass Rescue Operation
MRSC	Maritime Rescue Sub Centre
MSI	Maritime Safety Information
MTTSI	Minimum Time -To – Scene Intercept
NBDP	Narrow Band Direct Printing
NC³I	National Command, Control, Communication & Intelligence
NM	Nautical Mile
NOTAM	Notice to Airmen
NPC	Next Port of Call
OS	Counter Search

OSC	On Scene Coordinator
PANS ATM	Procedure for Air Navigation Services- Air Traffic Management
PIF	Pilot Information File
PIW	Person in Water
PLB	Personal Locator Beacon
POB	Persons On Board
POC	Probability of Containment
POD	Probability of Detection
POS	Possibility of Search
PR	Position Report
PS	Parallel Sweep Search
PRECOM	Preliminary Communication
R	Search Radius
RANP	Regional Air Navigation Plan
RCC	Rescue Coordination Centre
ROC	Regional Operating Centre
ROS	Remote Operating Station
RSC	Rescue Sub Centre
RTF	Radio Telephony
RPAS	Remotely Piloted Aircraft System
S/V	Sailing Vessel

SAC	Special Access Code
SAR	Search and Rescue
SARSAT	Search and Rescue Satellite Aided Tracking
SARAT	Search and Rescue Aid Tool
SART	Search and Rescue Transponder
SBAS	Space Based Augmentation System
SC	Search and Rescue Coordinator
SCCs	SAR Coordinating Committees
SDP	Search and Rescue Data Provider
SES	Ship Earth Station
SITREP	Situation Report
SLDMB	Self -Locating Datum Marker Buoy
SMC	Search and Rescue Mission Coordinator
SMCP	Standard Marine Communication Phrases
SOLAS	Safety of Life at Sea
SP	Sailing Plan
SPOC	Search and Rescue Point of Contact
SRR	Search and Rescue Region
SRU	Search and Rescue Unit
SS	Expanding Square Search
SSB	Single Side Band

SURPIC	Surface Picture
TAS	True Air Speed
TCAS	Traffic Collision Avoidance System
TS	Track Line Search
TSR	Track Line Search and Return
TTT	Total Trip Time
TMAS	Tele Medicine Assistance Services
UHF	Ultra High Frequency
UTC	Co-ordinated Universal Time
VFR	Visual Flight Rules
VHF	Very High Frequency
VMC	Visual Meteorological Condition
VS	Sector Search
W	Sweep Width
WWNWS	World Wide Navigational Warning Service
Z	Time Zone Identifier

Glossary of Terms

GLOSSARY OF TERMS

Aircraft Coordinator (AC)	A person who coordinates the involvement of multiple aircraft in SAR operations.
Aircraft Operator (ACO)	A person, organisation or enterprise engaged in or offering to engage in an aircraft operation." This means (i) a person or company who, for compensation or hire, participates in the carriage by air transport of persons or property, or other aerial-work services using aircraft; commonly an "airline" or other type of air transport or services company, and (ii) a person who owns or shares ownership of a general aviation aircraft that is used by them but not for commercial air transport purposes.
Aircraft Tracking	A process, established by the aircraft operator, that maintains and updates, at standardized intervals, a ground-based record of the four dimensional position (latitude, longitude, altitude and time stamp) of individual aircraft in flight. (ICAO Annex 6)
Air Traffic Service	A generic term meaning variously, flight information service, alerting service, air traffic advisory service, air traffic control service (area control service, approach control service or aerodrome control service).
Alert Phase	A situation wherein apprehension exists as to the safety of an aircraft or marine vessel, and of the persons onboard.
Alerting Post	Any facility intended to serve as an intermediary between a person reporting an emergency and a rescue coordination centre or rescue sub centre.
Awareness stage	A period during which the SAR system becomes aware of an actual or potential incident.

Autonomous Distress Tracking	The capability to transmit information from which the position of an aircraft in distress can be determined at least once every minute and which is resilient to failures of the aircraft's electrical power, navigation and communication systems.
Coast Earth Station	Maritime name for an INMARSAT shore-based station linking ship earth stations with terrestrial communication networks.
Commence Search Point	Point normally specified by the SMC where a SAR facility is to begin its search pattern.
Conclusion stage	A period during a SAR incident when SAR facilities return to their regular location and prepare for another mission.
Distress Alert Transmitter(DAT)	Distress Alert Transmitter is used to transmit emergency conditions and position location to a central hub station via UHF transponder of INSAT for rescue operation.
Datum	A geographic point, line, or area used as a reference in search planning.
Digital Selective Calling (DSC)	A technique using digital codes which enables a radio station to establish contact with, and transfer information to another station or group of stations.
Distress Phase	A situation wherein there is reasonable certainty that a vessel or other craft, including aircraft or a person, is threatened by grave and imminent danger and requires immediate assistance.
Ditching	The forced landing of an aircraft on water.
Drift	The movement of a search object caused by environmental forces.
Emergency Phase	A generic term meaning, as the case may be, uncertainty phase, alert phase, or distress phase.

False Alert	Distress alert received from any source, including communications equipment intended for alerting, when no distress situation actually exists, and a notification of distress should not have resulted.
Global Maritime Distress And Safety System (GMDSS)	A global communications service based upon automated systems, both satellite-based and terrestrial, to provide distress alerting and promulgation of maritime safety information for mariners.
Hypothermia	Abnormal lowering of internal body temperature (heat loss) from exposure to cold air, wind, or water.
Initial Action Stage	A period during which preliminary action is taken to alert SAR facilities and obtain amplifying information.
IMO Recognised Mobile Satellite Service (INMARSAT)	Distress and safety communication service provided by a mobile satellite service recognised by the International Maritime Organisation (IMO), for use in the GMDSS.
Instrument Flight Rules (IFR)	Rules governing the procedures for conducting instrument flight. Also a term used by pilots and controllers to indicate type of flight plan.
Knot	A unit of speed equal to one nautical mile per hour.
Last Known Position (LKP)	Last witnessed, reported, or computed DR position of a distressed craft.
Leeway	The movement of a search object through water caused by winds blowing against exposed surfaces.
Local User Terminal (LUT)	An earth receiving station that receives beacon signals relayed by COSPAS-SARSAT satellites, processes them to determine the location of the beacon, and forwards the signals.
Maritime Rescue Coordination Centre (MRCC)	A unit responsible for promoting efficient organisation of search and rescue services and for coordinating the conduct of search and rescue operations within a search and rescue region.

Maritime Rescue Sub Centre (MRSC)	A unit subordinate to a rescue coordination centre/ sub centre, established to complement the latter according to particular provisions of the responsible authorities.
MAYDAY	The international radiotelephony distress signal, repeated three times.
MEDEVAC	Evacuation of a person for medical reasons.
MEDICO	Medical advice. Exchange of medical information and recommended treatment for sick or injured persons where treatment cannot be administered directly by prescribing medical personnel.
Mission Control Centre (MCC)	Part of the COSPAS-SARSAT system that accepts alert messages from the local user terminal(s) and other mission control centres to distribute to the appropriate rescue co-ordination centres or other search and rescue points of contact.
Mobile-Satellite Service	A radio communication service between mobile earth stations and one or more space stations, or between space stations used by this service; or between mobile earth stations by means of one or more space stations.
Narrow Band Direct Printing (NBDP)	Automated telegraphy, as used by the NAVTEX system and telex-over-radio.
NAVAREA	One of 16 areas into which the world's oceans are divided by the International Maritime Organization for dissemination of navigation and meteorological warnings.
NAVTEX	Telegraphy system for transmission of maritime safety information, navigation and meteorological warnings and urgent information to ships.
On Scene	The search area or the actual distress site.

On Scene Coordinator (OSC)	A person designated to co-ordinate search and rescue operations within a specified area.
On Scene Endurance	The amount of time a facility may spend at the scene engaged in search and rescue activities.
Operations Stage	A period during a SAR incident when SAR facilities proceed to the scene, conduct search, rescue survivors, assist distressed craft, provide emergency care for survivors, and deliver survivors to a suitable facility.
Overdue	A situation where a craft has failed to arrive at its intended destination when expected and remains missing.
PAN-PAN	The international radiotelephony urgency signal. When repeated three times, indicates uncertainty or alert, followed by nature of urgency.
Personal Locator Beacon (PLB)	Personal radio distress beacon for alerting and transmitting homing signals.
Pilot in command	The pilot responsible for operation and safety of aircraft during flight time.
Planning Stage	A period during a SAR incident when an effective plan of operations is developed.
Position	A geographical location normally expressed in minutes of latitude and longitude.
Rescue	An operation to retrieve persons in distress, provide for their initial medical or other needs, and deliver them to a place of safety.
Safety Net	Communications service provided via INMARSAT for promulgation of maritime safety information, including shore-to-ship relays of distress alerts and communications for search and rescue coordination.

Search	An operation, normally coordinated by a rescue coordination centre or rescue sub-center, using available personnel and facilities to locate persons in distress.
Search Action Plan	Message, normally developed by the SMC, for passing instructions to SAR facilities and agencies participating in a SAR mission.
Search and Rescue Case	Any potential or actual distress about which a facility opens a documentary file, whether or not SAR resources are dispatched.
Search and Rescue Coordinator	One or more persons or agencies within an administration with overall responsibility for establishing and providing SAR services, and ensuring that planning for those services is properly coordinated.
Search and Rescue Data Providers	A source for a rescue coordination centre to contact to obtain data to support search and rescue operations, including emergency information from communication equipment registration databases, ship reporting systems, and environmental data systems (e.g., weather or sea current).
Search and Rescue facility	Any mobile resource, including designated search and rescue units, used to conduct search and rescue operations.
Search and Rescue incident	Any situation requiring notification and alerting of the SAR system and which may require SAR operations.
Search and Rescue Mission Coordinator (SMC)	The official temporarily assigned to coordinate response to an actual or apparent distress situation.
Search and Rescue Plan	A general term used to describe documents which exist at all levels of the national and international search and rescue structure to describe goals, arrangements, and procedures which support the provision of search and rescue services.

SAR Point of Contact (SPOC)	A point of contact for SAR, designated by the national administration, that is responsible for receiving distress alert information and providing the information to appropriate SAR authorities. In India, MRCC Mumbai is designated as the SPOC.
Search and Rescue Region (SRR)	An area of defined dimensions, associated with rescue coordination centre within which search and rescue services are provided.
Search and Rescue Stage	Typical steps in the orderly progression of SAR missions. These are normally Awareness, Initial Action, Planning, Operations, and Mission Conclusion.
Search and Rescue Unit (SRU)	A unit composed of trained personnel and provided with equipment suitable for the expeditious conduct of search and rescue operations.
Search Area	The area, determined by the search planner, that is to be searched. This area may be sub-divided into search sub areas for the purpose of assigning specific responsibilities to the available search facilities.
Search Object	A ship, aircraft, or other craft missing or in distress or survivors or related search objects or evidence for which search is conducted.
Search Pattern	A track line or procedure assigned to an SRU for searching a specified area.
Situation Reports (SITREP)	Reports from the OSC to the SMC or the SMC to interested agencies, to keep them informed of on scene conditions and mission progress.
SURPIC (Surface Picture)	A list or graphic display from a ship reporting system of information about vessels in the vicinity of a distress situation that may be called upon to render assistance.

Sweep width (W)	A measure of the effectiveness with which a particular sensor can detect a particular object under specific environmental conditions.
Track spacing (S)	The distance between adjacent parallel search tracks.
Triage	Process of sorting survivors according to medical condition and assigning them priorities for emergency care, treatment and evacuation.
Uncertainty Phase	A situation wherein doubt exists as to the safety of an aircraft or a marine vessel, and of the persons onboard.

CHAPTER 1

SCOPE AND PURPOSE

CHAPTER - 1

SCOPE AND PURPOSE

1.1 Introduction

1.1.1 Every country recognises the importance of saving lives and property at sea and the need to be directly involved in rendering maritime search and rescue services to the persons in distress. With a focus on the humanitarian nature of the work, the search and rescue if planned well, will certainly help to prevent and cope with distress situations and facilitate coordination on actual contingency and distress situations. To work towards the same, the use of available resources within the service and also from other resources in the country will be essential to assist in saving lives and also in minimising damage to the property in potential or actual distress.

1.1.2 The development of shipping industry all over the world has resulted in large scale merchant ship traffic between the seaports. A large volume of cargo, crude oil, edible oil, mineral ores, hazardous chemicals and explosives, freight containers and various other items are being transported by the ships across the oceans. This includes transportation of the cargo from and to the countries located in the Indian sub-continent, Arabian and South East Asian countries as well as from the countries located in the West to the East and Far East through the Arabian Sea, Bay of Bengal and the Indian Ocean. Therefore, the sea area around India used for transportation needs is getting busier every day and multiple shipping lanes carrying 30 percent of world cargo undertake passage within the Indian SRR which increases the potential risks to their safe operations.

1.1.3 In addition, the maritime zones of India are exploited to our economic advantage in the form of offshore activities through artificial islands. Various support vessels, barges, scientific study vessels, small transportation vessels are operating in increasing numbers in all weather conditions. In addition, our country's EEZ has vast potential of living resources which are exploited by the fishermen who operate various types of vessels which are prone to high risks and during emergency, such vessels and platforms need immediate assistance

for their safety and security. The distress alert can be activated by any of the vessels in the area and Search and Rescue facilities are to be provided at the earliest.

1.1.4 Further, more and more people use sea areas for recreation and leisure and providing safety to such users require suitable SAR preventive measures which needed coordination at all levels.

1.2 Aim

1.2.1 The aim of this manual is to assist those who are responsible for establishing, managing, supporting/ facilitating and conducting SAR operations to understand the following:-

(a) Functions and importance of SAR services.

(b) Components and support infrastructure essential for SAR.

(c) Training needed to co-ordinate, conduct and support SAR operations.

(d) Communications functions and requirements for SAR.

(e) Coordinating functions for ensuring efficiency by sharing resources.

(f) Basic principles of managing and improving SAR services to ensure success.

1.3 Objectives

1.3.1 In order to provide expeditious and effective SAR services as per the National Search and Rescue Plan as provided in **Appendix A**, the following objectives are to be considered:-

(a) Provide SAR services to meet the domestic and international contingencies in Indian SRR.

(b) Support lifesaving provisions of International Conventions on SOLAS and Maritime Search and Rescue of IMO and Convention on International Civil Aviation of ICAO and other International/Regional agreements to which India is a signatory.

(c) Provide overall plan for coordination of SAR operations, effective use of available resources, mutual assistance and efforts to improve such cooperation in Indian SRR.

(d) Utilise available resources for SAR contingencies into cooperative network for greater protection of life and property so as to ensure greater efficiency and economy.

(e) To achieve humanitarian, national and international SAR related obligations in Indian SRR by efficient coordination.

1.4 Benefits of SAR Services

1.4.1 Besides reduction of loss to life and suffering, by providing rescue services, the National SAR Coordinating Authority and the National SAR Board concern and involvement with SAR may offer other advantages, such as the following:-

(a) A safer and more secure environment for aviation and maritime related industries, recreation, tourism, travel and overall economic development.

(b) Availability of SAR resources provides initial response and relief capabilities critical to save lives in distress.

(c) SAR provides an excellent means for promoting co-operation and communication among States and between organisations at local, national and international levels.

(d) The value of property, which can be saved in association with SAR activities, can be high and provide additional justification for SAR services.

(e) Well performed SAR operations can provide positive publicity on successful completion.

(f) The rescue of fishermen in distress by proactive measures and involving all SAR agencies improves the faith on SAR system and will result in better exploitation of marine resources.

1.5 Responsibilities for Maritime SAR under International Conventions

The International Convention on the Law of the Sea 1982, Article 98(2) states:

"Every coastal state shall promote the establishment, operation and maintenance of an adequate and effective search and rescue service regarding safety on and over the sea and, where circumstances so require, by way of mutual regional arrangements co-operate with neighbouring States for this purpose".

1.5.1 **Maritime arrangements** The International Convention for the Safety of Life at Sea (SOLAS) is generally regarded as the most important of all international treaties concerning the safety of merchant ships. Its first version was adopted in 1914. Chapters with specific information relevant to SAR include:-

(a) **Chapter I – General Provisions Part A** discuss the application of the SOLAS Convention and provides some key definitions. Unless expressly provided otherwise within SOLAS, it applies only to ships engaged on international voyages. The classes of ships to which each chapter applies are more precisely defined in each chapter. The SOLAS Convention applies to ships and may not apply to the term "vessels" which has a different meaning under IMO regulations.

(b) **Chapter III –** Life-saving appliances and arrangements discusses lifeboats, liferafts and rescue boats. Passenger ships and cargo ships often do not have the same requirements. Regulation 6, Communications, discusses SAR locating devices which may be carried on survival craft.

(c) **Chapter IV – Radio communications** covers all forms of maritime communications (to include SAR alerting, coordinating, locating signals) and is the basis for IMO's Global Maritime Distress and Safety System (GMDSS).

(d) **Chapter V – Safety of Navigation**, with certain exceptions listed, applies to all ships on all voyages. "All ships" is defined to mean any ship, vessel or craft irrespective of type and purpose. Regulation 3 defines search and rescue service. Other regulations of particular interest to SAR include Regulation 7 Search and Rescue services, Regulation 19-1 Long-range identification and tracking of ships (information is free of charge for SAR services of Contracting Governments), Regulation 31, International Code of Signals and IAMSAR Manual, and Regulation 33, Distress situations: obligations and procedures (for the master of a ship at sea and also Contracting Governments).

1.5.2 The International Convention on Maritime Search and Rescue, 1979, known as the **SAR Convention 1979**, is designed to provide a framework for carrying out search and rescue operations following accidents at sea. The SAR Convention, as amended, clarifies the responsibilities of Governments and puts emphasis on the regional organisational approach and coordination between maritime and aeronautical operations.

1.5.3 Articles I to VIII of the SAR Convention 1979 discuss the general obligations of Parties under the Convention, and the obligations or rights of vessels provided for in other international instruments. The chapters 1-5 and further resolutions have a bearing on the management of emergency incidents involving persons in distress at sea. The establishment of National SAR Board as the competent national authority for addressing SAR issues, the development of SAR plan and SAR Manual, the demarcation of SRR limits, the establishment of three MRCCs, the GMDSS infrastructure at all MRCC/ MRSCs and onboard CG ships/ aircraft, the establishment of Ship Reporting System (INDSAR), the nomination of SRUs, the establishment of SAR training, certification and conduct of SAR exercise by the Indian Coast Guard is in compliance to the requirements of the SAR 79 Convention by the Government of India.

1.6 Bilateral and Multilateral Agreements for Regional SAR System

1.6.1 IMO advocates that neighbouring maritime states may create a regional SAR system by means of bilateral or multilateral understandings (e.g., plans and agreements) to co-operatively provide SAR services in a specific geographic area. A regional approach for providing SAR services has many advantages both to the beneficiaries of SAR services and to the States which provide those services.

1.6.2 The agreements will also facilitate smooth coordination of SAR services and exchange of information with respect to flag state vessels meeting with any contingencies while operating in other State's SRR. Duplication of effort and facilities can be avoided, more uniform services throughout the region can be provided, and proficient SAR services are possible even near States with limited resources, if a regional approach is taken to providing and improving SAR services.

1.6.3 Similar advantages are afforded by involving multiple agencies within a State in a co-operative SAR effort. The National maritime SAR Plan 2013 is made accordingly for undertaking SAR operations in the Indian SRR through cooperative efforts with shared resources.

CHAPTER 2

NATIONAL MARITIME SAR ORGANISATION

CHAPTER - 2

NATIONAL MARITIME SAR ORGANISATION

2.1 Indian Coast Guard and SAR Responsibilities

2.1.1 Indian Coast Guard is an Armed Force of the Indian Union and has been entrusted with the duties of providing search and rescue assistance to mariners and protection to fishermen including assistance to them at sea while in distress and safety of life and property at sea vide sections 14(2) (b) and 14 (2) (f) respectively of Coast Guard Act 1978.

2.1.2 Related to SAR, the Coast Guard charter of duties includes:-

(a) Providing protection to fishermen including assistance to them at sea when in distress.

(b) Safety of life and property at sea.

(c) Search and Rescue at sea.

(d) Enforcement of Maritime laws at sea.

2.2 SAR Definition

2.2.1 Search and Rescue comprises the search for, and the provision of aid to, persons, ships or other craft, which are, or are feared to be, in distress or imminent danger. The Indian Coast Guard is responsible for coordinating Search and Rescue in the Indian Maritime Search and Rescue Region. With a focus on the humanitarian nature of work, the Indian Coast Guard cooperates with other agencies to develop and sponsor vital standards and recommendations to provide all types of assistance to the maritime distress situation and coordination on a daily basis.

2.3 Maritime Search and Rescue - CG Mission

2.3.1 The mission of the Indian Coast Guard Maritime Search and Rescue (SAR) Programme is *"to save and protect lives in the maritime environment of the Indian Search and Rescue Region"*.

2.3.2 To fulfill the mission, the Coast Guard objectives are to:-

(a) Make all efforts to ensure maximum saving of life.

(b) Minimise the loss of life, injury, property damage and risk to the environment.

(c) Maintain highest professional standards.

(d) Provide national leadership and effective SAR Program Management.

(e) Provide international SAR leadership.

(f) Maximise SAR system efficiency through innovation.

(g) Increase awareness of SAR Program.

(h) Foster co-operative SAR agreements.

(j) Provide humanitarian aid and civil assistance wherever possible.

(k) Detailed contingency planning.

(l) Identification, training and review of resources.

(m) Improve communication capabilities.

(n) Reduce reaction time of ICG resources by appropriate basing, equipping and staffing.

(p) Review and improve SAR coordination through interaction with resource agencies.

(q) Encourage Ship Reporting Procedures for the purpose of M-SAR.

2.3.3 These objectives will help to provide an effective SAR service for all those at risk in Indian SRR.

2.4 National Maritime SAR Board

2.4.1 To coordinate national maritime SAR objectives in accordance to the provisions of the international conventions, the National Search and Rescue Board was constituted vide Ministry of Shipping, GoI, resolution number SW- MIC/27/77/MD/AG dated 28 Jan 2002 with the Director General, Indian Coast Guard as the National Maritime Search and Rescue Coordinating Authority (NMSARCA). This Board was formed subsequent to India's accession to SAR 79 Convention in May 2002. The Constitution of the national

SAR Board is as follows:-

(a)	Director General of Indian Coast Guard	Chairman
(b)	Representative of DG (Shipping)	Member
(c)	Representative of Indian Navy	Member
(d)	Representative of Indian Air Force	Member
(e)	Chief Hydrographer, Government of India	Member
(f)	Representative of Airports Authority of India	Member
(g)	Representative of Department of Telecommunication	Member
(h)	Representative of Department of Space	Member
(j)	Representative of Central Board of Customs and Excise	Member
(k)	Representative of Meteorological Department	Member
(l)	Representative of Major Ports Member (Nominated by Ministry of Shipping)	Member
(m)	Representative of Shipping Industry Member (Nominated by Ministry of Shipping)	Member
(n)	Representatives of all Coastal States & UTs	Members
(p)	Representative of Fishing Community (Nominated Member by Ministry of Fisheries, Animal Husbandry and Dairy)	Member
(q)	Representative of Sailing Vessels Operators (Nominated by Ministry of Shipping)	Member
(r)	Representative of Directorate of Civil Aviation (Nominated by Ministry of Shipping)	Member
(s)	Representative of Immigration (Nominated by Ministry of Shipping)	Member
(t)	Representative of Ministry of Shipping	Member
(u)	Representative of Ministry of Fisheries, Animal Husbandry and Dairy	Member
(v)	Representative from INCOIS	Member

2.5 Terms and Reference of National Maritime SAR Board

2.5.1 The terms and reference of National Maritime SAR Board are as follows:-

(a) Formulation and promulgation of National SAR plan including its review and updating.

(b) Define functions to be performed by participating agencies.

(c) Coordinate measures to be adapted by participating agencies and formulation of contingency plan.

(d) Attending to matters relating to SAR as per IMO requirements in consultation with Ministry of Shipping.

2.6 Resource Agencies

2.6.1 In addition to the resources available with Indian Coast Guard, being the National Maritime SAR Coordinator, the ships/ aircraft/ crafts/ shore based facilities with following agencies will also be requisitioned for carrying out SAR operations. These resources can be requisitioned by the SAR Mission Coordinator (SMC).

(a) Indian Navy.

(b) Indian Air Force.

(c) Port Authorities.

(d) Shipping Corporation of India.

(e) Director General Civil Aviation.

(t) States/ Central Fisheries Authorities.

(g) States/ Central Customs Authorities.

(h) Merchant Ships operating close to position of distress.

(J) Civil Authorities.

(k) Indian Meteorological Department.

(l) INMCC, Bangalore.

(m) Department of Telecommunications.

(n) DG (Shipping).

(p) NIOT.

(q) State Marine Police.

(r) National Disaster Response Force (NDRF).

(r) Other resources maintained by private companies where necessary.

2.7 Responsibilities of Resource Agencies

2.7.1 The ships/ aircraft/ crafts/ shore based facilities of the resource agencies are to assist and facilitate the coordinating MRCC and MRSC in accordance to the provisions of the National SAR Plan and National SAR manual. The agencies are to provide resources at their disposal to the SAR Mission Coordinator (SMC) till completion of SAR operation or on confirmation by the SAR Coordinator that requirement no longer exists.

2.8 Contact details of SAR Resource Agencies/ NMSAR Board Members

2.8.1 The Contact details of the Resource Agencies and NMSAR Board members for SAR requirements are placed at **Appendix B** and **Appendix C** respectively.

2.9 National Search and Rescue Plan

2.9.1 The Search and Rescue system in the Indian Search and Rescue Region is implemented by the National Search and Rescue Plan 2013 to enable greater protection to life and ensure efficient and effective SAR response to any distress situation occurring in the Indian SRR. The purpose of this plan is also to facilitate the development of international integrated and coordinated maritime SAR plan within Indian SRR. The National Maritime Search and Rescue Plan provides the general guidelines for the inter agency cooperation. This manual supplements the National SAR Plan by drawing the provisions of IAMSAR manuals and other treaty/ bilateral/ multilateral and policy provisions to effectively conduct SAR missions and for the activation of the components in stages as needed. The National Maritime SAR Plan 2013 is placed at **Appendix A**.

2.10 National SAR Manual

2.10.1 Every endeavour has been made to ensure that the application of the National Search and Rescue manual in Indian SRR does not conflict with the SAR responsibilities agreed to the Conventions on International Maritime Organisation pertaining to Maritime Search and Rescue and the Conventions on

International Civil Aviation Organisation (ICAO) or any other International Agencies. This manual is intended to provide guidelines and instructions to all participating agencies/ units for effective conduct of SAR operations.

2.10.2 No provision of National SAR manual and any other supporting plan is to be construed so as to contravene responsibilities and the authorities of any participant as defined by the guidelines or executive orders or international agreements or of established responsibilities of other agencies and organisation which assist persons and property in distress resulting from any incident.

2.11 SAR Coordinating Committee

2.11.1 An effective process for SAR coordination is the establishment and use of SAR Co-ordinating Committees (SCCs) comprising SAR system stakeholders. These can be established at SAR agency, national or regional level, and, ideally, at all three levels. SAR agency SCCs should deal with local operational SAR issues and have the ability to refer matters higher, if required. Committees established at a national level may consider strategic SAR policy matters and should have the ability to take matters to their respective governments for consideration. Regional SCCs should be able to refer SAR matters of a regional nature to their incorporated national committees for consideration.

2.11.2 The establishment of these SAR committees improve and support the SAR system in a number of ways, including:-

(a) Develop and recommend national strategic policy to their respective governments.

(b) Provide a standing forum for coordination of administrative and operational SAR matters.

(c) Develop plans, policies, positions, manuals, etc.

(d) Resolve cross-agency jurisdictional issues.

(e) Develop joint solutions for SAR matters of common concern.

(f) Assign and co-ordinate SAR responsibilities.

(g) Develop and implement SAR requirements and standards.

(h) Effectively use all available resources for SAR, including global, regional, national, private, commercial, and volunteer resources (such resources

may include advice, communications facilities and databases, ship reporting systems, training, SAR facilities, search planning expertise, technical assistance, foreign language assistance, medical or fueling facilities, regulatory support and others).

(j) Develop common equipment, facilities and procedures, as appropriate.

(k) Interface with other national and international organizations involved with emergency services.

(l) Promote close co-operation and co-ordination between civilian and military authorities and organizations for the provision of effective SAR services.

(m) Serve as a co-operative forum to exchange information and develop positions and policies of interest to more than one-member agency.

(n) Improve co-operation among aeronautical, maritime and land SAR communities.

(p) Determine ways to enhance overall effectiveness and efficiency of SAR services.

(q) Promote safety programmes to help citizens avoid or cope with distress situations.

(r) Develop contingency plans for use of SAR resources during disasters.

2.11.3 The National SAR Board shall establish a SCC for coordinating actions as listed in para 2.11.2. This provides the process for effective SAR co-operation and coordination. Participating organizations would include those directly involved with SAR and those in a supporting role.

2.11.4 It would be useful to establish regular conferences of representatives of departments and public and private concerns. This could gain the co-operation of those whose primary function is not SAR and would reach agreement on the respective roles to be performed by these facilities.

2.12 Search and Rescue Regions (SRR)

2.12.1 SRR is an area of defined dimensions associated with an MRCC within which SAR services are provided. The Regional Air Navigation Plans (RANPs) promulgated by lCAO depict aeronautical SRRs and global SAR Plan

promulgated by IMO, delineates Maritime SRR. The countries have agreed to accept SAR responsibility for an area, which is composed of one or more aeronautical SRRs. Any SAR facility within the SRR should respond to all distress situations whenever and wherever it is capable of doing so.

2.12.2 The purpose of establishing an SRR is to clearly define who has primary responsibility for coordinating responses to distress situations in every area of the world and to enable rapid distribution of distress alerts to the proper MRCC. It is also to ensure SAR services are provided at the earliest for the geographic area assumed by that country.

2.12.3 The maritime SRR is generally harmonised with aeronautical SRR in most areas, which therefore minimises confusion over which authority is to be alerted when a distress situation arises at and over a specific geographic position. Aeronautical SRRs often are aligned with Flight Information Regions (FIRs) for simplified notification, coordination and information sharing about aircraft emergencies and coordinate SAR aircraft and other air traffic operating within the FIR. It is also desired that the maritime and aeronautical search and rescue coordination centres should have effective interoperability and communication for efficient SAR coordination.

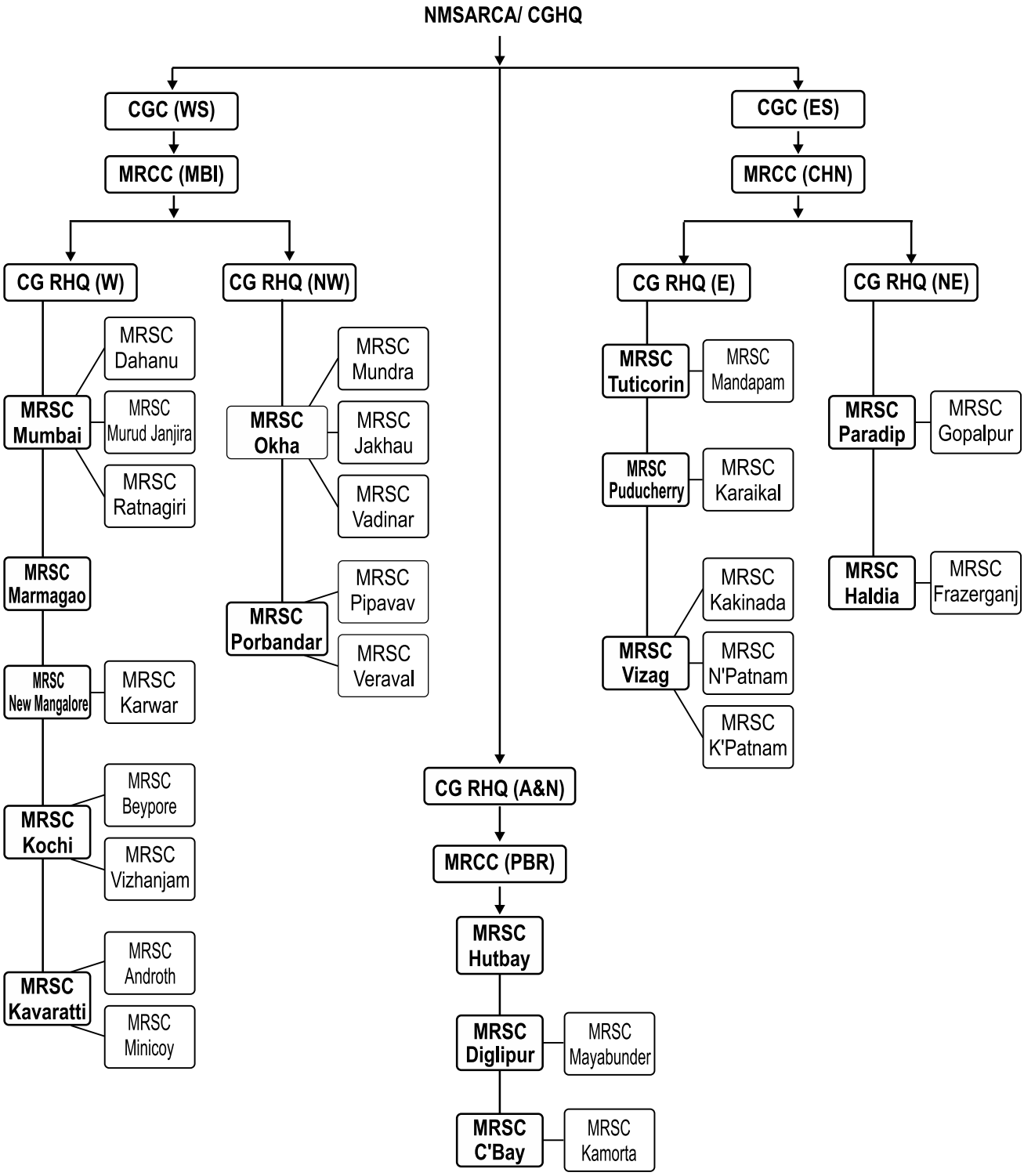
2.13 Indian SRR and SAR Organisation

2.13.1 On accession to the International Convention on Maritime Search and Rescue 1979, the Government of India has assumed the responsibility of providing SAR services in Indian SRR with Director General Indian Coast Guard designated as National Maritime SAR Coordinating Authority (NMSARCA). Three geographic areas/ regions are established with the Indian SRR for coordinating responses to both maritime and aviation related distress incidents. The SRR (West) covers the SAR operations in Western Seaboard. The SRR(East) covers Bay of Bengal including portions of Palk Bay and Gulf of Mannar. The SRR(A&N) covers the area adjacent to group of Andaman and Nicobar Islands.

2.13.2 There are three Maritime Rescue Coordination Centres (MRCCs) established to cater for three geographical SRRs. The MRCC located at Mumbai covers the entire western seaboard of Indian SRR. The eastern seaboard is covered by MRCC located at Chennai and MRCC Port Blair covers the Andaman and Nicobar sea areas.

2.14 Indian Coast Guard SAR Organisational Structure

2.14.1 The Indian Coast Guard SAR Organisational Structure with pictorial representation is placed as under :-



2.15 Maritime Rescue Coordination Centre in ISRR

2.15.1 The Maritime Rescue Coordination Centre (MRCC) is an operational facility responsible for promoting efficient organisation of SAR services, and for coordinating the conduct of SAR operation within the SRR. The MRCC only coordinates and does not necessarily provide SAR facilities in the applicable SRR. Aeronautical SAR responsibility is to be met by Airports Authority of India and the Aeronautical SAR coordination is performed from aeronautical RCC.

2.15.2 The coordinates of the Indian SRRs associated with the respective MRCCs are as follows:-

(a) **MRCC Mumbai area**. The Indian SRR (West) area covered by the MRCC Mumbai is defined by the line joining the following coordinates and IMBL with Pakistan:-

(i)	21 00 N 065 38 E	(ii)	12 00 N 063 00 E
(iii)	12 00 N 060 00 E	(iv)	06 00 S 060 00 E

(v) 06 00 S 068 00 E (vi) 00 00 S 068 00 E

(vii) 08 00 N 073 00 E (viii) 06 10 N 077 20 E

(ix) 08 08 N 077 20 E

(b) **MRCC Chennai**. The Indian SRR (East) area covered by the MRCC Chennai is defined by the line joining the following coordinates and IMBL:-

(i) 08 08 N 077 20 E (ii) 06 10 N 077 20 E

(iii) 06 00 N 078 00 E (iv) 10 00 N 080 00 E

(v) 10 00 N 082 00 E (vi) 07 15 N 088 30 E

(vii) 15 20 N 088 30 E (viii) Coastal border between India and Bangladesh.

(c) **MRCC Port Blair**. The Indian SRR (A&N) area covered by the MRCC Port Blair is defined by the line joining the following coordinates and IMBL:-

(i) Coastal border between India and Bangladesh (ii) 15 20 N 088 30 E

(iii) 07 15 N 088 30 E (iv) 06 00 N 092 00 E

(v) 06 00 N 097 32 E (vi) Northwards of position of serial (v) given above and covering the areas outside limits of the designated areas of other littoral countries.

2.16 Maritime Rescue Sub Centre (MRSC) in ISRR

2.16.1 In order to enable MRCCs exercise direct and effective control over SAR facilities in an area within its SRR, Maritime Rescue Sub Centres (MRSC) are established. This is so done wherein communication facilities in a portion of SRR are not adequate for closer coordination between MRCC and SAR facilities or where local control of SAR operations will be more effective.

2.16.2 In the Indian SRR, thirteen Maritime Rescue Sub Centres (MRSCs) have been activated. These are co-located with District Headquarters of Indian Coast Guard for carrying out the duties within their geographical regions. The respective areas of the Maritime Rescue Sub Centre (MRSC) and their location are as follows:-

Sl.	**Area**	**MRSC**
(a)	Gujarat & Gulf of Kutch	Okha, Porbandar, Jakhau, Vadinar, Mundra, Veraval, Pipava
(b)	Maharashtra	Dahanu, Ratnagiri, Murud Janjira
(c)	Goa	Marmagao
(d)	Karnataka	New Mangalore, Karwar
(e)	Kerala	Kochi, Beypore, Vizhinjam
(f)	Lakshadweep Islands	Kavaratti, Androth, Minicoy
(g)	Puducherry	Puducherry, Karaikal
(h)	Tamil Nadu (Gulf of Mannar)	Tuticorin, Mandapam
(j)	Andhra Pradesh	Vishakapatnam, Machilipatnam, Krishnapatnam, Kakinada
(k)	Odisha	Paradip, Gopalpur
(l)	West Bengal	Haldia, Frazerganj
(m)	Andaman Islands	Diglipur, Mayabunder, Hutbay
(n)	Nicobar Islands	Campbell Bay, Kamorta

Note: *Additional MRSCs are being activated in phased manner for local coordination of SAR response measures.*

2.17 Facilities and Equipment

2.17.1 The MRCC/ MRSC is located where they can effectively perform their functions within their Area of Responsibility. In addition, the MRCC/ MRSC has the communications facilities and general office equipment, desks, plotting space, charts for performance of SAR tasks.

(a) **Communications**. Communication needs are met by fixed communication networks, public services, GMDSS equipment, ATS channels, Digital Selective Calling (DSC), email facility and through INMARSAT earth station, besides mobile communication.

(b) **SAR Distress Telephone Number**. A SAR distress toll free telephone number 1554 is established nationwide which when dialed, the call reaches the respective MRCC/ MRSC. The number is widely publicised to the fishermen/ sailing vessels/ coastal community and seamen community.

(c) **Software based SAR Assistance Tools**. Usage of computer based applications such as SARAT, developed by INCOIS for ascertaining most probable search area for implementing suitable search pattern and web based ReaLCraft software can be utilised for Indian fishing vessel to aid the SAR operations.

(d) **Information**. Ready access to operational information is available at all MRCC and MRSC to help the SMC take immediate and appropriate action in an emergency. Much of this information is derived from this Manual, SOPs, MRCC plan for operations, SAR databases and other policy directives. The SRR chart and the local maps showing areas adjacent to the SRR are available at MRCC and MRSCs.

(e) **Publications and Supplies**. The following publications and supplies are available at the MRCC:-

(i) SAR publications of ICAO, IMO, and the National SAR Manual.

(ii) Air Navigation Regulations and Notices to Mariners.

(iii) Communications publications.

(iv) ITU publications.

(v) Index and names, addresses, telephone, facsimile numbers and email addresses of all resource agencies and other important authorities.

(vi) Relevant check lists and forms.

(vii) List of documents to be held at MRCCs/ MRSCs are placed at **Appendix D**.

(f) **NC³I Network**. The network assist in providing following valuable information:-

(i) Latest position of the distressed vessel.

(ii) Analysis of the previous tracks of vessel.

(iii) Detailed and updates of vessels present in proximity which may be in a position to render assistance.

(iv) Additional information pertaining to the vessel with help of offline World Register of Shipping (WRS) database.

2.18 Staffing

2.18.1 MRCCs perform administrative and operational duties. Administrative duties are concerned with maintaining the MRCC in a continuous state of preparedness. The Officer-in-Charge MRCC carries out the duties of the MRCC Chief. The operational duties are concerned with the efficient conduct of a SAR operation or exercise and are thus of a temporary character. They are the responsibility of the SMC who may be Regional/ District/ Station Operations Officer, trained duty officers. The SMC role may also be performed by the MRCC chief or by other trained staff of the MRCC. It may include temporary personnel from the other resource agencies also, for facilitating the coordination of specific incidents, if need arises. The MRCC is prepared to undertake and continue operational duties throughout 24 hours of the day.

(a) **MRCC/ MRSC Chief or Officer-in-Charge**. The MRCC/ MRSC Chief is the senior most Officer in the MRCC/ MRSC organisation. He makes appropriate preparations, plans and arrangements as well as oversee and the daily operations of the MRCC/ MRSC, to ensure that when an incident occurs the SAR operation can be promptly performed/ supported.

(b) **MRCC/ MRSC Staff**. The MRCC/ MRSC staff consists of personnel who are capable of planning and coordinating SAR operations. They mainly include GMDSS operator, communicator and plotter.

(c) **SAR Mission Co-ordinator**. SMC should be designated for each specific SAR operation, and adequate numbers of personnel qualified to perform the SMC function must be readily available on a 24-hour basis. This is a temporary function which may be performed usually by the concerned operations officer who controls the SRUs. However, the MRCC Chief or a designated SAR duty officer, assisted by MRCC/ MRSC staff may perform the SMC duties unless relieved by a suitable authority.

2.19 Adjacent SRRs

2.19.1 The SRR of neighbouring countries namely Pakistan, Somalia, Maldives, Sri Lanka, Seychelles, Mauritius, Indonesia, Malaysia, Myanmar and Bangladesh share the boundary with Indian SRR. These SRRs are established in co-operation with the neighbouring nations which are internationally recognised and described in the pertinent documents of IMO and Admiralty List of Radio Signals (ALRS) Vol 5 2017/18. The co-ordinating authorities of the respective SRRs along with contact details are as follows:-

(a) **Pakistan SRR**. Ports and Shipping wing of Ministry of Communications is responsible for coordinating search and rescue operations. MRCC (Pakistan Maritime Security Agency) is located at Karachi. The ICG and PMSA have established MoU for coordination and conduct of Maritime Search and Rescue operations as per international Maritime Organisation Conventions/ treaties/ instructions in vogue.

Telephone	:	00 92 2199214624 00 92 2199214964
Fax	:	00 92 2199214625 00 92 2199214621
E-mail	:	mrccpmsa@cyber.net.pk, hqpmsa@pmsa.gov.pk

(b) **Maldives SRR**. Maldives Coast Guard is the national SAR agency. MRCC is located at Male.

Telephone	:	00 960 3398898, 3395981
Fax	:	00 960 3391665
E-mail	:	mrcc@mndf.gov.mv, maldivescoastguard@defence.gov.mv

(c) **Sri Lanka SRR**. SAR operations are coordinated with Sri Lankan Navy, Air Force and Port authorities under Deputy Director Merchant Shipping. MRCC is located at Colombo.

Telephone	:	00 94 11 2445368/ 2423644
Fax	:	00 94 11 2441454/ 2424299
E-mail	:	mrcccolombo@gmail.com nhqdno@yahoo.com, nhqdno@navy.lk

(d) **Seychelles SRR**. Port and Marine Services Department and Seychelles Coast Guard coordinate the SAR operations. The MRCC is located at Mahe.

Telephone	:	00 248 4290900, 4224616
Fax	:	00 248, 4323288
E-mail	:	dcaops@seychelles.net mrcc.seycoast@email.sc

(e) **Mauritius SRR**. SAR operations in the SRR are coordinated by National Coast Guard. MRCC is located at Port Louis.

Telephone	:	00 230 2088317, 2083935
Fax	:	00 230 2122757
E-mail	:	opsncghq@intnet.mu

(f) **Indonesia SRR**. Baden SAR national is the national SAR agency.

Telephone	:	00 62 62811447
Fax	:	00 62 62811115
E-mail	:	siagakom.makassar@gmail.com

(g) **Malaysian SRR**. Marine Department Malaysia is responsible for SAR operations in their SRR. MRCC Malaysia is located at Port Klang.

Telephone	:	00 60 389413140
Fax	:	00 60 389413129
E-mail	:	mrccputrajaya@mmea.gov.my

(h) **Myanmar SRR**. Myanmar Air Force, Navy and Dept. of Civil Aviation and Marine Administration coordinate SAR operation. MRCC is located at Yangoon.

Telephone	:	00 95 3131651, 0095 9795279576
Fax	:	00 95 18202417
E-mail	:	mrcc.myanmar2012@gmail.com, mrcc.yangon@mptmail.com.mm

(j) **Bangladesh SRR**. The Department of Shipping is responsible for coordinating SAR operations. MRCC Bangladesh is located at Dhaka.

Telephone	:	00 880 29836314
Fax	:	00 880 28871254
E-mail	:	mrccdhk@navy.mil.bd

(k) **Somalia SRR**. Presently no agency is entrusted for SAR coordination.

2.20 Unlawful Acts

2.20.1 The MRCC may become aware of an aircraft known or believed to be subject to unlawful interference. ATS units would usually become aware of the situation first and would be responsible. The MRCC should declare an Alert Phase, advise appropriate authorities (ATS units if not already aware, and response agencies specified in the plans of operation), and begin preparations for possible SAR operations as appropriate.

2.20.2 Special signals have been developed for use by ships under attack or threat of attack from pirates or armed robbers. ‘‘Piracy/ Armed Robbery Attack’’ is a category of distress message for all classes of digital selective call equipment and Inmarsat has added a piracy message to the Inmarsat-C menu

for GMDSS. For their own safety, ships may have to covertly send out the ''piracy/ armed robbery attack'' message either through GDMSS communication system or by Ship Security Alarm System (SSAS). When the MRCC becomes aware of such a situation, it should declare the Alert Phase, advise appropriate response agencies as specified in the plans of operation, and begin preparations for possible SAR operations as appropriate. If the ship covertly sends a message, care must be used in any communications sent back to the ship so as not to warn the pirates.

2.21 SAR operations by Maritime Rescue Services in time of Armed Conflict

2.21.1 As per IAMSAR latest amendments of 2019, the SAR operations that may be required for civilians who may use the sea areas during the armed conflict and also for the casualties of war, SAR Services should not get suspended and accordingly provisions are to be made available by suitable action by SAR authorities.

2.21.2 The four Geneva Conventions of 1949 and their Additional Protocols of 1977 are the bedrock of International Humanitarian Law (IHL). The second of the four Geneva Conventions (GC II) concerns armed conflicts that take place wholly or in part at sea and extends this principle to the wounded, sick and shipwrecked members of the armed forces at sea. Recognising the important role search and rescue operations play in implementing its provisions, GC II extends protection to small coastal rescue craft and fixed coastal rescue installations used by such craft, such as rescue coordination centres, repair boats, sickbays and hangars for their humanitarian mission, including for SAR operations concerning civilians.

2.21.3 Such craft and their associated fixed coastal rescue installations, when employed by a State that is party to a conflict (whether by its armed forces or by civilian governmental agencies) that have been approved or authorised by a government authority or other public body to perform coastal rescue functions, shall be respected and protected, that is, may not be attacked, captured or otherwise prevented from performing their humanitarian tasks, so far as operational requirements permit. Some of the assets of the resource agencies may be placed for performing such role by the Govt of India, through an appropriate notification in this regard.

2.21.4 Neutral coastal rescue craft (i.e. craft of a State which is not a Party to an armed conflict between two or more other States) enjoy protection under other sources of international law and may also obtain special protection under Geneva Convention -II (GC II). Neutral vessels that agree to take onboard and care for the wounded, sick and ship wrecked and to collect the dead "shall enjoy special protection and facilities to carry out such assistance".

2.21.5 The marking of coastal rescue craft in times of armed conflict is not constitutive of their protection but merely facilitates their identification by parties to the conflict. GC II provides that all exterior surfaces of the craft shall be white and that one or more dark red symbols or other emblems recognised by IHL, in particular the Red Cross, Red Crescent and the Red Crystal, shall be displayed on each side of the hull and on the horizontal surfaces.

2.21.6 GC II moreover requires that the parties to the conflict be notified of the names and characteristics of coastal rescue craft at least ten days before they are used in conflict situation or wartime. This requirement is dispensed with in API, although the parties are invited to inform each other of any details of such craft which will facilitate their identification and recognition. Furthermore, to benefit from the protection of GC II, the rescue craft must not be used for any military purpose and must not hamper the movements of combatants. They must also afford relief and assistance to the wounded, sick and shipwrecked without distinction of nationality.

2.22 SAR System Assessment

2.22.1 SAR system Assessment processes involve:-

(a) Assessing emerging technologies and other environmental changes (climate change) and opportunities.

(b) Analysing and responding to the findings and recommendations of SAR incidents.

(c) Promoting legislation, rules, agreements, SOPs to improve safety.

(d) Participating in International and interagency SAR meetings.

2.22.2 At national level, the SAR managers should periodically assess their annual SAR programmes and ensure frequent updations and review required. Establishing a well-defined and realistic goal is an excellent way to ensure continuous

improvement in the SAR system. Goals should clearly promote public well-being by seeking to minimise accidents and death at sea and promote co-operation among Government agencies, ensuring efficient use of public resources. Some of the important SAR goals are:-

(a) Minimise loss of life, personal injury and loss of property.

(b) Minimise time spent on searching persons/ vessels in distress by using technology, education, R&D, regulation and enforcement.

(c) Improve safety and ensure distress numbers are reduced. Suitable preventive actions are to be ensured such as warning fishermen before a storm, cyclonic weather etc.

CHAPTER 3

SAR System Components

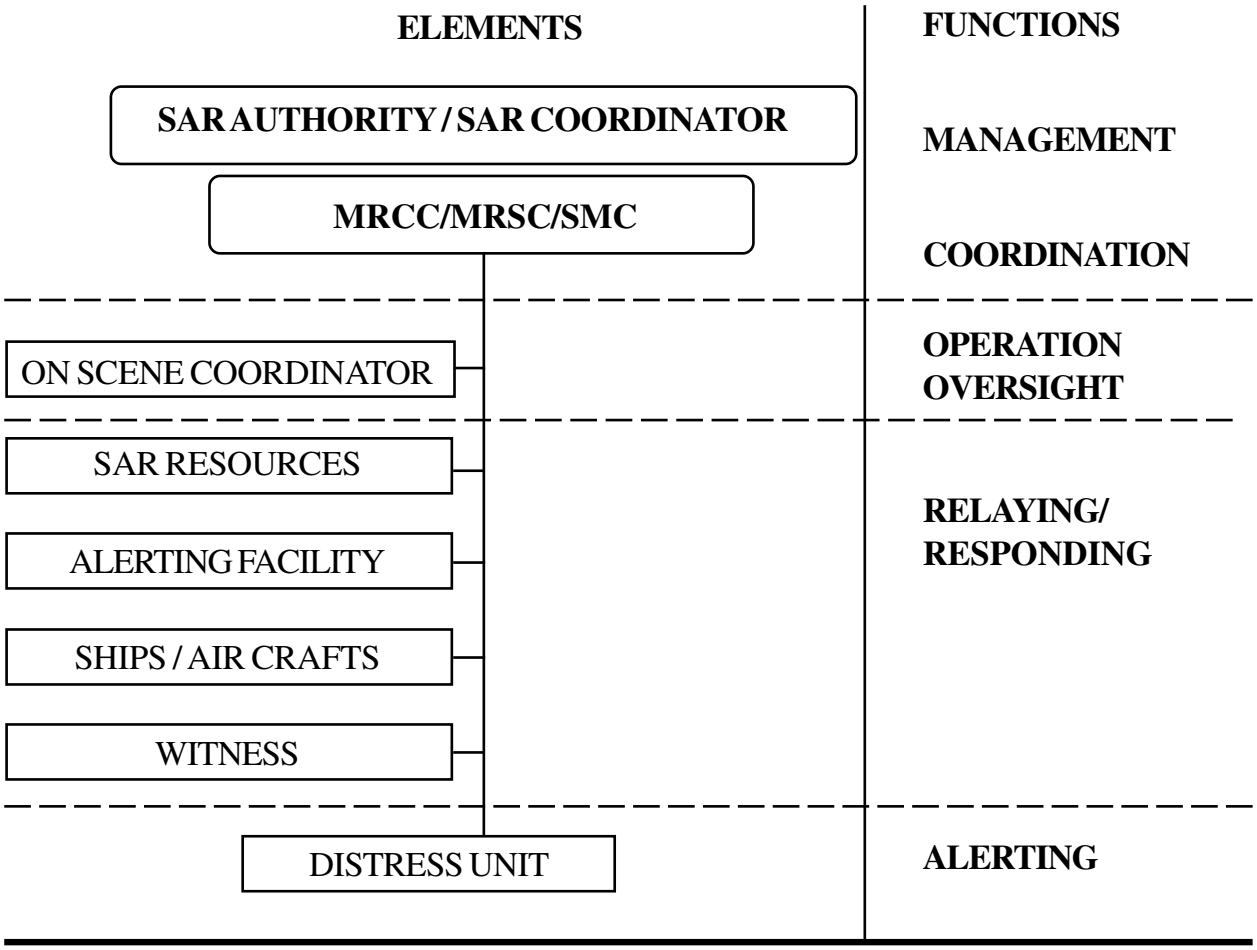
CHAPTER - 3

SAR SYSTEM COMPONENTS

3.1 SAR System

3.1.1 Search and Rescue (SAR) system, like any other system, has individual components that must work together in cohesion to provide the services efficiently.

3.1.2 The SAR system is an arrangement of components activated, as needed and use of available resources to efficiently and effectively assist persons in potential or actual distress in the Indian SRR, and beyond where necessary.



3.1.3 The above illustration depicts how the SAR system functions to enable distress alerting and SAR activities.

3.2 Components of SAR System

3.2.1 The SAR system has the following components:-

(a) **Organisation**. The division of SAR responsibility into geographic areas to provide centralised control, coordination, and effective use of all available SAR facilities, including SAR Coordinators (SCs), Maritime Rescue Coordination Centres (MRCCs), Maritime Rescue Sub Centres (MRSCs), SAR Mission Coordinators (SMCs), On Scene Commanders (OSCs) and Search and Rescue Units (SRUs).

(b) **Resources**. The personnel and equipment that undertake one or more stages of the SAR system.

(c) **Communications**. The media through which early detection, alerting, control, support and coordination are maintained throughout the SAR system.

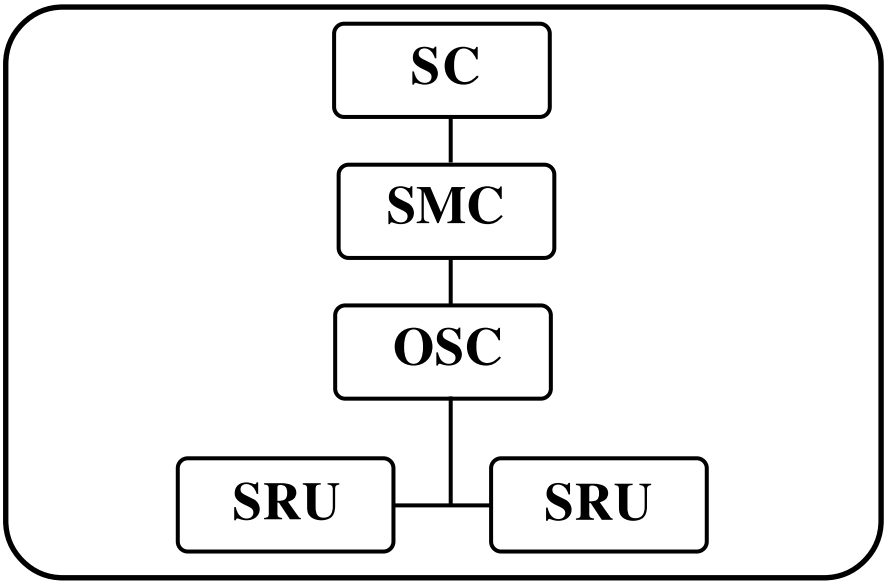
(d) **Emergency Care**. Emergency medical treatment at the distress scene and life support enroute to a medical facility.

(e) **Documentation**. The collection and analysis of SAR case information.

3.3 SAR Mission Organisation

3.3.1 The SAR coordinator mandates SAR mission organisation, assigning the responsibilities and inter-relationships of the SMC, OSC and SRUs for any mission.

3.3.2 The following figure shows the typical SAR mission Organisation:-



3.4 Basic System Functions

3.4.1 Any SAR system should be structured to provide all SAR services:-

(a) Receive, acknowledge, and relay notifications of distress from alerting posts.

(b) Coordinate search response.

(c) Coordinate rescue response and delivery of survivors to a place of safety.

(d) Provide medical advice, initial medical assistance or medical evacuation.

3.5 SAR Management

3.5.1 Successful SAR coordinators typically emphasize areas such as those below:-

(a) **Processes more than results**. Mission statements, goals, and objectives are important to any organization, but if sound processes are used, the desired results are more naturally identified and achieved.

(b) **Important matters more than urgent matters**. A SAR coordinator/ SAR mission coordinator must first manage time. Planning, coordinating, directing, evaluating, and other basic management functions which bring lasting improvements require dedicated time which must be set aside, protected and used for those purposes.

(c) **Satisfaction of the needs of others**. The SC/ SMC depends on people throughout and outside the SAR organization to accomplish the SAR mission. All these people, in turn, depend upon the SC/ SMC to provide what they need; the SC/ SMC should involve them in identifying these needs. Such needs include information, training, policies and funding. The successful manager will identify these people and strive to see that what they need to support the SAR system is provided.

3.6 SAR Coordinator

3.6.1 The SAR Coordinator (SC) is the national level administrator on SAR issues who has overall responsibility for establishing, staffing, equipping and managing SAR system with thorough coordination and using the available SAR resources. The SAR Coordinator is not normally involved in the conduct of the SAR operations. The SAR Coordinator should ensure that the MRCC/ MRSC is familiar with the capabilities of all the facilities available for SAR in its area of

responsibility. Collectively, these facilities are the means by which the MRCC/ MRSC conducts its operations. Some of these facilities will be immediately suitable for use. Others may have to be enhanced by changing organisational relationships or supplying extra equipment and training. If the facilities available in certain parts of Indian SRR cannot provide adequate assistance, arrangements should be made to provide additional facilities in coordination with national and regional partners. The major duties of the SAR Coordinator include the following:-

(a) Identification of SRU/SAR resources that may be used within the area.

(b) Establishing close liaison and agreements with other services/ agencies/ organisations having SAR potential.

(c) Liaison with SAR authorities of neighbouring nations and ensure mutual cooperation and coordination.

(d) Preparation and distribution of current, comprehensive area SAR plans.

(e) Coordination of SAR resources within the region of responsibility and MRSC for the areas where MRCC cannot exercise direct and effective coordination.

(f) Conduct SAR, assign SMC and SRUs until assistance is no longer required or rescue has been affected.

(g) Coordination of national level SAR exercises, SAR training and developing SAR policies.

(h) Suspend SAR cases when there is no longer reasonable chance of success and report results to parent operating command.

(j) Provide appropriate legal support in difficult SAR cases for repatriation of rescued persons and refugee situation.

3.7 SAR Mission Coordinator

3.7.1 An SMC should be designated for each specific SAR operation. The Operations Officer or Officer suitably delegated as SMC duties at RHQ/ DHQ/ CG Station will assume SMC during SAR situations. Every mission is conducted under guidance of SMC and for the duration of that particular mission. While the overall responsibility of the mission is with the SAR Coordinator (SC), the SMC plans, coordinates including transit of SAR facilities to the scene and controls SAR

missions with the available resources for the time assigned till conclusion of each mission. The SMC must use good judgment to modify, combine or bypass SAR stages and adopt the procedures to cope with unique, unusual or with the development of the ongoing SAR mission. SMC should use readily available facilities and request additional units when required during the operation.

3.7.2 The SAR operation may continue over a prolonged period of time. Therefore, the SMC remains in charge of a SAR operation until the rescue has been effected or until it has become apparent that further efforts would be of no avail. The MRCC plan of operations should give the SMC freedom to employ any facility, to request additional ones and to accept or reject any suggestions made during the operation.

3.7.3 The SMC should be thoroughly familiar with SAR plans and competently gather information about distress situation, develop accurate and workable action plan and dispatch SRUs for effective conduct of SAR mission. The guidelines for SMC duties include the following:-

(a) Obtain evaluate and convey all data regarding person or unit in distress to OSC and SRUs.

(b) Ascertain type of emergency, equipment carried by the distressed/ missing craft.

(c) Obtain and update prevailing environmental conditions.

(d) Ascertain movement and location of vessels in the area for alerting traffic in search area.

(e) Maintain radio watch on appropriate frequencies for enabling communication with SAR facilities and designate frequencies for on scene communication.

(f) Plot search area and decide methods/ search facilities to be used.

(g) Develop search action plan, allocate search area, designate OSC and dispatch SAR facilities.

(h) Coordinate operations with adjacent MRCC when appropriate.

(j) Arrange briefing/ debriefing of personnel involved in SAR mission.

(k) Evaluate reports and modify search action plan as necessary.

(l) Arrange logistics/ supplies including accommodation for personnel and fuelling for aircraft.

(m) SMC to inform progress of all proceedings to SAR Mission Coordinator and respective administrative authority.

(n) Recommend/ decide on abandoning/ suspension of search.

(p) Release SAR facilities when no longer required.

(q) Notify accident investigation authorities and parent organisation regarding the incident.

(r) Prepare final report on results of the operation.

(s) Intimate search result to next of kin of person in distress.

(t) Press & Media management in consultation with appropriate senior formations.

3.8 On Scene Coordinator

3.8.1. The On Scene Coordinator (OSC) is designated by the SMC when two or more SAR units are working together on the same mission to enable better coordination of the activities amongst the participating units on the scene. The OSC may be the person in charge of the SRU, ship or aircraft participating in the search or someone at another nearby facility capable of handling OSC duties. However, if an OSC is not designated, the first SRU to arrive at the scene will normally assume the functions of OSC to advice SMC, until the SMC directs the unit/ person to be relieved by another. The OSC retains responsibilities from the time of designation until relieved or mission is completed. An OSC need not be a SRU. An advance-staging base with all facilities may also serve as an OSC to relieve SRU of that burden.

3.8.2 The OSC should be most eligible unit for conduct of SAR mission considering the proficiency in coordination of SAR capability, communications facilities and the endurance. Frequent changes of OSC should be avoided to enable continuous and proper coordination on scene. To provide continuity of command, any SRU arriving on scene who is senior to the OSC should **not normally** assume command unless ordered to do so by the SMC. The duties of OSC include the following:-

(a) Assume operational authority of SMC coordinate operations and control of all SAR facilities on scene.

(b) Ensure adequate manning and equipment for the SAR mission.

(c) Receive and familiarise search action plan from SMC.

(d) Modify search plan based on prevailing environmental conditions.

(e) Consult and advise SMC regarding any changes to the plan.

(f) Provide relevant information to other SRUs on scene.

(g) Advise SMC for relieving any SRU on scene and request for dispatch & suitable relief to maintain OSC resources.

(h) Implement search action plan promulgated by SMC.

(j) Monitor performance of other units participating in the search.

(k) Coordinate safety of flight for SAR aircraft.

(l) Develop and implement rescue plan if required.

(m) Consolidate reports obtained from other SRUs and dispatch to SMC.

3.9 Aircraft Coordinator (ACO)

3.9.1 The SMC shall designate an area for aerial search with height of the airspace required and intimate the same to the relevant FIC for promulgation. He shall intimate the same to the OSC as well as the ACO for safe flying. When two or more SAR facilities including aircraft are working together on the same mission, SMC designates one unit as Aircraft Coordinator (ACO) for coordinating air traffic, in addition to the OSC. Preferably, OSC and ACO should be different units. If it is not practicable, then OSC itself acts as ACO. The OSC may designate this responsibility to another unit also, with SMC concurrence. ACO is responsible to SMC and coordinates closely with OSC. However, the overall charge remains with SMC/ OSC. The primary concern of ACO is the flight safety of SAR aircraft.

3.9.2 The ACO may be a fixed wing aircraft, helicopter, ship or a fixed structure such as an offshore platform/ appropriate shore based unit. The SMC is to consider the availability of the radio, radar equipment, trained personnel and capabilities of the facilities involved before delegating the responsibility to ACO. The duties of ACO are as follows:-

(a) Maintain flight safety.

(b) Maintain safe horizontal and vertical separation between the aircraft in the area and transit.

(c) Ensure common pressure settings on altimeters.

(d) Determine aircraft entry and departure points, altitudes.

(e) Ensure frequency used is in accordance with the COMPLAN.

(f) Coordinate communications and ensure minimum radio traffic between other SRUs and aircraft.

(g) Coordinate with adjacent airfields/ ATS/ Area Control.

(h) Advise SMC/ SC on the weather implications on scene.

(j) Prioritise/ allocate task and direct the aircraft as per SAR plan.

(k) Monitor and report SMC/ OSC on search area coverage.

(l) Identify emerging task on scene and direct aircraft accordingly.

(m) Coordinate and supervise effectiveness of search with respect to changing factors on scene.

(n) Coordinate aircraft refueling.

(p) Render SITREPS of SAR aircraft to SMC/ OSC.

3.10 Search and Rescue Units

3.10.1 The Search and Rescue Units (SRUs) are used as a resource for performing search, rescue or similar operations. The unit can be an aircraft or a ship. Normally, SRUs having SAR as primary duty are used first. The following categories of vessels are used in maritime SAR incidents:-

(a) **Primary SAR Vessels**. A primary SAR vessel is a specially designed and equipped vessel with a trained crew that has SAR as its main task. These vessels are pre-positioned in areas with a high risk of SAR incidents. In Indian context, the Indian Coast Guard assets are used as the primary SRUs.

(b) **Secondary SAR vessels**. Secondary SAR vessels are all other government vessels.

(c) **Vessels of opportunity**. A vessel of opportunity is any other vessel not mentioned above, but in a location close enough to provide assistance to a vessel in distress.

3.10.2 The equipment needed by SRUs may be grouped as:-

(a) **Communications**. SRU must have rapid and reliable means to communicate by voice or message with the SMC, the OSC if assigned, other SRUs, and the distressed persons. Chapter 5 provide suitable information on SRU communications requirements.

(b) **Mobility**. The effectiveness of a SAR service depends on the number, speed, location, and efficiency of the aircraft, vessels and land vehicles available.

(c) **Supplies and Survival equipment**. Supplies and survival equipment are carried by air and maritime SAR facilities to give aid to survivors and to facilitate their rescue. Maritime facilities and helicopters generally can deliver this equipment directly to survivors. Fixed-wing aircraft can deliver supplies to survivors if suitable landing areas exist nearby or if the supplies can be dropped at the scene. Supplies and survival equipment requirements must be adapted to the circumstances of the SRR in which they are used.

(d) **Other equipment**. Every SRU should have at its disposal maps, charts, plotting equipment, and information relevant to the SRR(s) in which it is likely to operate.

3.10.3. If the SRUs is alone on the scene, it performs the OSC duties and keeps SMC advised. Facilities selected as SRUs should be able to reach the scene of distress quickly and in particular be suitable for one or more of the following operations:-

(a) Provide assistance to prevent or reduce the severity of the accident and hardship of the survivor.

(b) Conduct the search in the area designated as per the SAR action plans and reports to the OSC the area searched.

(c) Advise OSC on sighting of survivors with position and current environmental conditions.

(d) Signal to survivors and keep them in sight and effect rescue if within capabilities. If rescue is not possible, advise OSC on accurate position of the survivor and depart area.

(e) Deliver supplies and survival equipment to the scene.

(f) Rescue of Survivors.

(g) Provide food, medical or other initial needs of survivors.

(h) Transfer survivor to place of safety.

(j) Advice OSC on sighting of wreckage, debris, life boat/ rafts, oil slick, dye marker, flare, smoke or any other unusual object facilitating further in the SAR operations.

(k) Advise OSC on interception of any radio, radar or emergency signal with position and time whenever possible.

CHAPTER 4

SATELLITE AIDED SEARCH AND RESCUE

CHAPTER - 4

SATELLITE AIDED SEARCH AND RESCUE

4.1 Introduction

4.1.1 India is a participant in the global effort to track search and rescue alerts through a unique dedicated Satellite System called COSPAS-SARSAT. Satellite Aided Search and Rescue System in India is operational since 1989 under COSPAS-SARSAT programme, providing detection and location of distress signals from ELT, EPIRB and PLB. The COSPAS-SARSAT system comprises of mainly three segments viz. Radio Beacons, Space Segment and Ground Segment.

4.1.2 The distress signals are received by satellites in geostationary (GEO), low-altitude earth orbits (LEO) & Medium-altitude Earth Orbits (MEO) and relayed to the ground station called Local User Terminals (LUTs). The alert data, produced by LUT is sent to Mission Control Center (MCC) for distress dissemination to respective Rescue Coordination Center (RCC), SAR Point of Contacts (SPOCs) and to the owners, if registered in INMCC beacon database.

4.2 Radio Beacons

4.2.1 There are three types of Beacons which, except PLBs, are activated automatically and indicate distress situation, viz:-

(a) Emergency Locator Transmitter (ELT) for aviation use.

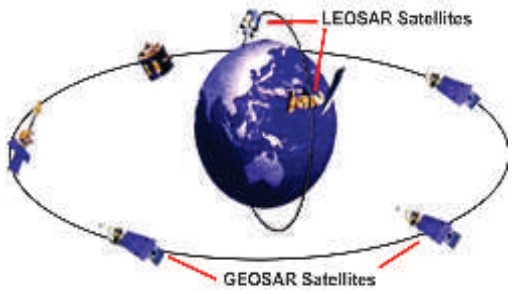
(b) Emergency Position Indicating Radio Beacon (EPIRB) for maritime use.

(c) Personal Locator Beacon (PLB) for aviation sector, general outdoor use by individuals on expeditions or journeys to remote places.

4.2.2 COSPAS-SARSAT Beacons transmit distress alerts on 406 MHz frequency only. The 406 MHz units are coded with a country code and registered in the country that maintains the database of beacons. This helps in identifying the transmitting beacon by co-relating to the information in the beacon database held at the INMCC.

4.3 Space Segment

4.3.1 The Space Segment of COSPAS-SARSAT Satellite system comprises of a number of satellites in orbit around the Earth. These include satellites in Low Earth Orbit (LEOSAR) and Geostationary Orbit (GEOSAR). The constellation of satellites provides complete coverage of Earth so that distress signals can be picked-up by the system anywhere on the Earth. There are six LEOSAR satellites and five geostationary satellites in orbits.



Figure

4.3.2 The COSPAS-SARSAT space segment consists of LEOSAR constellation, GEOSAR satellites and MEOSAR constellations. Currently LEOSAR constellation consists of five SARSAT (Search and Rescue Satellite Aided Tracking) satellites provided by USA orbiting with 99º inclination, placed in sun synchronous, near polar and orbit altitude of 850 Km. GEOSAR consists of 15 satellites (5 GEOS satellites provided by the USA, 3 satellites (2 INSAT and 1 GSAT-17) by India, 4 MSG satellites by Europe and 3 satellites (1 Electro-L & 2 Louch) by Russia. GNSS MEO constellations consist of 75 satellites with GPS-34, GALILEO-37 and GLONASS-34 satellites carrying SAR payload for providing SAR services.

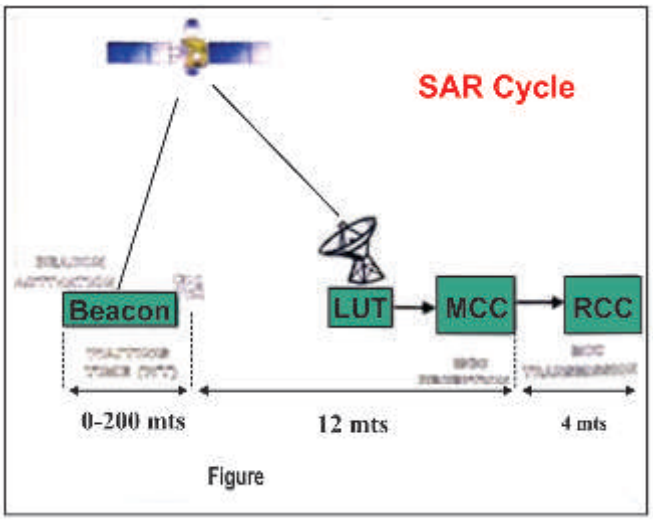
4.4 Ground Segment

4.4.1 In India, COSPAS-SARSAT ground segment consists of one GEOLUT, one MCC co-located at Bangalore and one LEOLUT at Lucknow. The ground system tracks, receives and processes distress signals from the COSPAS-SARSAT beacon. Indian receiving terminals, mainly Local User Terminal (LUTs - both LEOLUT & GEOLUT) receives the distress messages picked by these satellites and these messages are processed at INMCC. The processed data containing distress location and identification of user/ object in distress is sent to RCCs/ MRCCs for further SAR coordination.

4.4.2 The new LEO-GEO-MEO-MCC (LGM-MCC) likely to be operational by beginning of 2020, will be capable of processing MEOSAR alerts and will also be capable of processing 2nd generation beacon alerts mounted on aircraft (ELT-DT).

4.5 Distress Beacon Detection

4.5.1 The aircraft/ ship carries emergency beacons which could be activated either manually or automatically in case of a distress situation, such as an accident, a crash, sinking, fire, explosion etc. these units, when activated, transmit signals that are detected by COSPAS-SARSAT satellites and relayed to ground receiving stations, i.e, LUTs, which track and receive the data and provide user identification and location (Lat., Long.) of the distress object precisely. Alerts are then relayed, together with identification and location data via a Mission Control Centre to a RCC or MRCC. The location of a beacon is determined by Doppler principle using the relative motion between the satellites and the beacon.



Figure

4.5.2 RCC/ MRCC personnel use the distress alert information to verify the message by co-relating with other reports received by them and then initiate SAR action, as required.

4.6 Interpretation of COSPAS-SARSAT Distress Alerts

4.6.1 The interpretation of COSPAS SARSAT distress alert is as follows:-

(a) The LEOSAR system determines the distress location using Doppler technique. The initial LEO satellite pass provides two locations and the ambiguity is resolved during the second LEO satellite pass. In global mode, satellite will dump 406 MHz distress alerts stored onboard to the visible LUTs.

(b) GEOSAR system provides alert information & location information (if the beacon has built-in GPS receiver).

4.7 MEOSAR System

4.7.1 In the year 2012, the USA, the European Commission (EC) and Russia began consultations with COSPAS-SARSAT regarding the feasibility of installing 406 MHz SAR instruments on their respective medium-altitude earth orbiting (MEO) global navigation satellite systems referred as MEOSAR constellations (GPS, GALILEO & GLONASS).

4.7.2 The MEOSAR system will provide an enhanced distress alerting capability, characterized by:-

(a) Near instantaneous global detection and independent locating capability for COSPAS-SARSAT 406 MHz distress beacons.

(b) High levels of space and ground segment redundancy and availability.

(c) Robust beacon to satellite communication links.

(d) Multiple and continuously changing beacon/ satellite links, thereby providing flexibility against beacon to satellite obstructions, and resilience to interference.

(e) A return link service to 406 MHz beacon.

4.7.3 The MEOSAR system will provide independent distress beacon location information using a combination of Time Difference of Arrival (TDOA) and Frequency Difference of Arrival (FDOA) techniques. MEOLUTs calculate the location by measuring and processing the time and frequency differences of the same burst relayed by different satellite paths.

4.7.4 The Indian MEOLUT system consists of the 6 Antennae with 1 spare antenna and the Processor System. MEOLUT can have networking capability to receive/ transmit alert data from other global MEOLUTs and be able to merge and process the data from any number of external MEOLUT systems.

4.8 Data Distribution Procedures

4.8.1 The Indian MCC (INMCC) is connected with four national Aeronautical Rescue Coordination Centres (ARCCs: Chennai, Mumbai, Delhi & Kolkata) of the Airports Authority of India, three Maritime Rescue Coordination Centres (MRCCs: Chennai, Mumbai, Port Blair) of Indian Coast Guard and 7 SPOCs: Search and Rescue Points of Contact (Nepal, Bhutan, Bangladesh,

Maldives, Sri Lanka, Tanzania and Seychelles) through Aeronautical Fixed Telecommunication Network (AFTN) with additional support of email, manual FAX.

4.9 GPS Aided Geo Augmented Navigation (GAGAN)

4.9.1 GAGAN is a joint project of ISRO and Airports Authority of India (AAI). The GAGAN Signal-In Space (SIS) is available through GSAT-8, GSAT-10 and GSAT-15 satellites. GSAT-8 (PRN-127) and GSAT-10 (PRN-128) are transmitting GAGAN signals 24x7. The Directorate General of Civil Aviation (DGCA), India certified the GAGAN system to RNP0.1 (Required Navigation Performance, 0.1 Nautical Mile) service level on 30 December 2013 and later it was certified by DGCA for precision approach services APV-1.0 (Approach with Vertical guidance) over Indian landmass on 21 April 2015. With the certification of GAGAN for approach and landing operations, India has become the third country in the world to have such capabilities.

4.9.2 GAGAN is the first SBAS (Space Based Augmentation System) in the world to serve the equatorial region. The GAGAN system was dedicated to nation on 13 July 2015. The system is providing Satellite-based Navigation services with accuracy and integrity required for civil aviation applications and is also providing efficient air traffic management services over the Indian Airspace. With the certification of GAGAN system for APV-1.0 service levels, procedure development and aeronautical surveys at select airports are under progress.

4.10 Navigation with Indian Constellation (NavIC)

4.10.1 NavIC is the Indian Regional Navigation Satellite System (IRNSS) developed by Indian Space Research Organization (ISRO). It is an independent regional navigation system designed to provide accurate position information service to users in India as well as the region extending up to 1,500 km from its boundary, which is its primary service area. IRNSS is envisaged to provide two types of services, namely Standard Positioning Service (SPS) and Restricted Service (RS) and provides a position accuracy of better than 20 m in the primary service area.

4.10.2 NavIC Messaging Service: Using the NavIC messaging service along with support from Indian National Centre for Ocean Information Services (INCOIS), NavIC messaging receivers (NMR) were developed which transmit alerts messages

such as cyclone, high wave, etc., and provide information on Potential Fishing Zone for the fishermen venturing into deep sea. After consolidating the survey results and comments from the fishermen who were provided with NMRs, the integration of existing NMR with Distress Alert Transmitter (DAT) was taken up.

4.10.3 With the second generation DAT, the fishermen can send a distress alert through the regular DAT link to the rescue centre and the acknowledgement for the reception of distress signal and impending rescue attempt will be sent through the NavIC messaging service. The hub is established at ISTRAC along with the existing COSPAR SARSAT ground system. Second generation DAT terminal prototype development is completed and the technology was ready for transfer to industry for commercial deployment.

4.11 Online Registration of 406 MHz Beacons (ELTs/ EPIRBs/ PLBs)

4.11.1 All the 406 MHz distress beacons used in India are to be registered in National Beacon Registration Database. MRCCs and RCCs can access this beacon registration database to know the details of the beacon owner. The information contained in the database about the beacon, its owner and the aircraft/ vessel on which the beacon is located, is very helpful in effective utilization of SAR resources in case of an accident. Rescue operation is initiated after the alert status is confirmed.

4.11.2 Registration of the beacon with INMCC is mandatory and is free of cost. Beacons are to be registered online only (https://inmcc.istrac.org) and manual registration is not available.

4.11.3 It is to be ensured that proper Beacon Coding scheme as approved for that beacon model is undertaken. Most importantly, it is to be ensured that the beacon is coded with India country code (419), if the aircraft/ vessel is registered in India or owner/ operator is based in India.

4.12 INMCC Operations

4.12.1 As the distress beacon is activated, it is picked-up by GEO and LEO satellites and relayed to all ground stations (known as LUTs) globally in real time or later as the satellite passes over different LUTs.

4.12.2 For GEO satellites, the distress alarm is provided to rescue agencies within 10 minutes from its activation. Here the main limitation is that the location information will not be available if the beacon is non-GPS, but the user identification along with the alert information will be made available.

4.12.3 For detection by LEO (Low Earth Orbiting) satellites, the distress alert will be delayed to maximum 300 minutes subject to satellite pass (as per the current satellite constellation - Oct 2013). Even without GPS, the system provides distress location using Doppler principle. Once the beacon is detected, a distress message is transmitted to nearest Rescue Coordination Centre (RCC/ MRCC/ SPOC) for initiating SAR action.

4.12.4 The RCC/ MRCC looks for registration information available at "INMCC Online Beacon Registration Database" The alert is then investigated for its authenticity to initiate appropriate SAR action.

4.12.5 If the beacon is not registered, rescue authorities may have to spend a lot of time to find owner/ user information mainly through coordination with Indian regulatory authorities such as Directorate General of Shipping or Directorate General of Civil Aviation (DGCA) and sometimes through public database available on internet.

4.12.6 For all Indian beacons, detected outside Indian Search and Rescue Region, the MRCCs/ RCCs/ INMCC will provide the owner contact information, if available in the database, to external SAR agencies/ MCC concerned.

4.12.7 For all inadvertent beacon activations from ships, aircraft or person, MRCCs caution the users to avoid such happening in future and to take extreme care while maintaining and handling lifesaving equipment.

4.12.8 Once alert is detected at INMCC, it is passed on to MRCCs within 4 minutes (maximum). In addition to this, INMCC being a part of international COSPAS-SARSAT system receives distress alerts detected by external MCCs from Indian beacons as well as all other beacons detected in INMCC service area.

4.12.9 Once the investigation of the alert is completed, the concerned MRCC sends an **Action close-out report** to INMCC for compilation of alert statistics.

4.13 Additional Information to MRCCs

4.13.1 It may be noted that INMCC does Geo-sorting of alerts based on Maritime Search and Rescue Regions (SRR) and Flight Information Regions (FIR) which falls within the jurisdiction of MRCCs and RCCs respectively. In general, Alert message providing confirmed location falling outside the jurisdiction of the MRCC should be ignored by MRCC concerned, as these messages are only sent to notify the MRCC that the actual location got resolved outside the SRR of the MRCC and no further action is needed at MRCC end. The INMCC system has built in mechanism to route the alert messages to specific MRCC outside India where the location got resolved. MRCCs are required to concentrate only for those alerts falling within SRR boundaries.

4.13.2 INMCC does not discriminate alerts based on country, whether it is from an Indian or a foreign beacon, it follows the standard data distribution procedure as described above. If foreign aircraft/ vessel is in distress in Indian SRR, MRCC concerned is responsible to initiate necessary coordination.

4.13.3 Beacon registration information is additional information for alert follow-up with the owner and may be correlated with the specific alert message using beacon code (15-character beacon ID).

4.13.4 Subsequent detections of the alert signal from the same beacon are provided as updated messages to MRCCs to inform current active status of the distress beacon, as long as the beacon continues to radiate distress signal. These messages should be correlated using the INMCC reference number provided with each alert message. Alert messages arising out of same beacon will have same reference number as well as 15 Hex ID. This reference can also be used to get more information from INMCC if needed.

4.13.5 For maritime alerts falling on land area, no immediate action is needed. Such alerts can be separately followed up with appropriate authorities only after confirmation of the location (after it is resolved).

4.13.6 Alert messages are transmitted to MRCCs in a standard text format, which are internationally established by COSPAS-SARSAT and self-explanatory. These messages provide location of distress, time of detection, country of beacon registration and reference/ message numbers.

CHAPTER 5

MARITIME SAR COMMUNICATIONS

CHAPTER - 5

MARITIME SAR COMMUNICATIONS

5.1 SAR Communications

5.1.1 Good communication is critical as they promptly provide the Rescue Coordination Centres with alerting information thereby enabling the Rescue Coordination Centres to dispatch SRUs and other resources to search areas without delay. This also ensures maintenance of two-way contact with person in distress.

5.1.2 The SAR communication consists of a sender passing information to a receiver by various means. The SAR communications occur between the distressed unit/ survivor and SAR system and also the components and facilities of the SAR system. It is very vital to ensure that the message received is treated crucial so as to enable the successful accomplishment of the SAR system. Therefore, it is of paramount importance to provide the essential communications elements to receive distress alerts and enable further communication, as required. The necessary communication for SAR system includes telephones, radios operating on international distress frequencies, long range terrestrial and satellite systems and other equipment depending upon the geography and the factors affecting the ability of persons to contact each other.

5.1.3 Communications support distress alerting, co-ordination, and locating functions by allowing:-

(a) Those in distress to alert the SAR system.

(b) The SAR system to respond and conduct its mission.

(c) Survivors to help SAR units respond and conduct a rescue.

5.1.4 The main functions of a SAR communications system are:-

(a) Receipt of alerts from equipment used by persons in distress.

(b) Exchange of information with persons in distress, and among the SAR mission coordinator (SMC), OSC and SAR facilities for coordination of responses to SAR incidents.

(c) Direction finding (DF) and homing which allow SRUs to be dispatched to the vicinity of the distress and to home on signals from equipment used by survivors.

5.1.5 Communication used among SAR facilities depend upon the local arrangements, the structure of SAR services within the SRR and available equipment. Communication from-to MRCCs and MRSCs should be as timely and reliable as possible, and sufficient to handle the diversity and volume of communications for the worst potential scenario. General operating requirements for SAR communications include the following:-

(a) Timely delivery of alerts.

(b) Complete and easy to understand alerts.

(c) Minimum number of false alerts.

(d) Capability to contact units in distress.

(e) Common Language.

(f) Adequate manpower to handle the volume in worst case scenario.

5.2 GMDSS Sea Areas

5.2.1 The GMDSS is based on the concept of using marine communication sea areas to determine the operational, maintenance and personnel requirements of maritime radio communications. The four sea areas are described as follows:-

(a) **Sea Area A1**. Within the radiotelephone coverage of at least one VHF coast station in which continuous DSC alerting is available. Such an area could extend typically 30 -50 nautical miles from the coast station.

(b) **Sea Area A2**. An Area, excluding sea area A1, within the radiotelephone coverage of at least one MF coast station in which continuous DSC alerting is available. For planning purposes this area typically extends to up to 150 nm offshore, but would exclude any Al designated areas. In practice, satisfactory coverage may often be achieved out to around 400 nautical miles offshore.

(c) **Sea Area A3**. An area, excluding sea areas A1 and A2, within the coverage of an INMARSAT geo stationary satellite in which continuous alerting is

available. This area lies between about latitude 70 North and South, but excludes Al and A2 designated areas.

(d) **Sea Area A4**. An area outside sea areas A1, A2 and A3. This is essentially the Polar Regions, North and South of about 70 deg of latitude, but excludes any other areas.

5.3 MRCC and MRSC Radio Requirements

5.3.1 MRCC and MRSC are to be provided with GMDSS compliant communications equipment so as to satisfy following functional requirements:-

(a) Receive ship to shore distress alert by at least two independent means.

(b) Relay shore to ship distress alert.

(c) Transmitting and receiving SAR coordinating communication.

(d) Transmitting and receiving On Scene communication.

(e) Transmitting MSI.

(f) Transmitting and receiving general radio communications.

5.3.2 The carriage requirement of MRCC and MRSC in order to satisfy above functional requirements are as listed below:-

(a) VHF, MF and HF RT.

(b) VHF, MF and HF DSC.

(c) MF or HF Radio telex.

(d) EGC receiver.

(e) IMO recognised satellite services terminal.

(f) AFTN.

(g) INMARSAT Safety Net.

(h) Vessel Tracking Systems and Services.

(j) Telephone, Telefax and Email facility.

5.4 Vessels/ Ships Radio Requirement

5.4.1 The following radio equipment are to be essentially carried onboard all sea going ships for GMDSS compliance:-

(a) VHF/ MF/ HF radio installations capable to transmit/ receive DSC distress alerts on Channel 70 and Radio telephony on Channel 06, 13, 16.

(b) VHF/ MF/ HF radio installations to maintain continuous DSC watch on CH 70 (Note:(a) and (b) can be combined together).

(c) SART 9 GHz.

(d) NAVTEX receiver.

(e) In area with no NAVTEX, either an IMO recognised mobile satellite service EGC receiver facility or HF/ NBDP receiver (if service is provided).

(f) EPIRB transmits distress alerts either on 406 MHz or through INMARSAT geo-stationary satellite services (when operating in INMARSAT coverage area).

(g) VHF (waterproof upto 5 mtr depth) walkie- talkies as per the ships gross tonnage.

Ships 300-500 gross tons : Minimum two

Ships over 500 gross tons : Minimum three

5.4.2 In addition, ships are to carry following equipment when operating in respective GMDSS Sea Areas.

(a) **Sea Area A1**

(i) Means to transmit ship-to-shore distress alerts either on VHF DSC or EPIRB, on 406 MHz or MF DSC (if near CRS using MF DSC).

(ii) VHF radio capable to transmit and receive general radio telecommunications using radiotelephony.

(iii) An EPIRB on VHF DSC, Ch 70 with SART 9 GHz band attached in lieu of EPIRB, which transmit distress alerts either on 406 Mhz or through INMARSAT.

(b) **Sea Area A1 and A2**

(i) MF/ HF radio installation able to transmit/ receive, for distress and safety purposes on 2187.5 KHz using DSC and 2182 KHz using radiotelephony.

(ii) Radio installations to maintain continuous DSC watch on 2187.5KHz. (Note: (i) and (ii) can be combined together).

(iii) Means to transmit ship-to-shore distress alerts either on EPIRB, on 406 MHz or HF using DSC or an INMARSAT SES or the INMARSAT EPIRB.

(iv) Transmit/ receive general radio communication, either on radio communications in bands between 1605 KHz and 4000 KHz or between 4000 KHz and 27500 KHz or through an INMARSAT SES.

(c) **Sea Area A1, A2 and A3**

(i) An INMARSAT SES able to transmit/ receive distress and safety communications, distress priority calls, general radio communications and maintains shore-to-ship watch for distress alerts.

(ii) MF radio installations able to transmit/ receive for distress and safety purposes on 2187.5 KHz using DSC and 2182 KHz using radiotelephony.

(iii) Radio installations to maintain continuous DSC watch on 2187.5 KHz. (Note: (ii) and (iii) can be combined together).

(iv) Means to transmit ship-to-shore distress alerts either on EPIRB on 406 MHz or HF using DSC or an additional INMARSAT SES or the INMARSAT EPIRB.

(OR)

(i) MF/HF radio installations able to transmit/ receive, for distress and safety purposes. On all distress and safety frequencies in bands between 1605 KHz and 4000 KHz or between 4000 KHz and 27500 KHz using DSC, radiotelephony and NBDP.

(ii) Radio installations to maintain DSC watch on 2187.5 KHz and 8414.5 KHz and on at least one of 4207.5 KHz, 6312 KHz, 12577 KHz or 16804.5 KHz. (Note: (i) and (ii) can be combined together).

(iii) Means to transmit ship-to-shore distress alerts either on EPIRB, on 406 Mhz or an INMARSAT SES or the INMARSAT EPIRB.

(iv) Transmit/receive general radio communications, on MF/ HF in bands between 1605 KHz and 4000 KHz and between 4000 KHz and 27500 KHz, using radiotelephony or NBDP. {Note: (i) and (ii) can be added to (iv)}.

(d) **Sea Areas A2, A3 and A4**

(i) MF/ HF radio installations able to transmit/ receive, for distress and safety purposes. On all distress and safety frequencies in bands between 1605 KHz and 4000 KHz or between 4000 KHz and 27500 KHz using DSC, radiotelephony and NBDP.

(ii) Radio installations to maintain DSC watch on 2187.5 KHz and 8414.5 KHz and on at least one of 4207.5 KHz, 6312 KHz, 12577 KHz or 16804.5 KHz. (Note: (i) and (ii) can be combined together).

(iii) Means to transmit ship-to-shore distress alerts either on EPIRB, on 406 MHz.

(iv) Transmit/ receive general radio communications, on MF/ HF in bands between 1605 KHz and 4000 KHz and between 4000 KHz and 27500 KHz, using radiotelephony or NBDP. [Note: (i) and (ii) can be added to (iv)].

5.5 Distress Alerting

5.5.1 The distress alerts may arrive at MRCCs from a variety of equipment sources and via a variety of alerting posts which includes Coast Radio Stations (CRS), Local User Terminals (LUTs) and Mission Control Centres (MCCs) of the COSPAS -SARSAT System, Land Earth Stations (LESs) of the INMARSAT System, Air Traffic Services (ATS) units, Police and Fire departments, fishing boats through Distress Alert Transmitter (DAT) and vessels, aircraft or other persons or facilities which may receive and relay such alerts. Alerting posts are any intermediary facilities, which relay distress alert between their source and the responsible MRCC and may even include other MRCCs. Therefore, the aircraft or vessels in distress may use any of the aforesaid means available to attract attention, make their positions known and obtain help.

5.5.2 The distress alert can be activated through terrestrial and satellite based systems:-

(a) **Terrestrial Systems**

(i) VHF, MF, HF R/T.

(ii) VHF, MF, HF DSC.

(iii) VHF EPIRB (CH 70).

(iv) Telephone/ Mobile/ Fax/ Email.

(b) **Satellite Based Systems**

(i) COSPAS-SARSAT system.

(ii) INMARSAT system.

(iii) Distress Alert Transmitter (DAT).

(iv) SAT-AIS.

5.6 VHF, MF, HF RT

5.6.1 The ships/ crafts in distress announce the nature of distress and assistance required on RT on following international distress, urgency and safety RT frequencies.

(a) VHF - Channel 16.

(b) MF - 2182 KHz.

(c) HF - 4125 KHz, 6215 KHz, 8291 KHz, 12290 KHz and 16420 KHz.

5.7 Digital Selective Calling

5.7.1 Digital Selective Calling (DSC) is used for calling and replying and for transmitting, acknowledging and relaying distress alerts. It allows a specific station to be contacted and made aware that the calling station wishes to communicate with it and to indicate how to reply or what station to listen to for subsequent distress traffic. It also can make “all ships” calls. Follow-up communications are made on an appropriate non-DSC frequency. DSC radio users need to understand the basic operation of the radio, how DSC acts as an automated watch and the importance of registering the radio and keeping it on and tuned to the DSC channel. Channel 70 is used as a digital selective calling (DSC) channel in the maritime mobile service for distress, safety, calling and reply.

5.7.2 The relevant information in a DSC message is displayed at the receiving equipment and may be printed out if a printer is connected. The DSC system may be used to remotely operate a transceiver on board a ship if this equipment is designated for automated operation. Before the DSC routine call is transmitted it shall be verified that the frequency is free. On VHF this is done automatically by the equipment, which prevents transmitting until the frequency is free for other calls then distress and safety.

5.7.3 SOLAS ships sailing beyond range of a VHF DSC coast radio station must also have a MF DSC (2187.5 KHz) transmitter and watch receiver. In MF band frequency 2177 KHz is assigned for ship-to-ship DSC calling. The ship may call another ship on any routine DSC calling frequency in MF/ HF bands. If sailing beyond range of an MF DSC coast radio station, they must have an INMARSAT Ship Earth Station (SES) or an MF/ HF DSC transmitter and watch; receiver including narrow-band direct printing (NBDP). If operating outside INMARSAT coverage (i.e., in the polar areas), they must have the MF/ HF DSC capability.

5.7.4 One of the duties of the bridge watch keeper is to ensure that the VHF DSC is keeping automatic watch on Ch 70 and that the MF/ HF DSC is programmed to scan at least three of the six MF/ HF distress and safety frequencies; that is the 2 MHz, 8 MHz bands and one other frequency deemed to be suitable at the time.

5.7.5 If the distress alert is sent by DSC subsequent communications are always carried out on the distress frequency in the same band. The DSC also provides for urgency and safety category calls, which are sent on the appropriate distress and safety frequencies.

5.7.6 The distress activated through DSC contains MMSI number of ship in distress, nature of distress and subsequent mode of communication. The position in DSC can be fed automatically from GPS at regular intervals or updated manually in every watch. In case the position is not updated, the last position in DSC equipment will be transmitted. The alerts activated through DSC can be received by the DSC equipment fitted in other ships or shore stations. The stations on receipt of distress relay information to MRCC for coordination. The two types of distresses that can be activated by the ship craft are as follows:-

(a) **Designated Distress**. When unit in distress has time, then the present position, nature of distress and subsequent mode of communication can be inserted before activating distress.

(b) **Undesignated Distress**. When unit in distress has no time to insert present position and nature of distress, undesignated distress can be activated by pressing distress button provided on the equipment. The message so transmitted contains MMSI number of vessel and last updated position.

5.8 IMO Recognised Mobile Satellite Communication Services

5.8.1 IMO recognised mobile Distress and safety communication service provided by a mobile satellite service recognised by the International satellite service. The sets onboard SES is provided with a distress button. The distress is activated by pressing the button. The distress so activated is received at LES Ghaziabad, which in turn relays the message to the concerned MRCC for coordination.

5.9 Radio Communications Frequencies

5.9.1 The frequency bands allocated by ITU for the aeronautical mobile service include some in the High Frequency (HF) spectrum (3000 to 30000 KHz), the Very High Frequency (VHF) spectrum (30 to 300 MHz) and the Ultra-High Frequency (UHF) spectrum (300 to 3000 MHz). Initial transmissions of aeronautical distress messages normally are on the frequency being used for enroute communications with the aeronautical stations. SAR facilities proceeding to assist aircraft should establish communications on that frequency. The mode of communication between SAR facilities and the MRCC or MRSC can be included in the SAR local plan or SAR action plan maintained at MRCC/ MRSC and when a SRU is within radio range of distressed aircraft or vessel may establish the communications as per the plan.

5.9.2 Distress traffic includes all messages relating to immediate assistance required by persons, aircraft or marine craft in distress, including medical assistance. Distress traffic may also include SAR communications and on-scene communications. Distress calls take absolute priority over all other transmissions. Anyone receiving a distress call must immediately cease any transmissions, which may interfere with the call and listen on the frequency used for the call.

5.10 MF Communications

5.10.1 Medium frequencies (MF – 300 to 3000 KHz), seldom used by aircraft, are commonly used for maritime services. Silence periods on this frequency are observed for three minutes twice an hour, beginning at 15 and 45 minutes past each hour, to facilitate reception of distress calls and in the last 15 seconds of each period to announce distress, urgency or safety broadcasts.

5.10.2 The frequency 2182 KHz, an international maritime voice distress, safety and calling frequency, is also available in designated SAR aircraft. Silence periods on this frequency are observed for three minutes twice an hour, beginning on the hour and at 30 minutes past each hour, to facilitate reception of distress calls.

5.11 HF Communications

The frequencies 3023 KHz, 4125 KHz and 5680 KHz may be used for on-scene and SAR coordination communications when range dictates need for high frequencies. A wide range of maritime HF frequencies are allocated and subdivided for radiotelephony and radiotelegraphy. In certain areas radio telephone frequencies 4125 KHz and 6215 KHz are designated to supplement the frequency 2182 KHz for distress and safety purposes.

5.12 VHF Communications

5.12.1 The 121.5 MHz VHF AM aeronautical emergency frequencies normally used for calling or for emergencies. Where VHF is needed for a common VHF channel between aircraft and between aircraft and surface services involved in SAR operations, 123.1 MHz should be used when possible and 121.5 MHz used if an additional frequency is needed. An ELT or EPIRB transmitting on 121.5 MHz may make the use of this frequency impractical for communications. 121.5 MHz services are normally available at any aeronautical facility where needed to ensure immediate reception of distress calls. The frequency 156.8 MHz FM (Channel 16) is the international VHF maritime voice distress, safety and calling frequency. The frequency 156.3 MHz (Channel 06) may be used on-scene.

5.13 Vessel-Aircraft Communications

5.13.1 Vessels and aircraft may need to communicate with each other if either is in an emergency situation or performing SAR services. Since these occasions are

infrequent, civil aircraft may be reluctant to carry additional equipment for these purposes; incompatible equipment makes communications difficult.

5.13.2 The aeronautical mobile service uses amplitude modulation (AM) for VHF telephony while the maritime mobile service uses frequency modulation (FM). Except for SRUs, most small vessels normally cannot communicate on 3023 and 5680 kHz, or on 121.5 and 123.1 MHz.

5.13.3 The following frequencies may be used between vessels and aircraft when compatible equipment is available.

(a) **2182 kHz**. Many vessels, especially fishing vessels, and nearly all ships, are equipped to use 2182 kHz. Some transport aircraft can transmit on 2182 kHz, and aircraft designated for maritime SAR operations are required to carry this frequency. Aircraft may have difficulty calling up vessels on 2182 kHz, as vessels normally guard this frequency through automatic means and are alerted when the radiotelephone alarm signal is transmitted.

(b) **4125 kHz**. This frequency may be used by aircraft to communicate with ships for distress and safety purposes. All ships may not carry this frequency (most SOLAS ships and many other vessels do). If an aircraft needs help from a ship, SAR authorities can notify ships in the vicinity of the situation and ask them, if practicable, to set up watch on frequency 4125 kHz.

(c) **3023 and 5680 kHz**. These are HF on-scene radiotelephony frequencies for SAR. Designated SAR aircraft and most civil aircraft carrying HF equipment can operate on these frequencies; they may also be used by vessels (nearly all SOLAS ships) and coast radio stations engaged in coordinated SAR operations.

(d) **121.5 MHz AM**. This is the international aeronautical distress frequency. All designated SAR aircraft and civil aircraft carry equipment operating on 121.5 MHz; it may also be used by maritime craft. All aircraft are required to guard this frequency, flight-deck duties and equipment limitations permitting.

(e) **123.1 MHz AM**. This aeronautical on-scene frequency may be jointly used by aircraft and vessels engaged in SAR operations.

(f) **156.8 MHz FM**. This is the VHF maritime distress and calling frequency (Channel 16) carried by most ships; civil aircraft do not normally carry

radios that can use this frequency, but some aircraft that regularly fly over water do, usually in portable equipment. Designated SAR aircraft should be able to use this frequency to communicate with vessels in distress and assisting vessels.

5.13.4 Once alerted, MRCCs can often help aircraft make arrangements for direct communications with vessels, or provide a message relay. An aircraft in distress over an ocean area can be expected to contact an ATS unit about the situation on the frequency being used for air traffic control purposes. If ditching at sea is likely, the ATS unit will immediately advise the responsible RCC, which can alert ships in a position to assist and arrange an escort aircraft or other appropriate measures.

5.13.5 Regardless of whether the ship or the aircraft needs help, MRCCs can sometimes enable communications between them by asking the ship(s) to establish a listening watch on 4125 kHz if possible, or on 3023 kHz otherwise. The aircraft will attempt to establish communications on 4125 kHz, and if unsuccessful will try on 3023 kHz.

5.13.6 If the threat of ditching subsides, or the vessel no longer needs aid, all alerts must be cancelled immediately.

5.14 On Scene Communications

5.14.1 During a SAR operation for effective communication and co-ordination exclusive on scene communication channels are used between SRUs and the OSC. The SMC should specify an on scene communications channel for use by all the SRUs based on the equipment carried by the SRUs. If an on scene radio frequency for communications between air and surface facilities is involved in a SAR operation, distress and on scene frequencies may be used. Designated SAR aircraft operating in maritime areas must be equipped with a frequency for communicating with vessels during SAR operations. The SAR facilities both aircraft and ship are to be mandatory equipped to communicate on the following frequencies:-

(a) 2182 Khz International Voice Distress, Safety and Calling.

(b) 3023 Khz International Voice/ CW SAR on scene.

(c) 4125 Khz International Voice Distress, Safety and Calling backup frequency.

(d) 5680 Khz International Voice/ CW SAR on scene.

(e) 121.5 Mhz International Voice Aeronautical emergency.

(f) 406 Mhz ELTs and EPIRBs.

(g) 123.1 Mhz International Voice SAR on scene.

(h) 156.8 Mhz MMB CH-16 VHF FM International Voice Distress and International Voice Safety and calling.

(j) 156.3 Mhz MMB CH-06 VHF FM merchant ship and Coast Guard SAR on scene.

(k) 243.0 Mhz Joint/ Combine military voice aeronautical emergency and international survival craft and ELTs and EPIRBs.

(l) 282.8 Mhz Joint/ Combined on scene and DF.

(m) Portable DSC equipment on anyone frequencies: 2187.5 Khz, 8414.5 Khz or Ch 70 VHF.

5.14.2 The SAR authorities may also provide other communication equipment on scene as under:-

(a) SART compatible 9 GHz radar to SAR facilities.

(b) Disposable droppable radios operating on 123.1 MHz VHF/ M1 which can be dropped for survivors to use in communicating with SAR aircraft or SAR vessels on scene.

(c) Radio installation onboard SAR facility, which will actuate radiotelephone alarms aboard vessels in the vicinity to help establish communications with them more directly.

5.15 SAR Communication for Fishing Vessels

5.15.1 The State government should ensure that the fishing boats are equipped with at least one VHF set. The boats operating beyond the visual range of land are to operate in groups of five to ten & at least one boat to carry one HF set and a distress alerting mechanism onboard (e.g. Distress Alert Transmitter). The frequency is to be promulgated and communication guard is to be provided by the fisheries department or alternatively by a suitable monitoring authority.

5.16 International Safety Net System

5.16.1 The International Safety NET provides an automatic, global method of broadcasting SAR messages to vessels in both fixed and variable geographic areas. The Safety NET broadcasts can be received by the vessels equipped either with Safety NET receivers or INMARSAT-C CESs configured to perform Enhanced Group Calling (EGC) receiver functions. The Safety NET User's manual published by INMARSAT prescribes the procedures and exact coding which must be followed for preparing Safety NET broadcasts, including SAR broadcasts.

5.16.2 The International Maritime Satellite Organisation (INMARSAT) has authorized Indian Coast Guard for broadcasting Maritime Safety Information (MSI) through International Safety Net Service required for coordinating SAR operation vide IMO certificate no. 68 dated 10 Jan 2019. Accordingly, MRCCs in Indian SRR located at Mumbai, Chennai and Port Blair are having adequate infrastructure to relay any distress messages to the ships in area. MSI can be transmitted to a particular ship or a group of ships or all ships in a particular area in which SAR operation is being coordinated. The message format for transmission through International Safety NET System is placed at **Appendix E.**

5.17 Maritime Safety Information. MSI can be transmitted in following ways:-

(a) **MSI through Internet**. The MSI can be transmitted by logging on INMARSAT web site (http://msds.inmarsat.com/msds) on Internet and inserting the allotted PIN. The message is routed through Land Earth Station (LES) Ghaziabad for broadcast through satellite.

(b) **MSI through Telex**. The MSI can be transmitted through telex at MRCC (Mumbai), MRCC (Chennai) and MRCC (Port Blair). PIN numbers are allotted to reach MRCC against respective telex numbers. The message can be transmitted by dialing the telex number of LES Ghaziabad followed by PIN number.

(c) **MSI through INMARSAT London**. In case of failure of satellite system in the area of interest, request for transmission of MSI can be routed through INMARSAT London. INMARSAT London has allotted PIN for all MRCCs against respective telex numbers. Message can be transmitted by dialing INMARSAT London telex number followed by respective PIN.

(d) **MSI through LES Ghaziabad**. In case of failure to transmit MSI through Internet or Telex, request for transmission of MSI can be faxed to LES Ghaziabad.

(e) **MSI through NAVTEX.** The MSI can be transmitted through NAVTEX on 518 Khz and 490 KHz by MRCC(MB). The message is routed through National Data Centre (NDC), Ghatkopar.

5.18 NAVTEX

5.18.1 The NAVTEX is used to promulgate navigation and meteorological warnings and other safety related information to vessels. SAR personnel for SAR related broadcasts might use this facility. The types - of warnings, which SAR personnel may send over NAVTEX, include distress alerts and information about overdue or missing aircraft or vessels.

5.18.2 All SOLAS ships and vessels sailing within NAVTEX coverage areas are expected to carry 518 KHz NAVTEX receivers. Some may carry equipment to receive MSI over Safety NET in addition to NAVTEX. Therefore, it is appropriate and advisable to promulgate safety information over both NAVTEX and SafetyNET. Normally, the most practical way to handle SAR broadcasts over Safety NET is to send them to all vessels within a desired radius of a specified position.

5.18.3 The NAVTEX messages may be sent via satellite or terrestrial radio. It is also called as Narrow Band Direct Printing (NBDP) and MRCCs and MRSCs use this channel for shore-to-ship distress traffic. NAVTEX is used for notifying distress information in coastal areas only.

5.18.4 In India, the following places provide the NAVTEX transmission:-

Sl	**Station**	**BI**	**Broadcast Timings (UTC)**					
(a)	Veraval (Gujarat)	H	0110	0510	0910	1310	1710	2110
(b)	Vengurla Point (Maharashtra)	J	0130	0530	0930	1330	1730	2130
(c)	Muttam Point (Tamil Nadu)	L	0150	0550	0950	1350	1750	2150
(d)	Porto Novo (Tamil Nadu)	O	0220	0620	1020	1420	1820	2220
(e)	Vakalapudi (Andhra Pradesh)	Q	0240	0640	1040	1440	1840	2240
(f)	Balasore (Odisha)	S	0300	0700	1100	1500	1900	2300
(g)	Keating Point(Car Nicobar)	V	0330	0730	1130	1530	1930	2330

5.19 NAVAREA VIII Coordinator

5.19.1 The MSI for SAR purposes can also be promulgated to the ships in the concerned area through NAVAREA VIII Coordinator. These types of alerts are in addition to the regular warnings of hazards to navigation. The MSI thus transmitted will be covering the entire area under NAVAREA VIII irrespective of position of distress. MRCC/ MRSC to notify NAVAREA VIII coordinator required details of vessel, crew, position, type of distress, assistance required and instructions to Mariners. The request for cancellation of NAVAREA should also to be sent to NAVAREA VIII coordinator on completion of SAR case or on receipt of information from vessel that no more assistance required.

5.20 EPIRBs, ELTs and PLBs

5.20.1 EPIRBs, ELTs and PLBs are another means of alerting by using the Global Maritime Distress Safety System (GMDSS). This is used when other available means of alerting are inadequate. An EPIRBs/ ELTs/ PLBs transmits a signal using satellite automatically along with an updated position by the onboard GPS, which alerts SAR authorities and allows rescue facilities to home onto the distressed vessel directly. It is activated automatically upon exposure to the sea or manually. The types of maritime satellite EPIRBs are as follows:-

(a) 406 Mhz satellite EPIRBs whose signals are relayed via COSPAS-SARSAT satellites, Local User Terminals (LUTs) LOCATED AT Lucknow and Bangalore and Mission Control Centers (MCCs) to MRCCs or SAR Point of Contact (SPOC).

(b) INMARSAT EPIRBs whose signals are relayed via INMARSAT satellites and INMARSAT CESs to MRCCs. The INMARSAT-E EPIRBs transmit messages via INMARSAT geo stationary satellites and CESs to MRCCs. These beacons have registered coded signal identities. The position information from INMARSAT-EEPIRBs is derived either from integral equipment such as GPS or via interfaces with shipboard navigation equipment. The positions from ship board equipment cannot be updated after the EPIRB floats free. INMARSAT-E EPIRBs operate only within INMARSAT's coverage area, generally between 70 Deg latitude North and South.

(c) Non-satellite VHF EPIRBs on channel 70, which are used close to shore in lieu of, satellite EPIRBs where receiving stations are available.

(d) Most of the civil aircraft carry one or two types of ELT to alert SAR authorities to a distress situation. The 406 MHz satellite ELT and 406 MHz satellite Personal Locator Beacons (PLBs) are intended for use with COSPAS-SARSAT satellites.

(e) **ELT**. Most civil aircraft carry one of two types of ELT to alert SAR authorities to a distress situation.

(i) 406 MHz ELT for use with COSPAS-SARSAT satellites, required on aircraft on international flights.

(ii) 121.5 MHz ELT might be allowed/ required on domestic flights and is intended to be heard by other aircraft.

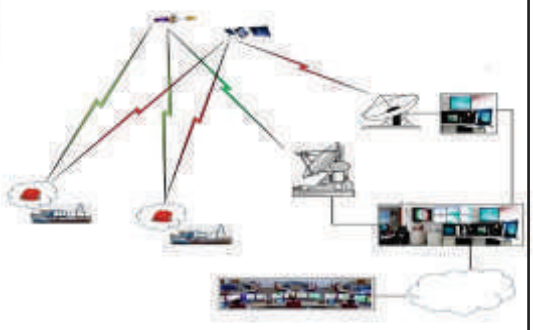
(iii) 243 MHz ELTs also transmit on 406 MHz.

(f) **PLB**. The 406 MHz PLB carried on a person and has similar characteristics to EPIRBs and ELTs.

(g) **Distress Alert Transmitter (DAT)**

(i) The DAT is a low cost GPS transmitter based fisheries alert system for use by fishermen at sea. The DAT transmitter transmits distress alert on 402.67 MHz and sends out continuous alerts every minute for first five minutes and then after every 5 minutes till it is switched off or the battery lasts. It is fitted to the fishing boat and after its activation transmits boat's coordinates from inbuilt Global Positioning System (GPS). Distress alerts are picked up by INSAT-3A satellite and relayed to the central HUB station presently at MRCC, Chennai. Template for medical emergency, fire onboard, sinking of boats and man overboard is provided in the equipment, can be reported to authorities on shore for immediate assistance.

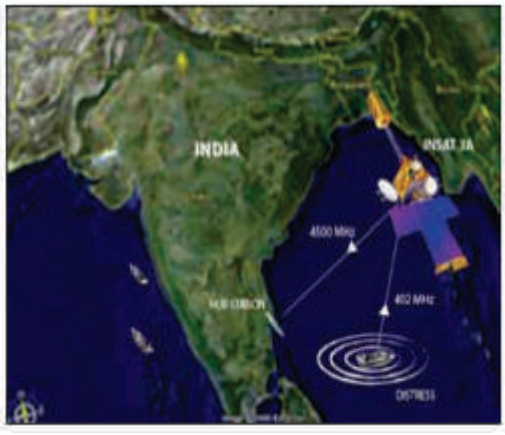
(ii) **Distress Alert Transmitter - Second Generation**. Space Applications Centre (ISRO) has developed the Distress Alert Transmitter - Second Generation (DAT-SG) which is a UHF transmitter based on NavIC module. This NavIC module supports position determination as well as reception of broadcast messages called as NavIC messaging service. The end users are mainly fishermen of small boats who can use this device for emergency messages along with reporting of position information. The unit



Network Block Diagram for DAT-SG

Features	
Modulation	**BPSK/QPSK**
Data Rate	**300bps**
Amp. Imbalance	**+0.3 dB**
Phase Imbalance	**+3 deg.**
Waveform	**BPSK with rate 1/2 FEC**
Output Power	**5W (37 dBm + 1 dB)**
Power Supply	**7.2V Primary Lithium Battery**

2nd Gen DAT



DAT Link

5.21 Mobile Telecommunications

5.21.1 Mobile telecommunication devices are extensively used by coastal communities viz. fishermen and coastal shipping for point to point communication while operating in mobile coverage area. When receiving an alert via mobile telephone, SAR personnel should obtain the following information:-

(a) Caller's complete mobile telephone number.

(b) Caller's mobile service provider.

(c) Roam number if needed to recall the user; other means of available communications.

(d) An alternative point of contact.

(c) Roam number if needed to recall the user; other means of available communications.

(d) An alternative point of contact.

(e) Battery level and if they have a back-up power source.

(f) Ask caller if they use a mobile telephone tracking or emergency app. If yes, ask them what type of app it is and to activate the emergency alert or locating function.

5.21.2 If an MRCC receives a report of a missing or overdue person, the SMC should ask the informant if the missing person(s) uses a tracking and locating app. If yes, the SMC should ask for details about the type and name of the app. corroboration of any GNSS position. **Appendix F** describes the procedure for mobile device location.

5.22 Vessel and aircraft actions on observing AIS-SART or AIS MOB device signals

5.22.1 Vessels at sea may observe AIS-SART or AIS MOB signals on navigation displays. Although AIS-SARTs and AIS MOB are locating signals, these signals may be related to a vessel or craft that has activated a device to draw attention to its location due to a distress situation and this should be investigated by RCCs. Therefore, AIS-SART and AIS MOB transmissions should not normally be ignored unless information is available that confirms that no response is necessary, e.g. it is known to be a false alarm.

5.22.2 The majority of vessels will have AIS directly linked to the electronic charting system which means that the SART should automatically be displayed on the navigation display. The AIS-SART and AIS MOB also display on any X band radar as a series of 12 dots for identification.

5.22.3 It is recommended that any vessel at sea or aircraft that observes AIS-SART or AIS MOB signals should report this to the nearest RCC immediately. The RCC will then take appropriate actions.

5.22.4 Vessels or aircraft should also be prepared to proceed to the location of the AIS-SART or AIS MOB signal, if it is safe to do so, to assist the RCC in

investigating the transmission. As AIS-SART and AIS MOB signals are likely to transmit over relativity short distances, e.g. up to 10 NM, a vessel should not be significantly delayed by doing this.

5.23 Maritime Identification Digits

5.23.1 Every country has been allotted with a unique three digit number called Maritime Identification Digit (MID). The MID forms a part of the Maritime Mobile Service Identity (MMSI) number and is useful to the SAR Coordinator for identifying the flag of the vessel. The MID for the Indian flags is 419.

5.24 Maritime Mobile Service Identity

5.24.1 Every vessel and coast station has been assigned a unique nine digit number called Maritime Mobile Service Identity (MMSI) number for easy identification.

(a) **Ship Stations**. Every ship has been provided with a unique MMSI number. The MID of the flag of the vessel forms the first three digits of the number. The MMSI number with two trailing "0"s indicates that the vessel can have direct access through regional/ national communication network. The MMSI number with three trailing "0"s indicates that the vessel can direct access through international communication network.

(b) **Group of Ship Stations**. In case of group of ships, the MMSI number begins with "0" followed by three digits MID number of the country.

(c) **Coast Stations**. The MMSI number of coast stations begin with two "0"s followed by the MID number of the country.

5.25 Global Aeronautical Distress and Safety System (GADSS)

5.25.1 The Global Aeronautical Distress and Safety System (GADSS) is a system of systems and procedures that will apply initially to commercial air transport operations, under ICAO Annex 6, Part 1 applicability. It may also extend to other civil air transport operations. The GADSS consists of the following main system components:-

(a) Aircraft tracking function.

(b) Autonomous distress tracking (ADT) function.

(c) Lost flight localisation and recovery function.

(d) GADSS information management procedures.

5.25.2 The objectives of the GADSS are to:-

(a) Ensure timely detection of aircraft in distress.

(b) Initiate timely SAR actions.

(c) Accurately direct SAR actions.

(d) Enable efficient and effective SAR operations.

(e) Ensure timely retrieval of Flight Recorder Data.

5.25.3 The aircraft tracking capability will enhance the ability for RCCs to obtain on an aircraft in an emergency situation but also to provide information on other aircraft in the area that may be able to assist, for example divert to a distress.

5.26 Aircraft Tracking

5.26.1 The operator shall establish an aircraft tracking capability to track aeroplane throughout its area of operations. The operator should track the position of an aeroplane through automated reporting at least every 15 minutes for the portion(s) of the in-flight operation(s) under the specific conditions.

5.26.2 The operator shall establish procedures for the retention of aircraft tracking data to assist SAR in determining the last known position of the aircraft.

5.26.3 Aircraft tracking is a core component of GADSS. The automated four-dimensional (latitude, longitude, altitude and time) position reports are to be transmitted at an interval of 15 minutes or less (recommended in all areas of operation and required in oceanic areas). Any missed aircraft position reports identified by the aircraft tracking system will be used in the provision of alerting service.

5.26.4 The frequencies to be used for communication during search and rescue is placed at **Appendix G**.

5.27 Reducing Response Time

5.27.1 To improve SAR communications, SAR authorities should consider initiatives like the following:-

(a) Ensure that suitable national legislation and regulations are in place and support international aeronautical and maritime mobile service developments.

(b) Reduce total communication facility shortfalls and costs by sharing facilities between organizations or States with similar needs, and to serve multiple units which are co-located, or which can be suitably connected.

(c) Establish written communications maintenance plans, and written policies for communications procedures, reports, files and logs.

(d) Use landline, cable, or microwave when possible for point-to-point or fixed communications.

(e) Use the most efficient signal characteristics and control techniques commensurate with required reliability, speed, and traffic volume for long-range communications and line-of-sight techniques for short-range communications.

(f) Provide compatible communications for civil and military facilities used for SAR to the maximum extent possible.

(g) Provide equipment and personnel adequate to handle both operational communications and distress, urgency and safety communications.

(h) Ensure that communications can be carried out rapidly with operating facilities, and that high-priority messages can be routed quickly.

(j) Ensure that personnel from different organizations are able to understand each other's communications, especially matters concerning priority and risk.

(k) Arrange for communications personnel to report observed frequency violations to enforcement authorities.

(l) Establish communications reliability goals for the coverage areas and assess performance.

(m) Institutionalize sufficient training for proper operation and administration of communication facilities.

(n) Ensure that commercial proprietary information, such as ship reports for SAR, remains proprietary and used only for SAR or safety purposes, to help safeguard continued availability of this information.

(p) Ensure that distress communications are always recognized and handled as a higher priority than logistic, administrative, training and routine operational communications.

(q) Where practicable, enable SAR personnel to communicate directly with potential craft in distress, including aircraft, ships, fishing vessels, recreation vessels and other types of marine craft.

(r) Provide comprehensive distress communications throughout SRRs, but especially along the coast and over land.

(s) Use automation techniques and phone patch capabilities to keep resource needs reasonable as workloads increase.

(t) Ensure that communications funding needs are included in SAR agency and SAR facility budget plans.

(u) Address personnel qualification and replacement needs from both a SAR and communications perspective.

(v) Prepare radio coverage charts.

(w) Develop written test and casualty restoration procedures.

(x) Cooperate with other organizations to provide disaster-recovery sites for each other for crucial alerting posts, computer centres and MRCCs.

5.28 First MRCC

5.28.1 The concept of ‘‘First MRCC’’ has been developed to show how an MRCC that receives a distress alert has responsibility to do what it can to acknowledge the alert, and arrange assistance, until it can identify another MRCC willing and better able to respond.

5.28.2 This same philosophy is applied when an MRCC receives an HF alert which may have been received by other MRCCs as well, or when other MRCCs may have also received an alert from the distressed craft from a different alerting device. Until it is known that another MRCC better able to respond has accepted SAR coordination duties, any MRCC receiving an alert should consider itself to be the ‘‘First MRCC’’.

CHAPTER 6

MARITIME AND AERONAUTICAL DISTRESS

CHAPTER - 6

MARITIME AND AERONAUTICAL DISTRESS

6.1 General Maritime and Aeronautical Distress

6.1.1 The Masters of the ships and the Pilots-in-command of the aircraft should not delay notifying the MRCC/ MRSC/ ATS unit, if a problem is or may be, developing which could involve need for assistance. This allows the MRCC/ MRSC/ ARCS to carry out preliminary and contingency planning that could make the critical difference if the situation worsens.

6.2 Sources of Distress Input

6.2.1 The distress message input can be received from any of the following sources:-

(a) Ship in distress directly.

(b) INMCC, Bangalore as relay.

(c) Other countries MRCC relays of EPIRB, HF DSC, and INMARSAT - C.

(d) LES, Ghaziabad INMARSAT- C relay.

(e) MRSC.

(f) MOC, Indian Navy.

(g) Agents/ Owner of the ship.

(h) Ships passing nearby the area.

(j) Aircraft over-flying near the distress unit.

(k) ATS/FIC/ ADIZ authorities.

(l) Local fishermen/ fishing association/ authorities.

(m) State/ Local administration/ Police authorities.

(n) International SAR authorities/ MRCCs of other nations picking up distress in Indian SRR through INMARSAT/ MF/ HF DSC/ EPIRB etc.

(p) DGCOM Centre (DG Shipping Communication Centre).

(q) Analysis from Coast Guard Coastal Radar Stations (ROC/ ROS)

(r) Information through Distress Alert Transmitter (DAT).

(s) AIS/ AFTN.

(t) NAVTEX Control Centre.

(u) NDC Ghatkopar.

6.3 Emergency Phases

6.3.1 Emergency phases are based on the level of concern for the safety of persons or craft, which may be in danger. Upon initial notification, a SAR incident is classified by the respective MRCC/ MRSC or Air Traffic Services (ATS) unit as being in one of three emergency phases, namely Uncertainty, Alert or Distress Phase. The emergency phase may be reclassified by the SMC as the situation develops. The current emergency phase should be used in all communications about the SAR incident as a means of informing all interested parties of the current level of concern for the safety of persons or craft which may be in need of assistance.

6.4 Uncertainty Phase

6.4.1 An Uncertainty phase is said to exist when there is knowledge of a situation that may need to be monitored or to have more information gathered, but that does not require dispatching of resources. When there is doubt about the safety of an aircraft, ship or other craft or persons on board or it is overdue, the situation should be investigated and information gathered. A communications search may begin during this phase. An Uncertainty phase is declared when there is doubt regarding the safety of an aircraft, ship or other craft or persons onboard.

6.4.2 For an aircraft, the Uncertainty phase is declared as follows:-

(a) No communication has been received from an aircraft within a period of thirty minutes after the time, a communication should have been received or from the time an unsuccessful attempt to establish communication with such aircraft was first made, whichever is the earlier.

(b) An aircraft fails to arrive within thirty minutes of the last estimated time of arrival (ETA) last notified to or estimated by air traffic services (ATS) units, whichever is the later, except when no doubt exists as to the safety of the aircraft and its occupants.

6.4.3 For ships or other craft, an Uncertainty phase is declared as follows:-

(a) Been reported overdue at its intended destination.

(b) Failed to make an expected position safety report.

6.5 Alert Phase

6.5.1 An Alert phase exists when an aircraft, ship or other craft or persons onboard are having some difficulty and may need assistance, but are not in immediate danger. Apprehension is usually associated with the Alert phase, but there is no known threat requiring immediate action. SRUs may be dispatched or other SAR facilities diverted to provide assistance if it is believed that the conditions might worsen or that SAR facilities might not be available or able to provide assistance if conditions worsen at a later time.

6.5.2 For overdue craft, the Alert phase is considered when there is a continued lack of information concerning the progress or position of the craft. SAR resources should begin or continue communication searches and dispatch of SRUs to investigate high probability location or overtly the craft's intended route. Vessels and aircraft passing through the area where the concerned craft might be located should be asked to maintain a sharp lookout, report all sightings and render assistance, if needed. An Alert phase is declared as follows:-

(a) Following the Uncertainty phase, subsequent attempts to establish communication with the aircraft, ship or other craft are failed or inquiries to other relevant sources have failed to reveal any news of that craft.

(b) An aircraft has been cleared to land and fails to land within five minutes of the estimated time of landing and communication has not been re-established with the aircraft.

(c) Information has been received which indicates that the operating efficiency of the aircraft, ship or other craft has been impaired, but not to the extent that a forced landing or distress situation is likely, except when evidence exists the safety of that aircraft and its occupants is in doubt.

(d) An aircraft is known or believed to be the subject of unlawful interference.

(e) A ship is under attack or threat of attack from pirates or armed robbers.

6.6 Distress Phase

6.6.1 The Distress phase exists when there is reasonable certainty that an aircraft, ship or other craft or persons onboard is in danger and requires immediate assistance. For overdue craft, a distress exists when communication searches and other forms of investigation have not succeeded in locating the craft or revising its ETA, so that it is no longer considered overdue. If there is sufficient concern for the safety of a craft and the persons aboard to justify search operations, the incident should be classified as being in the Distress phase. For aircraft, a distress phase is declared as follows:-

(a) Following the Alert phase, the further unsuccessful attempts to establish communication with the aircraft and more widespread unsuccessful inquiries point to the probability that the aircraft is in distress.

(b) The fuel on board is considered to be exhausted or to be insufficient to enable the aircraft to reach safely.

(c) Information is received which indicates that the operating efficiency of the aircraft has been impaired to the extent that a forced landing/ ditching is likely.

(d) Information is received or it is reasonably certain that the aircraft is about to make or has made a forced landing/ ditching, except when there is reasonable certainty that the aircraft and its occupants do not require immediate assistance.

(e) A ditched aircraft debris is inadvertently located as the result of a sighting or of homing on an ELT transmission and homing on SLB by SRU fitted with SONAR.

6.6.2 For ships or other craft, the distress phase is declared as under.

(a) Positive information is received that a ship or other craft or a person onboard is in danger and needs immediate assistance.

(b) Following the alert phase, further unsuccessful attempts to establish contact with the ship or other craft and more widespread unsuccessful inquiries point to the probability that the ship or craft is in distress.

(c) Information is received which indicates that the operating efficiency of the ship or other craft has been impaired to the extent that a distress situation is likely.

6.7 Distress Alert from a Vessel

6.7.1 In addition to facilities onboard for distress notification viz. VHF/ HF RT/DSC, EPIRB and distress call from IMO recognised mobile satellite service, 2182 kHz (Radiotelephony) and 156.8 MHz (VHF Channel 16) are used to transmit a distress alert from a vessel. In remote oceans areas, the distress call should also be transmitted on a 'ship-to-shore' HF circuits and INMARSAT terminals to the MRCC/ MRSC, especially when distress calls on 2182 kHz or Channel 16 are not replied by other stations.

6.7.2 If there is a doubt concerning the reception of the distress message, it should also be transmitted on any frequency available on which attention might be attracted such as an inter-ship frequency which may be in use in local areas. Before changing frequency, adequate time should be allowed for reply. In the event of failure of the ship's radio station, it may be possible to transmit a message using portable equipment, provided for use in survival craft.

6.8 Distress Alert from an Aircraft

6.8.1 The aircraft would normally notify an ATS unit, which should notify the concerned MRCC/ MRSC. SAR efforts for incident in the FIR are but outside the SRR will be provided after mutual discussion between the adjoining MRCCs. Aircraft would transmit blind on 121.5/ 243.0 MHz, if there were no response on the assigned enroute frequency. It may also set transponder to 7700 if facility is available. An aircraft in distress may use any means at its disposal to attract attention, make known its position and obtain help.

6.9 Vessel Distress Message

6.9.1 The initial distress message should comprise of as much information as possible. The timing of subsequent transmissions will be governed by the prevailing circumstances. In general, if time allows, a series of short messages will be preferable to one or two long ones. Important components of the distress message include the following:-

(a) The distress signal "MAYDAY".

(b) The name of the vessel in distress.

(c) The call sign or other identification.

(d) The MMSI (if the initial alert has been sent by DSC).

(e) The position, given as latitude and longitude, or if this is not known or if time is insufficient, in relation to a known geographical location or last plotted position.

(f) The nature of the distress.

(g) The kind of assistance required.

(h) Weather in immediate vicinity, wind direction, sea and swell, visibility.

(j) Time of abandoning ship.

(k) Number of crew remaining onboard.

(l) Number and type of survival craft launched.

(m) Emergency location aids in survival craft or in the sea.

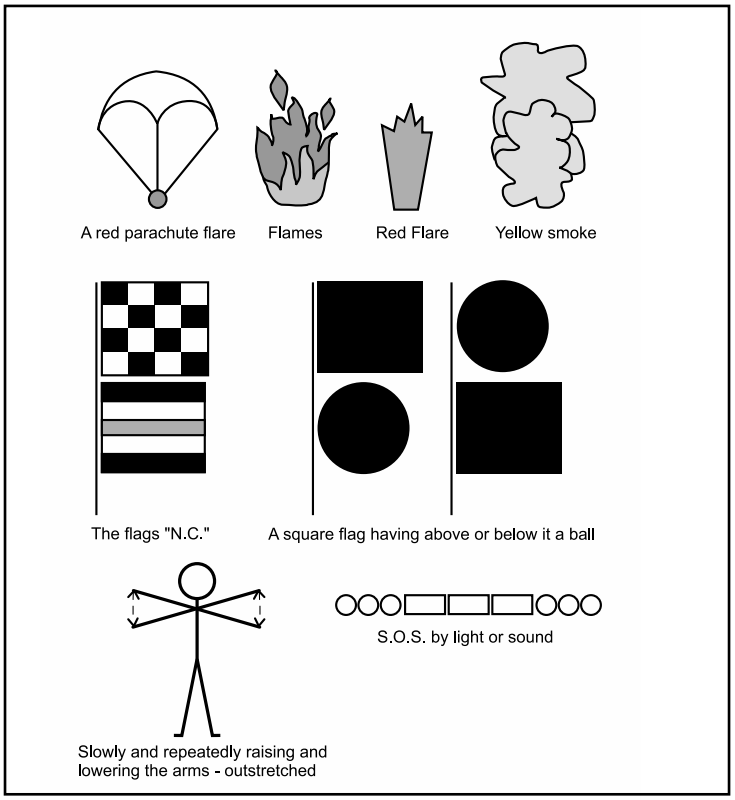
(n) Number of personnel injured seriously.

(p) INMARSAT numbers etc.

(q) Details of Agent/ owner with telephone no.

(r) Any other useful information

6.10 **Visual distress signals.** Visual international distress signals are shown below.



6.11 Additional Equipment

6.11.1 SOLAS ship requirements include two-way VHF radiotelephone apparatus and also survival craft Search and Rescue Radar Transponder (SART) to be placed on each side of the vessel, in a position ready to be taken on board a survival craft. The SART, after being switched on manually, is activated automatically by receiving radar pulses. It automatically sends out a series of pulses, which are displayed on the radar screen as a series of elongated blips, similar to a radar responder beacon (RACON) blip.

6.12 Methods of Distress Alert Notification/ Signals

6.12.1 The following are the spoken Emergency Signals and procedural words used by aircraft and vessels in distress. Any message headed by one of the following signals has precedence over routine messages. The signal is usually repeated three times at the beginning of the message.

(a) **Distress Signal.** MAYDAY (pronounced M' AIDER) is used to indicate that a mobile craft is in imminent danger and requests immediate assistance – for example, when a vessel has a person overboard and a master considers that further help is necessary. It has priority over all other communications.

(b) **Urgency Signal**. PAN-PAN (pronounced PAHN-PAHN) is used when the safety of a mobile craft is in jeopardy. The urgency signal PAN-PAN should be used when an unsafe situation exists that may eventually involve a need for assistance. It has priority over all except distress traffic.

(c) **Safety Signal.** SECURITE (pronounced SE-CURE-E-TAY) is used for messages concerning safety of navigation or giving important meteorological warnings. Any message headed by one of these signals has precedence over routine messages.

6.13 Overdue Vessel/ Aircraft

6.13.1 SAR procedures should be initiated if an aircraft or vessel becomes overdue or fails to make a report. For aircraft, this is usually accomplished through an ATS unit or the flight plan system. However, if radar communications are unexpectedly lost with an Instrument Flight Rules (IFR) or Visual Flight Rules (VFR) aircraft, SAR procedures may be initiated.

6.13.2 On receipt of the information from the appropriate agency that the vessel aircraft is overdue alert the SRUs available immediately. Complete preliminary communication (PRECOM) and execute extended communications (EXCOM) and gather maximum information possible including the following:-

(a) Date, time, point of departure, planned routes/area of operations, speed of advance, ETA and point of destination.

(b) Possible route deviation.

(c) Weather history and forecast along the proposed route/ area.

(d) Information from other sources like friends, relatives, associates and agents/ agencies.

(e) Date/ time of initial report/ Last known position (LKP).

(f) Other pertinent information like vessel's history of timely reporting/ arrival.

6.13.3 If the vessel is not located by the completion of EXCOM, when the situation deteriorates or when the unit or person is considered to be in grave or imminent danger the case is to be advanced to Distress phase. The other agencies and SAR authorities, which are capable of rendering assistance by providing SAR facilities also, be alerted regarding the overdue vessel distress phase.

6.13.4 SAR Co-ordinator is to designate SMC, to prepare search plan to dispatch SRU for initial search. Broadcast information on vessel overdue on radio channels and through ISN. Promulgate notices to mariners through Navarea VIII coordinator. If the overdue vessel is located later, close the case and cancel broadcast notices and NAVAREA-VIII. Notify the information to all concerned.

6.14 False Alerts

6.14.1 False alerts are any alerts received by the SAR system, which indicate an actual or potential distress situation, when no such situation actually exists. Some causes of false alerts include equipment malfunctions, interference, testing and inadvertent human error. A false alert transmitted deliberately is called a **hoax**.

6.14.2 With the advent of better and more alerting equipment, which transmits automatic pre-formatted data messages, the tendency for the numbers of false alerts received to increase is inevitable. If counter measures are not developed, this

will place increasing strain on the SAR system, unnecessary deployment of SRUs, bring increasing risk to SAR personnel and harm the credibility of alerting systems needed to inform the SAR system when help is needed. This will also involve waste of government exchequer.

6.14.3 Despite the above, it is essential that SAR personnel treat every distress alert as genuine one until they know for certain it is not an actual case of distress alert. For a false alert or an unnecessary SAR alert, a message should be sent by the MRCC/ MRSC to the appropriate authorities for follow up to prevent re-occurrence of similar false alerts. The follow up should include the person or persons responsible for the false alert and may include information such as the effort expended by the SAR organisation in response to the false alert.

6.15 Preventing False Alerts

6.15.1 SAR authorities should take all possible measures to prevent any activation of false alerts. The following steps are suggested to ensure prevention of the same:-

(a) Inform aircraft and vessel owners and operators about implications of the rising number of false distress alerts.

(b) Provision for the vessels to register all communications equipment related to SAR, and to ensure that this registration data is readily available to MRCCs/MRSCs.

(c) Follow up on unnecessary SAR messages.

(d) Consider establishing or using enforcement measures to prosecute those who inadvertently transmit a false distress alert without proper cancellation, or who fail to respond to a distress acknowledgement, due to misuse or negligence or separately transmit false alerts and deliberately transmit false alerts.

(e) Use the ITU violation reporting process for false distress alerts.

(f) Communications equipment operators are to be well informed on how to operate their equipment, the importance of avoiding false alerts and steps to be taken to prevent transmitting false alerts.

(g) Inform equipment approval authorities of false alert problems to draw their attention to testing and alerting functions of radio equipment during the type approval process.

(h) Urge companies installing radio equipment to train the users to ensure they become familiar with operation of the installed equipment.

(j) Investigate the cause when a specific model of communications equipment repeatedly transmits unwanted alerts and inform appropriate organisations.

(k) Surveyors and inspectors are to be informed about communications equipment and particularly how to operate and test it without transmitting a false alert.

(l) The operators are to be appropriately certificated for installed communications equipment.

(m) Manufacturers, suppliers, and installers of communications equipment are to be urged to provide clear and precise operating instructions that are easy to understand.

(n) The equipment is to be designed for distress alerting so that it will be impossible to transmit an alert unintentionally.

(p) The panel for emergency operation is separated from the one for normal operation, is fitted with a cover, and has colour coded switches, with standardized arrangements of control panels and standard operational procedures.

(q) Design test features so that the testing of equipment will not result in false distress alerts.

(r) When any communications equipment has been installed, necessary instructions are to be given to users, specifically pointing out the operating procedures.

(s) Any distress alert activation is to be indicated visually and/or aurally, showing that the equipment is transmitting a distress alert, until manually deactivated.

(t) Implement any appropriate technical and operational measures to avoid unwanted transmission of alerts.

(u) Ensure that the ELT or EPIRB handling procedures and installations, including the location on board the aircraft or vessel and the release and activation mechanisms, preclude unwanted activation.

(v) Design EPIRBs so that when they are out of their brackets they must also be immersed in water to activate automatically and when operated manually, a two-step activation procedure should be required.

(w) Consider ELT and EPIRB installation locations for new aircraft and vessels at early stages of the craft design and construction.

(x) Educate users of communications equipment and their employers to ensure the following:-

(i) All personnel responsible for sending a distress alert are to be instructed and are competent to operate all radio equipment aboard the aircraft or vessel.

(ii) Only persons responsible for communications are to operate the equipment during distress incidents.

(iii) Give necessary instructions and information to all crew members on how to send a distress alert.

(iv) The equipment testing is to be undertaken only under supervision of the person responsible for communications during distress incidents.

(v) The equipment testing or drills are never to be allowed to cause false distress alerts.

(vi) The encoded identities of satellite ELTs and EPIRBs, which are used by SAR personnel responding to emergencies, are to be properly registered in a database accessible 24 hours a day or automatically provided to SAR authorities.

(vii) The aircraft and vessel operators should confirm that their beacons have been registered with such a database to help SAR services to identify the unit in the event of distress and to rapidly obtain other information to help them respond.

(viii) Immediately update ELT, EPIRB, INMARSAT and DSC registration data. If necessary, reprogram the equipment codes of the aircraft or vessel change of ownership, name, flag, or similar information.

(ix) Install and maintain satellite ELTs and EPIRBs carefully in accordance with manufacturer's instructions and using qualified personnel.

(x) Avoid activating EPIRBs if help is already available. Use of Tester beacon is recommended for testing the EPIRB.

(xi) Once an EPIRB is switched on, whether accidentally or intentionally, the vessel should make every reasonable attempt to communicate with SAR authorities by other means to advise them of the situation before turning the EPIRB off.

(xii) After emergency use, if possible, retrieve and deactivate the EPIRB. When a 406 MHz distress beacon is damaged and needs to be disposed of or if an aircraft or vessel is sold for scrap or for any other reason a beacon will no longer be used, it is to be made in operable by removing its battery if possible and returning it to the manufacturer or demolishing it.

(xiii) Take measures, such as wrapping the ELT or EPIRB in tin foil, to prevent transmission of signals during shipment to the manufacturer for any reason and when the distress beacon is destroyed or demolished, ensure that the beacon is removed from registration lists.

(xiv) DG (Shipping) may initiate appropriate action against Indian Registered vessels activating repeated false alert.

(xv) DGCA may initiate appropriate action against Indian Registered aircraft activating repeated false alert.

6.15.2 DG (Shipping) Resolution A.814 (19) adopted on 22 Nov 1995 on Guidelines for avoiding of False Distress Alerts is self-explanatory.

CHAPTER 7

SAR COORDINATION

CHAPTER - 7

SAR COORDINATION

7.1 SAR System

7.1.1 The SAR system is an arrangement of components activated, as needed, to efficiently and effectively assist persons in potential or actual distress. The SAR system has the five components as discussed in earlier chapters. The distressed unit or the witness element functions as the alerting agency. The Coast Radio Stations, Coast Earth Stations or any other alerting facility, ships and aircraft on the scene or the other SAR resources functions as the relaying agency or responding agency. The SAR authority and the Maritime Rescue Coordination Centre or Maritime Rescue Sub Centre coordinates the entire operations in respective area of responsibility within the ISRR.

7.2 SAR Stages

7.2.1 The response to a SAR incident usually proceeds through a sequence of five stages. These stages are groups of activities typically performed by the SAR system in responding to a SAR incident from the time the system becomes aware of the incident until its response to the incident is concluded. The designated SAR stages define the nature of SAR assistance provided at any particular time. A specific mission may not necessarily include each and every stage. In some cases, the stages may overlap. The stages of the SAR are as follows:-

(a) **Awareness**. Knowledge by any person or agency that an emergency situation may exist.

(b) **Initial Action**. Preliminary action taken to alert SAR facilities and obtain amplifying information. This stage may include evaluation and classification of the information, alerting of SAR facilities, preliminary communication checks and extended communication checks and in urgent cases, immediate action from other stages.

(c) **Planning**. The development of operational plans, including plans for search, rescue and final delivery.

(d) **Operations**. Sending SRUs to the scene, conducting searches, rescuing survivors, assisting distressed craft, providing necessary emergency care for survivors and delivering casualties to medical facilities

(e) **Mission Conclusion**. Return of SRUs to a location where they are finally debriefed, refueled, replenished, remanded and prepared for other missions and compilation of documentation of the SAR mission by all SAR facilities.

7.2.2 The first two stages, Awareness and Initial Action, can be associated with any or all three of the emergency phases of Uncertainty, Alert, and Distress which are discussed below.

7.2.3 **Emergency Phases**. Emergency phases are based on the level of concern for the safety of persons or craft, which may be in danger. Upon initial notification, a SAR incident is classified by the respective MRCC/ MRSC or Air Traffic Services (ATS) unit as being in one of three emergency phases, namely Uncertainty, Alert or Distress Phase. The emergency phase may be reclassified by the SMC as the situation develops. The current emergency phase should be used in all communications about the SAR incident as a means of informing all interested parties of the current level of concern for the safety of persons or craft which may be in need of assistance.

7.2.4 **Uncertainty Phase**. An Uncertainty phase is said to exist when there is knowledge of a situation that may need to be monitored or to have more information gathered, but that does not require dispatching of resources. When there is doubt about the safety of an aircraft, ship or other craft or persons on board or it is overdue, the situation should be investigated and information gathered. A communications search may begin during this phase. An Uncertainty phase is declared when there is doubt regarding the safety of an aircraft, ship or other craft or persons onboard. For an aircraft, the Uncertainty phase is declared as follows:-

(a) No communication has been received from an aircraft within a period of thirty minutes after the time, a communication should have been received or from the time an unsuccessful attempt to establish communication with such aircraft was first made, whichever is the earlier.

(b) An aircraft fails to arrive within thirty minutes of the last estimated time of arrival (ETA) last notified to or estimated by air traffic services (ATS) units, whichever is the later, except when no doubt exists as to the safety of the aircraft and its occupants.

(c) For ships or other craft, an Uncertainty phase is declared as follows:-

(i) Been reported overdue at its intended destination.

(ii) Failed to make an expected position safety report.

7.2.5 **Alert Phase**. An Alert Phase exists when an aircraft, ship, or other craft or persons on board are having some difficulty and may need assistance, but are not in immediate danger. Apprehension is usually associated with the Alert Phase, but there is no known threat requiring immediate action. SRUs may be dispatched or other SAR facilities diverted to provide assistance if it is believed that conditions might worsen or that SAR facilities might not be available or able to provide assistance if conditions did worsen at a later time. For overdue craft, the Alert Phase is considered when there is a continued lack of information concerning the progress or position of a craft. SAR resources should begin or continue communications searches, and the dispatch of SRUs to investigate high-probability locations or overfly the craft's intended route should be considered. Vessels and aircraft passing through areas where the concerned craft might be located should be asked to maintain a sharp lookout, report all sightings and render assistance if needed. An Alert Phase is declared when:

(a) Following the Uncertainty Phase, subsequent attempts to establish communication with the aircraft, ship, or other craft have failed, or inquiries to other relevant sources have failed, to reveal any news of that craft.

(b) An aircraft has been cleared to land and fails to land within five minutes of the estimated time of landing and communication has not been re-established with the aircraft.

(c) Information has been received which indicates that the operating efficiency of the aircraft, ship or other craft has been impaired, but not to the extent that a forced landing or distress situation is likely, except when evidence exists that would allay apprehension as to the safety of that craft and its occupants.

(d) An aircraft is known or believed to be the subject of unlawful interference.

(e) A ship is under attack or threat of attack from pirates or armed robbers.

7.2.6 **Distress Phase**. An Alert phase exists when an aircraft, ship or other craft or persons on board are having some difficulty and may need assistance, but are not in immediate danger. Apprehension is usually associated with the Alert

phase, but there is no known threat requiring immediate action. SRUs may be dispatched or other SAR facilities diverted to provide assistance if it is believed that the conditions might worsen or that SAR facilities might not be available or able to provide assistance if conditions worsens at a later time. For overdue craft, the Alert phase is considered when there is a continued lack of information concerning the progress or position of the craft. SAR resources should begin or continue communication searches and dispatch of SRUs to investigate high probability location or overtly the craft's intended route. Vessels and aircraft passing through the area where the concerned craft might be located should be asked to maintain a sharp lookout, report all sightings and render assistance, if needed. An Alert phase is declared as follows:-

(a) Following the Uncertainty phase, subsequent attempts to establish communication with the aircraft, ship or other craft are failed or inquiries to other relevant sources have failed to reveal any news of that craft.

(b) An aircraft has been cleared to land and fails to land within five minutes of the estimated time of landing and communication has not been re-established with the aircraft.

(c) Information has been received which indicates that the operating efficiency of the aircraft, ship or other craft has been impaired, but not to the extent that a forced landing or distress situation is likely, except when evidence exists the safety of that aircraft and its occupants is in doubt.

(d) An aircraft is known or believed to be the subject of unlawful interference.

(e) A ship is under attack or threat of attack from pirates or armed robbers.

7.3 Awareness Stage

7.3.1 The first notification of the SAR system on an actual or potential SAR incident initiates the Awareness stage. Persons or craft in difficulty may report a problem, alerting posts may receive information, nearby personnel may observe an incident or an uncertainty may exist due to lack of communication or due to non- arrival. Anyone who becomes aware of an actual or potential SAR incident should report it immediately to the appropriate MRCC/ MRSC, if known or to the nearest MRCC/ MRSC, otherwise. If an SRU receives the information, it should also respond to the incident as appropriate.

7.3.2 All reports concerning an incident which are received before and during a SAR operation must be carefully evaluated to determine their validity, the urgency for action and the extent of the operation required. The evaluation must be thorough, decisions must be made and action taken as quickly as possible. If confirmation of uncertain information cannot be obtained without undue delay, the MRCC/ MRSC should act on a doubtful message rather than wait for verification. Reports of overdue craft present particular evaluation challenges as follows:-

(a) **Communication Delays**. In some areas of the ISRR, communication delays may prevent timely reports of positions and arrivals. Trends in delays should be kept in mind by the MRCC or MRSC when estimating the significance of a report to prevent unnecessary alerts of the SAR services.

(b) **Weather Conditions**. Adverse weather may contribute to communication delays or deviations from flight or voyage plans.

(c) **Habits of Pilot or Captain**. Some pilots-in-command or Masters of the vessels are known to react in a certain manner in certain circumstances. Knowledge of their habits, including preferred routings, may provide guidance in the evaluation of an incident and the subsequent planning and execution of search operations.

7.3.3 **Air Traffic Services Units**. ATS units receive information on most aircraft flights and are periodically in contact with them. Most of this information will come from aircraft reporting directly to ATS units. An aircraft emergency and its development is therefore likely to come to their notice first. It is for these reasons that each ATS unit provides alerting services to all aircraft flights known to it and Area Control Centres (ACC) and Flight Information Centres serve as a collecting point for all information concerning an aircraft emergency within its Flight Information Region (FIR). An ATS unit will usually notify its associated MRCC/ MRSC when an aircraft is actually or likely to be in a state of emergency. MRCC/ MRSC may seek undermentioned details from RCC in case of any aeronautical casualty at sea. However, when the nature of the emergency is such that local rescue facilities can deal with it, such as when an incident occurs at or near an aerodrome and inland areas, the MRCC/ MRSC may not be informed. The notification from an ATS unit to an MRCC/ MRSC will contain information, if available, in the order listed below:-

(a) UNCERTAINTY, ALERT or DISTRESS as appropriates to the phase of emergency.

(b) Agency and person calling.

(c) Nature of the emergency and type of assistance required.

(d) Significant information from the flight plan.

(e) Unit, which made last contact, time and frequency used.

(f) Last position report and how the position was determined.

(g) Colour and distinctive marks of the aircraft in difficulty.

(h) Time of communication with the ship or craft.

(j) Position or last known position of the ship or craft.

(k) Description of the ship or craft.

(l) Intentions of the captain.

(m) Number of POB if known.

(n) Any other information.

7.4 Notification by Other Sources

7.4.1 All persons are encouraged to report any abnormal occurrence they have witnessed or heard about. Notification that an aircraft has crashed or an aircraft, ship or other craft is overdue or in a state of emergency, may therefore reach an MRCC/ MRSC from any source, either directly or relayed through an alerting post. The following points are to be kept in mind when notification of distress is received from other sources.

(a) A record of events should be maintained by the MRCC/ MRSC. A separate log is to be maintained for each incident to record all information as it is received. This could be either in full or by reference to other permanent records such as separate reports, forms, folders, charts, telegrams, recorded radio frequencies and telephones and recorded radar data.

(b) The initial notification should be entered on a standard Incident Processing form. This form should be available at MRCC, MRSC, ATS units and other alerting posts as necessary. It is used to obtain the important information at first contact since it may be impossible or too time-consuming to obtain such information later. Its use will prevent the loss of details. The form lists the address of the reporting source to help assess the reliability of the report and for obtaining additional information.

(c) After evaluating all available information and if an emergency phase is declared, the MRCC/ MRSC should immediately inform all appropriate authorities, centres, services or facilities.

(d) When more than one MRCC may have received the distress alert, the concerned MRCCs should quickly coordinate and each should advise the other of the action it has taken on the alert. This can be done by any practical means, including IMO recognised mobile satellite services or AFTN through ATS. This especially applies to an initial COSPAS-SARSAT alert where the A and B positions can be in different SRRs.

7.5 Initial Action Stage

7.5.1 The Initial Action stage is when the SAR system begins response, although some activities, such as evaluation, may begin during the preceding Awareness stage and continue through all stages. Initial action may include SMC designation, incident evaluation, emergency phase classification, SAR resources alert and communication searches. Since no two SAR operations follow exactly the same pattern, it is not possible to develop comprehensive procedures that apply at all times. INDSAR surface picture may be obtained from MRCC (MB). Basic procedures, as outlined below, may be adopted for each phase of emergency. These procedures should be interpreted with flexibility as many of the actions described may be performed simultaneously or in a different order to suit specific circumstances.

7.6 Uncertainty Phase Initial Actions

7.6.1 When an Uncertainty phase has been declared by the MRCC/ MRSC/ ATS unit, the following actions are to be taken:-

(a) SAR Coordinator is to immediately appoint SMC and inform appropriate SAR authorities, centres, services and facilities of this action. The identity of the MRCC or MRSC where SMC functions are being performed for an incident should never be in doubt. One MRCC or MRSC may request another to assume the role of SMC, whenever such a change will aid the response effort.

(b) Verify the information received, if necessary and if it does not cause any undue delay.

(c) When no flight plan has been filed or, in the case of ships or other craft, no information is available on the intentions of the captain, attempt to obtain information from which the route and times of departures and arrivals of the aircraft, ship or other craft may be reconstructed.

(d) Maintain close liaison with the appropriate ATS or CRS facility, so that, new information, such as that obtained through a communication search, verification of flight plan or review of weather information passed to the pilot before and during the flight will be available immediately for evaluation, plotting, decision making. This is also to avoid duplication of action.

(e) Plot the actual track of the craft involved, as far as it is known and the intended or estimated track beyond that point, making use of all relevant information.

(f) Conduct a communication search.

(g) For ships or other craft, send Urgency broadcast via NAVTEX and Safety NET requesting ships to keep a lookout by all means available for missing or overdue ships or other craft. Promulgate NAVAREA by notifying NAVAREA VIII coordinator.

7.6.2 **Communication Search**. The communication search can be conducted by two primary methods and the procedures/ actions are as follows:-

(a) Attempt to communicate with the aircraft, ship or other craft by radio on all appropriate frequencies.

(b) Determine its most probable location by making inquiries at aerodromes (including the aerodrome of departure) and other locations where an aircraft might have landed or at locations where a ship or other craft might have stopped or drifting (including the point of port of departure) and also by contacting other appropriate sources, e.g., aircraft known or believed to be on the same route or within communication range, vessels at sea which may have sighted the ship or craft, ship reporting systems that may provide SURPICs and other persons who have knowledge of the intentions of the pilot-in-command or ship's Captain, such as the craft's operating authority.

(c) When the communication search or other information received indicates that the aircraft, ship or other craft is not in distress, the MRCC/ MRSC

will close the incident and immediately inform the operating agency, the reporting source and any alerted authorities, centres, services or facilities. However, if apprehension regarding the safety of the aircraft and its occupants continues, the Uncertainty phase should progress to the Alert phase.

7.7 Alert Phase Initial Actions

7.7.1 An Alert phase may be declared by a MRCC/MRSC/ATS unit. In case of an aircraft in distress, it can pose added difficulties. If SAR operation by aircraft is probable, the MRCC/ MRSC may need to give an earlier alert to SAR resources or advise MRCCs along its intended route or dispatch an escort aircraft, whenever possible. Upon the declaration of an Alert phase for aircraft, ships, other craft or persons, recommended MRCC/ MRSC actions are described below:-

(a) Initiate or continue any appropriate or incomplete actions normally performed during the uncertainty phase. It must be ensured by SAR Coordinator that an SMC has been appointed and that all interested parties have been informed of this action by SMC.

(b) Enter all the incoming information and progress reports, details of actions and subsequent developments in the diary of events.

(c) Verify the information received.

(d) Obtain information about the aircraft, ship or other craft from sources not previously contacted such as communication stations associated with radio navigation aids, radar facilities, direction finding stations and any other communication stations which might have received transmissions from the aircraft, ship or other craft. Request these facilities to guard the specified radio channels. Also contact all possible landing or stopping points along the intended route and other agencies and facilities included in the flight or voyage plan, which may be capable of providing additional information or verifying information on hand.

(e) Maintain close liaison with associated ATS units, and similar alerting posts so that any new information obtained from other aircraft and ships will be made available immediately for evaluation, plotting and decision making and so that duplication of effort can be avoided.

(f) Plot relevant details obtained through the actions described above on an appropriate map or chart to determine the probable position of the aircraft,

ship or craft and its maximum range of action from its last known position and plot the positions of any ship or craft known to be operating in the vicinity.

(g) As appropriate, initiate search planning and report any action taken to the associated ATS unit.

(h) Whenever possible, communicate all information received and action taken to the craft's operating agency, owner or agent.

(j) Thoroughly evaluate the craft's intended route, weather, terrain, possible communication delays, last known position, last radio communication and operator's qualification.

(k) For aviation incidents, estimate fuel exhaustion time and note the aircraft's performance under adverse conditions.

(l) Request assistance from ATS facilities that may assist by passing instructions and information to the distressed craft or to the craft reporting the distress. The craft operating in the vicinity of the distress can also be informed of the nature of the emergency. Also monitor and keep the MRCC/ MRSC informed on the progress of any craft of which the operating efficiency has been impaired to the extent that a distress is likely.

(m) When information received indicates that the aircraft, ship or other craft is not in distress, the MRCC/ MRSC will close the incident and immediately inform the operating agency, and any alerted authorities, centres, services or facilities.

(n) If the craft has not been located when all efforts have been completed or if the time of an aircraft's estimated fuel exhaustion has been reached, whichever occurs first, the craft and its occupants should be considered to be in grave and imminent danger. The alert phase should then progress to the distress phase. The decision to declare the distress phase should be taken without any undue delay and on the basis of past experience with similar situations.

7.8 Distress Phase Initial Actions

7.8.1 A distress phase may be declared by an ATS unit MRCC/MRSC, The SAR system may be able to respond quickly by dispatching SAR facilities and effecting the rescue. If a search is required and upon the declaration of the distress phase the MRCC/ MRSC should take the following actions:-

(a) Initiate or continue any appropriate or incomplete actions normally performed during the uncertainty and alert phase. In particular, ensure that SMC has been appointed and that interested parties have been informed of this action.

(b) If normal radio or satellite communication are unavailable or not connecting, and terrestrial telecommunications are likely to be within range, attempt or make calls, texts or emails to any distress person(s) known to carrying a mobile telecommunication device.

(c) Examine the detailed plans of operations for the conduct of the SAR operations in the area.

(d) Determine the availability of the SAR facilities to conduct SAR operations and attempt to obtain more facilities, if the need for them is anticipated. Check vessel tracking systems (e.g. AIS/ LRIT/ VMS and VTS) for vessels which may be able to assist.

(e) Estimate the position of the distressed craft, the degree of uncertainty of this position and determine the extent of the area to be searched.

(f) Develop a search action plan or rescue planning as appropriate, for the conduct of the SAR operation and communicate the plan to the appropriate authorities.

(g) Initiate the action and pass relevant details of the plan to the concern MRCC/ MRSC/ ATS unit, for transmission to the distressed craft or to the craft reporting the distress or to the SAR resources. Also inform all the MRCCs and MRSCs along the intended route of the distressed craft as well as those whose SRRs are within the maximum radius of action as determined from the last known position (the possibility area).

(h) Amend the plan as the operation develops.

(j) Notify the State of registry of the aircraft or the owner or agent of a ship or other craft.

(k) Notify the appropriate accident investigation authorities.

(l) Request at an early stage such aircraft, vessels, or other services not specifically included among SRUs, if in a position to do so, to maintain a listening watch for transmission from the distressed craft, from survival radio equipment or from an ELT or EPIRB. Also direct them to assist the distressed craft as far as practicable and inform the MRCC/ MRSC of any developments.

(m) Notify the distressed craft's operating agency and keep it informed of developments.

(n) When the distressed craft has been located and the survivors rescued, the MRCC/MRSC will terminate the SAR operation, close the case and immediately advise the operating agency, the reporting source and any alerted authorities, centres, services or facilities as applicable.

(p) IMAC/NC³I node may be consulted to identify the last position and track of vessel as per AIS transmission received from SAIS in high seas.

(q) IMAC/ NC³I node may be consulted to identify the vessel in vicinity to render immediate assistance.

7.9 SAR Planning Stage

7.9.1 Search planning is necessary when the location of the distressed craft is not known or significant time has elapsed since the last known position of the search object. The planning is undertaken for each search effort and repeated until either the survivors are located and rescued or evaluation of the situation indicates that further searching would be futile.

7.9.2 The SMC is responsible for developing and updating the search plan. The plan may involve a single or multiple SRUs searching for several days depending upon the updated information. Many factors influence the movement of the search objects. The SMC ascertains the impact of these factors to determine the area to search and the methods to be used, evaluates the numbers and capabilities of the available SRUs and determines the compromise between the search area size and search effectiveness as necessary. The success of the search plan depends upon the planner's ability and judgment capabilities and the effectiveness of the SRU. The planning involves the following steps:-

(a) Evaluation of the situation, including the results of any previous searches.

(b) Estimation of the distress incident location and probable error of that estimate.

(c) Estimation of the survivors' movements after the distress notification and probable error of that estimate.

(d) Use of these results to estimate the most probable location (datum) of the survivors and the uncertainty of that position including the probable error of that position.

(e) Determinations of the best way to use the available search facilities so as to maximise the chances of finding the survivors.

(f) Determination of search sub areas and search patterns for assignment to specific SRUs.

(g) Providing a search action plan, which includes the current description of the situation, search object description, specific search responsibilities to each SRU, on scene coordination instruction and search facilities reporting requirements.

(h) Weather forecast and period of forecast.

(j) SAR facilities on scene.

(k) Position of ship is not known, the track of ship may be discerned on the CSN node to identify the location of distress and assess the SRR.

7.10 Operations Stage

7.10.1 The SAR operations stage encompasses all activities that involves the search for the distress vessel/ craft/ person, providing assistance and transferring to safe place on effective conduct of rescue. During this stage the SMC assumes monitoring and guidance role so as to ensure the search plan is received, understood and complied by the SAR facilities. The MRCC/ MRSC staff will be spending most of this stage in planning searches and subsequent searches based on the updated information from the scene and on assumption the present search will be unsuccessful.

7.11 Conclusion Stage

7.11.1 SAR operations enter conclusion stage when anyone of the following occurs:-

(a) The information is received that the vessel/ craft/ aircraft or persons reported in distress/ subject to SAR incident are not in distress any longer.

(b) The vessel/aircraft/ person for whom SAR facilities were searching, have been located and the survivors rescued during the operation.

(c) During the distress phase the SMC determines that further search would be of no avail because the area has been adequately searched and all the probability areas have been thoroughly investigated or when there is no longer any reasonable probability of survivor being located.

7.12 Responsibilities of Designated MRCC/ MRSC

7.12.1 Typically, an MRCC/ MRSC will receive a distress alert and assume responsibility for SAR co-ordination for that incident. However, there may be times when the First MRCC/ MRSC to receive the distress alert will not be the responsible MRCC/MRSC, such as when the distress is in another SRR. There should be no undue delay in initiating action while determining the responsible MRCC/ MRSC. Figure 7.1 depicts the recommended actions of the "First MRCC" that receives the distress alert. The following paragraphs provide guidance on the responsibilities of that MRCC/ MRSC.

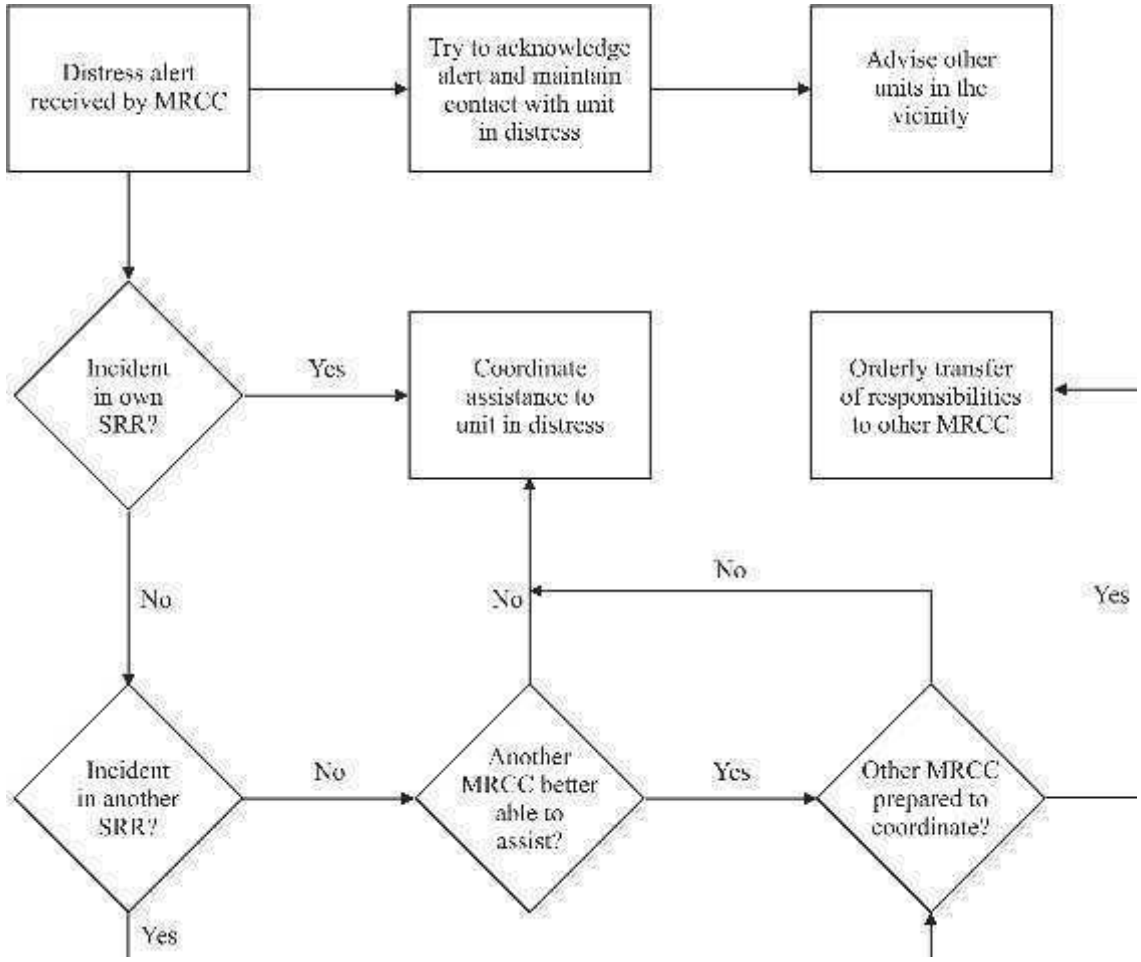


Figure 7.1 - Actions of the "First MRCC"

7.12.2 **When Position of Aircraft, Ship or Craft is Known**. Any MRCC/ MRSC receiving an alert should assume responsibility until coordination with other MRCC/ MRSC takes. Place and the appropriate MRCC/ MRSC assume the

responsibility. When the position of the distressed craft is known, the responsibility for initiation of a SAR operation will be that of the MRCC or MRSC in whose area of jurisdiction the craft is located. When the MRCC or MRSC recognizes that the distressed craft is continuing its flight or voyage and may leave the SRR for which he/ it is responsible, it should take the following actions.

(a) Alert the concerned MRCC/ MRSC associated with the planned or intended route of the distressed craft and pass on all information.

(b) Continue coordination of the SAR operation until it has been notified or confirmed by the adjacent MRCC or MRSC that the distressed craft has entered its SRR and that it is assuming responsibility. When transferring the SAR operation to another MRCC or MRSC, the transfer should be documented in the MRCC/ MRSC Diary of events and Operations logbook.

(c) Remain ready to assist until informed that assistance is no longer required.

7.12.3 **Position of Ship, Other Craft or Aircraft is not Known**. When the position of the distressed craft is unknown, the MRCC or MRSC, should assume responsibility for SAR operation and consult MRCC/ MRSC along the route of the craft concerning which MRCC/ MRSC will assume primary responsibility and concerned SAR coordinator will designate an SMC. Unless otherwise agreed among the MRCCs or MRSCs concerned, the MRCC or MRSC assuming responsibility should be determined as follows:-

(a) If the last reported position of the distressed craft falls within an SRR, the MRCC or MRSC responsible for that SRR should assume responsibility for coordinating the response and the SAR operation.

(b) If the last reported position falls on the line separating two adjacent SRRs, the MRCC or MRSC responsible for the SRR towards which the distressed craft was proceeding should assume SAR coordination responsibilities.

(c) If the craft was not equipped with or not under obligation to maintain two way radio communication, the MRCC or MRSC responsible for the SRR containing distress craft intended destination should assume coordination responsibilities.

7.13 Transferring Responsibilities between MRCCs and MRSCs

7.13.1 When transferring the co-ordination of an SAR operation to another MRCC or MRSC, the transfer should be documented in the MRCC or MRSC log. The initiating MRCC may invite the other MRCC to take over responsibility or the other MRCC may offer to take over responsibility. The responsibility is retained by the initiating MRCC until the other MRCC formally accepts responsibility. All participating SAR units are to be advised of the transfer.

7.13.2 Procedures to transfer SMC responsibility to another MRCC should include Personal discussion between the SMCs of both MRCCs concerned; and exchange of data using SITREP form including full details of action taken. Details to be included in the process of transfer between MRCCs should be as follows:-

Date and time of transfer:

From (MRCC):

To (MRCC):

1 Identity of casualty.

2 Position.

3 Number of persons in distress.

4 Description of casualty.

5 Weather on scene.

6 Initial actions taken.

7 Areas already searched (including POD).

8 Alerted units.

9 Current/present search in sub-areas.

10 Endurance of existing SAR units on scene.

11 Availability of SAR units on scene (hours/ days).

12 Communication plan.

13 Confirmation that all participating SAR units have been advised of the transfer of the responsibility.

7.14 MRCC Procedures for Requesting SAR Facilities

7.14.1 When an MRCC, at the request of another MRCC, provides facilities to assist in SAR operations, the MRCCs should agree upon position, start time on-scene, expected time on-scene, communications, operational limitations, and time of assumption of coordination responsibility by the requesting MRCC. The MRCCs should also agree upon how the SAR facilities will be briefed and tasked. The MRCC providing the facilities will advise them of these procedures. Once the SMC has assumed co-ordination of the SAR facilities, it will keep the MRCC which provided the facilities informed of progress.

7.15 Position of Distress Outside Indian SRR

7.15.1 When the MRCC/ MRSC receives distress information and on plotting if it is continued outside Indian SRR, it should be immediately notified to the appropriate SAR authority of that country/ MRCC or MRSC and should take all necessary actions to coordinate the response until the appropriate MRCC/ SAR authority of that country assumes the responsibility. The procedures to transfer SMC responsibilities to another MRCC of concerned country should include the following:-

(a) Person to person discussion between the SMCs of both MRCCs/ SAR authorities concerned is essential.

(b) The initiating MRCC/ SAR coordinating authority may invite the concerned MRCC/ SAR authorities to take over the responsibility or the other MRCC/ SAR authority may offer to take over responsibility.

(c) Responsibility is retained by the initiating MRCC/ SAR coordinating authority until the other MRCC/ SAR authority formally accepts responsibility.

(d) Full details of action taken are to be passed between two MRCCs/ SAR authorities.

(e) Relay distress to concerned MRCC/ SAR authority with copy to vessel distress/ company/ owner for coordinating further SAR operation.

(f) The distress relay to contain all available details of vessel.

(g) In case of aircraft in distress the same is to be intimated to the appropriate ATS/ FIR authorities also.

(h) Transfer of SMC responsibility recorded by both SMCs in the MRCC operations log and diary of events and all involved SAR facilities are advised of the transfer.

(j) In case of aircraft in distress the same is to be intimated to the appropriate ATS/ FIR authorities also.

7.15.2 In case of coordination during aeronautical contingency at sea, concerned MRCC and aeronautical RCC under whose area of responsibility the incident has occurred will coordinate. Indian Coast Guard and Airports Authority of India have entered into Memorandum of Understanding (MoU) between MRCCs and respective RCCs for effective coordination of SAR related communication, information sharing and coordination of services for any contingencies within the Indian SRRs and FIRs.

7.16 Disembarkation of person rescued at sea

7.16.1 Both the International Convention on Safety of Life at Sea 74 (SOLAS) and the SAR 79 convention state that States must arrange for the disembarkation of person rescued at sea as soon as reasonably practicable. The place of safety is described as a location where rescue operation is considered to terminate, where the survivor's safety or life is no longer threatened, and the care is provided and the transportation arrangements are made. Care should be taken to distinguish the Asylum Seekers or Refugees trying to gain entry into our country which must be handled in consultation with MEA/ MHA, Immigration, Customs and other relevant authorities and may also include involvement of UNHCR officials if the situation warrants. The IMO guidelines MSC Res 167 (78) on the treatment of Person Rescued at Sea and the IMO/ UNHCR Practical Guide on Rescue at Sea is a useful guide to shipmaster, insurance companies, ship owners, Government authorities during the post rescue phase actions. The IMO guidelines state that the Government responsible for the SRR in which survivors were recovered is responsible for providing a place of safety or ensuring that such a place of safety is provided.

7.16.2 Indian Coast Guard generally handover the rescued person at sea to the concerned ship agent, aircraft agent to deal with repatriation formalities in case of foreigners, who further deal with relevant Government agencies for their repatriation. In case of Indian fishermen, such person rescued at sea are handed over to the Local Police, Coastal Security Police, Fisheries department or family member as deemed necessary.

CHAPTER 8

TRAINING AND EXERCISES

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8.1 Training, Qualification and Certification

8.1.1 The importance of thorough training for all personnel employed on SAR missions are crucial for effective SAR response and conduct of operations. The purpose of training is to meet SAR system objectives by developing SAR specialists. Officer-in-Charge (Oi/C) MRCC/ SMCs and MRCC/ MRSC staffs need specific training in watch keeping, coordination of assorted resources, search planning and rescue planning. SAR coordinator have the responsibility to ensure that the overall training programme is effective. It will normally be the responsibility of the Officer-in-Charge (Oi/c) MRCC to ensure that all SAR service personnel reach and maintain the required level of competence. Training in itself can provide only basic knowledge and skills. A good training programme produces true professionals, personnel who can do it right the first time. The purpose of training is to meet SAR system objectives by developing SAR specialists.

8.1.2 Since considerable experience and judgement are needed to handle typical SAR situations, necessary skills require significant time to master. Training can be expensive. Poor training is even more expensive and can result in poor operational effectiveness, which can result in loss of lives of SAR personnel, lives of those in distress and loss of valuable facilities. Quality of performance will match the quality of training. Efforts to ensure professionalism may even extend to career development actions prior to assignment to SAR duties, ensuring SAR assignments of sufficient length to develop expertise and taking advantage of SAR experience in subsequent assignments.

8.2 Special Training for SAR

8.2.1 Training is critical to performance and safety. The SAR system should save those in distress when it can, and also use training to reduce risks to its own valuable personnel and facilities. Training personnel in making sound risk assessments will help to ensure that these trained professionals and valuable facilities remain available for future operations. The MRCC and RSC have particularly important duties. Upon completion of training, the prospective RCC watch stander should

undergo qualification procedures. MRCC staff should be fully qualified in SAR incident analysis, search planning and SAR operations management.

8.2.2 All SAR specialists need some training, in particular, the SCs, SMCs, and OSCs. Operational facilities which need training include:-

(a) MRCCs and MRSCs.

(b) Aeronautical units.

(c) Maritime units.

(d) Land units.

(e) Specialized units (Para rescue, paramedical, desert rescue, mountain rescue, urban SAR teams that deploy to disasters), divers, etc.

(f) Supply depots.

8.2.3 An individual, a group or multiple groups may be trained. Each person should have had previous training to perform individual tasks. Where the individuals integrate into teams, team training is required so that the individuals can support the team effort. Where teams integrate, multiple team training is required to support the overall effort. An example of multiple team training is SRUs training together.

8.2.4 The aviation and maritime communities require training in distress prevention, escape procedures, survival techniques, how to be located and actions to be taken to assist in one's own rescue. This training may focus on individuals or groups. Such training may be provided by the industry or company involved. It may also be provided by public and private education efforts for safety.

8.2.5 MRCC/ MRSC watch standers usually need formal SAR training. An individual's training must be based on a needs analysis. This analysis compares actual performance and behaviour with required performance and behaviour at a currently held position. Based on this analysis, training needs and methods to overcome the deficiencies can be identified.

8.2.6 The need for a working knowledge of the English language may be considered. MRCCs must be able to communicate with other MRCCs/ RCCs/ JRCCs, as well as ship masters and aircraft commanders, who are required to be able to speak English.

8.2.7 The present skill of a person can also be compared with the required competency which will be needed for a known future assignment. This enables systematic preparation for a new assignment. Planning for future training needs can be more effective if knowledge and skills which will be needed due to changing technology can be predicted.

8.2.8 Training of SAR service personnel can include the following:-

(a) Study of the application of SAR procedures, techniques and equipment through lectures.

(b) Demonstrations, films, and SAR manuals and journals.

(c) Assisting in or observing actual operations.

(d) Exercises in which personnel are trained to co-ordinate individual procedures and techniques in a simulated operation.

8.2.9 MRCC/ MRSC training should include at least the following topics. If search planning expertise gained from formal training is not used on a regular basis for operations or exercises, periodic refresher training will normally be needed. General categories include:-

(a) Aeronautical drift.

(b) AFN.

(c) AFTN.

(d) Bailout scenarios and planning Briefing/ questioning SRUs Case studies.

(e) Charts.

(f) Coastal SAR planning.

(g) Computer applications COSPAS–SARSAT.

(h) Datum marker buoys.

(j) Datum determination.

(k) Dealing with families.

(l) Dealing with public and news media Documentation of incidents.

(m) Electronic sweep width.

(n) Emergency care.

(p) Environmental factors.

(q) Evaluation of flare sightings.

(r) Fatigue factors.

(s) Inmarsat.

(t) International aspects.

(u) Interviewing techniques.

(v) Leeway drift.

(w) Legal concerns.

(x) Look-out skills and limitations Maneuvering boards.

(y) Medical advice.

(z) Medical evacuations.

(aa) Obtain and evaluate data.

(ab) On-scene coordinator duties.

(ac) Parachute drift.

(ad) Plotting skills.

(ae) Registration databases.

(af) Rescue procedures.

(ag) Resource allocation.

(ah) Risk assessment.

(aj) SAR agreements.

(ak) SAR communications.

(al) SAR mission co-ordination.

(am) SAR operations conclusion.

(an) SAR phases, stages, and components SAR resource capabilities.

(ap) SAR system organization.

(aq) SAR technology.

(ar) Search areas.

(as) Search patterns.

(at) Search planning.

(au) Ship reporting systems for SAR.

(av) SRU selection.

(aw) Stress management.

(ax) Survival equipment.

(ay) Visual sweep width.

(az) Water currents.

8.2.10 Training can be accomplished in a range of locations, from on-the-job site to a formal training centres at MRCC and Aeronautical RCCs or any other site as convenient.

8.2.11 There are generally three ways to undertake SAR training as mentioned below:-

(a) Training based on performance helps SAR specialists and teams to perform their duties effectively. The SAR manager has the responsibility to ensure that the overall training programme is effective. The RCC chief and others must ensure that all SAR service personnel reach and maintain the required level of competence.

(b) Training based on knowledge provides information necessary for the SAR experts and students to perform their duties. One method is to provide knowledge to enable them to review SAR cases. Resulting recommendations can be used to review policy, update standard procedures, and improve training and other processes.

(c) Awareness training is required for those persons infrequently involved in SAR, such as high-level executives, budget authorities, general transportation operators and national transportation authorities.

8.3 Exercises

8.3.1 Exercises test and improve operational plans, provide learning experience and improve liaison and co-ordination skills. Exercises, conducted on a realistic basis, help to demonstrate and assess the true effectiveness of training and the operational efficiency and competence of the SAR service. Exercises will reveal deficiencies that may exist in SAR plans and enable them to be improved. It is safer to have shortcomings revealed by exercises rather than during actual operations. A template for a Joint Search and Rescue Exercise is placed as **Appendix H**.

8.3.2 **Types of Exercise**s. Exercises can and should be conducted on three levels.

(a) The simplest type of exercise, a Communications Exercise, requires the least planning. It consists of periodic use of all means of communications between all potential users to ensure capability for actual emergencies.

(b) A Co-ordination Exercise involves simulated response to a crisis based on a series of scenarios. All levels of the SAR service are involved but do not deploy. This type of exercise requires considerable planning, and usually one to three days to execute.

(c) The third type, a Full-Scale Exercise or a Field Exercise, differs from the previous types in that actual SAR facilities are deployed. This increases the scope of SAR system-testing and adds realistic constraints due to times involved in launching, transit and activities of the SRUs and facilities.

8.3.3 **Other Considerations**. The need for exercises varies. Some States have many SAR operations so exercises may add little to their learning experience, except when conducted with other States with which they may not routinely work. Other States may have very few SAR operations each year, so exercises will be critical to sustaining proficiency. Joint exercises among neighbouring States or parties to SAR agreements will also be valuable. It may be necessary to assign persons full-time to planning and evaluating exercises. Success of an exercise is measured by:-

(a) How many problems are discovered?

(b) How much is learned?

(c) How much operating plans are improved?

(d) How few mistakes are repeated during the next exercise?

8.3.4 **Exercise Element**. Successful exercises require planning, execution and evaluation. Exercises are carried out for training, to evaluate established plans and procedures and to test new concepts. Exercises also offer experience in the management of risks and safety for SAR operations.

8.3.5 **Planning**. The typical exercise sequence involves: development of the concept (broad goals and objectives) of what is to be exercised; selection of participants (staff and facilities); detailed planning for how the exercise will be conducted; conduct of the exercise; and evaluation to determine lessons learned and to develop recommendations for improvement. It is essential to have a clear understanding of which plans and procedures are being exercised. Scenarios can then be developed that include specific situations to which personnel will react and respond. Response, or lack of response, to established policy and guidance, and need for additional policy guidance, is evaluated.

8.3.6 **Execution**. Those who plan exercises should not be the same ones who respond to the created scenarios. This avoids covering up known weaknesses to ensure ideal results, instead of revealing what would occur in an actual SAR situation.

(a) Scenarios must be as realistic as possible. The decision as to how large and realistic exercises should be will depend on the extent of the SAR service, the demands expected to be made upon it and general considerations of economy. If primary responsibility for SAR has been delegated to military authorities or Government services, full-scale exercises involving as many units and facilities as possible may provide satisfactory means of implementing training programmes. Where private concerns are relied upon to play a major part in SAR, the timing of major exercises should be arranged so as to minimize disruption to normal activities.

(b) Opportunities should be taken to complement formal training programmes with exercises conducted on a unit basis by combining them with normal activities during quiet periods. They should be carried out at regular intervals and arranged so that all personnel participate. This is particularly important in respect of those facilities which seldom receive operational calls.

(c) Exercises carried out separately by facilities will not be as valuable as combined operations, but they can ensure that the SAR service will function in an emergency.

(d) As many facilities, including air and surface craft, should be exercised as possible. Communications between the SRUs is a vital test of co-ordination.

(e) It is not always practicable for organizations to engage in formal SAR training programmes. Whenever possible, personnel from these organizations should be invited to participate in or observe training exercises. They should be provided with documents, publications or other literature which describe the SAR policies and procedures used by the SAR service, showing the desired roles of the participating organizations in SAR operations.

(f) Adjacent MRCCs should periodically execute SAR exercises together where possible to develop and maintain efficient co-operation and co-ordination between their services. These exercises need not always be on a large scale, but at least those SAR units which are likely to operate together should engage periodically in co-ordinating exercises. Much may be learned by exchanging information on training methods (e.g., programmes, literature, and films) and visits between staff of adjacent SRRs.

(g) Safety requirements, particularly when using live ‘‘survivors’’, may impose significant constraints on the conduct of SAR exercises. SAR co-ordinating authorities should ensure that specific safety rules and limitations are issued for use during both the planning and conduct of SAR exercises.

8.3.7 **Evaluation**. The evaluation process is crucial. Inputs should come from a team of evaluation experts who observe the exercise, and from the people who actually participated in the exercise scenarios. Those observing and evaluating the response must have expertise in the areas they are evaluating, and clearly

understand what is being evaluated. The evaluators should know the situations being posed and then record the participant's response to the objectives of the exercise. The final step is identification of weaknesses and development of recommendations for improvement. Subsequent exercises would emphasis these recommended changes as well as other concerns.

8.3.8 A permanent record of the exercise, addressing each element, is necessary to disseminate valuable information and to maintain a historic file for later case studies, analyses and system improvements. A system of indexing and filing the reports is recommended for later retrieval.

8.4 Building Professionalism

8.4.1 A good training programme produces true professionals, personnel who can do it right the first time. The purpose of training is to meet SAR system objectives by developing SAR specialists. Since considerable experience and judgement are needed to handle typical SAR situations, necessary skills require significant time to master. Training can be expensive. Poor training is even more expensive and can result in poor operational effectiveness, which can result in loss of lives of SAR personnel, lives of those in distress and loss of valuable facilities. Quality of performance will match the quality of training. Efforts to ensure professionalism may even extend to career development actions prior to assignment to SAR duties, ensuring SAR assignments of sufficient length to develop expertise and taking advantage of SAR experience in subsequent assignments.

8.4.2 To increase the professionalism of their respective organizations, SAR personnel should:-

(a) Ensure that SAR procedures developed by IMO and ICAO are followed, and that supplemental plans of operation and procedures suitable to local SAR scenarios are developed and followed.

(b) Ensure that SAR personnel have the maturity and competence to carry out assigned tasks.

(c) Make arrangements to use all available resources for SAR, to the extent practicable.

(d) Arrange to work with other States, especially as provided for in SAR agreements.

(e) Ensure that responsible personnel understand and follow such agreements.

(f) Keep a complete and accurate log of operations.

(g) Properly investigate and report any problems, and find ways to apply lessons learned to prevent future recurrences.

(h) Ensure that once some specific step is taken (perhaps acknowledgement of a distress alert) which would lead those in distress to expect assistance, every effort is made to follow through, particularly since the survivors may forego other opportunities for help based on this understanding.

CHAPTER 9

SAR PLANNING

CHAPTER – 9

SAR PLANNING

9.1 **General** - For surface and aircraft facilities to search effectively, search patterns and procedures must be pre-planned so ships and aircraft can operate in coordinated operations with minimum risks and delay. Standard search patterns have been established to meet varying circumstances.

9.2 Search action plan and message

(a) The SMC typically provides the search action plan.

(b) The OSC and ACO (if designated) and SAR facilities on-scene implement the search action plan.

(c) The search action plan message generally **includes six parts.**

9.2.1 Situation

(a) A brief description of the incident.

(b) Position of the incident, and time that it occurred.

(c) Number of persons onboard (POB).

(d) Primary and secondary search objects.

(e) Number and types of survival equipment.

(f) Weather forecast and period of forecast.

(g) SAR facilities on-scene.

9.2.2 Search area(s) (presented in column format)

(a) Area designation, size, corner points, centre point, and circle radius.

(b) Other essential data.

9.2.3 **Execution (presented in column format)** SAR facility identification, parent agency, search pattern, creep direction, commence search points, and altitude.

9.2.4 Coordination required

(a) Designates the SMC, OSC and ACO.

(b) SAR facility on-scene times.

(c) Desired track spacing and coverage factors.

(d) OSC and ACO instructions (e.g. use of datum marker buoys).

(e) Airspace reservations (e.g. danger area).

(f) Aircraft safety instructions.

(g) SAR facility change of operational coordination (SAR facility follows coordinating guidance of SMC, OSC and/or ACO).

(h) Parent agency relief instructions.

(j) Authorizations for non-SAR aircraft in the area.

9.2.5 **Communication.** The communication channels that need to be established such as:-

(a) Coordinating channels.

(b) On-scene channels.

(c) Monitoring channels.

(d) Exclusive channel for OSC and/or ACO to be identified by SAR facilities.

9.2.6 **Reports**. The following reports are to be prepared by the appropriate authorities:-

(a) OSC reports of on-scene weather, progress, and other SITREP information, using standard SITREP format.

(b) Resource agencies to provide summary at the end of daily operations {hours flown, area(s) searched, and coverage factor(s)}.

(c) The OSC may be authorized by the SMC to alter the search action plan based on on-scene considerations and efforts achieved in previous searches.

9.3 **Own Search Planning**. Normally the SMC will determine the search area by use of search planning tools at the MRCC and in cooperation with the OSC. Considerations in developing a search plan include:-

(a) Estimating the most probable position of a distressed craft or survivors, taking drift effect into consideration.

(b) Determining the search area.

(c) Selecting SAR facilities and equipment to be used.

(d) Selecting a search pattern.

(e) Planning on-scene coordination.

9.4 Planning the Search Area at Sea

9.4.1 **Datum.** The most probable location of the search object, corrected for movement over time, is known as datum. Determining datum begins with the reported position of the incident. Unless a distressed craft or individual immobilized, as in a boat grounding or a debilitating physical injury, the actual position of the target during the search may be substantially different form the initial position. Therefore, possible movement of the search object should be accounted for when calculating datum. Datum should be recomputed periodically as drift forces continue to affect the position of the target. Recomputed datum are usually labeled sequentially (e.g. Datum1, Datum2, Datum3 etc) with time of calculation noted. It will be necessary to establish a datum, or geographic reference, for the area to be searched. The following factors should be considered while establishing the same.

(a) Reported position and time of the SAR incident.

(b) Any supplementary information such as DF bearings or sightings.

(c) Time interval between the incident and the arrival of SAR facilities.

(d) Estimated surface movements of the distressed craft or survival craft, depending on drift. Drift has two components: leeway and total water current.

(i) Leeway direction is downwind.

(ii) Leeway speed depends on wind speed.

(e) The observed wind speed when approaching the scene may be used for estimating leeway speed of life rafts (Persons in Water (PIW) have no

leeway while life raft stability and speed vary with or without drogue or ballast).

(f) Total water current may be estimated by using the computed set or by referring with pilots and other relevant graphs and drift of vessels at or near the scene.

(g) Drift direction and speed is the vector sum of leeway and total water current.

(h) Drift distance is drift speed multiplied by the time interval between the incident time, or time of the last computed datum, and the commence search time.

(j) Datum position is found by moving from the incident position, or last computed datum position, the drift distance in the drift direction and plotting the resulting position on a suitable chart. The computation of datum and search area is given in para 9.7 onwards.

9.5 Visual Search.

9.5.1 There will be a number of variables that cannot be foreseen. Search patterns based on visual search have been established which should meet many circumstances. They have been selected for simplicity and effectiveness and are discussed later in this section.

9.5.2 Sweep Width, Track Spacing, and Coverage Factor

(a) Sweep width (W) is an index or measure of the ease or difficulty of detecting a given search object with a given sensor under a given set of environmental conditions.

(b) Track spacing (S) Most search patterns consist of straight, parallel, equally spaced tracks covering a rectangular area. The distance between adjacent tracks is called the track spacing (S).

(c) Coverage Factor (C) is the ratio of the corrected sweep width (WC) to the track spacing (S): C = WC/S

The recommended coverage (C) for most situations is 0.7 to 1.0, which means the recommended track spacing (S) in most situations is the near or same as the corrected sweep width (WC). A coverage Factor of 1.25 is normally considered

the best comprise between efforts and results achieved. Any increase beyond 1.25 yields a disproportionately small increase in probability of contact detections, which is 94% under good condition and 77% under poor conditions.

However changes in weather, number of assisting craft, etc., may occur, making it prudent to alter the track spacing (S). All searching ships and aircraft should maintain safe distances from one another and accurately follow their assigned search patterns. In addition to the weather correction factors (fw), other factors may be considered, such as time of day, position of the sun, effectiveness of observers, etc.

9.6 Initial Position

9.6.1 **The location where the initial position occurred is called the initial position.** To compute datum, the time and the location of the search object's last reliable position are first considered. This will determine the type of datum to be computed. One of the three situations usually exists, based on the initial information.

(a) **Position Known**. The incident is witnessed or reported by craft in distress or CRS or other craft or position is computed from a previously reliable position. If the position of the craft is known, drift is determined and datum is computed.

(b) **Track Known**. The intended track is known but the position along the track is unknown, or a single line of position, such as a DF bearing, is obtained. If only the proposed track is known, a datum line, a known proposed track corrected for drift, can be established.

(c) **General Area Known**. Neither the position nor the intended track is known, but the general area the target was probably in, such as lake, a military exercise area, or an offshore fishing ground, is known. In this case, a datum area is developed. Datum area computations depend on many factors, such as fuel endurance, natural boundaries, and known or suspected areas of occupancy.

9 .7 Computation of Datum

9.7.1 Drift is movement of a search object caused by external forces. Datum is calculated by determining which drift forces will affect the search object, selecting the most appropriate ones and calculating a vector for each.

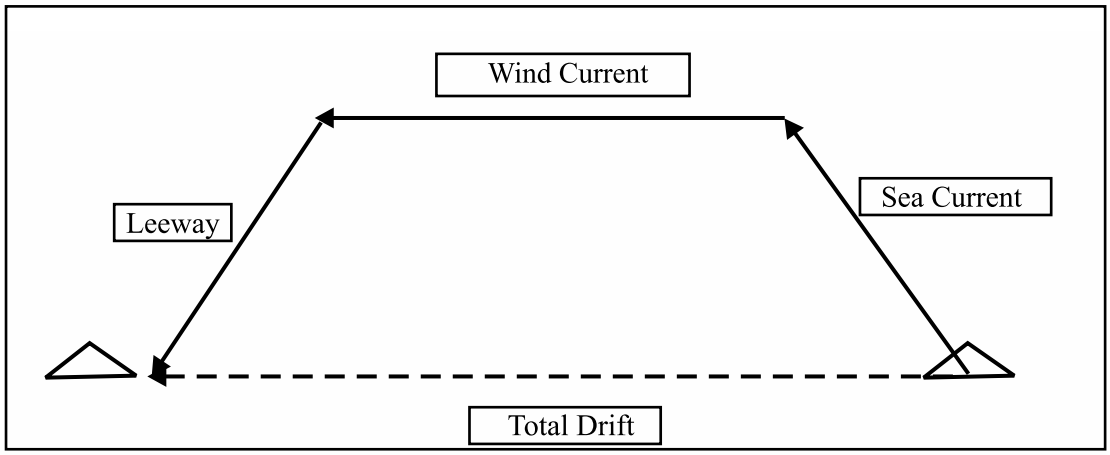
9.7.2 The SMC should determine which environmental forces affected the search object during and after the incident:-

(a) For marine incidents, currents and winds.

(b) For aircraft, primarily wind.

(c) For lost persons, terrain and met conditions.

9.7.3 The SMC should attempt to quantify each force affecting the drift, which is best done by vector, with bearing and length of the vector representing target direction and speed respectively. Surface drift forces that act on the target are plotted as shown in the figure below:-

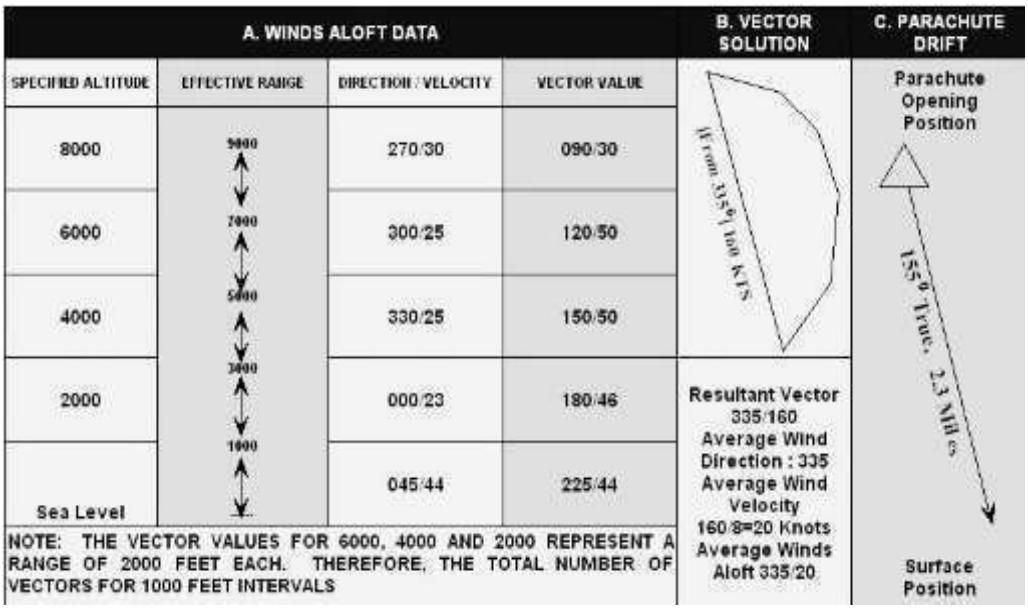


9.8 Aerospace Drift

9.8.1 **Aircraft Glide**. The maximum ground distance that an aircraft could cover during descent, should be determined if the position and altitude of an aircraft engine failure are known and crew bailout is doubtful. Aircraft glide ratio and rate of descent should be obtained from the parent agency or aircraft performance manual. The SMC can then determine maximum ground distance covered during descent and establish the possible area of impact after adjusting for wind's.

9.8.2 **Parachute Drift**. Parachute drift (dp) is the combination of parachute glide ratio and displacement due to winds aloft. Opening altitude, parachute type, and glide ratio, as well as average winds aloft and terrain height, should be considered when computing dp. The figure below shows a vector solution to a wind aloft problem where bailout and parachute opening altitude are 8000 ft and the landing

is at sea level. Wind values for 2000, 4000, and 6000 feet are used twice for winds from 7000 to 5000 feet, to 3000 feet and to 1000 feet respectively. Next the parachute drift due to average wind is determined, using the parachute drift distance, which is plotted to determine the surface position.



9.9 Maritime Drift

9.9.1 **Leeway (LW)** is the movement through water caused by winds blowing against the exposed surfaces of the search object. The pushing force of the wind is countered by water drag on the underwater surface. Most marine craft have a portion of the hull and superstructure (sail area) exposed above the water. The more sail-area the search object has, the greater the wind force on the object. Completely submerged objects and persons floating in the water are assumed to have no leeway. The SMC should get information on the physical characteristics of the search object to determine the amount of leeway.

9.9.2 Leeway direction is subject to large variations. It is usually assumed to be downwind, with divergence compensated for by extending the search areas to the right and left of downwind.

(a) The maximum angles off downwind are 45 deg for craft with moderate to deep draft, 60 deg for craft with a relatively shallow draft, and 35 deg for rubber rafts.

(b) Circular rafts with underwater portions symmetrical about vertical axes

through the center of the raft are considered a special category with a maximum leeway angle about 15 deg either side of downwind. Circular rafts with a deep ballast system fall into this category, while rafts with asymmetrical ballast pockets to not. The category should not be assumed if doubt about raft type exists.

9.9.3 **Sea Current** is the residual current when currents caused by tides and local winds are subtracted from local current. It is the main large-scale flow of ocean waters. Near shore or in shallow waters, sea current is usually less important than the tidal current or the local wind-driven current. The strongest sea currents exist near the edge of the continental shelf and are usually referred to as boundary currents. Sea currents are driven by the energy of large-scale wind systems and the interaction of ocean water masses of different densities.

9.9.4 **Wind Current** or wind-driven current is generated by the wind acting on the water surface over a period of time. As a wind blows over water, it causes horizontal water movement that grows with wind speed and duration. Two methods can be used to calculate the wind current vector. The first uses the wind history and forecasts for the incident area. The second uses historical data or local knowledge of wind currents. Wind currents need not be computed for coastal, lake, river, or harbour areas, but should be determined for water depths greater than 100 feet (30meters) and distances greater than 20 miles (32 Kilometers) from shore.

9.10 Other Water Current

9.10.1 Other water Currents affecting search objects are usually difficult to calculate.

9.10.2 **Lake Current (LC)** information usually comes form the local knowledge, charts, or computer models

9.10.3 **River Current (RC)** information can usually be obtained from published; data, local knowledge or direct observation. Current data is published for most large rivers.

9.10.4 **Bottom Current (BC)** should be considered in underwater incidents. BC is usually not strong enough to move a sunken object, including a body.

9.10.5 **Swell/Wave Currents (SWC)** may, in the absence of winds, affects rafts and other small marine craft. SWC is usually slight and is generally discarded.

9.10.6 **Total Water Current (TWC)** TWC is the vector sum of currents affecting the search object. The best information on total water current is usually obtained from a Datum Marker Buoy (DMB).

9.11 Minimax Solution

9.11.1 When one or more of the drift variables cannot be accurately determined; the minimax solution can be used. It is usually used in ocean search planning when drift time or speed of the object is unknown.

9.11.2 A minimax solution might be used if there is any doubt about the following information.

For aircraft:

(a) Altitude of parachute opening.

(b) Point along a DR track.

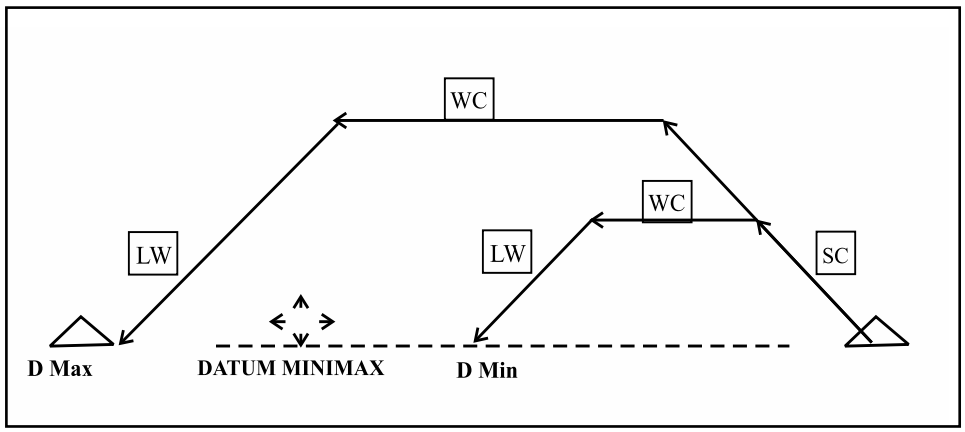
For Maritime Situations:

(a) Time a craft has been adrift.

(b) Time local winds shifted.

(c) Direction or speed of a drifting object.

(d) Only known factor is the direction of a flare sighting.



9.12 Search Area

9.12.1 The search area is the geographic area determined by the SMC as most likely to contain the search object. The amount of error inherent in the drift calculations and the navigational capabilities of the distressed craft and SRU are used to calculate a search Radius (R), cantered about datum, for the search area. The radius is normally limited by the maximum distance the search object could travel after the incident.

9.12.2 For areas such as large lakes, rivers, sounds, bays, or other coastal areas, the search area may depend on physical restrictions and time required to respond.

(a) When response times are short, the SMC may use a standard radius, adjusted for physical surroundings. In areas where a search can begin in less than 6 hours, a radius of 6 nautical miles is usually large enough to include most targets.

(b) Expanding the area based on drift calculations may place a large part of the area ashore or move datum into the ocean. It the SMC determines the target probably has moved into Open Ocean, and the standard radius may not apply, additional planning may be needed.

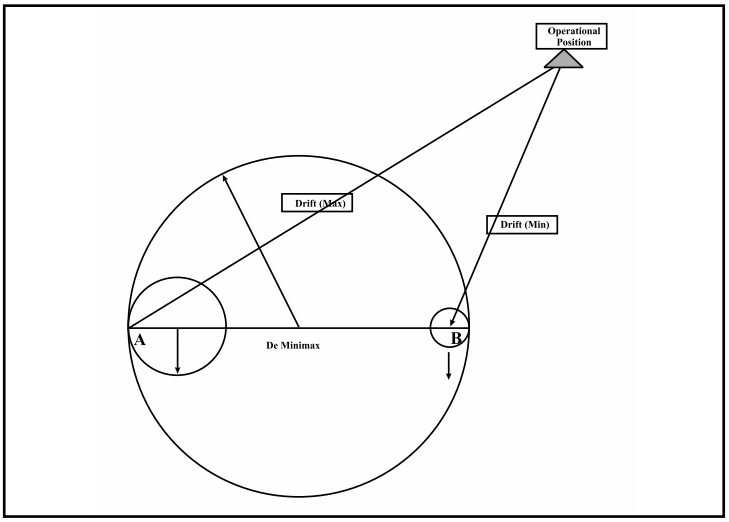
9.13 Total Probable Error

9.13.1 **Total Probable Error (E)** is a mathematical tool for determining search area based on the probable errors in estimation of drift (D), initial position of the incident (X), and navigational capability of the SRU (Y).

9.13.2 **Total Drift Error (D)** accounts for errors in estimating drift and is used when determining E. It is the arithmetic sum of the individual drift errors from the time of the incident until datum.

(a) Individual. Drift Error (d) should be computed for each datum and is assumed to be three-tenths of total drift. Errors less than one mile are disregarded. When the first datum is computed, 0 equals d on the first search plan. However, as the mission progresses, 0 becomes de 1, plus de 2, etc

(b) Drift Errors for datum minimax calculations are determined by graphical or algebraic solutions.



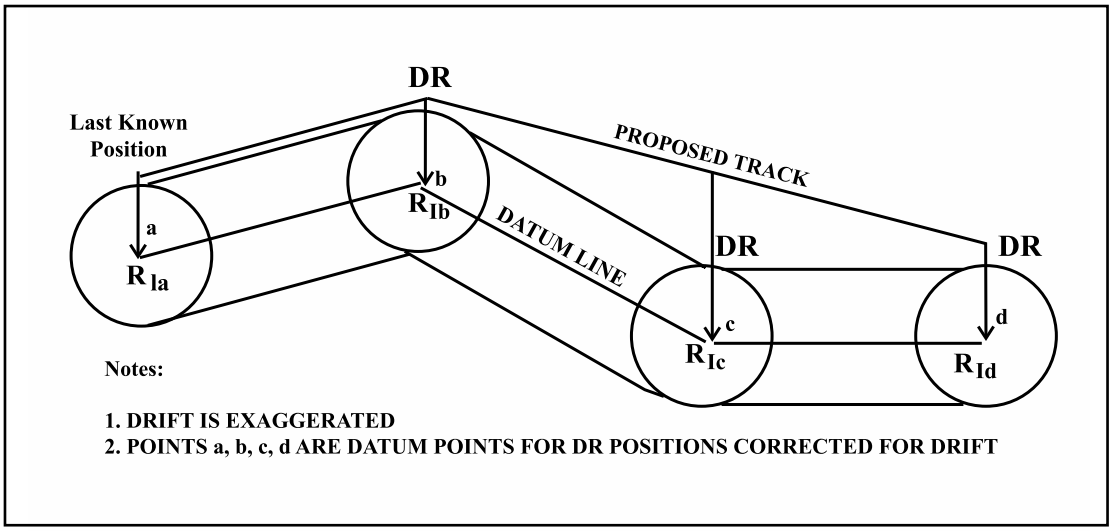
9.14 **The search radius** @ is the radius of a circle centered on a datum, having a length equal to E plus an additional safety length to help ensure that the target is in the search area. For ground and underwater searches, R is measured in yards. On other searches, R is measured in nautical miles. R is usually increased after successive searches to increase the chance of the target being in the search areas. Table below lists Safety Factors (Fs) used sequentially to gradually enlarge the search area.

E	Fs
1st	1.1
2nd	1.6
3rd	2.0
4th	2.3
5th	2.5
Subsequent Searches	2.5

Search Radius Safety Factors

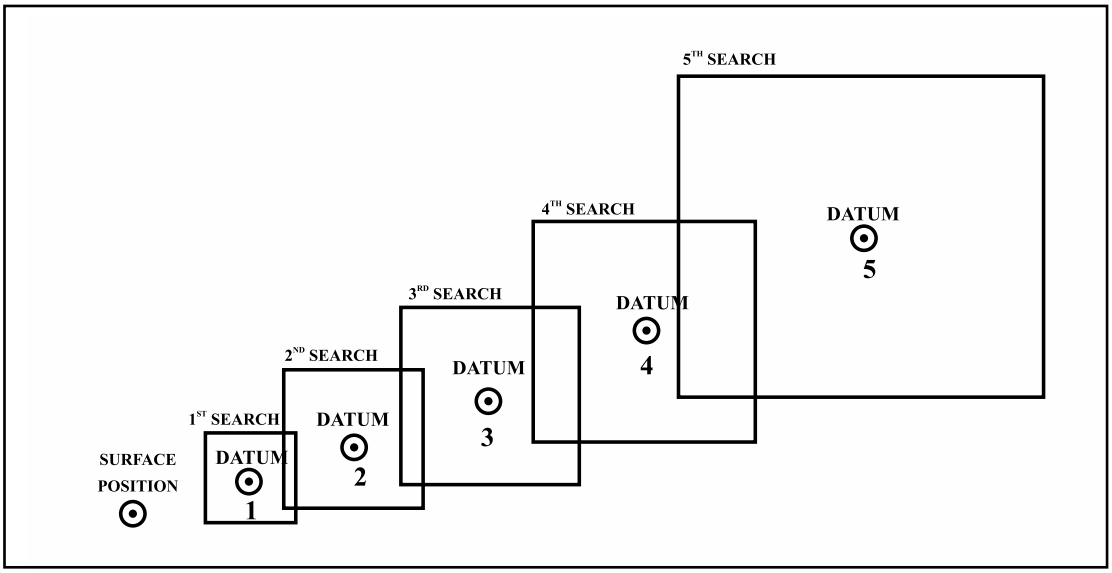
9.15 Search Area Development

9.15.1 Theoretically, the best search area is a circle centered on datum. However, few search patterns are adaptable to circular search areas. For most patterns, a square or rectangular search area is more. The ends of the area are squared off with tangent lines as illustrated in Figure below:-



9.15.2 For a search with little or not drift, search area is constructed around a stationary datum. It the target is not found, the areas may be expanded for subsequent searches. Therefore, the area around datum, which continues to be the most probable location, is searched repeatedly.

9.15.3 For maritime incidents, datum will normally move during the search, as Figure below illustrates:-



9.15.4 The enlargement of the search area for a moving datum is the same as for a stationary datum, but the area is centered on a new datum so that the water surface is re-searched where survivors are most likely to be.

9.16 Planning and Conduct of Search

9.16.1 The selection and orientation, of a search pattern are very important and all pertinent factors should be considered before a selection is made. Search patterns and their directional orientations should meet the criteria listed below:-

(a) They should be appropriate for the following:-

(i) Degree of uncertainty in the search object's position.

(ii) Navigational capabilities of each search facility.

(iii) Type of sensors being employed.

(iv) Primary type of search objects or signals the search facility in attempting to detect and locate.

(v) Environmental conditions.

(vi) Direction and rate of the search object's predicted movement during the search.

(vii) Time limits imposed by the survivors' expected survival time, search facility endurance and availability of daylight.

(b) It should be within the operational capability of each available SRUs so as to accurately and safely complete their assigned search pattern.

(c) The expected result should be worth the estimated time and effort.

(d) The selected search patterns should minimise the risk of collision with other SRUs in the area, allow adequate fuel reserves and avoid navigation hazards, wherever practicable.

(e) Close attention should be paid to air traffic in the area of the search. Normally more than one aircraft should not be assigned to the same search sub area simultaneously. Multiple aircraft operating together in the same search sub area distracts aircrew attention from the search and decreases the flexibility to respond to sighting of survivor/ wreckage or drop markers, flares, rafts, etc. This does not preclude an electronic search from taking place at high altitude, while a visual search is done at a lower level. In fact, the pilot-in-command of an aircraft doing an electronic search may be an excellent choice for On Scene Coordinator or may be assigned as Aircraft Coordinator when multiple aircraft are involved.

(f) It is likely that an EPIRB/ ELT may be available in the distressed craft or survival craft or being carried in person by the survivor. In such a case an electronic search using an appropriate pattern should be carried out by a fast aircraft flying at a, high level, while a visual search can be carried out at a lower level or on the surface.

(g) Search patterns coordinated between air and surface facilities offer a

number of advantages. For example, the surface facility can act as an excellent navigational and reference datum for the search aircraft, particularly during maritime searches far offshore. The airborne SRUs can be directed towards the survivors as soon as they are located. The surface SRUs can keep the aircraft informed of weather and other conditions at the scene and may relay progress reports for the aircraft. The surface SRUs can assist the crew of the search aircraft, should a forced landing be necessary.

9.17 Situation Reports (SITREPS)

9.17.1 Situation Reports (SITREPS) are used to pass information about a particular SAR incident. MRCCs shall use them to keep CGHQ, other MRCCs, MRSCs and appropriate agencies informed of cases which are of immediate or potential interest. The On Scene Coordinator (OSC) shall use SITREPS to keep the co-ordinating MRCC aware of mission events. Search facilities use SITREPs to keep the OSC informed of mission progress. The following procedures may be adopted for SITREPS:-

(a) The OSC shall address SITREPs only to the Co-Ordinating MRCC unless otherwise directed.

(b) The Co-ordinating MRCC shall address SITREPs to as many agencies as necessary, including CGHQ, MRCCs and MRSCs to keep them informed. SITREPs prepared by an co-ordinating MRCC should include a summary of information received from OSCs.

(c) A short SITREP may be used to provide the earliest notice of an causality or to pass urgent details when requesting assistance. Complete SITREP will be used to pass amplifying information during SAR Operations. Initial SITREP will be used to pass amplifying information during SAR operations. Initial SITREP should not be transmitted as soon as details of an incident become clear and should not be delayed unnecessarily for confirmation of all details.

9.17.2 The initial SITREP should be transmitted by the SMC to SAR coordinator and NMSARCA as soon as details of incident become clear enough on the SAR system involvement and when information is received from OSC/ SRUs. It is not to be delayed unnecessarily for confirmation of all the details.

The subsequent SITREPs are released when important new developments occur and at least once a day or as directed. The complete SITREP format is used to pass information in amplified manner or to pass information to the authorities of the craft in distress. A short SITREP can also used to provide earliest notice of a casualty or to pass urgent details when requesting assistance. The SITREP format should be as per the policy letters promulgated by NMSARCA/ SAR coordinator on this subject. However, the SITREP message should generally contain the following information:-

(a) **Identification**. This section contains the subject, SITREP number, and identification of the distressed vessel/ craft and brief description of the emergency. The SITREP should be sequentially numbered throughout the entire case during an operation. When the OSC is relieved on the scene the new OSC continues the SITREP numbering sequence.

(b) **Situation.** This part covers the description of the case, the conditions that affect the case including on scene weather, any amplifying information as required. After the first SITREP, only changes to the original reported situation need to be included.

(c) **Action Taken**. This portion comprises a complete report of all actions taken since last report, including the results of such actions, number of sorties/ hours flown by the aircraft during the search and compilation of the search efforts by all SRUs. In addition, when the search is unsuccessful, the report should also include the areas searched.

(d) **Future Plans**. This section contains descriptions of the actions planned for future execution, including any recommendations and if necessary, request for additional SRUs/any other assistance.

(e) **Case Status**. This is used only on the final SITREP message whenever the case is closed or when active case is suspended pending further developments or when suspended. SMC should recommend to SAR coordinator on suspension of SAR ops when there is no longer reasonable chance of success. On receipt of recommendation from SMC, SAR coordinator may suspend SAR case or direct to SMC to continue SAR efforts depending on prevailing situations.

9.17.3 The SITREP format which is being adopted internationally and intended for use is placed at **Appendix J.**

CHAPTER 10

SEARCH TECHNIQUES

CHAPTER 10

SEARCH TECHNIQUES

10.1 General

10.1.1 Before a search operation takes place, the search planner should provide a detailed search action plan to all involved facilities, specifying when, where and how individual search facilities are to conduct their search operations. Co-ordination instructions, communications frequency assignments, reporting requirements, and any other details required for the safe, efficient and effective conduct of the search must also be included in the search action plan as described in Chapter 9.

10.1.2 As a minimum, developing a search action plan consists of the following steps:-

(a) Selecting search facilities and equipment to be used.

(b) Assessing the search conditions.

(c) Selecting search patterns to cover the optimal search area.

(d) Dividing the search area into appropriate sub-areas for assignment to individual search facilities.

(e) Planning on-scene co-ordination.

10.2 Search Techniques

10.2.1 The types and numbers of available search facilities, along with the sweep width(s), determine how much search effort will be available at the scene. Small search efforts will result in correspondingly small probabilities of success, even when the effort is deployed in the most optimal fashion, and it will probably take longer to locate survivors. Detailed Search procedures and scanner techniques are presented in the International Aeronautical and Maritime SAR Manual for Mobile Facilities - Vol III.

10.2.2 The search patterns described below are arranged in the three general categories namely visual search patterns, electronic search patterns and night search patterns. The most commonly used search patterns are generally carried aboard

all merchant vessels. It is imperative that a record of the areas searched be kept safe for future analysis. The crew of search facilities should plot actual search coverage as tracks are flown or covered. The method of doing this is to shade or cross hatch the areas searched and to outline the areas not searched on the chart of the appropriate scale. This information must be reported back to the SMC so that the search may be evaluated, probability charts and probabilities of success updated and the next search be planned.

10.3 Visual Search Patterns

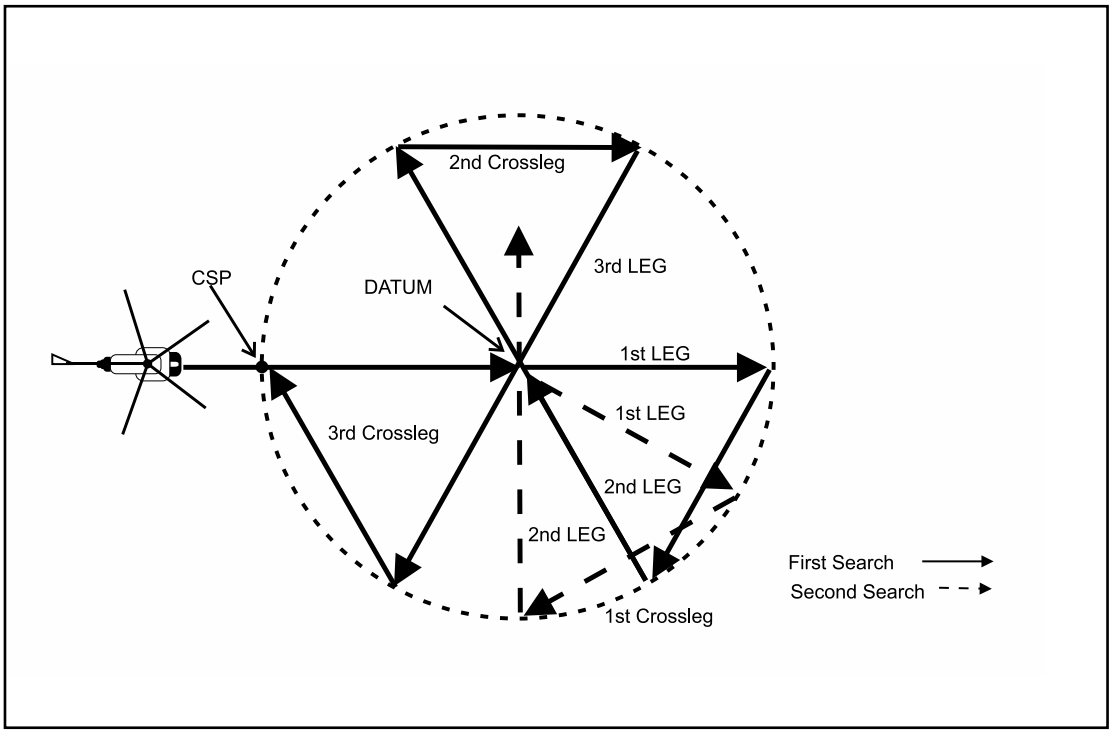
10.3.1 The various types of visual search patterns include sector search, expanding square search, track line search, parallel sweep search, creeping line search, creeping line coordinated search and shoreline search. The details of the visual search patterns are given in succeeding paragraphs. The height of the SRU aircraft is also a considering factor while planning the search. The other factors affecting the visual range are given below:-

(a) Condition of light.

(b) Colour, aspect, size and speed of the object.

(c) Sea state and weather in the area.

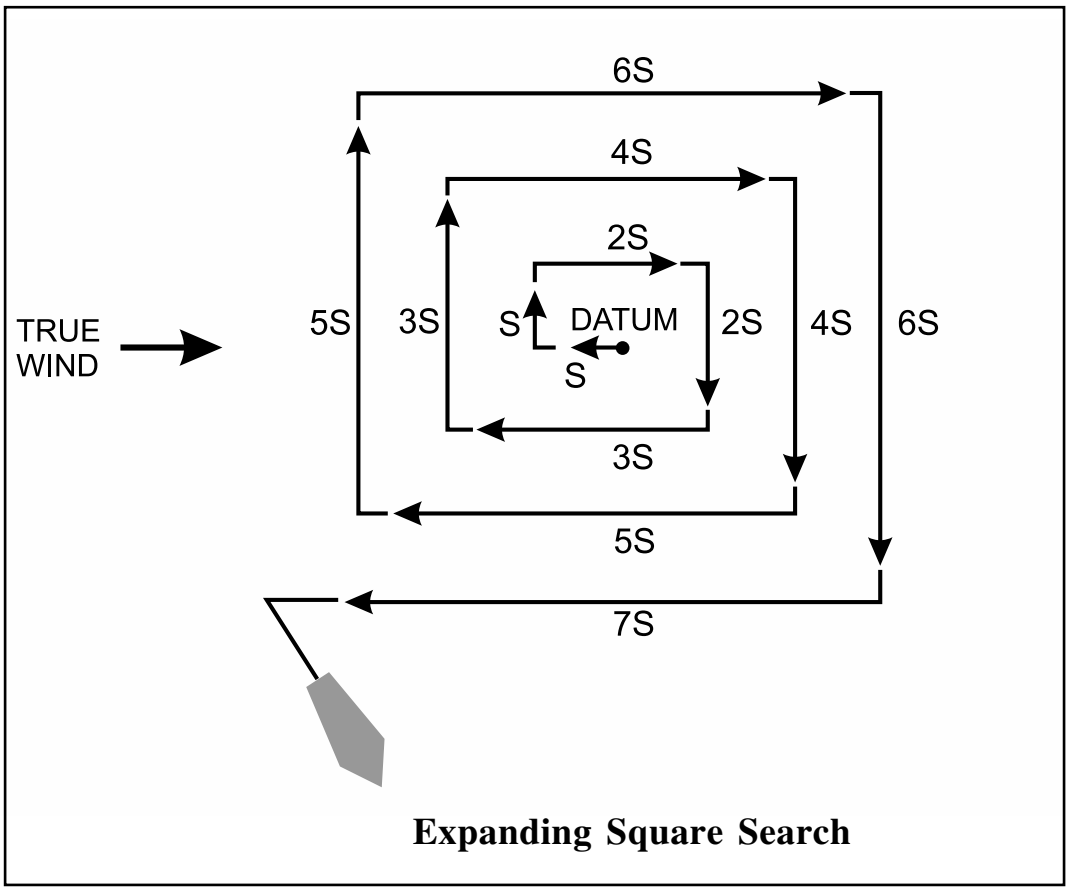
10.3.2 **Sector Search**. Sector searches are most effective when the position of the search object is accurately known and the search area is small. Examples of this situation include a crew member seeing another crew member fall overboard from a ship or a reported distress position from a craft known to have very accurate navigational capability. Sector searches are used to search a circular area centered on a datum point. They are easy to navigate and provide intensive coverage of the area near the centre, where the search object is most likely to be found. Due to the small area involved, sector search must not be used simultaneously by multiple aircraft at the same or similar altitudes or by multiple vessels. An aircraft and a vessel may be used together to perform independent sector searches of the same area.



10.3.3 A suitable marker (for example, a smoke float or a radio beacon) may be dropped at the datum position and used as a reference or navigational aid marking the centre of the pattern. Each search leg should then pass the marker at close range or directly overhead. When the sector search is used over a marker at sea, adjustment for the effects of total water current on the search object's motion during the search is automatic. This makes such sector search patterns an excellent choice for search objects, such as persons in the water, which have little or no leeway. For aircraft, the search pattern radius usually lies between 5 NM and 20 NM. The angle between successive search legs will depend on the radius used and the maximum track spacing at the ends of the search legs. For vessels, the search pattern radius is usually between 2 NM and 5 NM and each turn is 120°. Normally, all turns in a sector search are made to starboard. If the search object is not located by the time the sector search pattern has been completed one time, it should be rotated and repeated with the second set of search legs, falling half-way between the search legs followed during the first search, as indicated by the dashed search legs in the above figure.

10.3.4 **Expanding Square Search**. The expanding square search pattern is also most effective when the location of the search object is known within relatively close limits. The Commence Search Point (CSP) for this pattern is always the datum position. The pattern then expands outward in concentric squares as shown in

the figure, providing nearly uniform coverage of the area around the datum. If the datum is a short line instead of a point, the pattern may be changed to an expanding rectangle. Due to the small area involved, the same cautions about the use of multiple SRUs as previously mentioned for the sector search also apply to the expanding square pattern. The pattern of the expanding square search is given below.

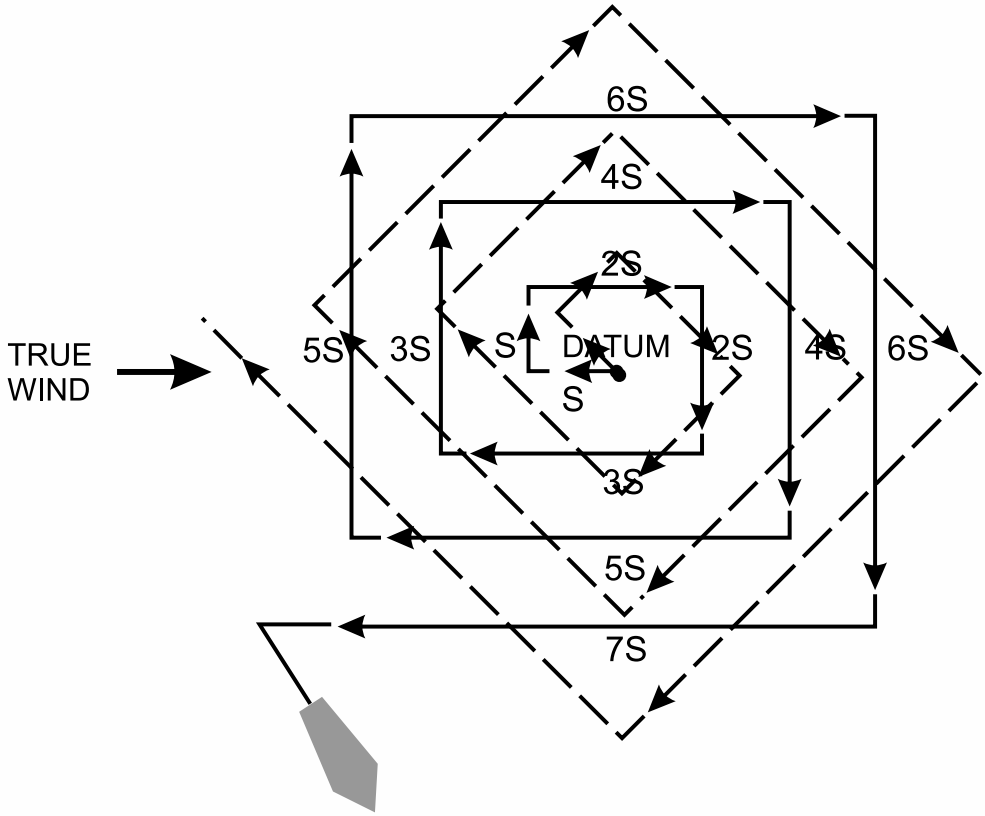


Expanding Square Search

10.3.5 The expanding square pattern is a precise pattern and requires accurate navigation. To minimize navigational errors, the first leg is usually oriented directly into the wind. The lengths of the first two legs are equal to the track spacing and the lengths every succeeding pair of legs is increased by another track spacing. For successive searches in the same area, the direction of the search legs should be changed by 45 degrees as shown in the figure below.

10.3.6 Expanding square patterns are often appropriate for vessels or small boats to use when searching for persons in the water or other search objects with little or no leeway as compared to the magnitude of the total water current. In such cases, it may be appropriate for the vessel or small boat to navigate the pattern

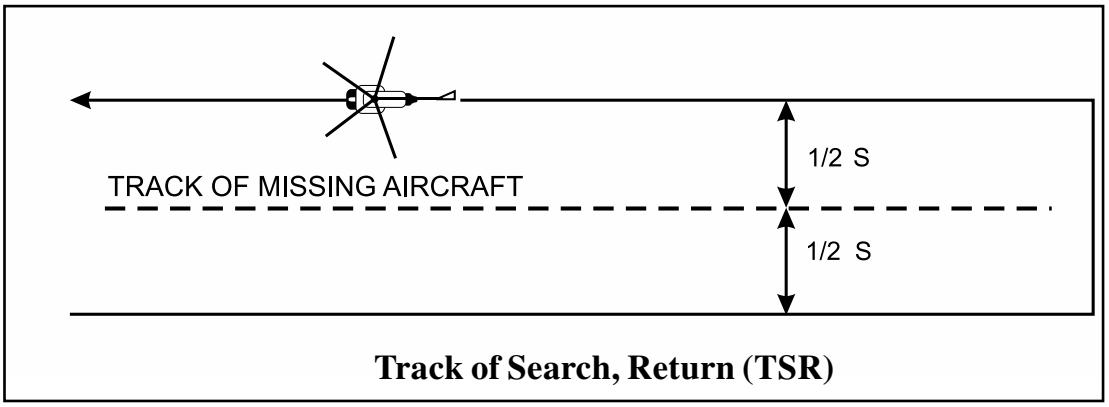
by careful dead reckoning rather than by precise electronic or visual navigation. Just as a sector search pattern automatically compensates for total water current when using a floating marker as a navigational reference, a vessel's DR navigation of an expanding square also automatically compensates for the effects of total water current.



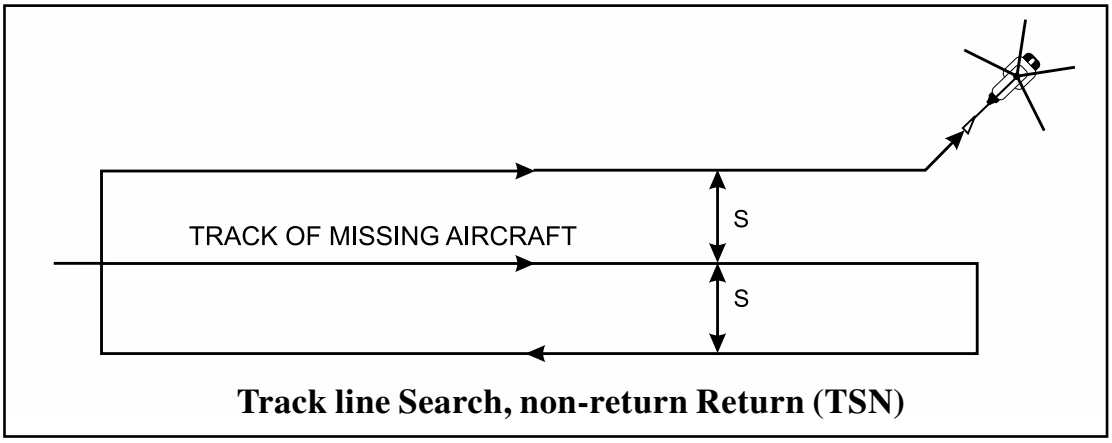
Second Expanding Square Search

10.3.7 **Track Line Search**. The track line search pattern is normally employed when an aircraft or vessel has disappeared without a trace while en-route from one point to another. It is based on the assumption that the distressed aircraft has crashed, made a forced landing or in distress on or near the intended route and concentrates the search effort near this datum line. It is usually assumed that the survivors are capable of attracting the search facility's attention at a considerable range by some means such as a signalling minor or coloured smoke by day, flares, flashing light or signal fire by night or electronic beacon by day or night.

10.3.8 The track line search consists of a rapid and reasonably thorough search along the intended route of the distressed craft. The search facility may search along one side of the track line and return in the opposite direction as shown in the figure. It may also search along the intended track and once on either side, then continue on its way and not return, as shown in the figure. Due to their high speed, aircraft are frequently employed for track line searches, normally at a height of 1000 ft to 2000 ft above the surface during daylight or at 2000 ft to 3000 ft at night. This pattern is often used as an initial search effort because it requires relatively little planning and can be quickly implemented. If the track line search fails to locate the survivors, then a more intensive search over a wider area should be undertaken.



Track of Search, Return (TSR)



Track line Search, non-return Return (TSN)

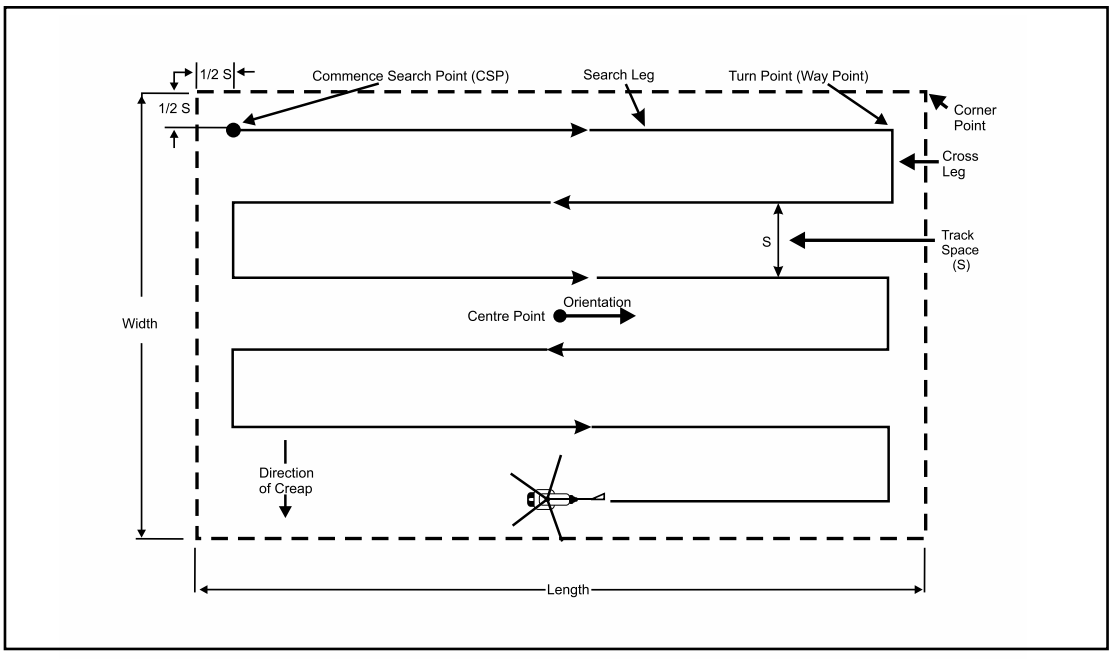
10.3.9 Aircraft and ships planned to follow the same or a similar route, as that of the missing craft should be asked to divert to assist in the search. This will mean diverting to follow the distressed craft's most probable route or a nearby Parallel course. When multiple facilities are requested to assist in this manner and especially if they are moving in opposite directions, the search planner must ensure that all facilities are aware of the presence of the others. The OSC must

also ensure that the SAR facilities moving in opposite directions should not follow exactly the same track on opposite headings.

10.3.10 For an aircraft SRU, track line searches should be regarded as additional to searches by SAR facilities with trained crew, while planning an en-route aircraft, it must be remembered that the aircraft may not have sufficient endurance and would be operating at higher levels/speeds and also above clouds rather than at optimum search heights and speeds.

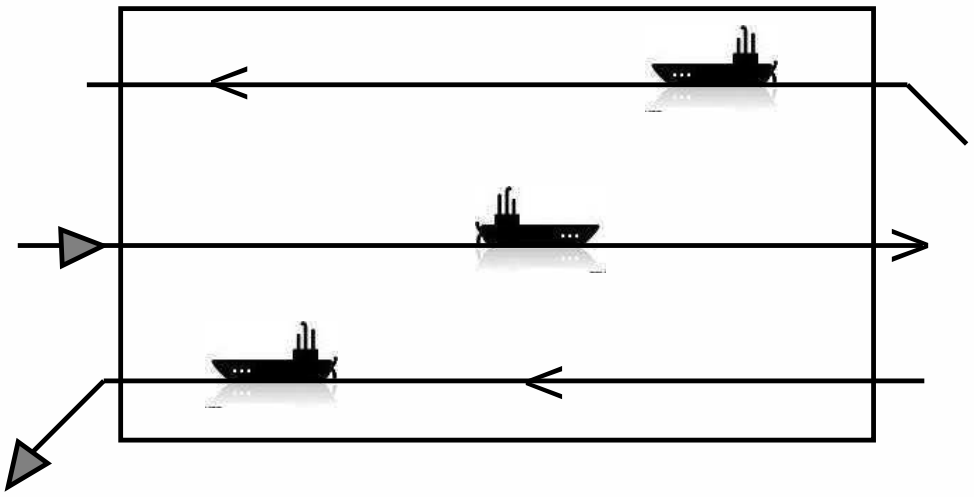
10.3.11 **Parallel Sweep Search**. The parallel sweep search pattern is normally used when the uncertainty in the survivor's location is large, requiring a large area to be searched with a uniform coverage. A parallel sweep search pattern covers a rectangular area. It is almost and always used when a large search area must be divided into sub-areas for assignment to individual search facilities, which will be on scene at the same, time and is most effective when used over water.

10.3.12 To perform a parallel search pattern, the search facility proceeds to the CSP in one comer of its assigned sub-area. The CSP is always one-half track space inside the rectangle from each of the two sides fanning the comer. The search legs are parallel to the long sides of the rectangle. The first leg is set at a distance equal to one-half the track spacing from the long side nearest the CSP. Successive legs are maintained parallel to each other and one-track spacing apart as shown in the figure.



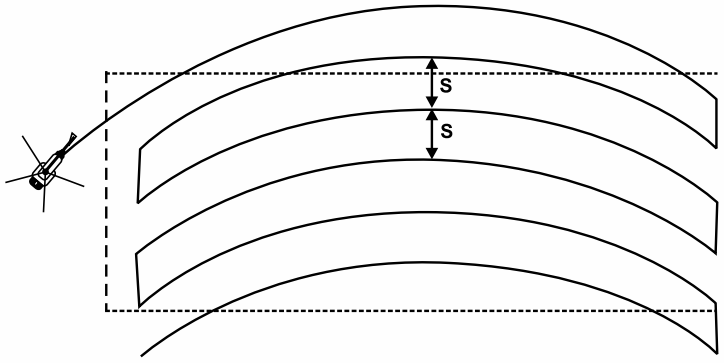
10.3.13 A parallel sweep search covering a single sub area is normally performed by a single SRU aircraft. The use of multiple aircraft working together in the same search sub area at similar altitudes is discouraged. However, there are cases where multiple facilities may be used to great advantage. Similarly, en-route aircraft may be asked, via the appropriate ATS unit, to divert through the search area along parallel tracks while listening for signals from an emergency beacon. However, for safety reasons, use of enroute light aircraft on VFR flight plans for visual search as in the case of vessels is not recommended.

10.3.14 Ships, fishing vessels, etc., which may be passing through or near the search area may be asked to divert along specific parallel tracks passing through the search area, as shown in the figure, while maintaining a sharp lookout for the survivors. This type of search can be both effective and efficient.



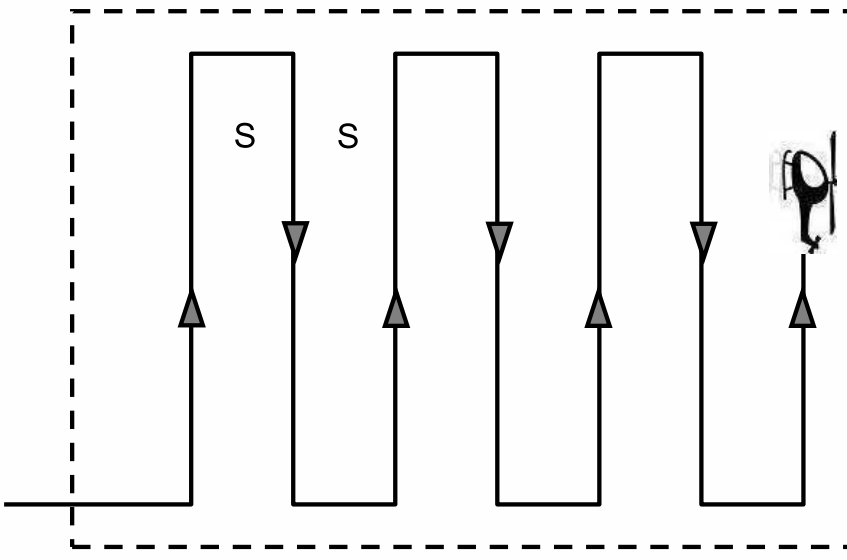
Diverting Merchant Vessels to follow parallel tracks through a search area

10.3.15 **Parallel Sweep Search Based on Distance Measuring Equipment**. The parallel sweep search can be undertaken based on Distance Measuring Equipment if available onboard the aircraft SRU. This pattern of search can be flown only within close radius and limited range of the airfield preferably located along the coastline, which is equipped with DME station. The pattern of the search is as shown in the figure.



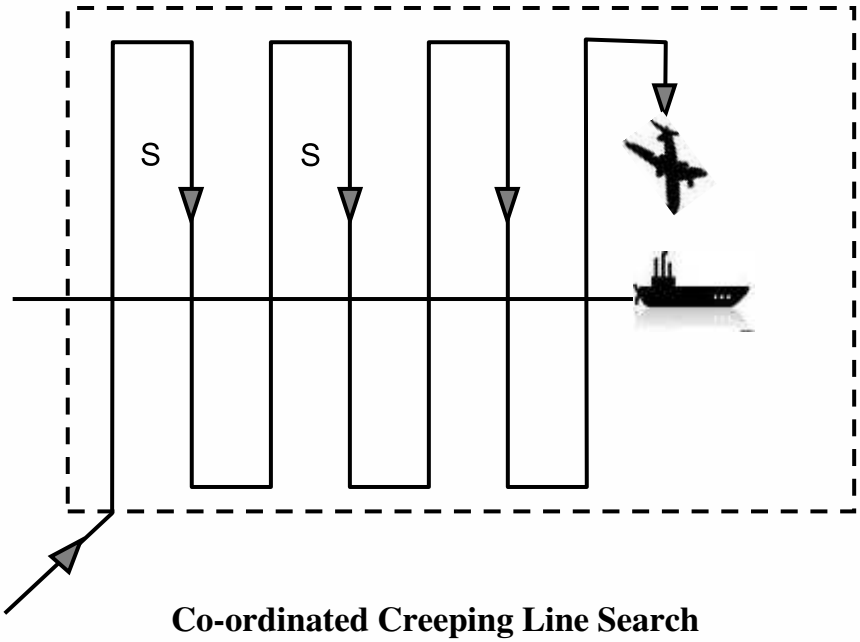
Parallel sweep search based on distance-measuring equipment

10.3.16 **Creeping Line Search**. The creeping line search pattern is basically the same as a parallel sweep search except that the search legs are parallel to the short sides of the rectangle instead of the long sides. Because the creeping search pattern requires many more turns to cover the same area, it is usually not as efficient as the parallel search pattern, unless it is used by an aircraft working in coordination with a vessel.



Creeping Line Search

10.3.17 **Coordinated Creeping Line Search**. A coordinated air maritime creeping line search is usually accomplished by coordinating the movement of an aircraft flying a creeping line search with those of a vessel moving along the major axis of the search area in the direction of the aircraft creep. The aircraft's search legs are flown at right angles to the vessel's track. The vessel's speed, the aircraft's speed, the length of the aircraft's search legs and the track spacing are all planned so that the aircraft's advance in the direction of creep equals the speed of the surface facility. When correctly performed, the aircraft should pass directly over the vessel at the centre of each search leg, as shown in the figure. If the fixed wing aircraft is used as SRU, the length of the long legs covered by aircraft SRU will be more to compensate with the surface SRU, which has limited speed. Therefore, it is recommended to use a helicopter as an aircraft SRU for coordinated creeping line search, which has less speed compared to fixed wing aircraft, so that the length of long legs are limited.



Co-ordinated Creeping Line Search

10.3.18 The relationship among the speed of the surface facility, the aircraft's speed, the track spacing and the length of the search legs is defined by the following equation.

$$Vs = (8 \times Va)/(L + 8),$$

Vs is the speed of the surface facility in knots, S is the track spacing in nautical

miles, Va is the aircraft's true air speed (TAS) in knots and L is the length of the aircraft's search leg in nautical miles.

10.3.19 **Shoreline Search**. Shoreline search is carried out by using small vessels or aircraft capable of safely flying at low altitudes and speeds. They are normally used in order to pass close enough to the shoreline to permit careful inspection, which cannot be undertaken by surface SRUs due to limitations of depth. Vessels engaged in shoreline searches must be aware of navigational constraints and any limitations imposed by sea conditions. SAR personnel on scene should consider the possibility of survivors clinging to navigational aids such as buoys or to rocks offshore. Survivors may make their way ashore if they drift close enough. Survivors may also anchor their boat or raft or tie it to an offshore navigational aid if they drift into shallow water but still cannot see land or believe that they cannot make it to shore unaided. Search facilities should pay special attention to any such possible places in their sub areas where the survivors may have succeeded in arresting their drift.

10.4 Electronic Search Patterns

10.4.1 The types of the electronic search patterns include the EPIRB/ELT search and radar search. These patterns are briefed in the succeeding paragraphs.

10.4.2 **EPIRB/ELT Search**. When it is known or believed that an aircraft vessel or persons in distress are equipped with an EPIRB/ELT, an electronic search at high level should be initiated immediately, whether or not any message has been received via the COSPAS-SARSAT system. In addition to EPIRBs operated by survivors, many aircraft carry ELTs that start operating when the G-forces reach a certain level, such as in a crash. The electronic search should not preclude the initiation of a visual search at lower levels since the success of an electronic search depends on the ability of the survival beacon to transmit a signal.

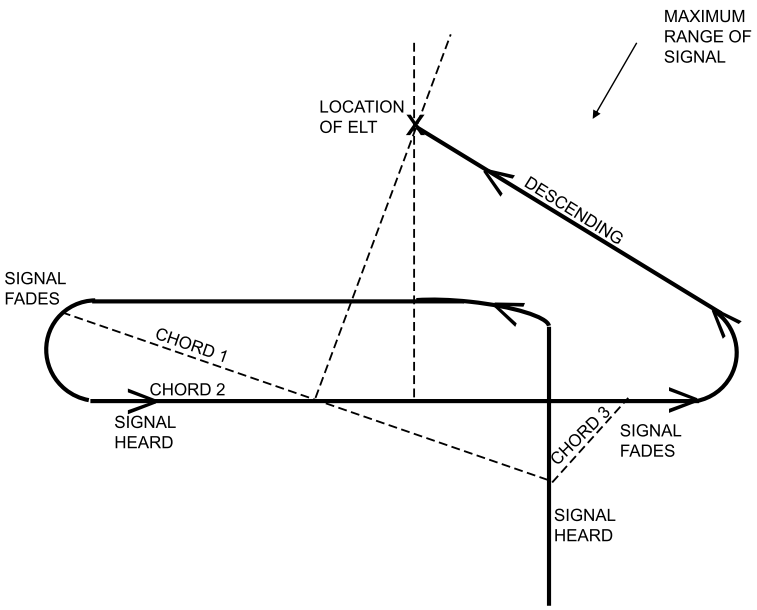
10.4.3 The sweep width in an electronic search should be estimated based on horizon range for the level chosen for the search, since most emergency beacons operate on frequencies that may be received only by line-of-sight. However, if the probable detection range is known and is less than the horizon range, it should be used instead. When the probable detection range of a survival beacon is not known, the estimated sweep width over the sea should be about one-half of the horizon range.

10.4.4 Normally, a parallel sweep or creeping line pattern should be employed for EPIRB/ ELT searches. The detection profiles for electronic searches are likely to be different from those of visual search. If the initial search of an area does not locate the beacon, the area should be searched again with the search legs of the second pattern oriented at right angles to those of the first pattern. If the beacon remains un-located but confidence is high that it is in the area and working, a third search with search legs parallel to those of the first search but offset by one-half of the track spacing may be considered. One of the following procedures may be used to locate an EPIRB / ELT once it has been detected.

(a) For search facilities with homing capability, the search facility homes on the survival beacon as soon as the signal is detected. The EPIRB/ ELT signal may be picked up quickly if the SRU proceeds towards the datum point where the search object location probability density is the highest. If this is unsuccessful, a systematic search of the area will have to be made, using the sector, expanding square, parallel sweep or creeping line search pattern with a track spacing based on the optimal value for the available search effort.

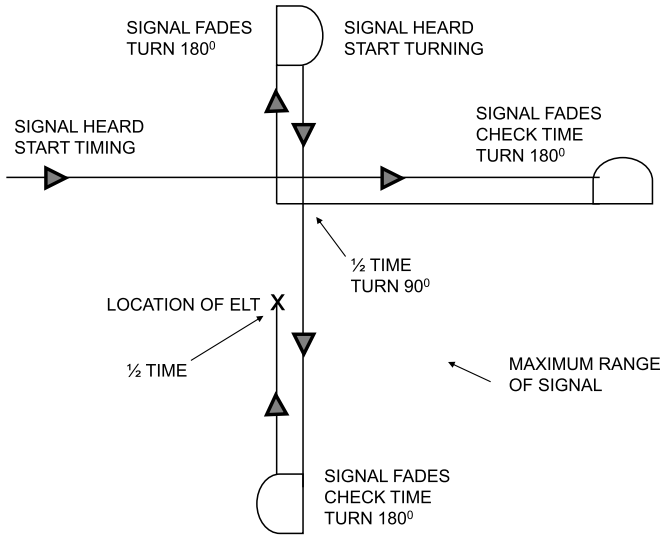
(b) For aerial electronic search by a facility without homing capability, a radio frequency signal from a survival beacon is detected and converted electronically to an audible sound which at least one member of the search facility crew can hear via a speaker or earphones. The following procedures are normally used only by the SRU aircraft.

(i) In a map assisted aerial electronic search, the aircraft flies a “boxing in” pattern on the assumption that the area of equal radio signals strength is circular. The position of the aircraft is plotted on an appropriate map or chart as soon as the signal is heard for the first time. The pilot continues on the same heading for a short distance, then turns 90 degrees left or right and proceeds until the signal fades. This position is noted. The aircraft now turns 180 degrees and once again the positions of where the signal is heard and where it fades are plotted. The approximate position of the survival beacon can now be found by drawing lines between each set of “signal heard” and “signal faded” positions, then drawing the perpendicular bisectors of each line and noting the position where they intersect. The aircraft can then proceed to that position and descend to a suitable altitude for visual search. The construction of such a plot is shown in the figure below.



Map Assisted Aerial Search

(ii) With the time assisted aerial electronic search, the time when the signal is first heard is noted. But the aircraft continues on the same heading until the signal fades, when the time is noted again and the length of time during which the signal was heard is computed as the difference between the two. The aircraft then performs a 180 degrees procedure turn and returns along its original track in the opposite direction for half the amount of time just computed. At that point, the aircraft turns 90 degrees right or left and continues until; the signal fades. The aircraft then makes another 180 degrees procedure turn and the time when the signal is heard again is noted. The aircraft continues on that heading until the signal again fades, noting the time and computing the signal's duration as the difference between the two times. The aircraft then performs a third 180 degrees procedure turn and proceeds in that direction for one half of the last computed signal duration. It then descends to an appropriate altitude for visual search. An en-route aircraft may be very helpful and should be requested to listen on the survival beacon's 125.5 MHz alerting or homing frequency and report the positions where the signal is first heard and where it fades. The figure illustrates the geometry of this procedure.



Time Assisted Aerial Search

10.4.5 **Radar Searches**. Radar is primarily used in maritime search. The sweep width considered in computing the optimal search area will depend on the type of radar, height of the antenna, amount of environmental clutter and noise, radar cross section of the search object, radar beam refraction due to atmospheric conditions and operator ability. It should be noted that when the wave height increases to above one to three-six feet, the probability of detecting a small search object rapidly decreases for most radar and, consequently, so does the sweep width. For an aircraft, the search altitude used should' normally range between 1000 ft and 3000 ft for small search objects. The altitude used for large search objects should not exceed 4000 ft. The factors affecting the radar detection are as under.

(a) Size, aspect and material composition of the object.

(b) Sea state and weather.

(c) Height of the aircraft.

(d) Efficiency of radar operator.

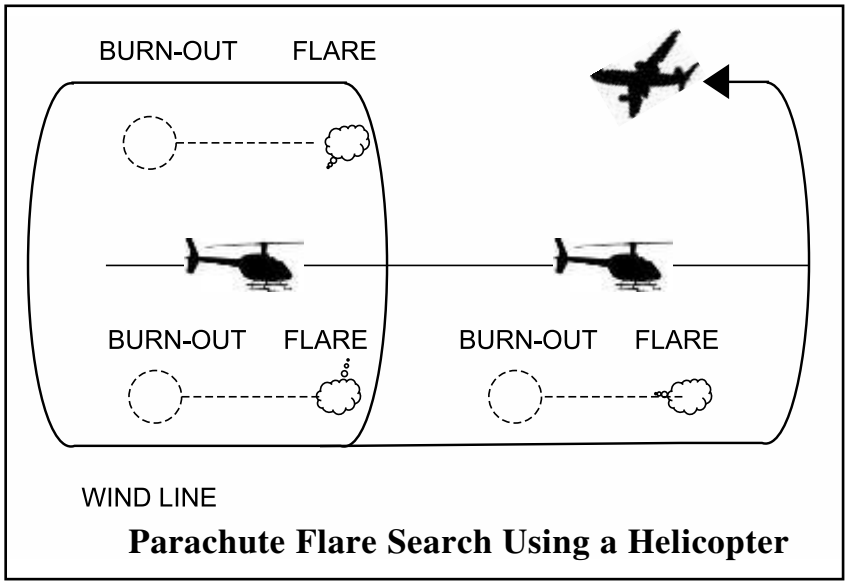
10.5 Night Search Patterns

10.5.1 Detection of survivors at night is unlikely, if they have no night signalling devices such as flairs or lights. However, the search patterns used along with visual night distress signals from the distressed craft are briefed as under.

10.5.2 **Parachute Flare Searches**. The use of aircraft parachute flares does not appreciably increase the chance of detection during the night. Therefore, this type of illumination has very limited potential in searches for anything other than large objects located in well defined search areas at sea. Parachute flares are normally dropped from fixed wing aircraft flying above and ahead of the search facilities. In this type of search, vessels and helicopters are the most efficient search facilities.

10.5.3 Fixed wing aircraft will normally be less effective, Parachute flares should not be dropped in such a way that casings or other material could fall on a search facility. It is essential to ensure flight separation between helicopters and fixed wing aircraft in these situations. If the flare is of the type, which falls free after bum out, the flare must be dropped in such a way that it does not bum out over a search facility. Flares must be handled with care by the crew familiar with their use.

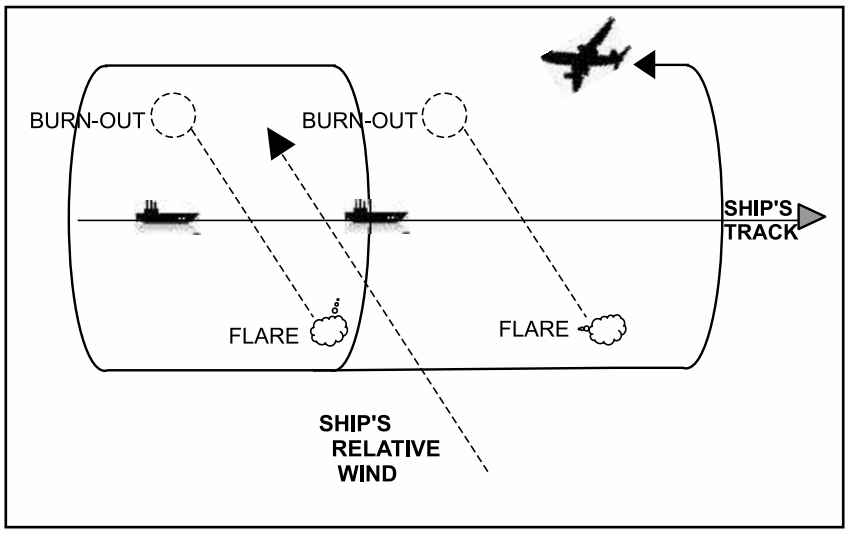
10.5.4 When helicopters are used as primary search facilities, it is essential to ensure a safe separation between them and the illuminating aircraft. Care must be exercised to ensure neither the flares nor debris from them collides with the searching helicopter. The searching helicopter normally flies into the wind or downwind at a height of 500 ft and the illuminating aircraft drops the flare at a height, which permits flare burn out below helicopter height. The flare should be dropped well ahead and well above, the helicopter at the two 0' clock or ten 0' clock position, so that the observers can search for silhouettes and shadows in addition to searching the area directly illuminated by the flare. The distance between successive flares should be calculated so as to ensure that the area is thoroughly covered. The aircraft dropping flares should be carefully positioned so that it is in position to drop the next flare before the previous flare has burned out. The helicopter pilot should be able to see the flare or flare dropping aircraft when the flare is dropped. This technique is illustrated in the figure.



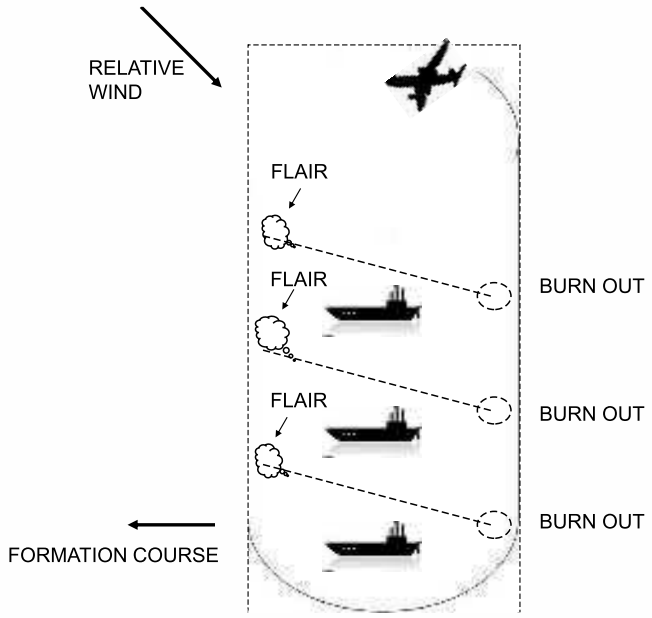
Parachute Flare Search Using a Helicopter

10.5.5 When a fixed wing aircraft is the primary search facility, the chances of success are small even if the search object is large and conspicuous. Fixed wing aircraft should be used only in extreme emergencies, when no other type of search facility is available. The search is carried out in a way similar to that for helicopters.

10.5.6 When a single surface craft is the primary search facility, the search is carried out by having the aircraft drop flares in a systematic pattern. Only large search objects on or near the surface facility's course win have a reasonably good chance of detection. The aircraft should drop the flare upwind of the vessel, off the bow. Flare bum out should occur on the opposite quarter of the vessel. Illumination may be on one or both sides of the vessel. The figure shows this pattern.



10.5.7 When several surface search facilities are available, this procedure is used with a line-abreast formation. The spacing between the surface facilities depends on the size of the search object and on scene conditions. The aircraft flies a race track pattern over the formation, dropping a set of flares upwind so that they are over the formation during the middle of the burning period and a new set is dropped as the previous set bums out. The number of flares to be dropped will depend on the length of the line of surface facilities. This pattern is shown in the figure.



Parachute flare search using several surface facilities

10.6 Night Vision Goggles

10.6.1 Use of night vision goggles (NVGs) can be effective in searches carried out by helicopters, fixed-wing aircraft, rescue vessels and other marine crafts involved in SAR operation. The following factors may influence the effectiveness of NVGs for searching.

(a) NVG quality.

(b) Crew training and experience.

(c) Environmental conditions (meteorological visibility, moisture, moonlight, cloud coverage, precipitation, etc.).

(d) Level and glare effects of ambient light (including natural light like moonlight and star light and artificial light like illumination from search, navigation and other lights, inside and outside the search facility).

(e) Whether the light sources are within the NVG user's field of view.

(f) SRU speed.

(g) Height of the observer above the surface.

(h) Sea state and presence of surf on the surface.

(j) Size, illumination and reflectiveness of the search object (reflective tape on survivors or their craft can significantly improve the chances of detection with NVGs).

(k) Types of survival equipment or light sources (like signaling devices and pyrotechnics) used by the survivors.

10.6.2 Glare should be minimized as much as possible within the facility's environment where the NVG users are stationed. This may involve opening or removing windows where practicable. Also, proper scanning techniques are important for reducing the adverse effects of moonlight or artificial light sources like light houses, offshore rigs, ships, anti-collision lights, etc.

10.6.3 Visible moonlight can significantly improve detection of unlighted search objects when using NVGs. Search object light sources, like strobe or similar lights or even cigarettes, can greatly improve detection even in poor visibility conditions. MRCC staffs should be aware that sweep width estimates should take into account local conditions and the advice of the facility on scene.

10.7 Electro Optical Sensors. If the SRU is equipped with electro-optical sensors viz, FLIR, the same can be employed during searches at night. The performance of these sensors however would be dependent on the prevailing weather conditions. Further, the employment should be decided after careful consideration of the equipment fitted onboard the SRU.

10.8 SAR Briefing

10.8.1 A thorough briefing by SMC must be undertaken to all SRUs and personnel involved in SAR operations well before departure of the SRUs. All SAR personnel

should be given the relevant details of the distress and all instructions regarding the conduct of SAR operations. Whenever time permitting this must be undertaken by issuing a search operation briefing/ tasking form to the crew involved, giving as much information as possible. When the SAR facility is enroute to the scene, situation update as available must also be provided. If any other additional pertinent information is received by the SMC after the briefing, the information must be passed to the facilities at the earliest.

10.8.2 Aircraft are the most capable facilities for searching a large area quickly. As each aircraft has its operating and technical limitations, the urgency of the situation should never cause an aircraft to be used beyond these limits for which it is not suitable. Reliable communications facilities must be ensured between the aircraft and the controlling agency on surface to keep all SRUs aware of the progress of the search. Therefore, through briefing must be undertaken for the aircraft SRUs exclusively which should include all items and important information as under.

(a) Full description and nature of distress.

(b) Details of search areas and description of clues that may indicate the presence of search objects including distress signals, visual signal codes, wreckage, dye markers, oil slicks, smoke, colored/ white objects, reflections from metal/ glass.

(c) Suggested type/ method of search and methods to record the area searched to optimise the search efforts.

(d) Details of other SAR facilities engaged and their search areas.

(e) Communications procedures and frequencies to be used.

(f) Frequencies to be guarded for monitoring transmission from the survivors.

(g) Special instructions pertaining to the flight to and from the search area including routes, levels and flight separation.

(h) Details of droppable supplies to be carried and any special dropping procedures.

(j) Action to be taken on sighting search objects.

(k) Precautions to be taken while dropping pyrotechnics.

(l) Present and forecast weather conditions to, from, in the search area and at the destination alternate aerodromes.

(m) Designation of OSC.

10.8.3 Briefing for the ships proceeding as SRUs should also cover all the instructions similar to that of aircraft SRU briefing. However, more emphasis should be given to the matters of interest pertaining to surface facilities. The surface SRUs must be briefed on extensive use of radio communication within the units on the scene for exchange of information during search operations in order to ensure effective coordination of surface search.

10.9 SAR Debriefing

10.9.1 Timely and comprehensive debriefing by SMC/SAR coordinator must be undertaken for all personnel involved in the search operations including all SRUs. This is as important as briefing prior operation, because careful debriefing and evaluation of the reports of every person involved in the operation is necessary for an accurate evaluation of search activities and remedial actions for shortcomings/ improvements, if any. This evaluation in turn will determine whether further search is to be undertaken if the previous efforts were unsuccessful.

10.9.2 All relevant information obtained during debrief must be plotted on the chart showing the search area. The careful study of this data will enable the SMC to update probability of containment, probability of success and cumulative probability of success values and use them together with other information to determine whether an area has been sufficiently searched.

CHAPTER 11

AIR OPERATIONS

CHAPTER - 11

AIR OPERATIONS

11.1 Aircraft Intercepts

11.1.1 The aircraft intercepts are based on the capability of SAR aircraft to establish visual/electronic contact with an aircraft in distress, provide in flight assistance and escort it to a safe landing. Escort service will nominally be provided to the nearest suitable airport. Should the escorted aircraft continue on another destination after reaching safe airport or decide not to divert to the nearest safe airport, further escort is discretionary.

11.1.2 **Occasion to Intercept**. The SMC in coordination with AAI & IAF may intercept and escort an aircraft when an alert phase exists and should intercept and escort when distress phase exists or when a pilot requests an intercept. The following incidents require aircraft intercepts:-

(a) When aircraft is unable to maintain altitude.

(b) When aircraft has suffered structural damage.

(c) When pilot in control of an aircraft is impaired.

(d) Uncertainty exists on the position of the aircraft.

(e) Uncertainty exists on the endurance of the aircraft to reach a safe airport.

(f) When one of the engines is inoperative.

(g) When the aircraft is in imminent danger.

11.1.3 **Types of Intercepts**. The methods selected for aircraft intercept will be determined whenever radar vectors to intercept the aircraft are not available. It is depending upon the nature of the emergency, the track of the distress aircraft and the relative position of the SAR aircraft. The aircraft intercept can be accomplished by using a direct, offset or maximum rescue coverage procedure and the conditions for the same are described below:-

(a) **Direct Intercept**. The direct or head on intercept is used when the distress aircraft is inbound to the SAR aircraft base. The distress aircraft should not be asked to change its heading for the intercept unless the aircraft is lost, requires minor heading changes to correct for navigation error or when it is in imminent danger and cannot reach the airfield safely.

(b) **Offset Intercept**. The offset intercept is used when the distress aircraft is making a good track to a landing area and the SAR aircraft is to one side of the track. The SAR aircraft intercepts the track of the distressed aircraft. When the distressed aircraft has greater ground speed, the, SAR aircraft has to be closest to the point of intended landing.

(c) **Maximum Rescue Coverage Intercept**. This procedure is to intercept and escort the high-speed aircraft with low speed SAR aircraft. Because of the speed difference it may be necessary for the SAR aircraft to turn short of the interception point on the distressed aircraft to provide maximum rescue coverage over the remaining distance to be flown.

11.1.4 **Aircrew Duties**. In order to provide maximum service to the distressed aircraft, the SAR aircraft crew requires thorough coordination amongst themselves and also between the distressed aircraft including the assisting air/ground facilities. To ensure this coordination, the duties of SAR aircraft aircrew include the following:-

(a) The pilots maintain communication with the distressed aircraft and other assisting facilities on the appropriate frequencies.

(b) The observer maintains an pertinent HF communications and keeps the pilots informed.

(c) The transmissions and conversations between the aircrew should be kept to minimum so as to enable exchange of information between the aircraft.

(d) In addition to navigation, the observer should plot the progress of both the aircraft. The accuracy of position report received from the distressed aircraft should be carefully evaluated and verified by other checks as soon as possible.

(e) The observer should compute an intercept at the earliest and advice the pilots and also the concerned MRCC/ MRSC, if required.

(f) If the calculation is not completed prior take off, the salient information like the initial heading, approximate distance and estimated time of intercept should be provided to the pilot. If possible, aircraft with SATCOM is to be deployed for such SAR missions to receive updated information by ground based units/ ships in area if not feasible on HF/ VHF. Also, aircrew should relay the progress of the situation to concerned authority.

(g) The observer should be prepared to complete the navigational visual intercept if communications/ electronic contact with the distressed aircraft is lost.

11.1.5 **Actions During Intercept**. The SAR aircraft should choose an altitude so as to enhance the capabilities of primary methods of interception, whether visual or electronic. The SAR aircraft should be flown at 1000 ft below or above the distressed aircraft to silhouette the latter against the sky and achieve maximum sighting distance. During night intercept additional vertical separation is recommended. To ensure safe vertical separation, it is imperative that altimeter settings of the both the aircraft be compared and coordinated prior to intercept. To enable best utilisation of the radar and to clear lower altitudes in case the distressed aircraft is unable to hold an assigned altitude, it is recommended that the SAR aircraft be flown at 1000 feet above the distressed aircraft.

11.1.6 **Intercept Communications**. The positive two-way communication between the SAR aircraft and the distressed aircraft plays a vital role in establishing visual/ electronic contact with the latter and provide assistance. To ensure this following points are to be ensured.

(a) Good communications between the aircraft instill confidence in the crew of the aircraft in distress. The crew must transmit messages in clear and concise form and provide information at periodic intervals to assure the distress crew that contact is being maintained. The distressed aircraft crew must not be burdened with unnecessary information.

(b) The SAR aircraft should establish direct communication on the enroute frequency, emergency VHF/ UHF frequency, with the distressed aircraft and other frequency as promulgated, at the earliest.

(c) The SAR aircraft must be prepared for any communications failure with the distressed as they may be forced to bailout, ditch or crash land at any moment depending upon the nature of emergency.

(d) If efforts to contact the distressed aircraft fails or communications is lost, the SAR aircraft must transmit information and instructions in blind under assumption that the distressed aircraft is receiving but is unable to acknowledge.

11.1.7 **Post Intercept Actions**. The following actions are to be taken by the SAR aircraft on intercepting the distressed aircraft:-

(a) Provide initial data like SAR aircraft identification, mission, present frequency, and secondary frequency to the distressed aircraft.

(b) Maintain listening watch on VHF/ UHF emergency frequencies must also as standby.

(c) Obtain and verify essential data like nature of emergency and intentions, true course, altitude, ground speed, flight conditions, endurance, persons on board must be by the SAR aircraft.

(d) Advise the distressed aircraft pilot regarding the location of closest suitable airfield for precautionary landing, type and length of runway. surface details, elevations, landing aids and weather.

(e) Confirm any further change in the plans of distressed aircraft. Notify the airfield simultaneously regarding position and time of intercept. Advise the airfield for services of crash and salvage facilities on landing.

(f) Reconfirm the altimeter setting with the distressed aircraft and advice on the minimum safe altitude enroute.

(g) Once the SAR aircraft is in escort position after the intercept, provide position, heading and ETA to the destination. Ensure that the distressed aircraft can arrive at the destination airport

(h) Confirm any fuel jettisoning would be essential prior landing. Take position accordingly well clear of the distressed aircraft during fuel jettisoning.

(j) Obtain the latest weather from the airfield and advice the distressed aircraft also. Once the distressed aircraft has the airfield in sight, obtain landing instructions for the distressed aircraft and remain overhead until distressed aircraft lands.

(k) If runway is clear for landing, the SAR aircraft can land at the same airfield or proceed to base, if endurance permits.

11.2 Aircraft Ditching

11.2.1 An aircraft ditching would set transponder to 7700 for distress, if available onboard. It would have also notified the appropriate AIS regarding the emergency situation, position and ditching intentions. Normally this would be done on the enroute air traffic control frequency or 121.5/ 243.0 MHz. If two way communications are not established, then the aircraft would have transmitted in

blind. If the aircraft is equipped with HF radio, ATS would have been apprised to have SAR authorities alert ships in the vicinity and have those ships attempt communications with the aircraft on 4125 kHz to assist ditching and rescue. If the aircraft has to ditch or the crew bailout over water, the most advantageous place near a surface craft preferablyalongside or slightly ahead.

11.2.2 The different maritime and aeronautical bands make direct communication between vessels especially merchant vessels and aircraft difficult. However, most civil aircraft flying over ocean are equipped with VHF/ AM radio 118-136 MHz and HF SSB radios 3-20 MHz. Military aircraft normally have UHF radio 225-399.9 MHz and HF SSB radio 3-30 MHz. Both military and civil aircraft with ATS units on HF while over ocean areas.

11.2.3 Merchants ships are ordinarily informed of aircraft distress situation by broadcast messages by CRSs on international distress 2182 kHz or 156.8 MHz (VHF Channel 16). Only few aircraft can operate on this frequency. However, emergency communications are usually established with the aircraft on 4125 kHz or 5680 kHz. Communications between aircraft and a vessel often may have to be relayed via an SAR aircraft, military vessel of ground station.

11.2.4 While there is no standard emergency signal to indicate ditching, an aircraft in distress can use any means to attract attention, make its position known and obtain help. Lowering landing gear and flashing landing lights on and off may be used by the aircraft to signal ditching intentions.

11.3 Assistance from Ships during Ditching

11.3.1 Assistance that may be provided in a ditching situation can be rendered only after establishing communication or locating the aircraft. The ship may establish and maintain communications with the distressed aircraft by direct voice channel. The ship may use its radar to locate the aircraft by identifying the transponder code 7700 if appropriately equipped. In case this is not possible the pilot may be able to make 90 degree identification turn and hold the new course for three minutes and then return to the base course.

11.3.2 **Homing**. The ship can also send homing signals on a frequency compatible with aircraft's automatic direction finder and the pilot may be able to provide the reciprocal bearing for homing. Also with the position, other associated navigation data and unusual weather conditions received from the aircraft, the

vessel the ship can home on to the distressed aircraft at the earliest. The ship may assist aircraft by providing the course to steer based on radar and DF bearing from the ship. Also during the daylight the ship can make black smoke, cruise at high speeds to form a wake or use other means to attract attention visually. During night the star shells, searchlights, pyro techniques, deck lights or the ship can use water lights.

11.3.3 **Weather and Surface Data** Although the final determination of ditching site is responsibility of the pilot, the ship can provide useful surface data, sea/swell information, weather update and recommend ditching heading. The ship is also to mark the sea lane along the selected ditching heading for easy identification by using fire extinguisher during day light with relatively calm sea conditions. During night or low visibility period a series of floating lights can be laid.

11.3.4 **Rescue and Medical Assistance**. Rescue of personnel from a ditched aircraft may be undertaken by small boats or the ship itself. The survivors in the water or aircraft should usually be rescued first and those safe in the rafts last. If there are seriously injured personnel ship/ OSC may render first aid and request SMC for medical arrangements to evacuate. An aircraft ditching must be responded to immediately since an aircraft will float for only a very limited time.

11.3.5 **Action in case of Survivor is Sighted.**

(a) The position of the survivor/ wreckage is to be plotted and marked immediately. If no markers are carried by the air craft, execute a turn with the survivor at the center. Fly low over the survivor with waggling wings by days or by flashing lights by night to indicate to the survivor that he has been sighted.

(b) Having sighted a ditched aircraft/ survivor, any nearby surface vessel may be guided to the location by the following procedure (in case there is no R/T contact)

(i) Circle the vessel at least once to draw its attention

(ii) Fly across the bows, opening and closing throttle

(iii) Fly away in the direction that you wish the craft to follow

(c) The vessel will acknowledge the message in one of the following ways.

(i) Hoist a vertical red and white striped code pennant

(ii) Flash TTT on signal lamp (---)

(iii) Alter heading to follow you

(iv) If unable to comply, the vessel will:-

(aa) Hoist Flag 'N' (Blue & White checkered flag)

(bb) Flash 'N' on signal lamp (-,)

(d) Return to orbit over the survivor. If not in R/T contact/ only Tx serviceable give blind calls (entire message should be repeated twice).

(e) Ground to air signals used by survivors are:-

(i)	Require assistance	-	V
(ii)	Require Medical Assistance	-	X
(iii)	No or Negative	-	N
(iv)	Yes or affirmative	-	Y
(v)	Proceeding to this direction	-	↑

(f) Ground to Air Visual signal codes used by rescue units are:-

(i)	Operation Completed	-	LLL
(ii)	We have found all personnel	-	LL
(iii)	We have found only some personnel	-	++
(iv)	We are not able to continue and Returning to base	-	XX
(v)	Having divided into two group Each proceeding in indicated direction	-	
(vi)	Information received that aircraft In this direction	-	→→
(vii)	Nothing found, will continue search	-	NN

(g) Survivor may use signaling lamps, torch and signaling flag using international code of signals to communicate with the aircraft.

(h) If, C/S not known, use the following:-

(i) Ship - TUM KAUN

(ii) Aircraft - KAUN HAI

(j) **Procedure for Search with and Without Homing Capability.**

(i) **HAL Homer Fitted Onboard**. Search aircraft homes on to the Transmission by keeping the homer needle at 12 O' Clock. To remove the 1800 ambiguity, turn 300 left or right from the original course. If the homer needle turns in such a direction so as to indicate to turn back to original course, the survivor/ transmitter lies in the direction 1800 to the original course of the aircraft. If unsuccessful, a systematic electronic search will have to made using parallel search pattern using tracking of known/ estimated range of ELT.

(ii) **Aircraft Fitted with DF 301 E**. DF 301 equipment fives directly the magnetic bearing of the transmitter on the RMI (Double Needle) when the transmitter frequency is selected on the communication set ARC 182. The aircraft can home on directly to the survivor/ Tx and no direction ambiguity exists.

(iii) **Search Aircraft Without Homer**. The following procedure will be employed by the Search Aircraft if not fitted with a homer.

(aa) Plot the position where the signal is first picked up (1)

(ab) Plot the position where the signal (2) is lost

(ac) Calculate the distance between the two plots

(ad) Alter heading by 1800 and head back in the direction half way to the above distance. Thereafter alter heading by 900 to the original course

(ae) Plot the position when contact is lost on this course (3)

(af) Head in the new direction till signal os lost again (4)

(ag) Calculate the distance between positions 3 & 4

(ah) Alter course by 1800 and head back in the direction till hald of the distance calculated. This position will be the position of the beacons (5)

(aj) If unable to sight the survivor in this position carry out expanding square search, taking position 5 as the datum

CHAPTER 12

HELICOPTER OPERATIONS

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HELICOPTER OPERATIONS

12.1 Advantages of Helicopter

12.1.1 Helicopters can be effectively used during SAR operations especially in the final stages of rescue at sea. It is an ideal SRU because of its slow speed and hovering capabilities particularly for search of small targets at sea. The ability to land in confined areas and to operate from ships enables the helicopter to aid survivors long before surface SRUs can arrive on scene. They are also suitable for rescues in heavy seas or at locations where surface facilities are unable to access and operate. Due to these unique capabilities, helicopters should be used whenever possible.

12.2 Resources

12.2.1 Presently, Indian Coast Guard has mix of single and twin engine helicopters based in the state of Gujarat, Maharashtra, Goa, Kerala, Tamil Nadu, Andhra Pradesh and at Port Blair in Andaman Island. The ICG single engine Chetak helicopters are capable of operating from the decks of Offshore Patrol Vessels having deck landing facilities. Advanced Light Helicopter is a twin engine aircraft which is capable of operating from deck and enhanced capabilities in terms of endurance and reach. In addition to these, Indian Navy also have single and twin helicopters at multiple places along the coast which can be employed for SAR services. Helicopters held with Indian Air Force are also useful in search and rescue operations at sea besides some of the private helicopters operated by Oil Rig operators.

12.3 Capabilities

12.3.1 The helicopters are excellent resources for search, maneuverability and rescue. They are excellent platforms capable of recovering personnel from wide variety of distress situations and from barely accessible areas. The helicopters have the following capabilities:-

(a) Sustained hover operations.

(b) Hoisting and lowering operations.

(c) Transfer of personnel by rescue hoist.

(d) Transfer of materials viz submersible pump for de-flooding operations.

(e) Under slung operations effecting logistics and material transfer.

(f) Deploying aircrew diver for rescue operations.

(g) Transfer of medical personnel for medical requirements.

12.4 Helicopter Operations on Passenger/ Special Vessels

12.4.1 The general guidelines for safe helicopter operations onboard Passenger vessels or other support vessels which has onboard helideck for undertaking medical evacuation or rescue of crew or passenger are given in succeeding paragraphs.

12.4.2 **Structure**. In general, the construction of helidecks should be of steel or other equivalent material. If the helideck forms the deck head of a deckhouse or superstructure it should have been insulated to A-60 class standard.

(a) If the Flag administration permits aluminum or other low melting metal construction that is not made equivalent to steel, the following provisions should be satisfied:-

(i) If the platform is cantilevered over the side of the ship, after each fire on the ship or on the platform, the platform should undergo a structural analysis to determine its suitability for further use, and

(ii) If the platform is located above the ship's deckhouse or similar structure, the following conditions should be satisfied:-

(aa) The deckhouse top and bulkheads under the platform should have no openings.

(ab) All windows under the platform should be with steel shutters, and

(ac) Been after each fire on the platform or in close proximity, the platform should undergo a structural analysis to determine its suitability for further use.

(b) A helideck should be provided with both a main and an emergency means of escape and access for fire fighting and rescue personnel; these should be located as far apart from each other as is practicable and preferably on opposite sides of the helideck.

12.4.3 **Fire-fighting Appliances**. In close proximity to the helideck, the following fire-fighting appliances should be provided and stored near the means of access to that helideck:-

(a) At least two dry powder extinguishers having a total capacity of not less than 45 kg.

(b) A suitable foam application system consisting of monitors or foam making branch pipes capable of delivering foam to all parts of the helideck in all weather conditions in which helicopters can operate.

(c) The principal agent should meet the performance standards of the International Civil Aviation Organization's Airport Services Manual, Part 1 (Rescue and Firefighting, Chapter 8), Extinguishing Agent Characteristics, paragraph 8.1.5 (Foam Specifications), Table 8-1 (Level 'B' foam), and be suitable for use with salt water.

(d) At least two nozzles of an approved dual-purpose type (jet/spray) and hoses sufficient to reach any part of the helideck.

(e) In addition to those required by regulation II-2/17 of the 1974 SOLAS Convention as amended, two sets of fireman's outfits.

12.4.4 Drainage facilities in way of helidecks should be constructed of steel and lead directly overboard independent of any other system and designed so that drainage does not fall on to any part.

12.4.5 **Occasional and Emergency Helicopter Operations**. Where helicopters land or conduct winching operations on an occasional or emergency basis on ships without helidecks, fire-fighting equipment fitted in accordance with

chapter II-2 of the 1974 SOLAS Convention, may be used. This equipment should be made readily available in close proximity to the landing or winching areas during helicopter operations.

12.5 Considerations by SMC

12.5.1 The pilot of the helicopter is the final judge of the capability of the aircraft for the mission. However, the SMC should consider the following before deploying the helicopter for the SAR mission:-

(a) Small/ light helicopters are usually limited to visual flight and some may be restricted to daylight flying only.

(b) While some helicopters are instrumented for both inclement and night flying, they may be prohibited from night hovering and night navigation capabilities.

(c) Turbulence, gusting winds or poor visibility conditions may limit helicopter use.

(d) Operations by surface SRUs may be hampered by noise and rotor down wash produced by the helicopters.

(e) Number of survivors who can be rescued by helicopter taken onboard each trip is limited depending upon the size of the helicopter and endurance onboard.

(f) It may be necessary to reduce all up weight by removing non-essential equipment or undertake operation with less fuel/ endurance.

(g) The fuel onboard at scene may be reduced by use of helicopter capable ships as staging/refueling platforms or operation from shore base nearby with refueling capabilities.

(h) It may be advantageous to dispatch a fixed wing aircraft in advance to confirm the suitability of weather enroute/ on scene for helicopter operations.

(j) Recovery by landing of the helicopter at an ashore facility needs additional concern like rotor down wash, turbulence, level/ nature of ground, loose debris/ FOD in area and landing/ takeoff path clearance.

(k) Operations in high altitude environment will reduce helicopter performance and severely affect hovering capabilities.

(l) Discharge of static electricity during hoist operations.

(m) While operating from deck, when conditions are marginal, landing should be carried only as a last resort.

12.6 Communications

12.6.1 It is important that adequate information is exchanged between the helicopter and the vessel and they are thoroughly understood. This would be possible only when a direct radio link is established between the ship and helicopter. This is usually accomplished with the helicopter equipped with the marine VHF FM radio able to transmit and receive on at least Channel 16 and preferably on two other working channels. Unless other arrangements have been agreed upon in advance, the ship should monitor VHF Channel 16 or pre-designated SAR frequency for the arrival of the helicopter.

12.7 Evacuation Missions

12.7.1 Evacuation by Helicopter is undertaken depending upon the nature of casualty, the prevailing condition and the availability of the space onboard for winch operations and landing. The mission also depends upon the capabilities and limitations of the helicopter. The safety and efficiency of the helicopter operations is greatly enhanced if the crew of the vessel. the ground party at the rescue scene and the aircrew are thoroughly briefed in advance on what is required/expected of the operations.

12.7.2 The helicopter operations include landing and winching on land, water and oil rigs/offshore installations or on the deck of the ships at sea. Landings on vessels and oilrigs at sea will normally be done on well-equipped and trained craft. Though winching by helicopter can be hazardous to the persons being hoisted/ lowered, the rescue facility and others on the scene of winching, the operations if coordinated and conducted well will certainly save lives of the casualties or personnel in distress. However, the final decision about whether it is safe to conduct the winching is subject to agreement of the pilots of the helicopter, personnel at the scene and the

person in command of the rescue facility.

12.7.3 When arranging for the evacuation of a patient by helicopter or any other helicopter operations with the vessel, the following points should be considered by MRCC/ MRSC:-

(a) Whether the ship has requested appropriate MRCC/ MRSC for helicopter assistance.

(b) Rendezvous position to be indicated as soon as possible.

(c) If the vessel is beyond helicopter range, it must be diverted to facilitate operation.

(d) Obtain as much medical information as possible from the vessel, particularly about the patient's mobility.

(e) Advise vessel to intimate immediately of any changes in the condition of the patient.

12.7.4 The vessel must be advised to be ready with the following information for exchange between the 'helicopter and the vessel' to enable helicopter operations for the evacuation of the casualty:-

(a) Position of the ship.

(b) Course and speed to the rendezvous position.

(c) Local weather situation.

(d) Details of the ship for easy identification from the air (such as flags, orange smoke signals, spotlights or daylight signaling lamps).

12.8 Standard Procedures for Helicopter Operations

12.8.1 Helicopter operations include landing and winching on land or at sea. Landings on vessels will normally be done on well-equipped and trained craft. Discussion here will focus on winching since it may be conducted for various trained and untrained facilities. Winching can be hazardous to the persons being hoisted, the rescue facility and others at the scene of the winching. The final decision

about whether it is safe to conduct the winching, subject to agreement of personnel at the scene, is with the person in command of the rescue facility.

12.8.2 The vessel at the rescue scene should be briefed on what is required. A sample briefing is provided after this discussion. This briefing can be given by OSC or another SAR facility prior to the on-scene arrival of the helicopter.

12.8.3 **Communications between Ship and Helicopter for Winching Operations**. It is important that information be exchanged between the vessel and helicopter, and that it is understood. A direct radio link should be established between ship and helicopter. This is usually accomplished by having the helicopter equipped with a marine VHF FM radio able to transmit and receive on at least Channel 16 and preferably on two other simplex working frequencies. The exchange of information and instructions about rendezvous positions, etc., may be established through shore-based radio stations. Unless other arrangements have been agreed upon in advance, the ship should monitor VHF Channel 16 for the arrival of the helicopter.

12.8.4 For easy understanding, a sample briefing to vessel prior to helicopter winching operations includes message details : A helicopter is proceeding to your position and should arrive at approximately at ..... hrs (GMT). Maintain a radio watch on ..... MHz/ kl+z/ Channel VHF-FM. The helicopter will attempt to contact you. Provide a clear area for winching. Lower all masts and booms that can be lowered. Secure all loose gear. Keep all unnecessary people clear of the pick-up area. Just before the helicopter arrives, secure the ship's radar or put it in standby mode. Do not direct lights towards the helicopter as it will adversely affect the pilot's vision. When the helicopter arrives, change course to place the wind 30 degrees on the port bow and maintain a steady course and steerage way. As the helicopter approaches, strong winds may be produced by the rotors, making it difficult to steer. The helicopter will provide all the equipment for the winching. A line will probably be trailed from the helicopter for your crew to guide the rescue device as it is lowered. Before touching the rescue device, allow it to touch your vessel. This will discharge static electricity. If you have to move the rescue device from the pick-up area to load the patient, unhook the cable from the rescue device and lay the loose hook on the deck so it can be retrieved by the helicopter. Do not attach the loose hook or the cable to your vessel. The helicopter may move to the side while the patient is being loaded.

Have the patient wear a lifejacket, and attach any important records, along with a record of medications that have been administered. When the patient is securely loaded, signal the helicopter to move into position and lower the hook. After allowing the hook to ground on the vessel, re-attach it to the rescue device. Signal the winch operator with a "thumbs up" when you are ready for the winching to begin. As the rescue device is being retrieved, tend the trail line to prevent the device from swinging. When you reach the end of the trail line, gently toss it over the side.

12.8.5 The following salient information should be exchanged between the helicopter and the vessel such as the position of the vessel, course and speed to the rendezvous position, local weather conditions, how to identify the vessel from the air (such as flags, orange smoke signals, spotlights, or daylight signalling lamps).

12.8.6 The general guidelines for preparing landing or pick-up areas include providing whenever possible, the clear zone should be close to the ship's side, identify clear access to the operating area and exit from it to the ship's side, establish the best position within the area in the maneuvering zone that will give the largest clear zone, areas close to the bow are not recommended due to the increased air-flow turbulence created by the ship's passage, a large stretch of deck which is clear of obstructions should be made available as a pick-up area.

12.8.7 Larger vessels may have areas marked on their decks. These markings are an aiming circle with "H" painted in white for landing, or a circle with an inner circle painted yellow for winching only. During the night, pick-up area floodlighting should be provided and the floodlights should be located so as to avoid glare to pilots in flight or to personnel working on the area. The arrangement and aiming of floodlights should be such that they are not directed towards the helicopter and shadows are kept to a minimum, the spectrum distribution of the floodlights should be such that the surface and obstacle markings can be correctly identified. Any clothing or other objects lying about should be cleared away or secured due to strong air-wind current from the helicopter. The helicopter may be able to lift a person from a lifeboat or a liferafts secured on a long painter. However, liferafts have been overturned by the helicopter's air-current.

12.8.8 The other general safety preparations include:-

(a) A briefing to discuss the safety aspects and operational details of helicopter-ship operations should be held for all involved personnel prior to the operation's commencement.

(b) Wherever available, the following fire-fighting equipment or its equivalent should be ready during helicopter operations:-

(i) At least two dry powder extinguishers with an aggregate capacity of not less than 45 kgs.

(ii) Suitable foam application system (fixed or portable), capable of delivering a foam solution at a rate of not less than 6 litres per minute for each square metre of clear zone and sufficient foam compound to enable the rate to be maintained for at least five minutes.

(iii) Carbon dioxide (CO_2) extinguishers with an aggregate capacity of not less than 18 kgs.

(iv) A deck water system capable of delivering at least two jets of water to any part of the helicopter operating area.

(c) For better identification from the air, and also for showing the direction of the wind to the helicopter pilot, flags and pennants should be flown.

(d) All crew members concerned, as well as the persons to be evacuated, should wear life jackets.

(e) Care should be taken that the patient does not wear loose clothing or headgear.

(f) On no account should the lifting device on the end of the winch cable be secured to any part of the ship or become entangled in the rigging of fixtures.

(g) Ship's personnel should not attempt to grasp the lifting device unless requested to do so by the helicopter crew. Even in this case, a metal part of the lifting device should first be allowed to touch the deck in order to

avoid possible shock due to static electricity.

(h) When helicopter winching is to be done from carriers of flammable or explosive cargo, in the vicinity of a flammable mixture spillage, the winching must be grounded clear of spillage or the carrier's tank venting area in order to preclude a possible fire or explosion from an electrostatic discharge.

CHAPTER 13

RESCUE PLANNING AND OPERATIONS

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RESCUE PLANNING AND OPERATIONS

13.1 Rescue Planning

13.1.1 When the search object has been located, the SMC, OSC or master or pilot in command of the SAR facility must decide on the method of rescue to be followed and the facilities to be used. The following factors should be considered:-

(a) Action taken by the sighting craft and the SAR action, which can be taken by other craft on scene.

(b) Location and disposition of the survivors.

(c) Condition of survivors and medical considerations.

(d) Number of persons reported to be on board the distressed craft and the number who have been located.

(e) Environmental conditions observed and forecasted.

(f) Available SAR facilities and their state of readiness (to reduce delay, the SAR facilities which are likely to be used should be alerted and deployed to a suitable location while the search is in progress).

(g) Effect of weather conditions on SAR operations.

(h) Time of day (remaining daylight) and other factors relating to visibility.

(j) Any risks to SAR personnel, such as hazardous materials.

13.2 Sighting and Subsequent Procedures

13.2.1 When the search object has been located, it must be remembered that rescue of survivors by the SRU on scene may be even more difficult than the search. The SRU should indicate to the survivors that they have been sighted by any of the following procedures:-

(a) Flashing a signaling lamp or a search light.

(b) Firing two signal flares, preferably between, a few seconds apart.

(c) If SRU is an aircraft, fly low over the survivors with landing lights on or rocking the wings.

13.2.2 If the SRU is unable to effect an immediate rescue, it may consider any of the following steps for assisting rescue.

(a) Drop communications and survival equipment.

(b) Keep the survivors in distress scene in sight at all times, thoroughly surveying the scene and accurately plotting the location and marking it with a dye marker, smoke float or floating radio beacons.

(c) Report the sighting to the SMC with the available information on the following:-

(i) Time of sighting.

(ii) Position of the search object.

(iii) Description of the distress scene.

(iv) Number of sighted survivors and their apparent condition.

(v) Apparent condition of the distressed craft. Take photograph and Email to SMC/ SAR coordinator if feasible

(vi) Logistics supplies and survival equipment required.

(vii) Supplies of water and food required.

(viii) All messages, including radio transmissions, received from survivors.

(ix) Weather and sea conditions.

(x) Type and location of nearby surface craft, if any.

(xi) Action taken or assistance already given and future actions required.

(xii) Remaining fuel and on scene endurance of SRU making the report.

(xiii) Apparent risks involved in the rescue including hazardous materials, if any.

13.2.3 The SMC may also request the search facility to establish the location and the nearest land suitable for use by aircraft especially helicopters so that, other rescue facilities and aircraft can be directed to the distress scene. If the SRU is an aircraft,

then it must be directed to take photographs or undertake video photography of the distressed craft, if possible, from normal search heights and directions, from a low level and from an angle to enable better appreciation during analysis. The SRU should remain on scene until PLE or relieved by another SRU or forced to return to the base; due to endurance limit or rescue has been effected.

13.2.4 **Delivery of Rescue Personnel and Equipment**. The maritime SRUs are liable means of delivering supplies, equipment and personnel to the scene of distress. Equipment may include bilge pumps, towing equipment, fire-fighting equipment and medical supplies. Personnel delivery is usually limited to medical personnel, damage control/ repair and salvage parties.

13.2.5 **Supplies and Survival Equipment**. The supplies and survival equipment are carried by air and maritime, SAR facilities to aid survivors and facilitate their rescue. The type and number to be carried depend upon the circumstances on scene. Maritime facilities and helicopters generally can deliver this equipment directly to survivor. Fixed wing aircraft can deliver supplies to survivors if suitable landing areas exist nearby or if the supplies can be dropped at the scene. The packing of supplies and survival equipment should be adapted to the manner of delivery. Packs of supplies and survival equipment must be adapted to the circumstances of the SRR in which they are used.

13.2.6 **Droppable Life Rafts**. Life rafts packed for dropping should be available for use when survival craft have not been launched successfully or have been damaged in launching or survival craft have become unserviceable. It should also be dropped when the survivors: are overcrowded in the survival craft in use or survivors are in the water. Liferafts, supplies and equipment may be dropped together in a chain, ideally with life rafts at each end.

13.2.7 An airborne droppable inflatable lifeboat may contribute to the rescue, but the need for a particular type of aircraft, handling and dropping procedures makes it an item, which can only be used by specialized aircraft SRUs, if available.

13.2.8 The supplies and survival equipment carried on rescue boats and other inshore crafts need not be extensive when medical attention, blankets, clothing, hot drinks, etc., are available ashore. Additional equipment should be taken if the rescue boats are limited in number or the climate is severe. Hot liquids, covering for survivors and insulating blankets for hypothermic survivors should always be carried. Rescue vessels likely to operate some distance offshore should carry

an adequate quantity of the items and equipment for artificial respiration; first aid and advanced life support to the extent of the crew training.

13.2.9 **Medical Personnel**. In formulating any rescue plan, the SMC should consider establishing a forward medical base to enable appropriate treatment by competent medical staff according to the priority. Once the search object has been sighted, the SMC must consider whether to send medical personnel to the scene. Another consideration is 'the' mental trauma that both survivors and rescuers may undergo. Plans and procedures should be developed for post traumatic stress syndrome debriefings.

13.3 Rescue by Aircraft

13.3.1 In some cases aircraft may be used for rescue. Each aircraft has operational and technical limitations and should not be used on operations for which it is not suitable. Whenever possible, a rescue operation by aircraft should be backed up by a surface SRU, particularly for a large number of survivors.

13.3.2 Fixed wing aircraft may drop equipment to survivors and direct rescue facilities. They can mark the position as long as they can remain on scene, by serving as a radio and radar beacon, showing lights, dropping flares and providing radio signals for direction finding and homing by other rescue facilities.

13.3.3 Helicopters can be used to rescue survivors by winching or by landing on a ship if a suitable location exists. Due to their unique flying capabilities, they should be used whenever possible. They are particularly suitable for rescues in heavy seas or at locations where surface SRUs are unable to operate. However, the special concerns of which the SMC must be aware are as follows:-

(a) Operations by surface parties may be hampered by the noise and rotor wash produced by helicopters. To facilitate the coordination between helicopters and surface rescue facilities and to minimize the risk of collision associated with helicopters operating in a confined space, their operations should be coordinated by a facility in communication with them and preferably by the OSC.

(b) Recovery by landing of the helicopter creates additional concerns. Factors like turbulence, level of the ground, clearing the loose debris, altitude and landing and take off paths must be considered when selecting a landing site. Operations in a high altitude environment will reduce helicopter

performance and severely affect hovering capability. When conditions are marginal, landings should be carried out only as a last resort.

(c) A typical recovery is carried out by hovering over the survivors and taking them aboard using a winch with a sling, rescue net or rescue stretcher. Selection of the site is the same as for recovery by landing. However, the cable and rescue device being lowered may have a large static electricity charge. No one should touch the cable or rescue device until it has made contact with the surroundings.

13.4 Rescue by Maritime Facilities

13.4.1 When both maritime rescue facilities and helicopters are dispatched to the scene, it may be advisable to transfer survivors to the helicopters for a more rapid delivery to medical facilities. All surface SRUs should be equipped to lift survivors from the water without any assistance by the survivors themselves, as they may be injured, exhausted or suffering from hypothermia. When hoisting a person suffering from hypothermia, especially after immersion in water using rescue strop, adequate care must be exercised, as hoisting of such persons is a vertical position may cause severe shock or even cardiac arrest.

13.4.2 Rescue boats typically are designated SRUs but may include any craft near the scene of the distress. Designated rescue boats are generally small and may not be able to carry many survivors. It may be necessary to send a number of boats to the distress scene if they are available. Each boat should carry additional life saving appliances to enable survivors who cannot be rescued immediately to remain afloat while awaiting the arrival of another boat.

13.4.3 As soon as the distress scene is located, an attempt should be made to account for all occupants of the distressed craft. The search must continue until all of the occupants have been found, otherwise accounted for or there is no significant chance of locating additional survivors. Meanwhile, those survivors who have been located must be rescued as soon as possible. The duties of an OSC at a distress scene include the following:-

(a) Giving first aid.

(b) Evacuating survivors by whatever means available.

(c) Collecting and preserving medical and technical data to support investigations.

(d) Establishing identities of casualties/ survivors.

(e) Making a preliminary examination of the wreckage and reporting to the SMC.

13.5. Special Requirements at Aircraft Crash Sites

13.5.1 Many military aircraft are fitted with ejection seats and other hazardous material, e.g., bombs or chemicals. When a pilot has to be removed from an aircraft so fitted, extreme care should be taken to avoid triggering such mechanism. The activating handles are normally indicated by red or yellow and black colouring.

13.5.2 While undertaking rescue operations at the aircraft crash site; the wreckage and its surroundings should not be disturbed except to assist in the recovery of survivors. Not only does the wreckage pose dangers, but also the position of flight controls, the location of debris and other factors are important to the accident investigation. Control of the access to the crash site should also be established at the earliest. Photographs of the crash site and wreckage should be taken at the earliest, which may help in accident investigation.

13.5.3 The SAR personnel must ensure that the aircraft is not accidentally set on fire. If it is necessary to cut into aircraft to remove survivors, no tools, which are likely to cause sparks, should be used and fire extinguishers should be kept standby. Composite material construction of the aircraft and the possible presence of hazardous material pose additional safety hazards to the survivors and rescue personnel.

13.5.4 Measures to preserve as much medical evidence as possible includes photography of bodies before moving them, shielding of bodies by the best means available to avoid decomposition, notation of the position of immobilized survivors and maintenance of a medical log for each survivor. Except for compelling reasons, human remains should not be moved without authorization from the SMC who should, in turn, obtain authorization from an appropriate authority.

13.6 Ditching Assistance

13.6.1 The MRCC on receipt of information about an aircraft ditching in the SRR should plan to render assistance as follows:-

(a) Obtain the latest position of the aircraft by any means available, e.g., from the aircraft, from its escort (if applicable), by direction finding or by radar.

(b) Alert vessels in the vicinity of the distressed aircraft, asking them to keep a listening watch on frequencies 4125 kHz and/ or on 3023 kHz.

(c) Provide the aircraft with the position of the nearest ship, the information on sea condition and ditching heading, if possible.

(d) Request the distressed aircraft to communicate with the selected vessel on 4135 kHz or any other suitable frequency. Act as a relay station if required.

(e) If time permits, inform the ship on how she can assist the aircraft.

13.6.2 Assistance provided by ships for ditching depends on the capabilities of the ship. The nearest vessel to the ditching aircraft will often be a merchant ship. The ship may be limited to the assistance arranged by the MRCC, but she can also rescue survivors. The most suitable vessels are SRUs equipped for two way radio communications with the aircraft and with crew trained and equipped for SAR incidents including ditching. Assistance to the ditching aircraft that can be rendered by the vessels includes the following:-

(a) Locating the aircraft by radar.

(b) Providing navigation and homing aids.

(c) Furnishing weather and sea information.

(d) Directing the aircraft to the vessel.

(e) Assisting the aircraft by marking a sea-lane and providing the illumination.

(f) Effecting rescue after the ditching.

13.6.3 Escort aircraft if available can render assistance to the ditching aircraft by providing the following:-

(a) Guiding the distress aircraft to the vessel alongside which it plans to ditch.

(b) Giving advice on ditching procedures.

(c) Evaluating sea conditions and recommending ditching heading.

(d) Informing the vessel on how it can assist the ditching aircraft.

(e) Rescue of persons from inside damaged, capsized or ditched aircraft.

(f) Dropping of survival and emergency equipment.

(g) Informing SMC the location of ditching.

(h) Directing other vessels to the scene.

(j) Providing illumination for night ditching if it is planned away from the vessel or when the vessel cannot provide.

13.7 Rescue of Persons from Damaged, Capsized or Ditched Craft

13.7.1 The rescue of persons from inside damaged, capsized or ditched craft is typically dangerous and should normally be attempted only with suitable facilities, equipment and specially trained personnel. There is always the risk of the craft sinking or shifting. Diving may be required to reduce this risk and for the rescue operation. Therefore, these operations must be conducted promptly according to a prudent plan. Such operations are generally carried out in following three stages, which are discussed in detail in the succeeding paragraphs:-

(a) Investigation of the situation.

(b) Prevention of sinking.

(c) Lifesaving.

13.8 Investigation of Situation

13.8.1 Rescue personnel must conduct an initial investigation and accurately assess the condition of the emergency. A reasonable work plan should then be developed based on the investigation. The following items should be considered and investigated.

(a) **Distress Area Considerations**

(i) Incident position and depth of water at that location.

(ii) Meteorological and sea conditions (weather, wind direction and velocity, air temperature, sea current direction and velocity, water temperature, visibility both above and below the water surface, waves, swells, etc.).

(iii) Existence of fishing nets or other obstructions.

(iv) Leakage of hazardous material.

(v) Conditions of other vessels in the vicinity.

(vi) Existence of sharks or other dangerous marine life.

(b) **Rescue Forces Considerations**

(i) Size and number of boats and aircraft.

(ii) Number of divers available.

(iii) Availability of floating cranes, tug boats, fishing boats, etc.

(iv) Medical assistance.

(v) Transport for rescue personnel and survivors.

(c) **Missing Persons Considerations**

(i) Number of persons missing.

(ii) Position of crew when the accident occurred.

(iii) Existence of survivors inside (determined by tapping or other reaction tests).

(iv) Need for emergency measures to sustain survivors trapped inside (i.e. supply of air into the craft, etc.).

(d) **Investigation Procedures**. The following investigation procedures should normally be used in various situations:-

(i) **Conditions on Scene**. While approaching the wreck, rescuers should observe circumstances such as meteorological conditions, sea phenomena, conditions of other vessels in the vicinity and so on. They should also check to see if there is any debris in and under the water.

(ii) **Investigation of Craft**. The average waterline, list and leakage of air should be observed at appropriate intervals with video or instant cameras to quickly verify any change of condition. If at least one meter of a floating craft is exposed and the list is insignificant, investigators may consider climbing onto the craft to check for air leakage from the doors, stem tube, etc.

(iii) **Existence of Survivors**. Investigators may hit the craft with hammers or other items and then listen for any reaction suggesting the existence of survivors. To hear weak signals from the survivors, silence among the rescuers is essential. A loudspeaker may be used

in an attempt to talk to persons inside. Inboard voices may be audible when the ear is put against the outside of the craft, thus making it possible to talk with survivors inside. If it is difficult to lower a work boat or for investigators to move from a work boat on to the distressed craft due to stormy weather or other hazards, investigating divers should arrive from the leeward side of the craft to reach underneath and hit it with knife grips or similar objects, to see if there is any reaction from persons inside. At this point, it is normally premature and too dangerous to actually swim beneath or enter the craft.

(e) **Other considerations**. Additional matters, which are also to be considered during the investigation, are listed below:-

(i) When a fishing boat has capsized, there are often fishing nets adrift in the nearby sea area, so caution is needed in maneuvering vessels and carrying out the rescue operation.

(ii) The craft may be less likely to sink if floating on an even keel, not listing, existing waterline is one-fifth to one-half the normal draught, no opening in the hull leaks air or floating for more than one hour in the same condition.

(iii) Even if there was no reaction when the craft was tapped the first time, it is necessary to tap it three or four times at appropriate intervals.

(iv) Unless it is known that there are no survivors, work should be performed with the assumption that survivors remain inside.

13.9 Prevention of Sinking

13.9.1 The measures that could be taken, where practicable, to prevent the vessel/craft from sinking during rescue operations include the following:-

(a) **Preventing Air Leakage**. This can be accomplished by closing of the openings such as doors, ventilators, hatches, pipe, stem tube etc. and plugging cracks with wooden or metallic wedges.

(b) **Supply of Air into Craft**. Air may be introduced into the craft from a lower opening or by using special tools, e.g., striking a drive pin and attaching an air hose.

(c) **Fitting of Floats**. Attaching floats is effective when it is not practical or safe to supply air to the inside. However, floats may not fully compensate for the lost buoyancy of the craft and should be considered mainly to minimise the leakage of air and prevent sinking by correcting list or trim. Typical methods of fitting floats are as follows:-

(i) **Looping Method**. A wire or cable is looped around the lower part of the craft and both ends are fitted to floats.

(ii) **Fitting Wires to Fixed object**. One end of a wire or cable is fitted to a bollard or some other fixed object and the other end to a float.

(d) **Holding Alongside**. This can be accomplished by using one or two vessels with wires or cables by supporting the craft. The wires or cables may be taken off or cut off immediately as the situation demands.

(i) **Alongside Support by Two Rescue Vessels**. Two vessels move into position on opposite sides of the craft, but at an appropriate distance from it. Wires or cables are then stretched under, the craft between both vessels.

(ii) **Alongside Support by One Rescue Vessel**. A single vessel may be used to limit list or to support one end of the craft.

(f) **Floating Crane**. This method is most effective in preventing the sinking of a damaged vessel if available on the scene. It is therefore necessary to immediately arrange use of a floating crane and tugs.

(g) **Stranding in a Shallow Place**. The craft may be gently grounded in near by shallow water, if the situation permits and if it appears safer than the present situation.

13.9.2. Other important factors to be considered to prevent a distressed, damaged or capsized craft from sinking are listed below:-

(a) Supplying air into a craft provides buoyancy, but the air should be introduced into an area where it will improve rather than worsen the craft's stability.

(b) Keeping the craft level improves the chances for survivors and helps to prevent sinking.

(c) Maintaining buoyancy with air and correcting list with side support or floats decreases the possibility of sinking.

(d) A capsized vessel may turn sideways if more than half of its hull comes out of the water.

(e) Alongside support may lead to the sinking or damage of the craft if maneuvering is done incorrectly, especially in stormy weather.

(f) Supplying fresh air to the sub divisions where survivors are located may be necessary.

13.10 Lifesaving

13.10.1 Survivors can be expected to be in state of a panic or shock and in complete darkness. Rapid rescue is necessary due to the lack of food, water and fresh air in a capsized craft. Survivors may be rescued either through an opening made above the waterline or from under water. The method that has the greatest chance for success must be selected, taking into account that making an opening can threaten the air pocket into the vessel and survivors may panic if they have to dive under water.

13.10.2 The lives of the survivors may be prolonged by periodic tapping on the craft by the rescue personnel, which may reveal the existence of the survivors and provide encouragement by keeping them informed of the progress of the rescue operation. Air hoses and air tanks for divers may be used to feed fresh air to the compartments with the survivors. If survivors are accessible by divers, fresh water and food can be provided until the survivors are rescued.

13.11 Rescue Action Plan

13.11.1 A rescue action plan is normally prepared along with the search action plan by the SMC for implementation by the OSC and other facilities on scene. This may be provided to them in form of a rescue action message for implementation in the operation. The essential components of the message are listed below:-

(a) **Situation**. This section has the description of the following:-

(i) Brief description of the incident.

(ii) Number of persons requiring rescue.

(iii) Extent of injuries.

(iv) Amount and type of survival equipment.

(v) Weather forecast and period for forecast.

(vi) SAR facilities on scene.

(b) **Rescue area**. The rescue area section describes the following:-

(i) Position of the incident.

(ii) Access routes to be followed by SAR facilities, if applicable.

(c) **Execution**. The execution part covers the following points:-

(i) SAR facilities assigned, including facilities call signs and parent agencies providing them.

(ii) Rescue method to be attempted.

(iii) Supplies or equipment to be delivered in the area.

(d) **Coordination.** The coordination portion covers the following details:-

(i) Designated SMC and OSC.

(ii) On scene endurance of SAR facilities.

(iii) Change of operational coordination.

(iv) Coordinating instructions from SMC to OSC/ SRUs.

(v) Parent agency relief instructions.

(vi) Temporary flight restrictions.

(vii) Authorisation for non-SAR aircraft in the area.

(e) **Communications**. The communication prescribes the following points:-

(i) Coordination procedure and on scene channels.

(ii) Call signs of aircraft assigned and other surface units.

(iii) Other special instructions and relevant communications information.

(f) **Reports**. The report component describes the following:-

(i) OSC to SMC report format.

(ii) Reporting interval.

(iii) Parent activity reports.

13.12 Developing a Rescue Plan. Although the SMC normally prepares a rescue plan, sometimes the OSC may have to develop it. Factors to consider include:-

(a) Risk to SAR personnel.

(b) Number, location and disposition of the survivors.

(c) Condition of survivors and medical considerations.

(d) Current meteorological conditions.

(e) Current sea conditions, as appropriate.

(f) Time of day.

(g) Survival equipment on hand.

(h) Type of rescue craft, etc.

13.13 SAR for Fishing Boats

13.13.1 There are numerous fishing villages located along the coastline of India operating various kind of fishing crafts/ boats. Generally these boats sail with out communication sets necessary to effect distress notification. Also these boats do not carry the required survival equipment onboard. As a result, the distress alert raised by the fishing boats are very common in Indian SRR. The poor knowledge of the fishermen in respect of the requirement of communication sets, fishing groups or in company and monitoring meteorological forecast aggravates the situation further. The delay in response to these situations may lead to the drifting of the vessel into mid sea making the search further complicated and time consuming. This may also involve loss of life due non-availability of adequate food and water onboard. The non-availability of communication sets onboard and less radar cross sectional area makes the coordination of search difficult. Therefore, this arena needs quick and concerted efforts by all concerned so as to effect the search and rescue with minimal delay. In order to avoid frequently raised alerts by fishing community, the

planning should involve the participation of the fishing community itself, local fishing organisation, State/ Central fishing authorities and concerned MRCC/ MRSC.

13.13.2 **Responsibility of Fishing Community**. The contribution of the fishing community in coordinating SAR by MRCC/ MRSC plays a vital role in making the search and rescue mission successful. The MRCC/ MRSC through periodic community interaction and awareness programs with the fishing villages should educate fishermen on the following aspects as a preventive measure:-

(a) The boats are to be equipped with VHF communication sets for reporting distress if any to the other vessels in the area and seek assistance.

(b) The fishing boats are to carry survival equipment like rafts, lifebuoys and life jackets onboard.

(c) The boat should carry distress alerting mechanism to indicate nature of distress at sea along with position.

(d) The fishing boats are to intimate area of operation with likely time schedule to the local fishing authority/ fishermen association prior departure and operate only in that area and period.

(e) The fishing boats are to intimate the appropriate association/ authority regarding change in area of operation, time schedule, un-scheduled arrivals in any harbour.

(f) The boats going out of the visual range of the coastline are to operate in groups of five to ten each. Such groups are to operate in the vicinity of each other.

(g) At least one boat in the group is to carry GPS and charts of the area along with HF communication sets. The frequency of communication for fishing boats for distress notification should be promulgated.

(h) The fishing community should develop own SAR system by deploying boats belonging to the community for first aid response activities till arrival of SRUs on the scene.

13.13.3 **Responsibilities of Local Fishing Association/ Authority**. The local fishing association/ authority is to carefully evaluate the existence of a distress situation before notifying the same to MRCC/ MRSC as it involves alerting of the SAR

facilities and may result in diversion of SAR facilities engaged in other missions. The local fishing association/authorities are to consider the following points before alerting the appropriate MRSC and also during the SAR mission:-

(a) Consultation with other fishing associations nearby to rule out the probability of return of the vessel to those fishing harbour.

(b) If distress situation exists, notify the same to the appropriate MRCC/ MRSC and commence the search using local assets.

(c) Communication maintained with MRCC/ MRSC in order to establish two-way communications round the clock and exchange of developments.

(d) Report to the MRCC/ MRSC at the earliest, when the missing fishing boat reaches the harbour.

(e) The distress notification to MRCC/ MRSC should include the following:-

(i) Name, port of registration, registration number and colour of the boat.

(ii) Length, height and structure.

(iii) Nature of distress and assistance required.

(iv) Position/area of operation, ETD and planned ETA with harbour.

(v) Communication sets available onboard and frequency manned.

(vi) Survival equipment onboard.

(vii) Number of crew.

(viii) Name, address and telephone number of the owner.

(ix) Contact person, address and telephone number for round the clock exchange of information.

(x) Details of search undertaken with area.

(xi) Fuel, food and water onboard.

13.13.4 On few occasions, the fishing boats under distress are assisted by other fishing boats operating in the area after the distress alert is raised to relevant MRCC/ MRSC which deploys resources for the mission. In such cases, it is essential that the fishing association/ authority/ person raising the alert must inform concerned MRCC/ MRSC about the rescue assistance.

13.13.5 **Planning by MRCC/ MRSC**. The MRCC/ MRSC on receipt of distress notification of fishing boat should evaluate the situation so as to ascertain the existence of the distress and establish the communication with the local fishing association/authorities to collect above information.

(a) In case of alerts received through DATs, the precise position and nature of distress is well established to initiate precise planning and launch of rescue services.

(b) MRCC should continuously relay the updated position received from DAT of distress IFB to the SRU so as to ensure precise homing towards the casualty. This will ensure timely and early action in rendering assistance to the distressed mariners at sea and early evacuation. Further, MPA using SARAT (INCOIS) software should also be updated to ship.

(c) Large amount of chemicals and hazardous and noxious substances are transported in the Indian Ocean region. Incidents involving Hazardous and Noxious Substances (HNS) are often broad in their impacts and often pose a challenge for rescue operations and dangers to the rescue teams. The units and following Maritime Search and Rescue operations are often the same as those that carry out the initial rescue operation.

(d) As in most of the cases, the missing fishing boats returns to the nearby fishing harbour and there involves considerable time delay in cancellation of the distress, the MRCC/ MRSC is to ascertain the existence of distress prior deploying the SRU. The following include the actions to be taken by the MRCC/ MRSC for SAR of fishing boats:-

(i) Careful evaluation of distress situation.

(ii) Maintain the record of the contact details of the fishing authorities, associations and harbour in their jurisdiction.

(iii) Ensure round the clock communication with appropriate local authorities during distress period.

(iv) Notify the distress to the vessels operating in the area through ISN.

(v) Notify the distress to NAVAREA VIII coordinator for NAVAREA promulgation.

(vi) Alert the rescue facilities to remain standby for deployment.

(vii) Carry out search by aircraft. Drop locating aids like EPIRB, SART to aid the rescue facilities to home on.

(viii) On locating dispatch surface units for assistance. If required, drop food and water through aircraft.

13.14 Termination of Rescue

13.14.1 As soon as the rescue operation has been completed, the SMC should immediately notify to all authorities, facilities, or services which have been activated. All information on the conduct of the rescue operation should be added to that on the search operation and a final report prepared. Information of interest to accident investigation and medical authorities should be given to them without delay.

13.15 Wreckage Precautions/Salvage/Disposal

13.15.1 Under Regulation 15 of Chapter 5 of the International Convention for Safety of life at Sea, the Govt. of India has an obligation to ensure that necessary arrangements are made for the rescue of persons in distress at sea. When a Ship or an aircraft is in distress around the coast of India, assistance may be given not only by ship in the vicinity but by also the following authorities:-

(a) Indian Coast Guard

(b) DG Shipping/Mercantile Marine Department

(c) State Administration

(c) Indian Navy

(d) Indian Air Force

(e) Air Traffic Control Centres

13.15.2 When a EPIRB/ELT/Radio Signal is received on a distress frequency it is transmitted to ships at seas and various authorities including the nearest Indian Coast Guard and the naval authority to initiate and co-ordinate the research and rescue operations. Radio distress calls and distress traffic have absolute priority over other maritime traffic. During distress communication no transmission is allowed from any ship which may interfere with the search and rescue operations. The details of the search and rescue procedures are also contained in detail in Indian Notice No. 7 of Notices to Maritime Special Edition 1994.

13.15.3 **Wreckage and Salvage for ships**. The provision regarding wreck and salvage are contained in part XIII of the M.S. Act, 1958. This part of the M.S. Act, 1958, contains provisions for the following:-

(a) Appointment of receivers of wreck;

(b) Duties and powers of receivers of wreck;

(c) Procedure for reporting, custody and disposal of wrecks;

(d) Salvage payable for saving life, cargo or wreck;

(e) Power of the Central Government to make rules respecting wreck and salvage.

(f) In accordance with Section 404 of the M.S. Act, 1958, the Central Government has made rules to carry out the purposes of part XIII of the said Act. These rules are called "The Merchant Shipping (Wreck & Salvage) Rules, 1974". These rules provide for the following matters :-

(i) The procedure to be followed by receiver of wreck in respect of the taking possession of wrecks and their disposal;

(ii) The fees payable to receivers in respect of the work done by them,

(iii) The procedure to be followed for dealing with claim relating to ownership of wrecks;

(iv) The appointment of valuers in salvage cases;

(v) The principles to be followed in awarding salvage and the apportioning of salvage;

(vi) The procedure to be followed for dealing with claims for salvage;

(vii) The detention of property in the custody of a receiver of wreck for the purpose of enforcing payment of salvage.

13.15.4 **Wreckage and Salvage for Aircraft**. Wreckage resulting from aircraft accidents within the entire Indian Territory including territorial waters or, in the case of accidents on the high seas or in areas of undetermined sovereignty, falling within the search and rescue region are removed, obliterated or charted following completion of the accident investigation, if its presence might constitute a hazard or confuse subsequent search operations.

13.15.5 **Aircraft Wreckage Precautions/Salvage/Disposal.**

(a) Aircraft crash sites can pose hazards to searchers from wreckage, chemicals, explosive ammunitions, or radiation.

(b) An aircraft crash site may have each hazard spread over several miles following impact. Appropriate safety precautions should be observed. IAMSAR Manual, Volume 2, Chapter 6, provides additional guidance.

(c) Search parties should not disturb aircraft wreckage, except to assist in the recovery of survivors.

(d) Not only does the wreckage pose dangers but other mechanisms, such as ejection seats, may be hazardous. The position of flight controls, location of debris, and other factors are important in post-flight accident analysis.

(e) Charts, flight plans, and other documents should be preserved if threatened with destruction, and if preservation can be accomplished without danger or undue movement of debris.

(f) SAR personnel, if do not have the authority to enforce laws, should normally only take action necessary to preserve incident site. In general, SRUs should not take any chance in a situation that might endanger SAR personnel.

CHAPTER 14

MEDICAL ASSISTANCE AT SEA

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MEDICAL ASSISTANCE AT SEA

14.1 Medical Assistance at Sea

14.1.1 A system of medical assistance at sea applies generally to ships that do not have a doctor on board. It may, however, be requested in certain circumstances by a ship's doctor. IMO Maritime Safety Committee Circular no. 960 of 20 Jun 2000 specifies Medical Evacuation, medical advice and initial medical assistance to a person in distress at sea, as an integral part of Search and Rescue which is also consistent with the International Convention on Maritime Search and Rescue.

14.1.2 The system of medical assistance at sea, does not apply to maritime accidents involving a large number of shipwrecked people or where the rescue proper involves the assistance of medical teams. However, the various elements of the system are normally involved in the case of a serious accident, subject to special procedures.

14.1.3 During an incident of medical assistance at sea, MRCC/ MRSC should be able to provide the Master of the vessel with information to advise him to contact a Tele-Medical Assistance Services (TMAS) or an authorised Medical Practioner. If medically necessary and advised by an authorised Medical Practioner, MRCC/ MRSC are to organize an evacuation, to the extent of its capacities and resources available.

14.1.4 In case, the vessel has been directed for diverting the voyage, the Master of the vessel may be advised of the most suitable port, bearing in mind the condition of the sick or injured person. MRCC/ MRSC shall also to transmit the alert, together with any relevant information, to the shore-based reception facility.

14.2 Means of Evacuation at Sea

14.2.1 The means used for evacuation are generally the same maritime or aeronautical means used for rescue operations. It may be useful in certain circumstances to use a more specialized means of search (e.g. aircraft) to guide the rescue craft responsible for the evacuation. The responsible authorities should regard it as desirable to have onboard the rescue craft a team that includes either a doctor,

or one or two people with appropriate training, when recommended by the TMAS doctor or an Authorised Medical Practioner.

14.2.2 If medical evacuations are being considered, the benefits must be weighed against the inherent dangers of such operations to both the person needing assistance and to the rescue personnel. When medical assistance is required, the MRCC/ MRSC should obtain the following information, which may be considered necessary according to specific cases:-

(a) Name of the vessel and radio call sign including IMO/MMSI No.

(b) Position of the vessel, port of destination.

(c) Estimated time of arrival, course and speed.

(d) Patient's name, age, gender, nationality and language.

(e) Patient's respiration, pulse rate, temperature and blood pressure.

(f) Location of pain.

(g) Nature of illness/ injury, including apparent cause and related history.

(h) Symptoms.

(j) Type, time, form and amounts of all medications given.

(k) Time of last food consumption.

(l) Ability to eat, drink, walk or be moved.

(m) With accident cases, how the accident occurred.

(n) Whether the vessel has a medicine chest.

(p) Whether a physician or other medically trained person is onboard.

(q) Whether a suitable area is available for helicopter, winch operations/ landings particulars/ dimensions of deck.

(r) Name, address and phone number of vessel's agent.

(s) Last port of call, next port of call and ETA to next port of call.

(t) Communications and homing signal available.

(u) Additional patient remarks.

14.3 Medical Evacuation by Helicopter

14.3.1 In case the medical evacuation operations is being undertaken by helicopter, the vessel must be directed to be ready in all respects for embarking the casualty well before the arrival of the helicopter. Also the vessel must be advised on the following:-

(a) The patient is to be moved as close to the helicopter pick up area, depending on the patient's condition.

(b) Ensure that the patient is tagged to show details of any medication, which has been administered.

(c) The patient's seaman's papers, passport, medical record and other necessary documents are to be prepared in a package ready for transfer with the patient.

(d) Ensure that personnel are prepared as necessary to move the patient to the special stretcher (lowered by the helicopter) as quickly as possible.

(e) The patient should be strapped in the stretcher with face up and with lifejacket if condition permits.

14.4 Shore-based Arrangements

14.4.1 Unless the evacuation craft transports the evacuated person directly to a hospital (evacuation by helicopter), it is essential to provide for reception of the sick or injured person and transport from the point of disembarkation to the hospital, including specialized equipment (ambulance) and trained personnel and, if necessary, a doctor. There is nothing specifically maritime about this aspect, but being well prepared to admit the patient to the most suitable medical establishment is essential, if the system is to be fully effective.

14.5 Mass Casualty

14.5.1 The shipboard disasters and aircraft crashes may require major medical response. The logistics of rescuing large number of victims, providing first aid and transportation of survivors to appropriate medical facilities are very demanding especially when rescue is undertaken at sea. Therefore, SMC should respond by involving all means available and provision as quickly as possible. SMC should also ensure availability of ambulance and hospital facilities ready and ensure that survivors are not left alone after the rescue particularly if injured or showing

signs of hypothermia or physical/ mental exhaustion. When medical assistance or advice is required, the SRU should provide the basic medical assistance. The medical information on the mass casualties provided by the SRU to the SMC should include the following :-

(a) Name of the SRU and its available means of communications.

(b) Position of SRU, destination, ETA, course and speed.

(c) Name, gender, age of patients/ survivors, Nationality and language known.

(d) Information concerning respiration, pulse, temperature, blood pressure and symptoms, if possible.

(e) Nature of illness/ injury, location of pain, apparent cause and relevant history.

(f) Type, time, form and amount of all medication given.

(g) Time of last food consumption.

(h) Ability of casualties to eat, drinks, walk or be moved.

(j) Availability of medical kit/professional with the SRU and SAR facilities in company.

(k) Availability of area for helicopter landing/ Winch operations with specification/ dimension of deck.

(l) Name and point of contact of personnel having further details of distress vessel and its occupants.

(m) Identification of deceased casualties in coordination with OSC/ SMC to facilitate handing over to local authorities.

(n) Precautions taken for not exposing the rescuers and the other casualties to the deceased casualties.

14.5.2 The MRCC/ MRSC should make arrangements to obtain competent medical advice on twenty-four-hour basis and when possible take medical advice from personnel familiar with risks peculiar to the environment of SRR and with the inherent risk involved with medical casualties. The MRCC/ MRSC should maintain list of resources that can provide medical advice and facilities. The factors to be considered by MRCC/ MRSC during mass casualties are as follows:-

(a) Condition of survivors.

(b) Capability of SRU to reach the survivors in shortest possible time and effect rescue.

(c) Medical training, qualifications and operation capabilities of the personnel onboard SRU.

(d) Availability of doctors amongst survivors/ onboard other ships nearby.

(e) SRUs capabilities to transport casualties without aggravating injuries or leading to new complications.

(f) Advise SMC/ OSC on difficulties that may be encountered by shore facilities on provision of shelter, food, water and weather conditions.

(g) Methods of maintaining communications with the SMC/ OSC.

(h) Obtain information from SAR personnel/ rescue casualties for coordinating additional requirements on scene.

(j) Status of life saving appliances including Boats/ Gemini/ Life Raft onboard SRU.

14.6 MEDICO

14.6.1 The SMC should have procedures in place for responding to a request for medical advice at sea (MEDICO) and for Medical evacuation.

14.6.2 MEDICO is an international term usually meaning the passing of medical information by radio/ Inmarsat phone/ E-mails. Medical Advice (acronym MEDICO) consists of diagnosis and prescription of treatment on board. It may in some cases be given by bodies other than those providing the Telemedical Assistance Service (TMAS) where such advice does not involve evacuation or diversion.

14.6.3 MEDICO messages request or transmit medical advice from and to a vessel at sea. Each MEDICO message may be addressed to MRCC/ MRSC or communications facilities from ships at sea. The messages should be prefixed MEDICO so that communications personnel know to handle them as MEDICO messages. These messages are normally delivered only to hospitals or other facilities with which SAR authorities or the communications facility has made prior arrangements. SAR services may provide medical advice either with their

own doctors or via arrangements with doctors outside the SAR organisation. There are several commercial enterprises that provide international subscription and pay per use medical advises to vessels at sea. Replies to messages should indicate the medical facility that provided the medical information.

14.7 Tele-Medical Assistance Services (TMAS)

14.7.1 The existence of Tele-medical Assistance Service in a system of medical assistance at sea is essential for the following reasons:-

(a) To alleviate the isolation at sea of both the victim (the sick or injured person on board) and the captain responsible for giving treatment.

(b) To avoid, as far as possible, the need for evacuation, which, although sometimes essential, is by its nature dangerous and expensive.

(c) To assist RCCs, which are often the first contact with the captain in difficulty, to take an appropriate decision.

14.7.2 A TMAS should be officially designated as such by the competent authority in the State concerned so as to appear in official documentation and provide a guarantee of competence and quality to potential users. The designation should also indicate effective links with one or more MRCC/ MRSCs, so that the latter are quite clear as to which MRCC they should turn in any particular instance. For the telemedical service, it involves taking medical responsibility for the advice given by its doctors.

14.7.3 Although the ship may call the TMAS directly, MRCC/ MRSCs are often the first contact for a captain faced with a medical emergency. They need immediate medical advice and a recommendation for action (which may simply be treatment on board): the TMAS doctor has full authority to recommend evacuation on medical grounds.

14.8 Telemedical Advice at Sea

14.8.1 The global system of medical assistance at sea relies heavily on the use of telemedical advice. Telemedical advice is one of the emergency procedures in maritime radio communications, in the same way as a call to an MRCC. The ship's Master, who is responsible for treatment on board, must be able to access the TMAS of his choice, based on his nationality, the ship's flag and especially

the language spoken. Communications used for telemedical advice must be subject to the strictest confidentiality and are subject to medical secrecy. Recording of the date and time of all TMAS communications and archiving on secure tape will enable essential data to be preserved should they be required in the case of legal proceedings into responsibility. All recorded information is subject to medical secrecy in the same way as the content of a medical file. A format for TMAS Medical Information exchange form is placed at **Appendix K**.

14.9 Means of Communications

14.9.1 Voice communication is the basis of telemedical advice. It allows free dialogue between the doctor and the person responsible for treatment on board or between doctor and patient and contribute to the human relationship which is crucial to any medical consultation.

14.9.2 Text messages exchanged between the ship and the TMAS by telex are a useful complement to the voice telemedical advice and add the reliability of writing. Capacity for dialogue, however, is limited, and the gain in precision is obtained at the expense of the human relationship which remains essential in an isolated environment.

14.9.3 Fax allows the exchange of pictures or diagrams which can help to identify a symptom, describe a lesion or the method of treatment.

14.9.4 Digital data transmission (photograph or electrocardiogram) provides an objective and potentially critical addition to descriptive and subjective clinical data. Devices for recording and transmitting electrocardiograms, at a relatively low cost and for use by people who are not doctors are now available on the market and some ships are already equipped with them.

14.10 Operational Guidelines on Medical Evacuations at Sea

14.10.1 Following operational guidelines for MRCC/ MRSC and Rescue Agencies/ Units while responding to Medical Evacuation (MEDEVAC) at sea requests:-

(a) On being requested by person/ vessel in distress, MRCC/ MRSCs may direct the vessel to obtain Medical advice from authorised Tele Medical Assistance Services (TMAS).

(b) Medical advice may also be obtained from qualified and authorised civil/ military Medical Practioner and relayed to vessel.

(c) The urgency and decision to undertake MEDEVACs is to be decided on obtaining the advice on the inputs of Tele Medical Assistance Services (TMAS) or from authorised civil/ military Medical Practioner and patient's clinical status unless situations warrants otherwise.

(d) In case of situation developing into MEDEVAC requirement, patient's clinical status and TMAS - TMAS Information Exchange Form in accordance with Appendix R, IAMSAR Manual, Vol - II and MSC 1/ Circular 1318 must be obtained from the Master. Following information is critical to SMC prior deploying ICG unit:-

(i) Medical History or Clinical status of patient.

(ii) Reply to a set of Questionnaire from Patient/ Master of the vessel for attaining updates on Patient and other facilities available onboard including Patient's clinical course, if MEDEVAC is delayed or not performed.

(e) Feasibility of evacuating patient on ship's arrival to nearest port by boat arranged by the ship's Agent be explored prior deploying rescue units for appropriate response/ assistance.

(f) Appropriate Rescue unit be deployed/ diverted for the evacuation of the ill crew taking into consideration the clinical status of the crew.

(g) It is desirable to have a Doctor or medical attendant onboard the ICG unit deployed for MEDEVAC. However, MEDEVAC missions can also be undertaken without presence of Doctor/ medical assistance in case of dire situations and urgency, provided that the MEDEVAC can be handled by the rescue unit being deployed. Feasibility of embarking a specialist Doctor arranged by the ship's Agent may also be explored.

(h) Since MEDEVAC can be extremely hazardous to both the patient and rescuer because of severe environment conditions at sea and inherent dangers during embarkation/ transfer of a patient etc, benefits of the MEDEVAC must be weighed against the risks to the patient and the Rescue personnel undertaking the mission.

(j) Necessary arrangements and all safety precautions be undertaken during evacuation/ disembarkation/ transfer of the patient. MEDEVAC Check off List in accordance with this Manual be implemented and adhered by SMC/

unit during the operation. A check list for MEDICO or MEDEVAC is placed at **Appendix L.**

(k) In case the vessel is directed to a port for medical assistance or MEDEVAC, the designated port, reception agency and the local agent need to be intimated for necessary evacuation arrangements.

(l) Medical Officer/ medical assistance or authorised Medical Practitioner arranged by Agent should be available for assessing the status of the Patient and examining the documents prior disembarkation of Patient.

(m) MEDEVAC is to be considered completed when patient is either shifted to other medical authorities or no longer requires medical assistance.

(n) Diary of Event, Narrative, Photography and Communication log be maintained at MRCC/ MRSC/ SMC for records and documentation.

(p) A detailed report be forwarded to MRCC/ NMSARCA keeping Operational/ Admin Authorities informed.

14.10.2 The ibid guidelines are to be read in conjunction with the provisions elaborated in International Aeronautical & Maritime SAR (IAMSAR) Manual Vol I, II, III on medical evacuation at sea.

14.11 Care of Survivors

14.11.1 After rescue, survivors may require hospital treatment. This must be provided as quickly as possible. The SMC should consider having ambulance and hospital facilities ready. SAR personnel must ensure that, after rescue, survivors are not left alone, particularly if injured or showing signs of hypothermia or of physical or mental exhaustion. When selecting the method of transport of survivors to medical facilities, the following factors should be considered:-

(a) Condition of survivors.

(b) Capability of the rescue facility to reach the survivors in the shortest possible time.

(c) Medical training, qualifications, and operational capabilities of the personnel.

(d) Rescue facilities' capabilities to transport survivors without aggravating injuries or producing new complications.

(e) Difficulties that may be encountered by land parties. (e.g., provision of shelter, food, and water)

(f) Weather conditions.

(g) The possible availability of doctors among the survivors, aboard nearby ships, etc.

(h) Methods of maintaining communication with the SMC.

14.11.2 When medical advice or assistance is required, the rescue facility should provide the SMC a basic medical assessment. Other information may also be necessary in certain cases. If medical evacuations are being considered, the benefit of such an evacuation must be weighed against the inherent dangers of such operations to both the person needing assistance and to rescue personnel. MRCCs should make arrangements to obtain competent medical advice on a 24-hour basis, and should use, when possible, medical advice from personnel familiar with risks peculiar to the environments of the SRR, and with the inherent risks involved with medical evacuations. It may be advisable to involve such personnel in SAR exercises. Medical information provided by the rescue facility to the SMC includes:-

(a) Name of the SAR facility and its available means of communications.

(b) Position of the SAR facility, destination, estimated time of arrival, course, and speed.

(c) Names, gender, and age of patients.

(d) Information concerning respiration, pulse, and temperature, and also blood pressure, if possible.

(e) Location of pain.

(f) Nature of illness or injury, including apparent cause and related history.

(g) Symptoms.

(h) Type, time, form, and amounts of all medications given.

(j) Time of last food consumption.

(k) Ability of patients to eat, drink, walk, or be moved.

(l) Whether the rescue facility has a medical kit, and whether a medical professional is with the SAR facility.

(m) Whether a suitable clear area is available for helicopter hoist operations or landing, or a suitable beaching area is available for marine craft.

(n) Name and point of contact of off-scene persons who hold further details about the distressed craft and its occupants.

14.11.3 Victims of diving accidents may need special consideration. These victims often have compressed-gas injuries that few on-scene SAR personnel understand or are prepared to handle. SAR personnel should be able to recognize the general symptoms of dive-related injuries, be aware of their potential severity, and take basic steps to minimize worsening the medical condition. Other divers with the victim may be excellent sources of information. The MRCC should maintain a list of resources that can provide diving medical advice and a list of available recompression chambers.

14.11.4 Divers with decompression sickness or an air embolism require immediate treatment with hyperbaric oxygen in a recompression chamber. These dive-related injuries are worsened by reduced atmospheric pressure. Aircraft transporting these victims should fly at the lowest safe altitude, which may require taking a less direct route.

14.12 Handling of Deceased Persons

14.12.1 Searching for and recovering bodies is not normally considered to be part of SAR operations. However, handling of human remains may at times be necessary.

14.12.2 Human remains at an aircraft crash site should not be disturbed or removed without authorization except for compelling reasons. The SMC would obtain authorisation from an appropriate authority, usually associated with aircraft accident investigations.

14.12.3 Without exposing rescuers to danger, an attempt should be made to identify deceased persons. All articles removed from or found near each body must be kept separate, preferably in a container so labelled that it can be correlated later with the body. All these articles should be handed over to the proper authority as soon as possible.

14.12.4 When human remains are recovered during a SAR operation, or when a death occurs on board a SAR facility, a waybill should be made out for each deceased

person. It should contain the full name and age of the deceased (if known), as well as the place, date, time, and cause of death (if possible). This waybill should be made out in English.

14.12.5 Considerations for the transport of human remains include:-

(a) On vessels, body bags or sailcloth for human remains should be carried. (If human remains are kept on board for any length of time, they should be properly wrapped and put in a suitable place on the vessel.)

(b) SAR aircraft do not normally transport human remains. (However, SAR aircraft may have to carry human remains if no other means are readily available.)

(c) Immediately after return to a base specified by the RCC, the remains must be handed over to the appropriate authorities, accompanied by the waybill.

(d) If it is known or suspected that a deceased person had an infectious disease, all material and objects which have been in direct contact with the deceased person must be cleaned and disinfected or destroyed.

CHAPTER 15

Mass Rescue Operations

CHAPTER - 15

MASS RESCUE OPERATIONS

15.1 Overview

15.1.1 A Mass Rescue Operation (MRO) is characterised by a need for immediate response to large numbers of persons in distress such that capabilities normally to SAR authorities are inadequate.

15.1.2 MROs are relatively rare low-probability high-consequence events compared to normal SAR operations. But major incidents leading to the need for MROs have not been infrequent on a world-wide basis, and can occur anywhere at any time. The nature of such operations may be poorly understood due to limited experience of such incidents.

15.1.3 Flooding, earthquakes, terrorism, emergencies in the offshore energy industry and accident involving release of hazardous materials are examples which, because of their scale, may require the application of the same resources as required for mass maritime or aeronautical rescue operations. There are many potential causes of MROs, and the risks should be analysed locally: but the effects are more important than the causes for response planning and purposes.

15.1.4 The sequence of priority in major multi-mission incident must be life saving first, generally followed by environmental protection, and then protection of property. Moral and legal obligations and public and political expectations require preparedness to carryout MROs safely and effectively should they become necessary. Since the need for MROs is relatively rate, it is difficult to gain practical experience to help deal with them. Types of potential MRO scenarios vary, but there are certain general principles that can be followed based on lessons of history.

15.1.5 Effective response to such major incidents requires immediate, well-planned and closely coordinated large-scale actions and use of resources from multiple organisations. The following are typical MRO demands:-

(a) Intense and sustained high priority lifesaving efforts may need to be carried out at the time and place as major efforts to protect the environment and property.

(b) Huge amounts of information needs to be readily available at the right times and places to support the response efforts and meet the needs of emergency responders, the news media, the public, and friends and families of the person in distress, who may number in the hundreds or thousands.

(c) Many means of communication need to be available and inter-linked amongst organisations at various levels to handle this information reliably for the duration of the response.

(d) An increase in the number of competent staff in all key organisations must be made available immediately and be sustainable for up to weeks at a time.

(e) Equipment and logistics demands may increase to unprecedented levels.

(f) Successful MROs depend on the advance provision of flexible and all-level contingency plans. Intense integrated planning and operational efforts must also be carried out in real time throughout the rescue efforts.

15.1.6 All involved in the overall multi-agency, multi-jurisdiction, multi-mission and possibly international response to major incidents must clearly understand who is in-charge, the respective roles of all involve, and how to interact with each other. SAR authorities may be responsible for all or part of the MRO functions, and must be able to co-ordinate their efforts with other responders under the overall direction of another authority within or outside their own agency.

15.1.7 The broader response environment may involve activities such as:-

(a) Hazards mitigation.

(b) Damage control and salvage operations.

(c) Pollution control.

(d) Complex traffic management.

(e) Large-scale logistics efforts.

(f) Medical and coroner functions.

(g) Accident-incident investigation.

(h) Intense public and political attention.

15.1.8 MRO plans need to be part of and compatible with overall response plans for major incidents. Plans must typically allow for command, control and communications structures that can accommodate simultaneous air, sea and land operations.

15.1.9 The consequences of poor preparations for MROs in terms of loss of life and other adverse results may be disastrous. Major incidents may involve hundreds or thousands of persons in distress in remote and hostile environments. A large passenger ship collision, a downed aircraft, or a terrorist incident could, for example, call for the immediate rescue of large numbers of passengers and crew in poor environmental conditions, with many of the survivors having little ability to help them selves.

15.1.10 Preparedness to mount an extra ordinarily large and rapid response is critical to preventing large-scale loss of lives. Such preparedness are often depends on strong and visionary leadership and unusual levels of co-operation to achieve at the planning stage.

15.1.11 There will often be resistance to paying the high price in terms of time, efforts and founding that preparedness for major incidents entails, particularly as they are relevant. The required levels of co-operation, co-ordination, planning, resources and exercises required for preparedness are challenging and do not happen without the requisite commitment of SAR authorities, regulatory authorities, transportation companies, sources of military and commercial assistance and others.

15.1.12 MRO planning, preparations and exercises are essential since opportunities to handle actual incidents involving mass rescues are rare. Therefore, the exercising of MRO plans is particularly important.

15.2 General Guidance for MROs

15.2.1 For a situation involving large numbers of persons in distress, on-scene responsibilities for their safety will be shared. Responsibility for the safety of passengers and crew remains with the person in charge of the craft in distress while that person is still in command. During the rescue/recovery operation responsibilities for the safety of passengers and crew are shared by the person in charge of the craft in distress and the pilot in command or master of the rescue unit. The commander of each rescue unit has responsibility for the safety

of survivors while they are on board the rescue unit. The OSC and ACO have responsibilities relating to the safe coordination of SAR efforts on scene.

15.2.2 Recovery of people from survival craft at sea is a complex and potentially hazardous operation. Keeping people aboard a ship in distress may be safer in some circumstances. However, evacuation of a ship at sea takes time, especially if the ship is damaged. The ship's master may have to make the difficult decision to order the commencement of an evacuation without knowing whether or not it is absolutely necessary. The SMC must be ready to support the master's decision, by providing on-board support where necessary and possible, and SAR facilities on scene in case of evacuation.

15.2.3 In the case of downed aircraft, each incident is unique in deciding whether people would be safer onboard or should evacuate. Usually, at sea, they should promptly evacuate the aircraft. On land, this decision will take into account the conditions of the aircraft and the environment, expected time to rescue survivors and whether required survivor care can be best provided inside the aircraft.

15.2.4 In an MRO, an OSC should normally be designated by the SMC. Where there is a pilot or master, still in command of a craft in distress, the OSC acts in support of this person, bearing in mind that the OSC’s primary responsibility is to coordinate SAR facilities and rescue efforts under the SMC’s general direction.

15.2.5 Unnecessary communications with the master of a ship or pilot in command of an aircraft in distress must be minimised, and this should be taken into account in advance planning.

15.2.6 Exchanges of information by use of SAR Plans of cooperation for passenger ships and by other agreed means, will reduce the need to ask the pilot or master for this information during a crisis. Responders requiring this information should be directed to a source ashore or on the ground that is prepared to handle many potential requests, the response teams at the shipping company or the airline involved, for example.

15.2.7 High priority should be given to tracking and accounting for all persons involved in the operation onboard the distressed craft, aboard survival craft and elsewhere. Efforts to keep them together will help in this regard. Availability of accurate manifests and accounting is critical. Search action should be carried out and the scene patrolled as a matter of course, to guard against people being overlooked.

15.2.8 If possible, survival craft should be recovered or sunk after the people in them have been retrieved, to avoid wasting valuable resource in checking empty craft subsequently. However, the potential that other survivors may find and need the craft should be considered before they are disposed off.

15.2.9 Naval/ Coast Guard vessels and passenger ships are often better equipped than other types of vessels for retrieving survivors: but use of any available ships must be considered. Ship reporting systems for SAR may help identify commercial ships available to assist.

15.2.10 Helicopter capabilities should be used if available, especially for retrieval of weak or immobile survivors. Aircraft may also be used to deliver equipment and supplies, to sustain life pending rescue. Crew members who may become involved in helicopter hoist operations, including survival craft and surface SAR unit crews, should be made familiar with the usual procedures.

15.2.11 Shipping companies are encouraged to equip their vessels with helicopter landing areas or clearly marked hoist-winch areas, and onboard helicopters to facilitate more direct transfers of numerous persons.

15.2.12 If a ship with a large freeboard cannot safely retrieve survivors from the water or survival craft, it may be possible to first retrieve them onto small vessels, and then transfer them to progressively larger ones.

15.2.13 Depending on the circumstances, it may be safer to tow survival craft to shore without removing the occupants at sea. Consideration should also be given to passing survival equipment and supplies to people in distress to sustain them until they can be rescued. Lifeboats could be designed to support passengers for longer periods of time, and to be able to reach shore on their own from longer distances offshore.

15.2.14 To the extent practicable, MROs should be coordinated by an SMC in an MRCC, and the SAR element should always be so. However, depending on the magnitude, nature and complexity of the incident, the overall response may be better coordinated by an appropriate operations centre higher within the SAR agency or another Government agency, so that the SMC can focus on the SAR effort. Considerations in this decision includes:-

(a) Extensive and complex SAR workload for the MRCC staff.

(b) Extensive support by organizations other than those commonly used for SAR.

(c) Need for international diplomatic support: and

(d) Serious problems in addition to potential loss of lives, such as environmental threats, terrorist actions, or national security issues.

15.2.15 The following factors should be considered in MRO planning:-

(a) Use of the Incident Command System (ICS) discussed below, or other effective means of coordinating multi-agency, multi-jurisdiction, multi-mission scenarios.

(b) Identification and analysis of situations within the SRR that could potentially lead to the need for MROs.

(c) Mobilisation and co-ordination of necessary SAR facilities, including those not normally used for SAR services.

(d) Ability to activate plans immediately.

(e) Call up procedures for needed personnel.

(f) Need for supplemental communications capabilities, possibly including the need for interpreters.

(g) Use of liaison officers.

(h) Activation of additional staff to augment, replace or sustain needed staffing levels.

(j) Need for supplemental information technology and tele communications facilities, in case of overload.

(k) Best use of the air and surface SAR facilities available.

(l) Recovery and transport of large numbers of survivors (including those unfit, injured or incapable).

(m) Triage classification tools such as numbered and/or coloured cards or tags.

(n) Identification of potential landing sites.

(p) Identification of potential places of safety (survivor reception centres).

(q) Providing for survivors needs, including medical needs, during the transfer to places of safety, guarding against hypothermia, etc.

(r) Recovery and handling of bodies.

(s) A means of reliably accounting for everyone involved, including responders.

(t) Efficient and smooth handover from SAR facilities to shore/ land response units at landing points/ places of safety.

(u) Care, assistance and further transfer of survivors once delivered to a place of safety and further transfer of bodies beyond their initial delivery point.

(v) Activation of plans for notifying, managing and assisting the families.

(w) Activation of plans for working with the news and social media.

(x) Control of access to the MRCC and other sensitive facilities and locations.

(y) MRCC backup and relocation plans, as appropriate.

(z) Ready availability to all potential users of plans, checklists and flow charts, etc.

15.2.16 The ability of an MRCC to continue to effectively co-ordinate the MRO and still handle its other SAR responsibilities may become overwhelmed, and another MRCC/ MRSC or a higher authority may need to assist.

15.2.17 With these possibilities in mind, MRO plans should provide for various degrees of response, along with criteria for determining which degree of response will be implemented. For example, as local SAR resources are exhausted (or from the outset), SAR resources may need to be obtained from distant national or international sources. These resources will need to be alerted at the outset, and may need to move forward so as to be ready when required. A standard template for formulating Local Contingency Plan for Mass Rescue Operation (MRO) is placed at **Appendix M.**

15.2.18 Experiences in responding to major incidents have resulted in the following practical guidance. Authorities should:-

(a) Plan how any agency receiving notification of an actual or potential mass rescue event can immediately alert the MRCC, the responsible lead SAR agency and conference call other authorities that will potentially be involved, brief them, and enable immediate actions to be taken by all concerned (this will require identification of entities in each agency that can be contacted on a 24-hour basis, and that have authority to immediately initiate actions and commit resources).

(b) Train all staff who will be involved.

(c) Conduct exercise, to test both the above plans and the training.

(d) Co-ordinate all search and rescue operations effectively from the very beginning.

(e) Begin quickly with a high level of effort stand down as appropriate rather than begin too late with too little effort.

(f) Use capable resources like cruise ships for taking large numbers of survivors onboard.

(g) Ensure that MRO emergency plans address communications inter operability or inter linking.

(h) Retrieve and protect debris as evidence for follow on investigation.

(j) Put security plans in place to limit access to the RCC.

(k) Arrange in advance to involve the Red Cross, chaplains, critical incident experts and other such support for human needs.

(l) Identify senior agency spokes persons to protect the time of workers directly involved in the response and designate a senior official to provide information to families.

(m) Clearly identify the point at which the SAR response (lifesaving) has ended and the focus shifts to investigation and recovery.

(n) Be prepared to use an Incident Command System (ICS) or equivalent when appropriate.

(p) Ensure that air traffic, air space and sea or land traffic can be and is controlled on scene.

(q) Assign additional liaison personnel on-scene, as required.

(r) Anticipate incident development and needs and act early.

(s) Ensure that the scope of SAR plans and other emergency or disaster response plans, including company emergency response plans, are coordinated to reduce gaps, overlaps and confusion about the person in overall charge and the command, coordination and communication structures, and the procedure to be followed at various time and places.

(t) Control access to the scene, including access by the news media.

(u) Determine in advance how private resources can be appropriately used to supplement other SAR resources.

(v) Ensure that SAR plans provide for logistics and welfare support for large numbers of rescuers and survivors including pre-arranged accommodations, if possible, and availability of food, medical care and transportation.

(w) Consider requesting assistance from airlines and shipping companies other than the one whose aircraft or ship is involved in the incident, and know the types of assistance that such organisations might provide.

(x) Attempt to reduce the burden on the distressed craft's pilot or master and crews; if safe and appropriate to do so, place a marine casualty officer onboard to assist the master and SAR personnel.

(y) Share capabilities, expertise and assets among Government and industry to take maximum advantage of the strengths of each.

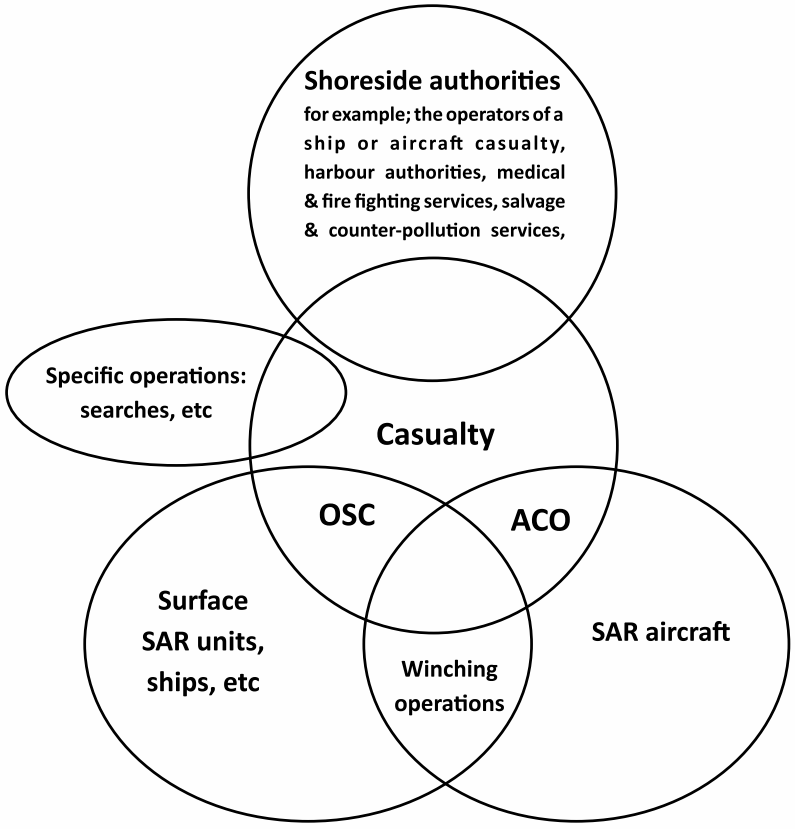
15.3 Communications for Mass Rescue Operations

15.3.1 Communication plans must provide for a heavy volume of communication use as a major incident will normally involve many responding organizations that need to communicate effectively with each other from the beginning. It is likely that the volume of communications at the beginning of a MRO will be very high and potentially confused. This must be prepared for and managed until the situation becomes more stable.

15.3.2 Advance arrangements should be made as necessary to link systems that are not inherently interoperable. Interagency communications must be based on terminology understood by all involved.

15.4 MRO communications in a maritime incident

15.4.1 Efficient communications in major maritime response incidents are best arranged by dividing communications between several different frequencies. The number of frequencies used may vary, depending on the circumstances, but is unlikely to exceed five. The diagram below shows a major incident with numerous surface and air units responding and several different activities taking place on scene and, in support, ashore. The communications plan set up to deal with this incident is relatively simple so that all those responding may readily understand it. It needs to be established from the outset.



Concept of a communications plan for a major incident

15.4.2 The primary coordinating frequency – initially VHF FM channel 16 but a common working frequency may be assigned to ensure channel 16 is available for other distress alerts – is used by the casualty, the OSC, the ACO (if designated) and, if possible, the SMC. If the incident is out of the SMC's VHF range, the SMC will communicate primarily with the OSC by satellite or MF or HF radio

communications. Other units on scene should monitor the primary coordinating frequency if possible, to be kept up to date by SITREPs, etc., but will not usually transmit on it.

15.4.3 Surface SAR units and other surface units such as ships responding to the distress alert will use a second frequency – usually VHF FM channel 6 – controlled by the OSC.

15.4.4 Aircraft may also use this second frequency under the OSC's control, if suitably equipped. An ACO should be designated if responding aircraft are not equipped with marine VHF or in cases where it would be more efficient to control them separately (such as multiple aircraft on scene). The aircraft will then use a third frequency – usually VHF AM 123.1MHz – controlled by the ACO.

15.4.5 If other activities are taking place on scene, additional frequencies may be used for the necessary communications. If a helicopter, for example, needs to winch to or from a ship, these two units should switch to a mutually compatible frequency not already in use, returning to the main working frequencies after the winching operation is complete. Another example would be a search being conducted as part of the overall SAR operation. In this case, the units assigned to the search will switch to a mutually compatible frequency controlled by a search coordinator. This coordinating unit reports to OSC or MRCC, as appropriate.

15.4.6 In a major incident, such as an MRO, there will need to be significant exchange of information with authorities ashore: the operators of a ship or aircraft casualty, harbour and other receiving authorities, shore side emergency services providing support, authorities and agencies concerned with counter-pollution and salvage operations, and so on. These many organizations should communicate via the MRCC, not directly with units on scene. This enables the SMC to maintain a clear overall picture of the response. Efficient procedures for this aspect of the communications plan can and should be pre-planned. The exchange of liaison officers is recommended.

15.5 Major Incident Co-ordination

15.5.1 Regardless of the magnitude and priority of the life-saving efforts involved in responding to a major incident, if any other functions are being carried out concurrently on scene by other than SAR personnel, the overall response

involving SAR and the other functions, e.g firefighting, must be well coordinated. If certain basic concepts and terms are recognised and understood by all emergency responders, they will be much better prepared to co-ordinate joint efforts.

15.5.2 Standard SAR procedure should typically be followed for the SAR part of the response, but these procedures will be largely independent of other efforts. Companies or authorities handling other aspects of the response will follow command, control and communication procedures developed for their respective organisation and duties.

15.5.3 The SAR system can function in its normal manner or use modified SAR procedure established to account for special demands of mass rescues, but it should be appropriately linked and subjected to a scheme for management of the overall incident response.

15.5.4 For major incidents, crisis management for the overall response may also be needed. The Incident Command System (ICS) is one simple and effective means of meeting this need. ICS can be used where no equivalent means of overall incident management is in place. SAR and transportation authorities are likely to encounter use of the ICS within emergency response communities.

15.5.5 The ICS works best with some advance familiarisation and exercising. The general information on MRO exercise is placed at **Appendix N**.

15.6 Landing Sites

15.6.1 Ideally, a single landing site will be established for the mass rescue incident. A single site enables all land support resources to be consolidated at one location. This reduces overhead requirements and facilitates response management. Multiple sites require more people and material – both of which are often in short supply during a crisis.

15.6.2 However, some mass rescue operations may require multiple landing sites due to geographic location and range, number of evacuees, landing site size or arrangement, rescue vessel or aircraft limitations, or other reasons. Each site must be established and managed to meet the functions expected. Considerations include:-

(a) Proximity to incident location

(b) Land facilities' survivor support capacity.

(c) Waterside access for rescue vessels.

(d) Safe landing areas for aircraft.

(e) Aircraft refueling facilities, especially for helicopters.

(f) Sufficient aircraft apron parking space.

(g) Ease of transfer from rescue craft to land.

(h) Land transportation access.

(j) Crowd control and foot traffic flow.

(k) Disabled and other special needs requirements.

(l) Sufficient space for assembly of survivors.

(m) Adequate space for medical and other support services.

(n) Sheltering capability.

(p) Site control & security capability.

(q) Secure location for retrieved debris for investigation purposes.

15.7 Planning and Response in Coordination with Shipping/ Airline Companies

15.7.1 SAR authorities should co-ordinate MRO plans with companies that operate ships and aircraft designed to carry large numbers of persons, such companies should share in preparations to minimize the chances that MROs will be needed, and to ensure success if they become necessary.

15.7.2 For passenger ships, SAR Plans of Co-operation required by the Safety of Life at Sea Convention and developed by SAR authorities and shipping companies are part of MRO and a useful tool in the early stages of the response to an incident involving a passenger ship, either as casualty or a SAR facility.

15.8 Public and Media Relation for MRO

15.8.1 Good public and media relations, including on social media, are very important but also very demanding and quite important during MROs.

15.8.2 The role of the media may be critical in shaping the reactions of the public and of those directly involved in the distress situation in a way that contributes to safety, control and success. There should be no unwarranted delays in providing information.

15.8.3 Information should be readily available, clear, accurate, consistent and freely exchanged among emergency responders and others concerned.

15.8.4 Develop agreed Press releases and social media responses, and appoint trained spokesperson. Use agreed and factual scripts.

15.8.5 Appointing well-informed spokesperson not directly involved in the incident otherwise can be valuable in relieving the key response staff of this duty.

15.8.6 Interviews should be live if possible.

15.8.7 Many entities are involved in a response to a major incident, including ships, companies and SAR services, Co-ordination is required to ensure that there is one message with many messengers.

15.8.8 Prompt establishment of a joint information centre at a location distant from the SMC will help to achieve this goal, The centre can establish proper procedures for establishing what messages will be released to the public and how those messages will be released. Since the messages may be sensitive, it is critical that everyone communicates the same information. The centre can be responsible for co-ordinating information made available via the internet and perhaps establishing and maintaining a public website and regular social media updates dedicated to the emergency response.

15.8.9 The media is a rapid response 24-hour global market, and its news is broadcast worldwide. The media will find a way to get to the scene for first hand information, picture and video. By providing transportation to the scene and controlling media access, safety and the information the media reports can be better managed.

15.8.10 Information should be provided to the public on the SAR facilities being used and, if possible, a web address and/ or contact phone numbers should be provided for families, media and others to contact for more information.

15.8.11 Preparations should be made so that large numbers of callers can be accommodated without saturating the phone system or crashing the computer server.

15.8.12 Advance preparation of standby web pages by transportation companies and SAR authorities can help in responding to floods of requests for information. These pages can be quickly posted to provide general information for media and general public use. Web information should be timely and accurate.

15.8.13 Once posted, these pages can be easily updated with the status of the incident and could also include:-

(a) Contact information.

(b) Basic Government, SAR services or industry fact.

(c) Industry and SAR definitions.

(d) Photographs and statistics of aircraft, ships and SAR facilities.

(e) Answers to frequently asked questions.

(f) Links to other key sites.

(g) Information on passenger capacity, crew size, vessel plans and fire-fighting capabilities; and

(h) Library footage of a vessel inspection or of the crew performing life saving drills.

15.9 MRO Follow Up Actions

15.9.1 It is very important to develop and share lessons learned from actual MRO operations and exercises. Since lessons learned can help prevent recurring serious mistakes, agreement should be reached among principal participants on how lessons learned can be depersonalised and made widely available. Lessons from MROs should be shared not just locally, but internationally.

15.9.2 Careful accounting for survivors after they have been delivered to a place of safety remains important. They need to be kept informed about plans for them and about the ongoing response operations. With large numbers of persons often staying in different places, keeping track of and working with them can be difficult. If the incident has involved a passenger ship or aircraft, it is important to work closely with the company involved as they may be able to provide considerable assistance. The company is usually best suited to assist survivors during this time.

15.9.3 Communicating with passengers is more difficult in remote areas where phone service may be inadequate or lacking. If phone do exist, calling the airline or shipping company may be the best way to check in and find out information. In more populated areas, local agencies may have an emergency evacuation plan or other useful plan that can be implemented.

15.9.4 To protect passengers from harassment by interviewers and cameras, survivors may be placed in hotels or other places of refuge. However, triage and landing locations must be established and publicized to all rescue personnel and good Samaritans.

15.10 Search and Rescue within areas remote from SAR facilities

15.10.1 A key to success when responding to a SAR mission in areas remote from SAR facilities is to develop a SAR Response Plan which presents agreed procedures in its area of responsibility. This plan relies on assets available in the area. The SAR plan should also describe if there are seasonal variations to consider so as to identify the basis of the response endeavor. If the incident has involved a passenger ship or aircraft it is important to work closely with the company involved as they may be able to provide considerable assistance. The company is usually but sharing experience recurring, or can otherwise improve response in the future.

15.10.2 Within the areas remote from SAR facilities, the SAR authority should describe the availability of suitable infrastructure and facilities, capable of supporting a SAR response (e.g. airports/bases, sea ports, fuel facilities, landing locations, places of safety).

15.10.3 SAR routines and SAR planning should be proactively prepared by the responsible MRCC for efficient SAR operations in areas remote from SAR facilities.

15.10.4 It is important that MRCCs should be aware of the SAR resources available in regional and neighbouring MRCCs, and arrange regular exchange and update of such information including details about SRUs (aircraft, vessels, land and specialised units), airstrips, refueling and other facilities.

15.10.5 If a passenger ship intends to operate in an area remote from SAR facilities, the MRCC responsible for that area should establish a relationship with the Company and any other organisations involved in planning an emergency response in addition to obtaining the basic SAR cooperation plan, to assist in case of an emergency. The responsible MRCC should also encourage the Company to provide information regarding the ship's position and intentions while the ship is operating in the area.

15.10.6 All operators working in areas remote from SAR facilities should be encouraged to advise the responsible MRCC of the location(s) of their operations and their capabilities to assist in case of an emergency.

15.10.7 MRCCs in adjacent States should conduct SAREXs with each other with regard to areas remote from SAR facilities. Such SAREXs need not be complex but simple dialogues and coordination exercises to foster an understanding of how each MRCC may help the other, including operations across SRR boundaries or lines of delimitation. It is important that information is exchanged between neighbouring States' MRCCs about SAR data formats and interpretation of such data, for example drift modelling outputs and any other computer applications that may assist each other.

15.10.8 The MRCC should support the ACO, OSC and other rescue personnel in assessing risks, identifying hazards and response options, and other relevant factors of importance when participating in SAR missions in areas remote from SAR facilities.

15.10.9 The SMC should take into consideration in SAR missions within areas remote from SAR facilities the limitations of communications due to lack of infrastructure, weather conditions, long distances and topography. Problems may occur in communications between SAR units involved in conducting such a SAR mission need to be considered. The SMC should also take into consideration every possible means of communication between units through an ACO/ OSC or Air Traffic Service Unit, etc.

15.10.10 The SMC should be aware of the need for communication between States, especially if the SAR mission is conducted near a SRR boundary and/or the craft in distress is of different nationality.

15.10.11 Factors to consider when establishing the SAR response plan for areas remote from SAR facilities:-

(a) The number of people potentially at risk as the result of an incident in the area.

(b) The total recovery capacity of SAR facilities available to reach the scene of the incident and recover those at risk within survival times.

(c) The nature of the risk and whether containment strategies can mitigate its effects to enable those at risk to survive until rescued.

(d) The availability of SAR facilities and other resources which may be deployed in order to contain the incident and assist those at risk until rescued.

(e) The distance (in time) between individual SAR facilities starting points and the scene of the incident.

(f) The terrain, weather and sea conditions encountered by SAR facilities proceeding.

(g) Any restriction on SAR facility development and their ability to respond even if theoretically within reach of the scene of the incident.

(h) The survival time in the prevailing terrain and/or weather and sea conditions.

(j) The capability of available SAR facilities to rescue those at risk in the prevailing terrain and/ or likely weather and sea condition.

(k) Availability and quality of communications.

(l) The ability of tasked SAR facilities to provide mutual SAR response assistance if emergency occurs to a deployed SAR facility.

15.11 Care of Survivors

15.11.1 After rescue, survivors may require hospital treatment. This must be provided as quickly as possible. The SMC should consider having ambulance and hospital facilities ready.

15.11.2 Where there are survivors with different medical needs, and in mass rescue operations, a triage system should be used. Triage is the sorting and classification of casualties to determine the order of priority for treatment and transportation. There are many different triage systems already in use. For example, casualties are often classified into four categories, as follows:-

(a) **Priority I** : Immediate care

(b) **Priority II** : Delayed care

(c) **Priority III** : Minor care

(d) **Priority IV** : Deceased

15.11.3 Triage of casualties should include the use of casualty identification tags or cards to aid especially in the sorting of the injured and their transportation to medical facilities. Casualty identification tags should be standardized through priority numbering and colour coding to make them suitable in multilingual situations. The following coding is widely used:-

(a) Priority I/ Immediate: a RED tag or card, with Roman numeral I

(b) Priority II/ Delayed: a YELLOW tag or card, with Roman numeral II

(c) Priority III/ Minor: a GREEN tag or card, with Roman numeral III

(d) Priority IV/ Deceased: a BLACK tag or card, with Roman numeral IV

15.11.4 Tags or cards should be usable under adverse weather conditions, and be water resistant. Coloured light sticks or reflectors are also useful. A card can be used to supply basic information about the casualty, if time permits: identification details, injuries observed, treatment given, etc. If tags or cards are not available, prioritization can be indicated by marking the appropriate Roman numeral on adhesive tape, the casualty's clothing or exposed.

15.11.5 SAR personnel must ensure that, after rescue, survivors are not left alone, particularly if injured or showing signs of hypothermia or of physical or mental exhaustion.

15.12 Termination of Rescue

15.12.1 As soon as the rescue operation has been completed, the SMC should immediately notify to all authorities, facilities, or services which have been activated. All information on the conduct of the rescue operation should be added to that on the search operation and a final report prepared. Information of interest to accident investigation and medical authorities should be given to them without delay.

15.13 Local Contingency Plan for MRO

15.13.1 Considering the growing maritime activities in the Indian waters, there is a need to develop local contingency plan for MRO at sea towards building up prompt response services in case of contingencies at sea. The plan is required to be integrated with the State Disaster Contingency Plans for effective coordination.

15.13.2 Template for Local Contingency Plan for MRO at Sea is placed at **Appendix M** for reference.

CHAPTER 16

RENDERING ASSISTANCE

CHAPTER - 16

RENDERING ASSISTANCE

16.1 Action by SRU on Locating Search Object

16.1.1 The SRU if successful in locating the search object, is to notify the same to the OSC/ SMC, and proceed to render assistance. The OSC/ SMC in turn reports the sighting of the distressed craft to the MRCC/ MRSC, for further coordination with shore based facilities for rescue operation. The OSC employs the required number of SRUs in the rescue operation and others are kept standby in the vicinity for further assistance or directs to continue the search or release to return to the base depending on the situation. The OSC should retain only the required number of SRUs on the scene as presence of too many units may hamper the rescue operation. The MRCC/ MRSC alerts the rescue facilities ashore to remain standby to meet further requirements.

16.2 Initial Action by Assisting Aircraft

16.2.1 **Distress Call and Message received**. The aircraft while on patrol over the sea must be ready in all respects for undertaking SAR operations. The aircraft may also expect to receive distress message, which may be communicated by any of the following methods:-

(a) Distress call or message from craft directly or by relay via an ATS unit.

(b) Distress call or other emergency information from a vessel and this usually occurs by relay from an MRCC.

(c) Distress signal aurally from an EPIRB, ELT or PLB on 121.5 MHz.

(d) Aircraft near a distressed craft may receive visual signals.

16.2.2 I**mmediate action**. Any aircraft receiving a distress message should take the following actions immediately:-

(a) Reports should be evaluated to determine their validity and degree of urgency.

(b) Any aeronautical station or aircraft knowing of an emergency incident should relay the MAYDAY or transmit a distress message whenever such

action is necessary to obtain assistance for the person, aircraft, or vessel in distress.

(c) In such circumstances, it should be made clear that the aircraft transmitting the message is not itself the distressed craft.

16.2.3 **Proceeding to Area of Distress**. In proceeding to an area of distress, prepare to assist the distressed craft. Aircraft designated for SAR operations should be equipped to receive and home in on following equipment:-

(a) **Navigation equipment**

(i) Radio transmissions

(ii) 406/121.5 MHz distress beacons (ELTs, EPIRBs and PLBs)

(iii) SARTs

(iv) AIS transmitters.

(v) Precise navigation equipment such as GNSS can be helpful in covering a search area carefully or locating a datum.

(b) **Communications equipment**

(i) All aircraft should be equipped to maintain good communications with the MRCC and other aeronautical SAR facilities.

(ii) Designated SAR aircraft engaged in SAR operations at sea should be equipped to communicate with vessels and survival craft.

(iii) Designated SAR aircraft should be able to communicate with survivors on VHF-FM on channel 16 (156.8 MHz) and VHF-AM on 121.5 MHz as a minimum.

(iv) Carriage of droppable radios operating on 123.1 MHz and/or channel 16 can be used for communications with survivors.

(v) Carriage of portable radios may be appropriate for aircraft SAR units to communicate with maritime or land SAR facilities and OSCs.

16.3 Initial Action by Assisting Craft

16.3.1 The ship while on passage at sea must be ready in all respects for undertaking SAR operations. The ship may also expect to receive distress message, which may be communicated by any of the following methods:-

(a) An alarm signal or distress calls from another vessel at sea, either directly or by relay.

(b) A distress calls or message from aircraft, which is generally relayed by MRCC/ RCCs.

(c) Alert sent from a vessel's alerting equipment and then relayed shore-to-ship.

(d) Visual signals or sound signals from a nearby distressed craft.

16.3.2 Any ship receiving a distress message should take the following actions immediately:-

(a) Acknowledge receipt of message.

(b) Gather the following information from the craft in distress, if possible.

(i) Position, course and speed of distressed craft.

(ii) Length, breadth and colour of the ship.

(iii) Distressed craft's identity, Port of registration, call sign, MMSI number and name.

(iv) Telephone, fax and telex number of the ship, owner and agent.

(v) Communication frequency manned by the vessel.

(vi) Number of personnel on board and nationality.

(vii) Nature of the distress or casualty.

(viii) Type of assistance required.

(ix) Number of casualties, if any.

(x) Facilities for helicopter operation and any obstruction for helicopter landing or winch operation.

(xi) Type and quantity of cargo including fuel, chemical, explosives and hazardous material.

(xii) Any other pertinent information that might facilitate the rescue.

(c) Proceed to render assistance.

(d) Relay distress and pass above information to the appropriate MRCC/ MRSC.

16.3.3 The MRCC/ MRSC coordinates the operation and the SAR coordinator dispatches the SRUs to the scene for rendering assistance. The ships on passage and the SRUs are to take the following additional actions.

(a) Maintain a continuous watch on the following international frequencies, if equipped to do so:-

(i) 2182 kHz (radiotelephony).

(ii) DSC 2187.5 kHz.

(iii) 156.8 MHz FM (Channel 16, radiotelephony) for vessel distress.

(iv) DSC VHF Channel 70.

(v) 125.5 MHz AM (radiotelephony) for aircraft distress.

(b) Vessels subject to the SOLAS Convention must comply with applicable equipment carriage and monitoring requirements and Global Maritime Distress and Safety System (GMDSS) equipment.

(c) Any vessel carrying GMDSS compatible equipment should use it as intended and must be prepared at a time to receive distress alerts with it.

(d) Vessels should maintain communications with the distressed craft while attempting to advise the SAR system of the situation. The following information should be communicated to the distressed craft :-

(i) Own vessel identity, call sign and name.

(ii) Own vessel position.

(iii) Own vessel speed and estimated time of arrival (ETA) to distressed craft site.

(iv) Distressed craft true bearing and distance from ship.

(e) The ships are to use all available means to remain aware of the location of distressed craft (such as radar plotting, chart plots, Global Positioning system (GPS). When in close proximity, post additional lookouts to keep distressed craft in sight.

(f) The ship or MRCC/ MRSC coordinating distress traffic should establish contact with the SMC and pass on all available information, updating as necessary.

(g) On proceeding to the area of distress the ships are to establish a traffic coordinating system among vessels proceeding to the same area of distress. The ships are also to maintain active radar plots on vessels in the general vicinity. Estimate the ETAs of other assisting vessels to the distress site. Assess the distress situation to prepare for SAR operations on-scene.

16.4 Onboard Preparation

16.4.1 A vessel enroute to assist a distressed craft, including the SRU should have the following equipment ready for possible use:-

(a) Life-saving and rescue equipment:-

(i) Lifeboat.

(ii) Inflatable life raft.

(iii) Lifejackets.

(iv) Survival suits for the crew.

(v) Lifebuoys.

(vi) Portable VHF radios for communication with the ship and boats deployed.

(vii) Line-throwing apparatus.

(viii) Buoyant lifelines.

(ix) Hauling ropes.

(x) Non-sparking boat hooks or grappling hooks.

(xi) Rescue baskets.

(xii) Pilot ladders.

(xiii) Scrambling nets.

(xiv) Copies of the International Code of Signals.

(xv) Radio equipment operating on MF/ HF and/or VHF/ UHF and capable of communicating with the SMC and rescue facilities and with a facility for direction finding (DF).

(xvi) Supplies and survival equipment, as required.

(xvii) Fire-fighting equipment.

(xviii) Portable ejector pumps.

(xix) Binoculars.

(xx) Cameras.

(xxi) Bailers and oars.

(b) Signaling equipment:-

(i) Signaling lamps.

(ii) Searchlight.

(iii) Torches.

(iv) Flare pistol with colour-coded signal flares.

(v) Buoyant VHF/ UHF marker beacons.

(vi) Floating lights.

(vii) Smoke markers.

(viii) Flame and smoke floats.

(ix) Fluorescent dye markers.

(x) Loud hailers.

(c) **Equipment for Medical Assistance**. In addition to the general preparation for rendering medical assistance, the availability of the following is to be ensured:-

(i) Stretchers

(ii) Blankets

(iii) Medical supplies and medicines

(iv) Clothing

(v) Food

(vi) Shelter

(d) **Miscellaneous equipment**

(i) If fitted, a gantry crane for hoisting on each side of ship with cargo net for recovery of survivors.

(ii) Line running from bow to stem at the water line on both sides for boats and craft to secure alongside.

(iii) On the lowest weather deck, pilot ladders and manropes to be rigged to assist survivors boarding the vessel.

(iv) Vessel's lifeboats ready for use as a boarding station.

(v) Line throwing apparatus ready for making connection with either ship in distress or survival craft.

(vi) Floodlights set in appropriate locations, if recovery at night.

16.4.2 During night the ship is to place extra lookouts on the bows as far forward and as low to the waterline as possible, to hear any calls for help and to establish the best night vision. Factors affecting observer/ lookouts effectiveness include weather conditions and visibility, type of search craft (vessel, aircraft, life raft or person), state of the sea (calm, choppy or rough), daytime or night times and lookout fatigue.

16.5 Vessels not Involved in Rendering Assistance

16.5.1 The master of the vessel deciding not to proceed to the scene of a distress due to sailing time involved and in the knowledge that a rescue operation is under way should take following actions:-

(a) Make an appropriate entry in the ship's logbook.

(b) If the master had previously acknowledged and responded to the alert, he must report his decision to the MRCC/ MRSC/ OSC regarding the same.

(c) The master may consider the reports unnecessary, if no contact has been made with the any of the SAR services. However he must reconsider the

decision of not proceeding for assistance nor reporting to the SAR services, when the vessel in distress is far from land or in an area where density of shipping is low.

16.6 Rescue Planning on Scene

16.6.1 Efficient and effective rescue planning is critical in saving lives in a SAR operation. Planning involves evaluating survival location, condition, selecting an appropriate rescue method and facilities-devising a rescue plan, selecting a delivery point and means of transportation. The SRUs, Rescue units (RUs) and all personnel involved in SAR operations are to be briefed to carry out this rescue plan.

16.6.2 The Rescue units are such facilities involved in mission, which are designed and equipped primarily for rescue. Such units may or may not be useful as search platforms. The safety of the RU and the survivor is a primary concern. Therefore, OSC/RU commander determines the actual method to be used for rescue, based on the conditions on scene and the RU capabilities.

16.6.3 Rescue planning also involves dispatching or diverting RUs to the scene for rescue of personnel and property in distress. However, SRUs at the distress scene, if able, should rescue without any delay. If they are unable, rescue planning may be necessary to effect a successful rescue operation. Rescue plan also should have the following logical sequence.

(a) **Evaluation of Survivability Conditions**. When evaluating rescue response, the survival time of the personnel should be considered the foremost. The SMC should also consider injuries or other medical conditions that right require special rescue response, such as the need for quick recovery using specialised rescue equipment. The factors to be considered should include the following:-

(i) The number of survivors.

(ii) The condition of survivors, If not known, it must be assumed that urgent medical attention is required. If known, other detailed description of injuries including the need for stretchers, oxygen, intra venous fluids and other medical supplies are to be obtained.

(iii) The medical action taken by survivors or other SAR facilities at the scene.

(iv) Hazardous environmental conditions.

(b) **Evaluation of Environmental Conditions**. The environmental conditions may vary and the points to be considered are as follows:-

(i) Nature of environment like cold, ocean or swampy.

(ii) Location of survivors within the environment particularly survivors trapped in hazardous areas.

(iii) Weather conditions and potential effects on rescue operations and life expectancy of the survivor.

(iv) Time of the day, particularly, how darkness may affect rescue attempt.

(v) Environmental constraints on use of RUs such as boat drift lack of landing/ hoisting areas etc.

(c) **Selection of Rescue Method**. Selecting the rescue method usually depends on environment on scene and the number of survivors and their conditions. It is sometimes left to the discretion of the OSC or SRU. However, the SMC usually develops the rescue plan and coordinates its execution with other SAR facilities, if required.

(d) **Selection of Rescue Facilities.** The SMC should consult the parent agencies to determine capabilities and limitations of RUs to rescue and transport survivors. The time delay in reaching the scene and schedule of availability in the area are also to be considered. If possible, at least one RU should be selected that can do both search for survivors and rescue them, if found. The nature of incident also influences the selection of SRUs. The additional factors that are to be considered are as follows:-

(i) If the survivors are known or suspected to be injured, the positioning of trained medical personnel on scene is very important. Also helicopter transportation, if possible, is the most ideal method of evacuating survivors from the scene. When helicopters operations are not feasible for any reason, suitable SRU with qualified and trained medical personnel are very essential.

(ii) Special equipment required like for fire fighting, hoisting, etc.

(iii) Transport required for survivors.

(iv) Communication capabilities.

(v) Special rescue techniques/personnel required.

(e) **Optimum Rescue Plan**. Rescue plan may not be necessary for all SAR missions. However, while developing an optimum rescue plan on requirement, the SMC should consider the type of incident/ casualty, the urgency/ magnitude of the situation, the results of the aerial survey and the time required for reaching the RUs on scene. The route chosen for the RU s should take the least enroute time while providing adequate safety and navigational references. The SMC is to determine RUs availability, allocate specific tasks for each RU with rescue methods for the circumstances, subject to the approval of the RU commander. The aerial delivery of supplies, supporting equipment and other assistance to the rest of SRUs on scene are also to be considered.

(f) **Attainable Rescue Plan**. Having developed an optimum rescue plan, the SMC should coordinate with parent agencies providing RUs for executing the plan. If original conditions of the plan change, the SMC is to alter the optimum rescue plan to meet the changing conditions. He is also to inform other participating SRUs/agencies regarding the final rescue plan.

CHAPTER 17

SAR Mission Conclusion

CHAPTER - 17

SAR MISSION CONCLUSION

17.1 Mission Conclusion

17.1.1 SAR operations enter the conclusion stage when:-

(a) Information is received that the ship, aircraft, other craft, or persons who are the subject of the SAR incident are no longer in distress.

(b) The ship, aircraft, other craft, or persons for whom SAR facilities are searching have been located and the survivors rescued; or

(c) During the Distress Phase, the proper authority determines that further search has no significant chance of succeeding.

17.2 Closing SAR Case

17.2.1 The authority to terminate a case sometimes rests with different levels within the SAR organization depending on the circumstances dictating that the incident be closed or active search suspended. In particular, the responsible SC or other SAR managers may retain the authority to suspend a case when the subjects of a search have not been found, and may delegate to the SMC the authority to close cases in all other circumstances, i.e., when the SMC determines that the craft or people are no longer in distress. In areas not under the responsibility of an MRCC, or where the responsible centre is not able to co-ordinate the operations, the OSC may need to take responsibility for deciding when to suspend or close the search.

17.2.2 Most SAR operations typically conclude when those in distress are no longer in distress or are rescued. The basic steps to closing this type of case are:-

(a) Notify immediately all authorities, centres, services, or facilities that have been activated; and complete a record of the case.

(b) Complete a record of the case.

17.3 Suspending Search Operations

17.3.1 Some cases may require extended searching. At some point, the proper authority must make the difficult decision to suspend active search operations pending the receipt of additional information. That is, the authority must decide that additional search effort will not result in success. In making this decision, each SAR incident must be considered on its own merits, and care should be taken not to end the search prematurely. The decision to s uspend a search involves humanitarian considerations, but there is a limit to the time and effort that can be devoted to each SAR case.

17.3.2 **Case Review Prior Suspending**. Prior to suspending search operations, a thorough case review should be made. The decision to suspend operations should be based on an evaluation of the probability that there were survivors from the initial incident, the probability of survival after the incident, the probability that any survivors were within the computed search area, and the effectiveness of the search effort as measured by the cumulative probability of success. The reasons for search suspension should be clearly recorded. The case review should also examine:-

(a) Search decisions for proper assumptions and reasonable planning scenarios.

(b) Certainty of initial position and any drift factors used in determining search area.

(c) Significant clues and leads re-evaluated.

(d) Data and Datum computations.

(e) The search plan, to ensure that:

(i) All assigned areas were searched.

(ii) The probability of detection is as high as desired.

(iii) Compensation was made for search degradation caused by weather,

navigational, mechanical, or other difficulties; and

(f) The determination about the survivability of survivors, considering:

(i) Time elapsed since the incident.

(ii) Environmental conditions.

(iii) Age, experience, and physical condition of potential survivors.

(iv) Survival equipment available.

(v) Studies or information relating to survival in similar situations

17.3.3 A search should normally be terminated only when there is no longer any reasonable hope of rescuing survivors from the SAR incident. Considerations for suspending a search include:

(a) All assigned areas have been thoroughly searched.

(b) All reasonable probable locations have been investigated.

(c) All reasonable means of obtaining information about the whereabouts of the ship, aircraft, other craft, or persons who are the subject of the search have been exhausted; and

(d) All assumptions and calculations used in search planning have been reviewed.

17.3.4 The SMC should advise the relatives of the missing persons that the search has been suspended. Relatives are normally more willing to accept the decision to suspend operations if they have been allowed to follow the progress of the search. The SMC should have maintained regular contact with relatives during the search to provide information and outline future plans. Providing access to the MRCC, or if not co-located, to the SMC, if appropriate, enables relatives to see the search effort. Notification of the decision to terminate should normally be made at least one day prior to suspension of operations, allowing relatives at least one more day of

hope, while giving them time to accept that the search cannot continue indefinitely.

17.3.5 When a search has proven unsuccessful and the SMC has suspended search operations, others concerned, e.g., the operating agency of the missing craft, may continue the search. These activities should, if requested, be co-ordinated by the MRCC. Normally, a MRCC will undertake search for missing person in water for 72 hours, which may be altered based on the merits of the case. If the missing persons are in a craft which enable them to survive long a periods, such duration should be cateredby the SMC prior suspending the search.

17.3.6 The MRCC should maintain a suspended case file, which should be periodically reviewed so that the operations can be re-activated without delay if additional information develops which justifies engaging in renewed search efforts.

17.4 Extended Search Operations

17.4.1 Some SAR operations are extended beyond the normal time when they would ordinarily be suspended because of the lack of reasonable probability of locating the survivors. Extended searches may be conducted considering the humanitarian factors, number of persons involved in distress or when the search conditions improve significantly. The SRUs must not be hazarded in the extended search operations to the same extent as during normal search operations or when the probability of saving the life is minimal or when their deployment precludes their availability for other missions.

17.5 Reopening a Suspended Case

17.5.1 If significant new information or clues are developed, reopening of a suspended case should be considered. Reopening without good reason may lead to unwarranted use of resources, risk of injury to searchers, possible inability to respond to other emergencies, and false hopes among relatives.

17.6 SRU Return and De-alerting

17.6.1 The SRUs are limited in the number and the endurance they can operate safely and efficiently is of paramount importance. The SMC should establish these limitations with the advice of the agencies providing them and deploy them judiciously. When long missions are envisaged, additional SRU and crew should be made available for augmentation. The SAR mission is not considered complete until the last SRU has returned to its operational base and all participating agencies are de-alerted.

17.7 Notifying Relatives

17.7.1 If a SAR mission is suspended or concluded the SMC must make necessary notification to the relatives of the distressed or missing persons regarding the same. During the search the SMC must maintain contact with the relatives to provide information on the search effort and outline of future plans so that they can follow the progress of the search. Notice may also be given to them prior suspension of the operations. This will enable the relatives to accept the decision to suspend the operation.

17.8 Final Reports

17.8.1 When a SAR case is closed or search efforts are suspended, every authority, centre, service, or facility activated should be notified. This is normally done via radio or telephone, and then followed by a final situation report (SITREP) from the MRCC. To ensure that search facilities remain under some type of flight or vessel tracking system, the MRCC should not stand down its efforts until all resources have established alternate plans, where appropriate. Other MRCCs involved should be notified of the conclusion of SAR operations, especially if responsibility for the case was assumed from another MRCC, such as the “First MRCC” to receive the distress alert.

17.8.2 If the MRCC Chief/ Officer-in-Charge and the responsible managers were not involved in a search suspension decision, they should be informed about the lack of success and the reasons for halting operations.

17.8.3 A record of SAR operations is required to improve methods, evaluate mistakes, if any, and provide statistics for SAR managers to justify SAR system support. This record should include information from debriefing of survivors. If the SAR service maintains computer files of SAR cases, appropriate information from this case file should be extracted and entered into the database for future analysis.

CHAPTER 18

SAR RESOURCES

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SAR RESOURCES

18.1 Resources

18.1.1 The primary responsibility of SAR coordinator is to effect search operation in minimum time and call out the rescue successfully. The time is the only deciding factor to deploy the forces available with the SAR coordinator or it requires mobilisation of facilities with other resource agencies. If MRCC feels the facilities available with other agencies will accomplish the mission with minimal time delay, the appropriate authorities are to be requested to extend the services of the assets at their disposal for mission accomplishment. The Resources available with Indian Coast Guard, Indian Navy, Indian Air Force and other resource agencies are given in the succeeding paragraphs.

18.2 Indian Coast Guard

18.2.1 The following include the assets available with the Indian Coast Guard for undertaking SAR mission:-

(a) **PCV**. Pollution Control Vessel (PCV) of length 94 Meters with maximum speed of 20 knots and GRT of 3178 tons. Ships with endurance of 6000 NM are capable of operating helicopter from the deck.

(b) **OPV**. Offshore Patrol Vessel (OPV) is having of length of 74-105 Mtrs and GRT of 1220 tons and can achieve 22 Knots of speed with maximum speed 25 knots. Ship with endurance of 6000 NM is capable of operating helicopter from the deck.

(c) **FPV**. Fast Patrol Vessel (FPV) having length of 46-55 Mtrs with maximum speed of 23 to 35 knots. The ships of various class have endurance ranging from 1500 NM - 3800 NM.

(d) **Air Cushion Vehicle**. Air Cushion Vehicle (ACV) is an amphibious hovercraft powered by two water cooled diesel engines each driving both a variable pitch propeller running in a duct and a centrifugal lift fan. Overall length of ACV is 19.85 Mtrs and can achieve 50 knots and operate in swampy and marshy lands. These craft have limitations operating above sea state 2 and 25 knots wind force.

(e) **Interceptor Boats (IB)**. IBs are having length of 30 Mtrs with endurance of 600 NM. The boats have limitation in operating beyond sea state 3.

(f) **Dorniers**. The Dornier is a fixed wing high performance aircraft capable of short takeoff and landing during day or night operations. The aircraft is fitted with state of art advanced surveillance sensors like ELTA Radar, Electro Optical Infrared system, Satellite communications, AIS and fly-by-wire features. It has a long flying endurance, usually up to five hours, all at unusually low operating cost with radius of action of 200 NM. The aircraft has the maximum speed of 200 Kts (TAS) and service ceiling of 25000 feet with oxygen cylinders.

Chetaks. The Chetak is a light weight single engine, multi role helicopter designed for undertaking visual range flying. The Chetak is capable of carrying 250 kg load under slung in case of emergency for short duration of approx. 45 mins. The Chetak has flight endurance of approx 02 hours 20 min over land or sea with a maximum speed of 90 knots.

(g) **Advanced Light Helicopters (ALH MK-III)**. The Advanced Light Helicopter (ALH) is designed as a multi-role helicopter for both military and civilian use. The helicopter used by the Coast Guard is fitted with surveillance radar, a Forward Looking Infer Red (FLIR), troop seats and a life raft along other for various requirements. The ALH is capable of carrying an internal load of 400 Kgs over a distance of 250 nm and external load of maximum 900 kg under slung with restricted flying endurance over a distance of approx. 216 km.

18.2.2 **Requisition of ICG Assets**. The Coordinating MRCC/ MRSC should requisition *IN*/ CG/ IAF assets to the respective regional Commanders and District/ Station Commanders keeping CGHQ informed in the format given in **Appendix P.**

18.3 Indian Navy

18.3.1 The facilities of the Indian Navy that can be requested for SAR Operations include the following:-

(i) Patrol Vessels.

(ii) Survey vessels.

(iii) Fast Attack Crafts

(iv) Other classes of war ships depending upon the requirement and availability.

(v) Helicopters Single engine - Chetak.
Twin engine - ALH, Sea King and Kamov

(vi) Fixed wing aircraft Dornier, Islander and other types of long-range aircraft namely P8I and IL-38 depending upon the requirement.

18.3.2 **Requisition of *IN* Assets**. The requisition of assets or for diversion of *IN* assets for to be projected to respective *IN* operational authority by concerned MRCC/ MRSC as per **Appendix P**.

18.4 Indian Air Force

18.4.1 The following assets available with Indian Air Force can be requisitioned for SAR operations by concerned MRCC as per **Appendix P**.

(i) **Helicopters** Single engine - Chetak and Cheetah.
Twin engine - ALH, MI - 8 & MI-17.

(ii) **Fixed Wing aircraft** Dornier, Avro, and AN - 33 and other long-range aircraft depending upon the requirement.

18.4.2 **Area of Operation**. The area of operation of IAF Assets over maritime areas will be coordinated by the MRCC/ MRSC.

18.4.3 **Requisition of IAF Assets**. The Coordinating MRCC/ MRSC should requisition services of IAF assets, if other assets are not available in the search area to local IAF authority keeping SAR coordinators and NMSARCA informed.

18.4.4 **Mission Result**. IN and IAF authorities will be required to forward mission result on completion of mission as per format placed at **Appendix Q**.

18.5 National Hydrographic Office

18.5.1 Chief Hydrographer to Govt of India shall assist concerned MRCC/ MRSC by timely promulgation of navigational warnings through NAVAREA and other measures.

18.5.2 The NAVAREA VIII coordinator should promulgate the NAVAREA VIII

messages for SAR when the coordinating MRCC requests the same under following circumstances:-

(a) When the aircraft or vessel in distress in maritime area and need immediate assistance.

(b) When an aircraft or vessel is lost or overdue and require assistance.

(c) Whenever there is a man overboard from a vessel at sea.

(d) When a vessel is in distress and the position is not known.

(e) When requesting passing ships to lookout for vessel/ fishing boats.

(f) When requesting ships to report weather.

(g) Any other situations as decided by the SMC to aid SAR response.

18.6 Indian Space Research Organisation

18.6.1 Department of Space (DoS) shall provide satellite "alert" services for detection and location of aircraft, ships or individuals in potential distress situation that carry distress beacons as per IMO and ICAO regulations. As a mandatory requirement for the users, the DoS also maintains beacon registration data base containing unique identity of the beacon, vessel/ aircraft type, owner and emergency contact details and distributes to concerned rescue co-ordination centre for SAR mission planning.

18.7 India Meteorological Department

18.7.1 Meteorological Department shall support SAR operations through timely input of weather messages, marine environment forecasts and warnings for the coastal and high seas and provide weather information on demand to coordinator and coordinating agency. The coordinating MRCC/ MRSC may request whether update from IMD for effective SAR coordination.

18.8 Major Ports and Minor Ports

18.8.1 The assets available with the Port authorities can be requested by MRCC/ MRSC to coordinate and respond to distress in their area of jurisdiction depending upon their capabilities and reach. The Ports can also coordinate traffic in the incident area and assist in ongoing SAR operations.

18.9 Other Resource Agencies

18.9.1 The following assets available with other resource agencies can also be requested for SAR operation depending on the requirement:-

Sl.	Resource Agency	Assets
(a)	Oil and Natural Gas Commission	Off shore Supply Vessels, Tugs and helicopters
(b)	Port authorities	Tugs and other crafts
(c)	Shipping Corporation of India	Ships enroute can be requested to assist in the on going Search and Rescue operation
(d)	Transport Corporation of India	Ships enroute can be requested to assist in the on going Search and Rescue operation
(e)	Dredging Corporations of India	Ships enroute can be requested to assist in the on going Search and Rescue operation
(f)	Fishing authorities	Crafts and Vessels
(g)	Customs authorities	Crafts and Vessels
(h)	State Government/Administration	Crafts and Vessels and also helicopters and aircraft, as available
(j)	Marine Police	Crafts available with the Coastal Marine Police
(k)	Indian Army	Helicopters - Chetak and Cheetah
(l)	Pawan Hans Helicopters Limited	Helicopters - Dauphin

18.9.2 **Requisition for Assets from other Resource Agencies**. Depending on the nature of SAR operation, the requirement of assets available with other resource agencies will be requisitioned by the MRCC/ CG RHQ/ DHQ/ Stations to the organisation through general request. The resource agencies are to provide the contact points to the closest MRCC/ MRSC so as to avail the resources during mass casualty evacuation situations or during other emergencies occurring at sea.

CHAPTER 19

SHIP AND AIRCRAFT REPORTING SYSTEMS

CHAPTER - 19

SHIP AND AIRCRAFT REPORTING SYSTEMS

19.1 Need for Ship Reporting System

19.1.1 The ship reporting system contributes to the safety of life at sea, safety and efficiency of navigation and protection of marine environment. The system plays an important role in developing a database of potential assisting ships based on real time inputs from merchant ships transiting through the area of interest. As an obligation to the GMDSS requirements, Master of each ship reports sailing plan, arrival plan, deviation report and periodic position/course/ speed report to the organisation maintaining the system. All above details are maintained on a plot along with SAR capabilities of the vessel. In case of distress, details of vessel along with present predicted position are made available to SMC for coordination. The transiting ships are key SAR resources for MRCC but request for them to assist must be weighed against the considerable cause to shipping companies on diversion/deployment in search/ rescue operation. MRCC is to identify the capable vessel, which will be least harmed by diversion and request the same for operation.

19.1.2 Valuable information on vessel characteristics for determining the SAR capabilities can also be entered into the database from available sources of information, which can be provided to the SAR agencies within the area of interest for use during emergency. The predicted location and other information are disclosed only for reasons connected with maritime safety. Decision on diverting the merchant ships in response to a SAR operation is the responsibility of the SMC based on careful consideration of all available information. It must be remembered that the ships participate voluntarily in the SAR system and are usually on tight logistical schedule and therefore diversions for SAR operation will be costly for the shipping companies.

19.1.3 Merchant vessels are valuable rescue facilities and should be called upon to assist whenever necessary to respond to life threatening situations only

and after having weighed against use of other available resources. The ships can however be used along their track to help verify the distress information and keep a sharp lookout for survivors if any. They can also be used to assist in searches but should be sparingly used for extended searches due to their relatively low speeds, small sweep width and high costs involved. The ships diverted for the search must be released as soon as possible, consistent with the situation and their apparent importance to the SAR case.

19.1.4 The INDSAR ship reporting system covering Indian SRR is already in force. The details of the same are given in succeeding paragraphs.

19.2 Indian Ship Reporting System (INDSAR)

19.2.1 Conforming to the provisions of International Convention on Maritime Search and Rescue, 1979 (SAR Convention 1979) to which India is signatory and with the aim of providing/ co-ordinating the effective search and rescue operations in a possible event of any marine casualty at sea, the Indian Coast Guard has brought in to operations a supplementary Ship Position Reporting System with effect from 01st February, 2003 called "Indian Ship Reporting System" (INDSAR). This is a supplementary and an advance computerized system designed to contribute to safety of life/ timely search and rescue operations at sea. This system is operated and maintained by the Indian Coast Guard through their Maritime Rescue Co-ordination Centre (MRCC) at Mumbai.

19.2.2 All Indian ships of 100 GRT and above entering into or transiting the Indian Search and Rescue Region (ISRR) shall participate in the INDSAR reporting system. All ships other than Indian Ships of 300 GRT and above entering or transiting through the above region are encouraged to participate in INDSAR reporting system.

19.2.3 All ships 100 GRT and above irrespective of the flag carrying a nuclear or other inherently dangerous or noxious substances or materials entering into or transiting the Indian Search and Rescue Region (ISRR) waters are encouraged to participate in the INDSAR reporting system for safety. All ships of 20 years and above irrespective of the flag are advised to send the relevant mandatory

report under INDSAR within ISRR.

19.2.4 The format of the report or reports shall conform to the ship reporting guidelines prescribed in IMO Resolution A.851 and Special Edition of Indian Notices to Mariners No.8 of 2016.

19.3 Reporting Procedures

19.3.1 Reporting procedures for INDSAR with respect to the type of reports, the format of reporting and mode of reporting are explained in the **Special Edition of Indian Notices to Mariners No. 8 of 2016,** DG Shipping Merchant Shipping Notice No. 7 of 2010 as well as, in Admiralty List of Radio Signals Vol.5 as amended.

19.3.2 **INDSAR Reporting**. All Indian ships of tonnage 100 GRT to 399 GRT, which are not fully complying with GMDSS requirements shall send relevant reports by VHF Channel 16 or MF band through Coast Guard station located along the coast line of India or as an alternate, the ship owner of such ships upon receipt of relevant report shall forward/ relay to the nearest MRSC or MRCC for onward transmission to MRCC Mumbai.

19.3.3 All ships other than Indian ships of tonnage 100 GRT to 399 GRT, which are not fully complying with GMDSS requirements are encouraged to send relevant reports by VHF Channel 16 or MF band through Coast Guard station located along the coast line of India or as an alternate, the ship owner of such ships upon receipt of relevant report shall forward/ relay to the nearest MRSC or MRCC for onward transmission to MRCC Mumbai.

19.3.4 The reports prescribed in the special edition to the Indian Notices to Mariners No. 8 for INDSAR reporting system can be sent by SOLAS compliant Ships using INMARSAT-C toll free code **43 through LES ARVI**. The prescribed reports may also be sent by email to the address **mrcc-west@indiancoastguard.nic.in**. To confirm effectiveness of INMARSAT transmission through LES ARVI vessels may transmit a test call through INMARSAT – C toll free code-43. Any constraints/difficulties in transmission of INDSAR through SAT-C toll free Code-43 can be communicated to MRCC

Mumbai by using the following mode of communication:-

(a) Telephone : 0091-22-24388065, 24383592

(b) Tele fax : 0091-22-24316558

(c) E-mail : mrcc-west@indiancoastguard.nic.in

(d) INMARSAT C: 441907210 (INDSAR Toll Free Code 43) : 441922594

(e) Fleet 77 : 764902542 (voice): 764902543 (Fax)

19.3.5 In order to maintain the continuity in this ship reporting system, the vessels trading around the coast of India and transiting through the Sri Lanka SRR and re-entering the India SRR are requested to send the prescribed report to INDSAR on continual basis.

19.4 Necessity to Enhance Participation of all ships/ vessels in INDSAR reporting system

19.4.1 Recognizing the fact that the security threats to the International shipping and occurrence of marine casualties in the Indian subcontinent especially in Arabian Sea have considerably gone up in the recent years in spite of concrete initiative taken by the Maritime Administration, it is essential for the Ship-Owners, Ship Managers, Shipping Agents, and Ship Masters to extend maximum cooperation and support to the Indian administration by actively participating in the INDSAR. The effectiveness in implementing the system can only be measured by sending as many reports as possible to the Indian Coast Guard (ICG) in respect of INDSAR.

19.4.2 All ships entering or transiting ISSR areas irrespective of flag shall carry a copy of a latest edition of Indian Notices to Mariners-Special Edition onboard as reference document, and also be guided by the detailed procedures specified in IMO Resolution A. 851(20).

19.4.3 To exercise control measures for the purpose of compliance with the provisions of National and International laws, the Port State and Flag State Inspectors

may check the records of relevant reports sent to Indian Coast Guard under INDSAR system.

19.4.4 The non-compliance shall be recorded in the prescribed report issued by the PSC/ FSI Inspector of Mercantile Marine Department to the master for the purpose of timely corrective measures prior to departure of the vessel from the port.

19.4.5 All Indian ships above 100 GRT if observed to be contravening these directives, the Ship Owner, Ship Manager or the Ship Master shall be liable for committing an offence under the provision of M.S. Act, 1958.

19.5 Pre-Arrival Notifications of Security (PANS)

19.5.1 The Maritime Safety Committee, at its 86th session decided to include in the standard data set of security-related information a ship might be expected to submit to entry into port, the IMO Company identification number and to this end it also decided to amend the Guidance to masters, Companies and duly authorised officers on the requirements relating to the submission of security related information prior to the entry of a ship into port set out in the Annex to MSC/Circ.1130.

19.5.2 As a result, based on the requirements of SOLAS regulation XI-2/9.2.1 and taking into account the guidance provided in Part B of the ISPS Code and resolution MSC.159(78) on Interim guidance on control and compliance measures to enhance maritime security, the Committee has developed the Revised guidance in an effort to prevent the proliferation of different demands for security-related information, which are neither conducive to the enhancement of maritime security nor promote the facilitation of maritime traffic.

19.5.3 SOLAS regulation XI-2/9.2.2 requires every ship to which SOLAS Chapter XI-2 applies intending to enter the port of another Contracting Government to provide the information described in SOLAS regulation XI-2/9.2.1 on the request of the officers duly authorised by that Government. The master may decline to provide such information on the understanding that failure to do so may result in denial of entry into port.

19.5.4 The Ship masters, Ship Owners, Managers, Operators, Ship Agents are requested to submit the information contained in Pre-Arrival Notification of Security (PANS) to the concerned port and following authorities:-

(a) Ships calling ports on West Coast of India are to submit PANS details to concerned port and Maritime Rescue Coordination Centre (Mumbai) through following:-

Tel : +91 22 2438 8065, 24383592

Fax : +91 22 2431 6558

E-mail : mrcc-west@indiancoastguard.nic.in

Inmarsat "C" (IOR) 441907210

Fleet 77 : 764902542 (voice)
: 764902543 (Fax)

(b) Ships calling ports on East Coast of India are to submit PANS details to concerned port and Maritime Rescue Coordination Centre (Chennai) through following:-

Tel : +91 44 25395018

Fax : +91 44 23460405

E-mail : isareast@dataone.in, mrcc-east@indiancoastguard.nic.in

Inmarsat "C" (IOR) 441922669

Fleet 77 - 764902568

(c) Ships calling ports on Andaman and Nicobar Islands are to submit PANS details to concerned port and Maritime Rescue Coordination Centre (Port Blair) through following:-

Tel : +91 3192 245530

Fax : +91 3192 242948

E-mail : pblmrccpb@sancharnet.in; com_cs@dataone.in
mrcc-ptb@indiancoastguard.nic.in

Inmarsat "C" : 441922666

Fleet 77 - 764902560

19.5.5 The PANS shall be submitted 96 hours prior to arrival of the vessel at any Indian ports. If the voyage is shorter than 96 hours, then it shall be submitted within 02 hours of departure from the last port. This also applies to vessel trading in coastal waters or coasting between Indian ports.

19.5.6 The standard format of Pre-Arrival Notification of Security (PANS) is placed at **Appendix R**.

19.6 Space Based - Automatic Identification System (SAT-AIS)

19.6.1 Automatic Identification System (AIS) is a mandatory navigation safety communications system under the provisions of the Safety of Life at Sea (SOLAS) Convention which requires ships of more than 300 Gross Tons engaged on international voyages, cargo ships of more than 500 gross tons not engaged on international voyages, and all passenger ships irrespective of size to be fitted with AIS.

19.6.2 Satellite AIS emerged as new technology in the late 2000's and has changed the landscape for monitoring the maritime domain which is now used to support a number of maritime safety and security applications including Search and Rescue (SAR). Improving upon the existing technology already deployed aboard most large vessels across the globe, Satellite AIS is truly revolutionary in providing a complete and global picture of the world's shipping.

19.6.3 As more AIS-equipped satellites come online, SAT-AIS information continues to grow in importance as a powerful aid in SAR. AIS data can now pinpoint the last known position, course heading and speed of the vessel in distress. In addition, SAT-AIS based solutions will confirm and identify other vessels in the search area that could be able to assist in rescue operations.

19.6.4 So, through the adoption of SAT-AIS based information, MRCCs can facilitate a rapid, targeted response to distress notifications, by providing:-

(a) Vessel identification and last known position.

(b) Rapid identification of ships in vicinity of distress.

(c) Tracking of drifting vessel from distress call location.

(d) Proactive notice to SAR coordinators of ships entering remote coverage zones; and

(e) Identification of projected track based on last known position, course and speed.

19.6.5 While SAR programs like GMDSS can track ships on a global scale and use the information to provide search and rescue assistance to vessels at extended ranges for vessels in distress, SAT-AIS can identify exactly where a vessel is located anywhere in the world even if it continues to drift far from its initial distress location.

19.6.6 Access to accurate, reliable and timely data about the status of a vessel and its crew can greatly reduce response time by focusing rescue resources to a more refined area and by providing enhanced overall rescue coordination to save lives. SAT-AIS can also track rescue teams and reduce the risk to rescuers, especially in harsh weather environments.

19.6.7 The MRCCs maintain a feed of SAT-AIS and employ the vessel data available for identifying and diverting vessels for immediate assistance to vessels or crew in distress. The high rate updated SAT-AIS data have proved highly beneficial in SAR coordination and response globally and have resulted in saving numerous lives in distress at sea.

19.7 Vessel Tracking Websites. The rapid advancement of technology has significantly improved the methods of monitoring and tracking the ships in the recent past. The fast-developing satellite services have enabled the ship tracking across the globe easier now and thereby ensuring better safety and security of the vessels on voyage. The availability of vessel tracking mechanism through registered and open source websites enables MRCCs and other SAR coordinating agencies for live tracking and employability of nearby vessels for rendering assistance.

19.7.1 With the help of a number of satellite-based vessel monitoring systems (VMS), different types of vessels have been monitored efficiently by marine agencies and vessel owners for a long period. The automatic identification system (AIS) helps track bigger vessels crossing waters across the world by offering real-time information about the vessels. Currently, a number of websites provide ship tracking using the automatic identification system to display the real-time location of the ships.

19.7.2 The various online services available at MRCCs/ MRSCs are widely used for near-accurate online vessel tracking. These vessel trackers provide not only the ship's location, but also technical and non-technical details, designated routes, and even photographs including contact details. On a number of occasions, the vessel tracking systems have provided valued information to SAR coordinators for search and rescue services. Some of the Notable Websites Used for Accurate Ship Tracking are:-

(a) Marine-Traffic.

(b) Fleet Mon.

(c) Shipfinder.

(d) Vessel Finder.

(e) Vessel tracker.

(f) VT Explorer.

(g) myshiptracking

(h) Cruisemapper.

19.8 Aircraft Reporting System

19.8.1 Air Traffic Services (ATS) units receive information on most aircraft flights and are in contact with them in specified intervals of time. This is more so in case of flights over oceans. Therefore, an aircraft emergency and its development is therefore likely to come to the notice of ATC (normally over oceans FIC or Approach Frequency) first. Further the ATS authority would be in a position to

direct SAR aircraft at the first instance as he would be able to direct any aircraft closer to/ transiting closer to the distress position.

19.8.2 On the lines of vessel tracking sites there are websites tracking the ADS-B data of aircraft with the capability of ADS-B OUT (eg. lightradartracker.com), which can be optimally utilised by the SAR managers.

CHAPTER 20

VESSEL IDENTIFICATION SYSTEM

CHAPTER - 20

VESSEL IDENTIFICATION SYSTEM

20.1 Need for Vessel Identification System

20.1.1 The detailed information about the vessel in distress plays a vital role in coordinating and rendering assistance in minimum possible time. Depending upon the nature of distress onboard, the situation changes within seconds. Therefore, rendering necessary assistance to the distressed vessel within the required time frame is of paramount importance and is to be borne in mind at all times by the SAR Coordinator. The following are some of the vessel identification systems available to the SAR Coordinator for obtaining information about any vessel within the shortest possible time.

20.2 INMARSAT Database

20.2.1 The name of the vessel, call sign and ID number in respect of all vessels equipped with INMARSAT terminals are listed in INMARSAT directory. In addition, the details of owner and accounting authority of the vessels are available with Land Earth Station (LES), Pune. In case of any requirement the details can be obtained from the same station. The MRCC Mumbai has been provided access for obtaining INMARSAT data. The other MRCCs Chennai and Port Blair are to contact MRCC Mumbai, in case any requirement of data regarding the merchant ships.

20.3 DG (Shipping) Database

20.3.1 The database containing name of the vessel, call sign, MMSI number, name and address of the owner in respect of all Indian vessels registered with Director General (Shipping) is available in database and held in their associated offices. The MRCC is to ensure that the respective offices of DG (Shipping) provide the details on required basis.

20.4 INMCC Database

20.4.1 The database containing name of the vessel, call sign, MMSI number, name and address of the owner in respect of all Indian vessels is also available with INMCC

Bangalore and the details can be obtained on request. The details of vessels are automatically included in the distress information sheet in case alert is activated through COSPAS-SARSAT system before relaying to MRCC/ SPOC.

20.4.2 International 406 MHz Beacon Registration Database (IBRD) is maintained by COSPAS-SARSAT program and is available online and free of charge at www.406registration.com. Several countries have opted to register their beacon with IBRD. National and International SAR authorities can access this database for SAR. The access is controlled by username and password.

20.5 ITU Publications

20.5.1 The List of Ship Stations and the List of Call signs and Numerical identities published by International Telecommunication Union (http://www.itu.int/cgi-bin/htsh/mars/ship_search.sh) contains the name of the vessel, call sign, name of the owner, MMSI number, communication facilities onboard and rescue equipment which can be referred on requirement.

20.6 MEREP Database

20.6.1 The details of vessels intercepted by Coast Guard units while on patrol are being maintained at MRCC Mumbai. All CG Units and other MRCC/ MRSC forward the MEREP reports to MRCC Mumbai for maintaining ship plot in INDSAR and for co-relating the ships position. This may provide some information regarding the vessel in distress.

20.7 Automatic Identification System

20.7.1 **The Automatic Identification System (AIS)** is an automatic tracking system that uses transponders on ships and is used by vessel traffic services (VTS). When satellites are used to detect AIS signatures, the term Space Based-AIS (S-AIS) is used. AIS information supplements marine radar, which continues to be the primary method of collision avoidance for water transport.

20.7.2 Information provided by AIS equipment, such as unique identification, position, course, and speed, can also be displayed on a screen or an ECDIS. AIS is intended to assist a vessel's watch standing officers and allow maritime authorities to track and monitor vessel movements in the vicinity. AIS integrates a standardized VHF transceiver with a positioning system such as a GPS receiver, with other

electronic navigation sensors, such as a gyro compass or rate of turn indicator. Vessels fitted with AIS transceivers can be tracked by AIS base stations located along coast lines or, when out of range of terrestrial networks, through a growing number of satellites that are fitted with special AIS receivers which are capable of de-conflicting a large number of signatures.

20.7.3 The International Maritime Organization's International Convention for the Safety of Life at Sea requires AIS to be fitted aboard international voyaging ships with 300 or more gross tonnage (GT), and all passenger ships regardless of size. The AIS data inputs have been integrated at MRCC/ MRSC to provide an operational picture of the maritime domain and also assist in vessel identification and subsequent diversion of vessels in area of casualty for proceeding to assistance.

20.8 Long Range Identification and Tracking System (LRIT)

20.8.1 As part of the international maritime community's wide-ranging response to the growing threat from terrorism world-wide, the International Maritime Organization (IMO) decided to establish a new system of Long-Range Identification and Tracking of Ships (LRIT) for the global identification and tracking of vessels.

20.8.2 The LRIT system consists of shipborne LRIT information transmitting equipment, Communication Service Provider(s), Application Service Provider(s), LRIT Data Centre(s), the LRIT Data Distribution Plan and the International LRIT Data Exchange. Certain aspects of the performance of the LRIT system are reviewed or audited by the LRIT Coordinator acting on behalf of all Contracting Governments to the International Convention for the Safety of Life at Sea (SOLAS).

20.8.3 Under new SOLAS 1974 Regulation, Chapter V-19-1, ships will be required to report their position (LRIT information) automatically, to a special shore data collection, storage and distribution system, at least four times and a day. LRIT information is provided to Contracting Governments and Search and Rescue services entitled to receive the information, upon request, through a system of National, Regional, and Cooperative LRIT Data Centres, using where necessary, the International LRIT Data Exchange.

20.8.4 **Shipborne Equipment**. The regulations that require ships to participate in the LRIT system apply to the following types of ships engaged on international voyages:-

(a) Passenger ships, including high-speed passenger craft.

(b) Cargo ships, including high-speed craft, of 300 and above GRT.

(c) Mobile offshore drilling units.

20.8.5 **In addition, the shipboard equipment must be capable of:-**

(a) Being configured remotely to transmit LRIT information at variable intervals.

(b) Transmitting LRIT information on receipt of a specific request from the shore (ie when called for).

(c) Being interfaced with an external global navigation satellite receiver (eg GPS), or have an internal positioning capability.

20.8.6 **LRIT Information**. The LRIT Information that is required to be transmitted by the ship is specified in new SOLAS Regulation V/19-1.5 and is limited to:-

(a) Identity of the ship.

(b) Position of the ship (latitude and longitude).

(c) Date and time of the position provided.

20.8.7 **LRIT Data Centres**. The primary purposes of an LRIT Data Centre (DC) are to collect, store and make available to authorised entities the LRIT information transmitted by ships as instructed by their administrations to utilise the services of that DC. LRIT data users are only provided with the LRIT information they are entitled to receive under the terms of SOLAS Regulation V/19.1.

20.8.8 The National Data Centre is established in India at DG Common centre, Mumbai which also provides the vessel input to MRCCs which can be used for response to a distress position. LRIT information are received free of charges at MRCCs for the Search and Rescue Service of persons in distress at sea and are to be exploited accordingly.

20.9 Fishing Vessel Database

20.9.1 The details of Distress Alert Transmitter fitted onboard fishing boats may be made available with all MRCCs by the respective Fishing Authorities, viz AD(Fisheries). The details of registration of all fishing boats in India are also available on the web portal of 'REALCraft" maintained by DADF of Ministry of Agriculture.

20.10 Internet Web Sites

20.10.1 The following web sites are available on Internet, which also contains the details of the vessels.

(a) www.cospas-sarsat.int

(b) www.lrfairplay.com

(c) www.vesseltracker.com

(d) www.equasis.org

(e) www.lloydslistintelligence.com

(f) www.gisis@imo.org

(g) https://inmcc.istrac.org

20.11 Other Sources

20.11.1 The details of vessels required for coordination of SAR operation can also be obtained from sources as listed below:-

(a) MRCC and registration authorities of the country to which vessel belongs (Contact details available in ALRS Vol 5).

(b) Port authorities/agents at LPC/ NPC

(c) Lloyds Registry
Lloyd's Register of Shipping
71, Fenchurch St, EC3M4BS,
United Kingdom
Telephone: 004420 77099166
Fax: 004420 77884796

(d) Fair Play Registry
20 Ullswater Crescent Ullswater Business Park Coulsdon
Surrey CR5 2HR,
United Kingdom
Telephone: 004420 8645 2800
Fax: 004420 8660 2824

(e) Piracy Reporting Centre (PRC)
Kuala Lampur.
Telephone: 00603238 5763/ 0060320310014
Fax: 0060 3238 5769
Piracy E-mail : piracy@icc-ccs.org

(f) Information and Analysis Centre & Information Fusion Centre – Indian Ocean Region
Naval Station, Sohna Road,
Gurgaon – 122001
Ph: 0124 – 2205385, Fax: 0124 – 2209385
E-mail – imac@navy.gov.in

CHAPTER 21

INTER AGENCY COORDINATION

CHAPTER – 21

INTER AGENCY COORDINATION

21.1 SAR Co-ordination

21.1.1 The effective coordination of SAR operation very often demands mobilization of SAR facilities with other resource agencies. If the involvement of the other agencies is felt, the requirement is to be projected without any hesitation. This would be possible only when there is thorough interaction between all the agencies involved in the conduct of a SAR operation. The SAR Coordinator on receipt of the distress notification coordinates with other agencies having SAR facilities. The availability of required type of facilities with the coordinator in time makes the job of the SMC easier in effecting a successful operation. The MRCC/ MRSC is to maintain a contact liaison with the resource agencies within its area of jurisdiction through periodic meetings and seminars. The contact details of the agencies need to be updated at regular intervals to avoid any delay in projecting the requirements.

21.1.2 The facilities with the following agencies can be requisitioned by the SAR coordinator for any SAR mission:-

(a) Indian Navy.

(b) Indian Air Force.

(c) Directorate General Shipping.

(d) Chief Hydrographer of India.

(e) Airports Authority of India.

(f) Department of Telecommunication and Local Authorities.

(g) Department of Space and Local Authorities.

(h) Customs Authorities.

(j) Fishing Authorities.

(k) Port Control Authorities.

(l) Ministry of Shipping and Local Authorities.

(m) State Government/ Local Administration authorities.

(n) Police Authorities.

(p) Oil and Natural Gas Commission and Local Authorities.

(q) Transport Corporation of India.

(r) Dredging Corporation of India.

(s) Indian Army.

(t) Pawan Hans Helicopters Limited.

21.2 Inter Agency Exercises

21.2.1 The requirement of a SAR mission is called for without any prior notice or appointment. The agencies likely to be involved in the SAR operations are to be geared up in all respects so as to be ready to render assistance if required. Also the procedures involved in undertaking such an operation with various agencies on the scene is to be very well known to the agencies and also to all the personnel of all facilities. Therefore, to ensure that everyone is prepared in all respects and works in cohesion, SAR training and exercises involving all the agencies will be conducted periodically simulating a SAR scenario. This will enhance the capabilities of the SAR system further and allow every agency to evaluate their capabilities to respond to any actual SAR requirement. The Inter Agency training and Exercise has been covered in Chapter-8.

21.3 Requirement for Information

21.3.1 Each MRCCs/ MRSCs has readily available up-to-date information concerning:-

(a) Search and Rescue units and alerting posts.

(b) Air traffic services units.

(c) Means of communication that may be used in SAR operations.

(d) Addresses and telephone numbers of all operators or their designated representatives engaged in operations in the region; and

(e) Other public and private resources including medical and transportations facilities that are likely to be used in search and rescue and their contact numbers. This includes, All India Radio, State/Private TV Channels,

Railways, Department of Telecommunications, Airlines, Army, DGCA, Meteorological Department, Customs/ Immigration, State Govt. resources for providing assets, emergency medical facilities.

21.3.2 Each MRCCs/ MRSCs has readily available all other information of interest to SAR, including information regarding;

(a) The locations, call signs, hours of watch and frequencies of all radio stations to be employed in support of SAR operations.

(b) The locations and hours of watch of services keeping radio watch and the frequencies guarded.

(c) Locations/agencies where supplies of droppable emergency survival equipment are stored; and

(d) Objects which it is known might be mistaken for un-located or unreported wreckage, particularly if viewed from air.

21.4 Harmonization of Aviation and Maritime Search and Rescue

21.4.1 As three SRRs of India viz. Chennai, Kolkata and Mumbai are having vast oceanic airspaces along with land areas, it is paramount to harmonize response from maritime SAR authorities for quick coordination.

21.4.2 Indian Coast Guard (ICG) has been entrusted with the responsibility of providing search and rescue operations over the territorial waters and high seas within areas entrusted to it by International Maritime Organization (IMO). Director General, Indian Coast Guard has been designated as National Maritime SAR Coordinating authority by Government of India. A National Search and Rescue Board have been constituted with Director General, ICG as the Chairman. Airports Authority of India is a member of the National SAR Board.

21.4.3 Three Maritime Rescue Coordination Centers (MRCC) have been established by ICG to discharge its responsibilities as follows:-

(a) The MRCC located at Mumbai covers the SAR operations in Western Sea Board.

(b) The MRCC located at Chennai covers Bay of Bengal including portions of Palk Bay and Gulf of Mannar.

(c) The MRCC located at Port Blair covers the area adjacent to Andaman and Nicobar Islands.

21.5 ICG-AAI SAR Coordination for Aviation Distress

21.5.1 The Airports Authority of India (AAI) is responsible for the coordination of aviation SAR services and provision of other air navigation services (ANS) over a vast space which also includes 1.76 million SqNM oceanic airspace over which the SAR Services are provided by the Indian Coast Guard. ICG is also a Permanent member for National Aeronautical SAR Coordination Committee (NASARCC).

21.5.2 A very high volume of air traffic passes through this oceanic airspace need effective coordination for SAR related issues over the oceanic areas. The Airports Authority of India and Indian Coast Guard have taken a number of initiatives, like execution of Memorandum of Understanding(MoUs), Joint SAR Refresher Courses, SAR Workshops, Seminars SAR Exercises, etc. towards Harmonisation of SAR services in the FIRs over Oceanic areas. Regular interaction and coordination between AAl and ICG officials to further strengthen and enhance the level of coordination and cooperation between two SAR coordinating authority is operationally essential towards following:-

(a) Formulation of AAI-ICG SAR Core Group towards developing integrated SAR Model for oceanic areas Need to constitute two tiers of core groups - one at the operational level and one at the higher level.

(b) AAI-ICG Joint SAR Working Group (JSARWO) with members from GM/ JGM (SAR), AAI and JD (SAR), ICG. Also the members from DGCA, INMCC/ ISRO and INCOIS be included. The JSARWG is also to explore the regulatory mechanism associated with aviation safety in Indian airspace for institutionalizing the harmonised SAR endeavors during aeronautical contingencies at sea,

(c) AAI-ICG High Level SAR Group with members from Executive Director (ATC), AAI and Principal Director (SAR)/ ICG

(d) ICG Real time sharing of maritime and aviation related information via AIS/ VTMS/ ATS/ SAR plot and picture transfers including utilisation of AAI facilities in coastal areas for ICG's ‘need based operational requirements’.

(e) SOPS, SAR resources data sharing and coordinated mobilization of assets for SAR missions.

(f) Deputation of one ICG Officer in AAI (or vice versa) as component on Maritime SAR Agency.

(g) Simulation and conduct of large scale and near real time scenario aeronautical contingency during SAREX with support of AAI once every two years.

(h) Enhanced MRCC-RCC integration, training and cross visits of personnel to train centers/ facilities envisioned in the MoUs.

(j) Setting of Joint Rescue Coordination Centers (JRCC)

(k) Identify Specialised Agencies who can help in the Sub Surface SAR Operations.

(l) Provisioning and support of AFTN Connectivity to all the MRCC/MRSC.

(m) ICG Representative in AA Regional Level Committees for Enhanced Integration and Safety issues.

21.6 Dissemination of Information

21.6.1 A annual SAR newsletter "SAGAR" is published by the Indian Coast Guard. Various efforts of the National SAR Coordination agency and other agencies related to SAR are projected for obtaining views and recommendations for improvement of the SAR system. This journal also carries SAR cases undertaken and also contains articles to educate people by the lesson learnt during the operation, refresh the knowledge on the SAR operation and also keep abreast on the latest development and technologies on the SAR operation.

21.7 Inter Agency Liaison

21.7.1 All personnel involved in the SAR operations should maintain constant liaison with the MRCC and the coordinating MRCC should in turn maintain constant touch with the military authorities providing SRUs and other SAR agencies involved in the operation to help coordinate the activities, provide briefing and debriefing and keep SMC informed on the SRU availability. Adequate background information must be provided so as to develop a picture on, what actions might have been taken by the missing craft and provide expertise about the craft to aid

in search planning during all joint operations. This will also enable to conduct coordinated studies, review procedures and equipment and recommend better method of operation. Any development in this regard should be informed to the SMC in an ongoing operation.

21.7.2 The Inter agency liaison will enable review of SAR matters affecting more that one agency, including recommendations of participating agencies for revision and amendment of the plan. This will also encourage all the agencies involved to develop equipment and procedures to enhance the national SAR capability and promote coordinated development of all national SAR resources.

21.8 International SAR cooperation & Coordination with neighbouring countries

21.8.1 The International SAR Cooperation & Coordination/ liaison is operationally essential to establish standard SOPs and communication. Linkages for finely undertaking of any Sea/ Air SAR operations. In addition to above bilateral agreements, practical cooperation, training, exercises and MoU should be established.

21.8.2 The bilateral cooperation should provide exchange of best practices on SAR coordination, linkages of MRCC/ JRCs/ RCCs, linkages with various ship reporting systems for effective vessel monitoring/ routing transiting in the respective SRRs.

21.8.3 Regular conduct of SARCOMEX between MRCCs/ exchange of SPOC (SAR Point of Contact) for effective coordination.

CHAPTER 22

DOCUMENTATION

CHAPTER - 22

DOCUMENTATION

22.1 Case Title and Numbering

22.1.1 The proper documentation of SAR cases handled by MRCC/ MRSC forms the backbone of the SAR system so as to guide the future evolutions to achieve the desired aim. The documentation promotes operational efficiency and creates statistical data and develops database for SAR case studies. The documentation consists of SAR folder, proper numbering of SAR cases, maintenance of dairy of events, filing of relevant documents received/ developed or dispatched in chronological order and rendering report in the desired format.

22.1.2 On reporting of every SAR incident, the MRCC/ MRSC is to allocate a running serial number from 001 commencing 01 Jan each year. In addition, National Maritime SAR Coordinating Authority (NMSARCA) is also to allocate a running serial number starting from 001 commencing 01 January every year for all cases responded by all MRCC/ MRSC. The SAR case numbers are maintained primarily for statistical purposes. The case title is to indicate the name of the vessel and type of emergency onboard. The detailed procedure for numbering is placed at **Appendix S**.

22.2 SAR Folder

22.2.1 A separate SAR folder is maintained for each SAR case and is numbered as discussed in the above paragraph. The diary of events pertaining to the case is developed in chronological order with the progress of the case and is stapled/ pasted to the inner side of the front cover of the folder. All messages received/ dispatched are to be placed in the folder in chronological order. All messages pertaining to ship/ air operation and coordination are to be filed in the folder only. The creation of sub files/folders in a case should be avoided. The interim reports on the progress of the SAR case and the final report on conclusion of the case are to form part of the SAR folder. The SAR folder should carry the serial of the case as given in SAR operation logbook, case number and case title.

22.3 Master SAR Folder

22.3.1 All SAR folders are to be tagged in Master SAR folder maintained for the current year as per the serial number given in SAR operations Logbook. A separate Master SAR folder is to be maintained for each year.

22.4 Diary of Events

22.4.1 The diary of events of the SAR case is to contain chronological entries of date and time of mission opening, phone call summary with details of the message, all messages received/ dispatched, movement of SRUs, requisition of resources from other agencies, including merchant ships transiting through the area, activation of ISN, SAR case summary etc. It should contain each and every minute details of the operation undertaken, so that the subsequent case studies, preparation of case summary and rendition of the final report will be done without referring to the messages filed in the folder. The diary of the events should be recorded in the following format:-

SAR CASE		
CASE TITLE		
DATE AND TIME	EVENTS	REMARKS

22.4.2 **Photography** The SAR folder is to carry a pouch on the inner back cover for placing the photographs pertaining to the events. Concerted efforts are to be made to take photographs of each and every event. The video photography of the incident, if possible, should also be taken and preserved for first hand information and future requirements. A soft copy of the same is to be created and kept for posterity.

22.5 SAR Operations Log Book

22.5.1 The SAR cases undertaken by the MRCC/MRSC are to be serially numbered and recorded in the SAR operations logbook in a chronological narrative manner for the cases responded as per the given format.

Sl.	Date	Case Sl. No. and title	Brief of incident	Remarks

22.6 SAR Incident Processing Forms

22.6.1 On initiation of any SAR mission, the SMC is to forward the completed SAR incident processing form to the NMSARCA and the respective MRCC. The format is to be initiated within two hours of the initiation of the incident. The format of the processing format is placed at **Appendix T**.

22.7 SAR Case Summary

22.7.1 On completion of the SAR mission, the SAR case summary is to be prepared by the SMC and forwarded to the MRSC, MRCC, NMSARCA and SAR coordinator. A copy of the same is also to be retained in the SAR folder. The format for the SAR case summary is placed at **Appendix U**.

22.8 SAR Charts

22.8.1 The tracings of the charts used for the SAR operation depicting all incidents including the track and speed made good, search pattern undertaken by the ships/ aircraft and other related data required for the evaluation of the SAR mission are to be prepared. The SAR chart should also include the projected track line of the missing craft, last known position, estimated position, search areas, mission number and title, SRUs and search area assignments. The SRUs involved in the operation are to forward the same covering the respective part of the operation to SMC for compilation of the SAR charts. The SMC is to submit the SAR chart to the respective MRCCs, SAR coordinator and NMSARCA. This should also form part of the SAR folder.

22.9 Computer Database

22.9.1 All the aforesaid documents are to be stored in digital database in compact disc. This should also contain the still photographs, video photography and charts whenever possible. This will facilitate the availability of the data during future requirements of analysis and case studies.

22.10 Case Studies

22.10.1 Constant improvement in the performance of the SAR system should be a clearly stated goal of the SAR authorities. The SAR coordinator should always consider SAR case studies for the betterment and enhancement of the SAR system. One method to encourage performance improvement is to set up goals whose degree

of attainment can be measured by key performance data. This data should be collected, analysed, and published on a routine basis so that individuals can see how the system as a whole is doing, and how their performance is contributing to the achievement of the established goals. The format for the Case Study Evaluation is placed at **Appendix V.**

22.10.2 The SAR case studies should also be undertaken when a search has failed to locate the target and the same was subsequently found or a mission has failed to locate a target resulting in loss of life. Also when a SAR mission is believed to be of unusual interest due to the use of new methods or procedures or when unusual experience is gained on completion.

22.10.3 A SAR case study is an appropriate method for addressing those aspects of an incident that are of particular interest. Individual aspects of interest could include issues with communication, assumptions made, search planning, coordination etc. SAR case studies or incident reviews also provide opportunity to analyse survivor experience and lifesaving equipment performance besides review of standard operating procedures.

22.11 **Sharing of SAR Information**. SAR cases, accidents, exercises and drills should be carefully assessed and potential improvements to the SAR system is to be identified. Lessons identified in such cases, and other information of use to the SAR community should be shared as appropriate including IMO and ICAO. It is important to note the distinction between a “lesson identified” and a “lesson learned”. Lessons from SAR events may be identified by MRCC and should be analysed and decision made about what actions may be required as a result. The assistance and commitments of various agencies towards SAR are to be documented and published.

CHAPTER 23

PUBLIC RELATIONS

CHAPTER – 23

PUBLIC RELATIONS

23.1 Public Relations

23.1.1 The public should be informed during SAR operations, within the limits of confidentiality, of SAR system actions. The potential benefits of early release of information include:-

(a) Additional information from the public, leading to more effective use of SAR resources.

(b) Fewer time-consuming requests from the news media.

(c) Reduction in inaccurate public speculation about the SAR mission.

23.1.2 A SAR operation often creates great interest with the general public and with radio, television and newspapers. Contacts with media are normally the responsibility of managers or public relation specialists, but may also be delegated to the MRCC. It is important that a good relationship between the media and the MRCC is established to ensure that information reaching the public is factual and complete. This relationship should be established prior to any major incident. The MRCC should use the media to communicate its overall image, the services provided, and its impact on the community. The MRCC can accomplish this by:-

(a) Providing information to the local media about the MRCC and the services it provides.

(b) Providing "good will" stories on an ongoing basis to build up the credibility with the media as a professional, concerned, and open organization and

(c) Taking every opportunity to present news so that when a major SAR operation is conducted, the media will be knowledgeable in reporting it.

23.1.3 Contact with the media can take many forms. Some of them are as under:-

(a) Press releases or media conferences can be used as an early release of information, followed by a public update on progress, and as a final release

summarizing the entire case after SAR operations are concluded. All information released by the MRCC should normally be approved by the SMC and appropriate authorities, and contain only factual information.

(b) Once initial media information has been released, the MRCC should consider programming and advertising regular and frequent updates in order to address the needs of the media. These could be done either through further press releases or press conferences. A press conference gives the MRCC the opportunity to initiate the following actions:-

(i) Providing information.

(ii) Providing interviews.

(iii) Answer questions.

(iv) Summarise what has happened and what the MRCC is doing in order for the media to fully understand what has occurred.

(v) Give the MRCC a ‘‘humane face’’ and

(vi) Give the media controlled opportunities to obtain video footage, photographs, and audio for broadcast use.

(c) **Conduct of Interviews.** To avoid wrong information and mis-understandings, normally only a designated spokesperson should conduct interviews with the media. This will also allow the MRCC to remain focused on its planning efforts. The spokesperson should be in direct contact with the MRCC to ensure that complete and up-to-date information is obtained. In interviews with the media, the MRCC spokesperson should exercise good judgement and avoid following:-

(i) Personal judgements or demeaning information on the crew or missing persons and judgement, experience, or training of the pilot in-command, captain, or the crew.

(ii) Degrading opinions on the conduct of SAR operations.

(iii) Personal opinions or theories as to why the accident occurred or

how it could have been avoided.

(iv) Being unduly pessimistic or optimistic on the chances of success, giving names of missing or distressed persons until every effort has been made to inform the relatives.

(v) Giving the name of the operator or the owner of the aircraft, ship or other craft before they have been informed.

(vi) Revealing names of persons who have given information related to the case.

(d) On the other hand, the type of information that the MRCC spokesman could release, depending on the specific circumstances of the SAR operation, includes following, but is not limited to:-

(i) General reason for the SAR operation, type of aircraft or vessel involved.

(ii) Owner/operator of the aircraft or vessel (only after the owner/ operator has been informed and given consent).

(iii) Name of vessel/ flight number (only after the owner/operator has been informed and given consent).

(iv) Number of people onboard.

(v) General area being searched.

(vi) Number and types of aircraft and vessels engaged in the search and the number of hours flown.

(vi) Arrangements for land or marine search (as applicable).

(vii) Details of other authorities participating in the search.

(viii) Contact number for use by the next of kin to obtain information, and

(ix) Contact number for further information and contact number for media enquiries.

23.1.4 Release of names can be a sensitive issue. Guidelines should be established in accordance with international and national laws and regulations. The general procedures recommended are as follows:-

(a) Names of civilian casualties should not be released until every effort has been made to contact family relatives. To accomplish notification, use whatever national and local public agencies are available. Until the relatives have been notified, normally only the number of deceased, survivors, and injured survivors should be released. Names of military casualties should be released only by the military service to which the casualties belong. When circumstances permit, queries on such casualties should be referred to the parent military service.

(b) Names of survivors should not be released until positive identification has been accomplished. Generally, survivor information should not be released prior to release of casualty information, although circumstances may permit exceptions. Survivors should be encouraged and assisted in contacting their families as soon as possible. However, SMCs should brief survivors on releasing information and possible reasons for with holding information.

23.1.5 When a major incident occurs, such as with a large aircraft or cruise ship, hundreds of persons may be at risk, involving many nationalities. Such an incident may result in the need for mass rescue operations (MROs), the salient details are reflected in chapter 15. In this situation, the MRCC could become the focus of world attention. Such events will undoubtedly require the involvement of other emergency service providers and a concerted effort will be required by the MRCC if a consistent and controlled message to the public is to be maintained. Actions by the MRCC may include the following:-

(a) Request representatives from responding organizations (including the aircraft or ship operator, as appropriate) to help man a joint media relations team.

(b) Issue regular press release and social media updates, as agreed upon whenever possible, with other responders.

(c) Make agreed information available on the Internet.

(d) Actively monitor media reports including social media to ensure correct information is being broadcasted/ published.

(e) Call a press conference.

(f) Prepare a room for the media, and

(g) Control media access to the MRCC and in other operational areas as appropriate.

23.1.6 Other considerations for a major incident include the following points:-

(a) As soon as it is apparent to the MRCC that a major incident has occurred, informing the media will help establish the MRCC as the primary source of information. Be clear, concise, and informative.

(b) Establishing the nationalities of those at risk will assist in anticipating where media enquiries will come from, and will assist in reducing media enquiries from States whose citizens are not involved.

(c) Scheduling regular media conferences and updates, including regular social media updates, can help reduce the volume of media enquiries and assist with maintenance of consistent and correct public information. Media updates should also take into account international time zone differences.

(d) Due consideration should be given to the language used with the media. Local and international interest in the SAR operation may require use of a common language or availability of translators.

(e) Ensure that arrangements are in place to deal sensitively with enquiries from friends and families of those involved and, where possible, to update next of kin ahead of the media.

(f) Assign appropriate personnel to manage information demands from government and other senior levels.

23.1.7 **Updations of information with Relatives** The SMC should be aware of the concerns of the relatives of missing persons. Waiting during searches and lack of information can be stressful to family members of those in distress, which could also affect MRCC performance. During the search, the SMC or staff should maintain regular contact with the relatives to provide information and

outline future plans. If possible, contact telephone numbers should be issued for relatives. Providing access to SMC headquarters, if appropriate, enables relatives to see the search effort. These steps assist the relatives in accepting the SMC's decision to conclude search operations even if the missing persons are not located.

CHAPTER 24

COMPUTER RESOURCES

CHAPTER - 24

COMPUTER RESOURCES

24.1 Computers Resources

24.1.1 Large amounts of computing and data storage capability can be obtained and maintained at a relatively low cost. Modern software makes development of helpful forms, computer aids, databases, and sometimes even some communications reasonably easy and inexpensive. Such aids can be developed by the user and do not require highly specialized expertise in the computing sciences. This is not true for software that directly addresses the search planning problem. Developing such software requires specialized expertise in computer modelling, the application of search theory and the application of environmental sciences such as meteorology and oceanography to SAR. Paragraph 1.11.9 lists some of the functional characteristics that should be considered for search planning software.

24.1.2 Forms. Word-processing software provides the capability to develop standard forms that best meet local, national, and regional needs. These forms may be printed on paper and completed by hand, or completed on the computer via the word processor. The functions of such forms include:-

(a) Ensuring critical data items are not forgotten; – ensuring calculations are done in the correct order.

(b) Saving time for the writer by having all standard information already on the form and requiring that only variable items need to be entered; and

(c) Saving time for the reader by having all information presented in a standard, predictable format.

24.1.3 Examples of forms which may be useful include:-

(a) Search action plans.

(b) Checklists.

(c) Situation reports, and

(d) Search planning worksheets.

24.1.4 **Computer aids**. The availability of electronic spreadsheets makes development of computer aids possible without doing computer programming in the traditional sense. Most of the work required by search planning worksheets, for example, could be done easily in spreadsheets. Having such spreadsheets helps in at least two respects.

(a) The search planner would have to enter only values needed as inputs. The spreadsheet software would do all the calculations required to produce the outputs (answers). This would relieve the search planner of most of the computational burden, reduce the potential for errors, and save valuable time.

(b) If an input value changed, the search planner would have to simply change the value of that item in the spreadsheet and all values based on it would be re-computed automatically, saving time and reducing the possibility of error.

24.1.5 **Databases**. The primary purpose of most databases is to store detailed information. This information may then be accessed rapidly if detailed data is required, or consolidated and summarized into useful reports. Examples are shown below.

(a) **SAR system management data**. Number of alerts received by the system, number of responses, number of sorties, number of SRU hours expended while engaged in SAR activities, SAR incident locations, dates, times, numbers of lives saved, and value of property saved are some of the many types of information a SAR manager may find useful.

(b) **Search planning**. The RCC may develop its own databases as well as make use of existing database programs on a variety of information valuable to search planning. Examples include:-

(i) An index to previous SAR incidents by distressed craft name or other identifier could lead to valuable information about that craft if it is involved in a later incident.

(ii) A database of known debris locations from previous aircraft crashes or forced landings over land, or vessels recently sunk, may avoid wasting valuable search time investigating old SAR incident sites.

(iii) In the maritime area, a database of past drift trajectories could improve estimates of survivor location in future incidents, and

(iv) An environmental database, including sea currents, water temperatures, winds currents, etc.

(c) Facilities and agencies

(i) A database of SAR and medical facilities, such as hyperbaric chambers and hospitals and their capabilities, could aid rescue planners in determining the best place to take injured survivors, and

(ii) Lists of frequently-called agencies and telephone numbers can be kept in a database and rapidly accessed, when needed.

24.2 Computer communications

24.2.1. Many computers can communicate electronically. The communications medium is usually either a modem connected to ordinary telephone lines or a network card in the computer connecting it to a local area or wide area network (LAN or WAN). Before depending on this type of communication, however, SAR system managers, search planners, etc., need to confirm the availability and reliability of the communications path.

24.3 SAR data providers

24.3.1 There are basically two types of SAR data. First, there is data which might provide additional clues about the SAR incident, the survivors, or their craft which could help in finding the survivors. Second, there is data which is used directly in the search planning and rescue processes. Some data, such as weather, fall into both categories.

(a) Data of the first type may already reside in existing databases. For example, if a State has a boat registration programme, information the search planner would find useful about a missing boat may be available in the database. Lloyds Registry of Shipping maintains an extensive database on commercial shipping, including specific data on the current status and history of virtually every vessel engaged in transoceanic trade. The Internet often provides a means to access this data as well as business and individual web sites which might provide pertinent information about the craft or persons in distress.

(b) Data of the second type includes weather, wind, and sea current data which might be available from local weather bureaus. It could also include ship reporting systems such as Amver, which maintain a continuously updated plot of estimated locations for participating merchant vessels.

24.4 Computer-based search planning

24.4.1 The use of computers to support the search planning process is growing as it offers the SAR Co-ordinator greater flexibility to calculate a refined search area. Although there may be a tendency to computerise the manual method, computerising this overly simplified pencil-and-paper technique should be avoided. Computers make much more sophisticated techniques feasible, such as making the best use of increasingly available detailed environmental data for modelling and predicting drift, creating and testing various scenarios, integrating and evaluating the impact of late-arriving information, and simulating changes in the search object's status and type, etc. Perhaps most importantly, such models can produce optimal search plans that maximise the probability of success. SAR Coordinators are cautioned that they should be familiar with the basic theories of each Search Planning element to fully take advantage of the search planning software. SAR Coordinators are also reminded that computers are only devices that provide support; they cannot make important decisions and the quality of their outputs can only be as good as the quality of the inputs. Further information may be found in appendix P of this publication.

24.4.2 Display of vessel tracking data. A computer system with geographic information system (GIS) display capability is important for displaying vessel tracking data sourced from AIS, LRIT, VMS, VTS and other sources. The location of SAR units can also be tracked and displayed, as can search areas and other information.

24.5 Computers and Related Features

24.5.1 The preservation of the data related to various methods and stages of distress notification, search planning and successful rescue operation is essential for the post operation analysis, improvement of the SAR system and staff training. The method of preservation of data in digital form in compact disc and portable HDDs proves to be more effective for quick retrieval of stored information and easy dissemination to various SAR facilities ashore or afloat. With the advent of the science and information technology numerous user-friendly computer aided tools are available to ease the task of SAR coordination. These include

two-way digital communication system to ascertain the emergency onboard, mobilising potential assisting ships around the position of distress through ship reporting system and ISN and effecting a successful search and rescue operation. Every MRCC/MRSC is to be equipped with such facilities to aid and enable a SAR operation successful.

24.5.2 Every MRCC/MRSC is to be provided with latest version of computers and associated software tools. The exclusive Internet connection should be provided in all these set up for down loading details of vessel from the web sites required for SAR operation. A number of web sites are available on the Internet having vessel details which can be obtained if name or call sign or MMSI number of the vessel is known. The computers at MRCC/ MRSC are to be connected through LAN for easy transfer of data for real time analysis so as to enhance coordination, online modification of search action plan and rescue action plan depending upon the continuously changing on scene conditions. The computers are also to be upgraded to the latest versions and soft ware tools available on periodic basis.

24.6 Electronic Data Transfer

24.6.1 All MRCC/MRSC are to be inter linked by electronic methods for enabling data transfer on the developing scenarios, for enabling the concerned SAR authorities to arrive at the appropriate decision. This will also provide adequate online exposure to other MRCC/ MRSC staff, who can analyse the operation and provide expert opinion/advise based on their experience on similar situations. In addition to the text message, still and video photographs are also to be exchanged for first-hand information and also to aid better analysis and appreciate/ modify the method of operation in real time.

24.6.2 As far as feasible, the SMC, SC, MRCCs and MRSCs should have sufficient data exchange capabilities which would enable the appropriate authorities to have quick and continuous appraisal of the developing On-Scene situation. This would entail computers with appropriate computing ability along with required bandwidth for data transfer/video conferencing.

24.7 Computer Database

24.7.1 All MRCC/ MRSC should be in possession of details of all Indian flag vessels on computer and details of vessels reported through MEREP/ INSPIRES/ INDSAR and also ships patrolling in the area. The contact details of port

authorities, local fishing associations, State/ Central/ Local administration authorities related to SAR should be available with all coordination centre and updated in the database regularly.

24.7.2 These contact details should be annually forwarded by the resource agencies viz. Port authorities, fisheries department, local fishing associations, State/ Central/Local administration authorities to the respective coordination centre.

24.8 Preservation of SAR Data

24.8.1 The following details regarding each SAR operation, including case studies if undertaken is to be preserved in digital form for quick retrieval and easy analysis whenever required.

(a) Alert notification and subsequent communication.

(b) Details of the vessel obtained from various sources.

(c) Coordination details to conduct search and effect rescue Including the SRUs deployed.

(d) Details of modification of Search action plan and Rescue action plan on evaluation of condition on scene.

(e) Involvement of other agencies with details of SRUs deployed.

(f) Still photographs taken and record of video photography.

(g) Result of the SAR operation and post operation analysis.

(h) Legal aspects; and

(j) Lessons learnt and recommendations for improvement of SAR system.

24.9 Computer Training

24.9.1 All MRCC/MRSC staff is to be proficiently trained in the handling of the computer software and associated tools so as muster the required information and undertake the coordination independently, without depending on anybody else. This will enable quick assimilation, appreciation of the available information; enhance the planning strategies and mobilisation of the SAR resources so as to conduct any SAR operation efficiently and successfully.

CHAPTER 25

CHECK OFF LISTS

CHAPTER -25

CHECK OFF LISTS

25.1 SAR Incident Data

25.1.1 Ascertain nature of emergency (e.g. fire, collision, man overboard, disabled, MEDICO/ MEDEVAC, overdue, lost person, bailout, crash etc.)

25.1.2 Find out the position and time of emergency (latitude/ longitude or bearing/ distance from known point or last reported position and next reporting position), including the following:-

(a) Heading/ Speed/ Altitude.

(b) For ships and boats, echo sounder readings, GPS fix, ranges and bearing with respect to prominent land feature, aids to navigation, and other vessels in the area or recently seen.

25.1.3 Obtain the details of the initial reporter/ name/ telephone or address of person, name/call sign of craft, AIS details, parent agency.

25.1.4 Find out the following in respect of the vessel/ craft.

(a) Distressed craft name or type/ call sign/ registration, description.

(b) Last known position and time.

(c) Sighting of survivors or parachutes.

(d) Persons on board.

(e) Craft description (size, type, craft number, hull colour, cabin colour, deck colour, funnel description, rigging, fuselage colour, tail colour, wingtip colour, aircraft tail number, vessel number, sail number, etc.).

(f) Secondary search objects.

(g) Radio frequencies in use, monitored, or scheduled.

(h) Emergency radio equipment and frequencies include EPIRB.

(j) Fuel on board/available endurance.

(k) Navigation equipment.

(l) Survival equipment/ life rafts available.

(m) Food/water available.

(n) Assistance desired, or received.

25.1.5 Record the date/time of initial report.

25.1.6 Find out other pertinent information, such as a craft's history of timely reporting and arrivals.

25.1.7 Collect supplementary data for air or marine craft overdue incident data.

25.1.8 Find out date, time, and point of departure, planned route, speed made good, ETA, and point of destination.

25.1.9 Ascertain possible route deviations.

25.1.10 Weather history and forecast along the proposed route.

25.1.11 Find out details from other information sources like friends, relatives, associates, agents and agency.

25.1.12 Obtain on scene weather and sea conditions.

25.2 Person Overboard

25.2.1 Find out the date, time and present position of the vessel.

25.2.2 Find out the craft course, speed and destination.

25.2.3 Ascertain the date, time of man overboard including position.

25.2.4 Find out the details of the initial reporting source, radio station, name and call sign of craft, owner and agent.

25.2.5 Obtain the estimated weather data including the following:-

(a) Visibility and any obscuration such as fog, smoke, or haze.

(b) Sea state.

(c) Wind direction and velocity.

(d) Cloud amount and ceiling.

(e) Estimated temperature of sea water.

(f) Barometric reading.

(g) Whether it is/was raining.

(h) Whether thunderstorm activities exists.

25.2.6 Find out the name, age and gender of the person overboard.

25.2.7 Ascertain the physical condition and swimming capability of the person.

25.2.8 Find out the details of the persons clothing and colour, including life jacket, life buoy, if any.

25.2.9 Examine the area searched and pattern used, if already undertaken by the vessel.

25.2.10 Find out further intentions of vessel/ craft.

25.2.11 Check if any assistance is already being received.

25.2.12 Other pertinent information, if any.

25.2.13 Notify the ship in area by ISN and NAVAREA VIII coordinator Promulgation of NAVAREA.

25.3 Drowning Near Shore/ River

25.3.1 Plot position. Compute distance from nearest Harbour/ prospective SRU.

25.3.2 Inform concerned MRCC/ MRSC/ authorities.

25.3.3 Inform following personnel:-

(a) Collector.

(b) Police Commissioner.

(c) Fishermen associations near the drowning position.

25.3.4 Request fishermen association to deploy fishing boats for search and rescue and advise fishing crafts in area to keep a look out.

25.3.5 Deploy helicopter in SAR configuration for aerial search.

25.3.6 If area is large and the probability of drifting into mid sea is high undertake following actions:-

(a) Launch fixed wing SRU with more endurance (e.g. Dornier) in SAR configuration for search.

(b) Promulgate message through lSN broadcast, requesting merchant ships to keep look out.

25.3.7 Deploy IBs/ICs/Ships for surface search.

25.4 Medical Evacuation

25.4.1 Plot the position of the ship. Find out distance from nearest port/ air field (for evacuation by helicopter).

25.4.2 Maintain narrative of events.

25.4.3 Ascertain nature of casualty and symptoms.

25.4.4 Ascertain treatment provided/ required.

25.4.5 Inform concerned authorities of MRCC/ MRSC and RMO/ DMO.

25.4.6 Obtain medical advice from RMO/ DMO and relay to the ship. Direct ship to contact RMO/ DMO for medical advice, if required.

25.4.7 Obtain following details of ship:-

(a) Names of vessel, present position, course and speed.

(b) Call sign, IMO number and MMSI number.

(c) Telex/ Telephone/ Fax number.

(d) Port of registration.

(e) LPC with date.

(f) NPC with date.

(g) Cargo.

(h) Name and nationality of Captain.

(j) Number of crew and nationality.

(k) Name of patient, nationality, age, gender, passport number, treatment provided and present condition.

(l) Availability of doctor onboard.

(m) Draught, length, width and tonnage of ship (for berthing requirement).

(n) Facility for helicopter landing/ space for winching patient.

(p) Provision of accommodation ladde.

(q) Name of company with contact details.

(r) Name of agent with contact details.

(s) Sea state, wind, sea state, roll and pitch.

(t) List/ Trim.

(u) Any structure/ projection posing obstruction for landing helicopter.

25.4.8 Make signal to NMSARCA and forward periodic SITREPs.

25.4.9 Decide the port at which medical evacuation is to be carried out and inform concerned MRSC.

25.4.10 Direct the vessel to obtain regular medical advice.

25.4.11 Inform owner and agent of the casualty and direct owner/agent to appoint a doctor for continuous medical advice. Advise the ship to contact the doctor directly, if possible.

25.4.12 Ensure evacuation/disembarkation of the casualty is done only after obtaining the advice and clearance of the doctor appointed by the agent.

25.4.13 Keep one ship/helicopter with MO/ MA with first aid kit and stretcher standby for evacuation. Prospective SRU which is nearest at sea be diverted to intercept the vessel, if available in the area.

25.4.14 Direct ship to head for port for evacuation/ shape course for early interception, if required.

25.4.15 Inform owner and agent of the vessel at point of evacuation.

25.4.16 Promulgate HF primary and secondary frequency. Intimate assisting ship and vessel requiring assistance INMARSAT number to each other for two-way communication.

25.4.17 Explore the possibility of diverting the merchant vessel to any Island nearby with airfield facility, for further evacuation by aviation assets.

25.4.18 Examine if night capable helicopter is to be deployed for evacuation.

25.4.19 Examine requirement of specialist medical team. Team to be arranged by owner/ agent. Team to be disembarked if possible to merchant vessel by helicopter. Obtain undertaking from team against any damage/ loss of life.

25.4.20 If doctor is not onboard the merchant ship requiring assistance, broadcast message through ISN requesting all vessels having medical officer and operating in area to provide assistance. Message, to include the telephone/fax/telex number of ship requiring assistance.

25.4.21 Inform agent to arrange following:-

(a) Berth, if vessel is coming alongside.

(b) Ambulance with medical team.

(c) Arrange hospitalisation.

25.4.22 Inform the following:-

(a) Local police.

(b) Local immigration authorities, if patient is a foreigner.

25.4.23 Inform ship to forward following documents:-

(a) Personal property list of the patient.

(b) Passport details and CDC book.

(c) See to doctor form.

(d) Letter to owner/ agent seeking permission to disembark at that port for hospitalisation.

(e) Medical history document.

(f) Medical report from master with brief on incident/casualty and treatment provided.

(g) International certificate of vaccination.

25.4.24 Carry out photography during evacuation.

25.4.25 Inform press.

25.4.26 Forward consolidated report to MRCC/ NMSARCA.

25.4.27 If medical evacuation is being considered, the benefits must be weighed against the inherent dangers of such operations to both the person needing assistance and to the rescue personnel.

25.5 Mass Casualties

25.5.1 Collect the following information on the incident.

(a) Date and time of report.

(b) Reporting source.

(c) Nature of distress.

(d) Aircraft crash/ shipboard fire/ explosion/ other incident.

(e) Description of incident (type of craft, amount of damage, cause).

(f) Date and time of incident.

(g) Position (latitude and longitude).

(h) Geographic reference.

(j) On scene weather

(i) Wind _____ / _____ Kts

(ii) Sea State _____ .

(iii) Visibility _____.

(iv) Clouds _____.

(k) Number of persons onboard: (Male_____, Female_____, Children___).

(l) Medical condition of POB.

25.5.2 Designate SMC and OSC.

25.5.3 Take actions as per MRO SOPs.

25.5.4 Dispatch SAR resources.

25.5.5 Notify appropriate Air Stations, maritime and various land based facilities.

25.5.6 Designate OSC or ACO for SAR operations on scene.

25.6 Cyclonic Disturbances

25.6.1 **On Issuance of Weather Warning by IMD/ Other Source**

(a) Closely monitor the weather developments through various sources.

(b) Maintain highest level of operational readiness to mitigate/ respond to emergent maritime SAR and disaster relief contingencies.

(c) Institute appropriate safety measures for aviation and maritime assets in areas which are to be likely affected.

(d) ICG operational units to be put on high alert and kept standby for deployment towards impending response measures.

(e) Following measures for weather advisory/ warning to fishermen in local language be implemented through all possible sources.

(i) SRUs units already at sea to regularly broadcast weather advisory/ warnings to fishermen.

(ii) ROSs/ ROC are to regularly broadcast weather advisory/ warning to fishermen.

(f) Requirement of additional manpower and resources for response and relief measures are to be appreciated and worked out in advance.

(g) MRCC to consider activation of International Safety Net (ISN) message and coordinate safety advisories through NAVTEX system and other means at regular interval.

(h) Areas of dense fishing activity may be identified in order to shepherd/ mitigate SAR operation in case of deterioration/ intensification of the weather conditions.

(j) Coordinate with local authorities, State/ District Emergency Operating Centre, Fisheries, All India Radio (AIR), NGOs, Volunteers etc. for sharing of weather information and advisories to fishermen.

(k) Liaise, integrate with Coastal States/ UTs/ local administration and civil authorities for disaster impact assessment, resource integration and preparedness of response measures for impending contingencies.

(l) Advise Coastal States/ UTs/ local Fisheries authorities to direct fisher folks not to venture into sea for fishing activities and institute precautionary measures to advise fishermen operating at sea to return to the safety.

(m) Inform/advise Coastal Marine Police/ Coastal Security Group for necessary precaution, preparedness and response measures.

(n) Advise Port Authorities/ VTMS for necessary precaution, preparedness and safety measures in their area of responsibility including safety of vessels at anchorage & derelicts keeping DG Shipping informed.

(p) Formulate Core Group/ Coordination Cell at appropriate levels with appropriate manning for coordination amongst all stakeholders.

(q) A Single Point of Contact may be established at each level for speedy communications and exchange of information. Whatsapp group may be formed, if appropriate.

25.6.2 On Intensification of Weather/ Cyclonic Disturbance

(a) Closely monitor the weather movements and forecasts to advise all concerned authorities for prompt appropriate response actions.

(b) Use all resources including units at sea for weather warning dissemination, shepherding fishermen to safety and response to Search and Rescue requirements at sea.

(c) MRCC, MRSC, ROS, and ROC are to intensify weather broadcast and advisories in local languages for guiding fishermen and mariners for safety. Additional options to relay/ broadcast messages through other sources/ agencies be also coordinated.

(d) MRCC to reinforce promulgation of safety message through ISN/ NAVTEX and also coordinate promulgation of NAVAREA to caution mariners with request to advise fishermen for safety as appropriate.

(e) Need for mobilisation of additional life saving and rescue gears may be contemplated and accordingly planned for mobilisation from all possible sources.

(f) A high level of operational readiness be maintained for coordination of Search and Rescue requirements at sea. Advise/ requisition other resource agencies (IN, IAF, Ports, etc.) for requirement of coordinated maritime SAR efforts, as appropriate.

(g) Activate Core Groups/ Coordination Cell for close liaison and coordination with State/ UT/ Local & Civil Administrative and Fisheries Authorities.

(h) Integrate with State/ UT/ District/ local Disaster/ Emergency response authorities and centres for rescue and relief contingencies.

(j) In case of launch of a large scale and extended Maritime Search and Rescue efforts, the Operation to be code-named, in consultation with CGHQ.

(k) Units at sea to forward photographs and video of the operations undertaken by the fastest means. Real time information is considered critical.

(l) Coordinate with Fisheries and Port authorities of cyclone affected and adjoining States for accounting of fishing boats operating at sea and returning harbour for shelter/ safety. Real time information from Fisheries authorities on disposition of fishing boats (in harbour or at sea) is essential for accounting and research.

(m) Assist Civil Authorities in rescue and relief efforts in the aftermath of cyclonic disasters along with other Military, Para-military and Civil organisations iaw guidelines laid down in CGBR 842.

(n) Maintain seamless communication with all the participating and resource agencies and at all level.

(p) In case of Cyclone affecting the Islands Territories, deploying ICG Units for transportation of essential commodities, food, medical and relief items may be appreciated depending on requirements and factored in the Operational Planning.

(q) Shore based medical assistance may be undertaken in coordination with State and local medical authorities.

(r) MRCC to consider liaisioning with MRCCs of neighbouring countries for Search and Rescue assistance to stranded fishermen and relaying alert messages in their AOR, if required.

(s) Search, rescue and relief operations by ICG units may be scaled down/ terminated in consultation.

25.6.3 **Documentation**

(a) Regular SITREPs are to be forwarded by ICG units, participating in search, rescue and relief operations to Operational Commander(s), who inturn to forward consolidated report to CGCs and CGHQ.

(b) Diary of events to be maintained at all level.

(c) Accounting of number of assets deployed including ship days and flying time including collated details of fishing boats (separately for rescued and assistance provided, if feasible).

(d) Detailed report along with photographs, lessons learnt and recommendations, if any, be forwarded to CGHQ on completion of operation.

25.6.4 **Miscellaneous**

(a) Maintain/ manage efficient Media Management and regular Press release/ update for ICG efforts.

(b) Identify potential modes of media inputs and may also maintain linkages with fisheries association heads and leaders.

25.7 Stranded/ Aground Vessel

25.7.1 Inform MRSC/ NMSARCA.

25.7.2 Plot position with time of grounding. Find out the following details:-

(a) Date and time of grounding.

(b) Position of grounding (Latitude and Longitude, range and bearing from the conspicuous landmark).

(c) Phase of moon.

(d) Height of tide at the time of grounding.

(e) Tidal stream and Current.

(f) Sea state, Swell, Wind and Atmospheric pressure.

(g) Next highest high water with date and time.

25.7.3 Details of incident leading to the grounding.

25.7.4 Find out the following details of vessel:-

(a) Name, Call Sign, IMO number and MMSI number.

(b) Telex/ Fax/ Telephone number of vessel.

(c) Flag state.

(d) LPC and NPC with date.

(e) Name, contact number (phone, fax, telex number) and address of company/ owner.

(f) Name, contact number (phone, fax, telex number) and address of agent at LPC and NPC.

(g) Length, breadth, draught and height.

(h) Gross Registered Tonnage.

(j) Type and quantity of cargo.

(k) Number of holds.

(l) Number of fuel, Lub oil, water and ballast tanks.

(m) Quantity of fuel, Lub oil, chemicals and other pollutants/ hazardous material onboard.

(n) Availability of electricity onboard.

(p) Number of submersible pumps onboard with capacity of discharge per hour.

(q) Number of lifeboats available.

(r) Availability of accommodation ladder, fenders and towing ropes onboard.

(s) State of anchors and cable.

(t) Number and state of cranes with capacity.

(u) Communication equipment with frequencies.

(v) State of propulsion.

(w) Space for helicopter landing/ winching operations.

25.7.5 Name of Master, number of crew and nationality.

25.7.6 Examine probability of refloating the vessel with time and date.

25.7.7 Assess threat of oil pollution in the area.

25.7.8 Deploy ship/launch helicopter to rescue crew if required.

25.7.9 Activate ISN requesting vessels nearby to render assistance and rescue if required. Also, vessels to remain clear of grounded vessel.

25.7.10 Promulgate message through NAVAREA.

25.7.11 Divert CG ships at sea for assistance for rescue of crew.

25.7.12 Plan Dornier sortie for assessment of situation and oil spillage.

25.7.13 Check aspect/list/trim of vessel and signs of oil spillage.

25.7.14 Inform Immigration and Police authorities if crew are foreigners.

25.7.15 Initiate NOS-DCP procedure if oil pollution is confirmed.

25.7.16 Obtain signature of master/ owner in Lloyds form if salvage assistance for claiming capitation charges.

25.7.17 Inform MRCC/ MRSC/ NMSARCA on the following:-

(a) Brief on incident.

(b) Brief on vessel and crew.

(c) Threat of oil pollution and details of pollutants onboard.

(d) Rescue of crew.

(e) Details of refloating.

(f) Plan of action.

25.7.18 Issue press brief.

25.7.19 Inform the following for future assistance if required.

(a) Indian Navy.

(b) Owner.

(c) Agents.

(d) Port control authorities.

(e) District Collector.

(f) Ministry of Surface Transport.

(g) Director General (Shipping).

(h) State/ Central Pollution Control Board.

(j) Chief Secretary of State Government.

(k) Ministry of Environment (State/ Central).

(l) Mercantile Marine Department.

(m) National Institute of Oceanography.

25.8 Hijacked Vessel

25.8.1 Inform MRCC/ MRSC/ NMSARCA.

25.8.2 Plot position with time, indicate course and speed and establish DR.

(a) Find out if vessel is in Indian SRR.

(i) If yes, how far inside the Indian SRR.

(ii) If not, how far from limit of Indian SRR.

(b) Find out time at which the vessel will enter Indian SRR or find out time at which the vessel will be out of Indian SRR if moving away.

25.8.3 Find out details of CG ship (Naval ship if available) at sea. Find out bearing and range of the hijacked vessel from last reported position of ships.

25.8.4 Find out details of CG aircraft (Naval aircraft if available) operating in area. Find out bearing and range of hijacked vessel tram area of operation.

25.8.5 Find out details of ready duty ships at all ports, status and flying programme of aircraft.

25.8.6 Make signal to all ships at sea to indicate present position, course and speed.

25.8.7 Find out bearing and range of hijacked vessel from present position of ships.

25.8.8 If vessel is to be recovered and escorted obtain following:-

(a) Owner to appoint P&I Club member and agent/ salver.

(b) Request letter from owner to recover vessel and escort to preferably Mumbai/ Chennai/ Kochi and payment of operational charges through P and I club.

(c) Request letter from P and I Club to recover and escort the vessel stating payment of operational charges.

25.8.9 Find out following details of the ship from Internet/owner/agent at LPC/ NPC and MRCC of country to which vessel belongs/ MMD in case of Indian vessel.

(a) Name of ship.

(b) IMO number.

(c) MMSI number.

(d) Call sign.

(e) Type of vessel.

(f) Flag.

(g) LPC with date.

(h) NPC with date.

(j) Cargo.

(k) Quantity and type of fuel, lub oil, chemicals, other pollutants and explosive/ hazardous material.

(l) Fax and Telephone number of vessel.

(m) Name of master and nationality.

(n) Number of crew and nationality.

(p) Name and contact number of agent at LPC/ NPC and in India.

(q) Name and contact number of company/owner/ manager.

25.8.10 Send fax/ e-mail to agent/ owner for details of the vessel indicating layout (compartment wise drawing sketch).

25.8.11 Find out the following details of stowaways/ hijackers:-

(a) Place of boarding with country.

(b) Date and time of boarding.

(c) Nationality.

(d) Time spent in country of boarding.

(e) Intended port of destination.

(f) Intended final destination (if different).

(g) Date and time found onboard.

(h) Compartment/position in which stowaways/ hijackers are present.

(j) Intention for boarding the ship.

(k) Weapons/explosives in possession of stowaways/ hijackers.

25.8.12 Assess probable threat of pollution from vessel.

25.8.13 Make signal to MRCC/ MRSC/ NMSARCA stating the following and after every development by a daily SITREP at the end of the day:-

(a) Brief of incident.

(b) Brief on vessel.

(c) Brief on stowaways/ hijackers.

(d) Threat of pollution if any.

(e) Intended plan of action.

25.8.14 Give code name to the operation and promulgate detailed operation orders.

25.8.15 Deploy ships (with helicopter embarked if possible) to intercept with specific instruction (in order to materialise plan of action) with the following instructions:-

(a) Aim of mission.

(b) Communication.

(c) Use of force.

(d) Shadowing.

(e) Photographs.

(f) Safe distance.

(g) Plan Dornier sortie, if required.

25.8.16 The ship deployed for the operation should have the following:-

(a) Diving team with diving sets and compressor.

(b) Maximum number of submersible pumps and diesel driven pumps.

(c) Fire fighting appliances (portable and fixed). Also carry adequate number of hose, nozzles, CABA sets etc.

(d) Trained Damage Control party and sufficient number of Damage Control items including DC torch, ELSA sets, leak stopping devices etc.

(e) Towing gears.

(f) Pollution control team with PR equipment, if required.

25.8.17 Send a message to Piracy Reporting Centre.

25.8.18 Promulgate the incident through International Safety Net and NAVAREA if situation demands. Request merchant traffic transiting through area to remain clear of vessel.

25.8.19 Persuade hijackers to cooperate and allow master to steer vessel towards port.

25.8.20 If hijackers do not cooperate, plan operation to isolate hijackers. If required take help of Naval/ Army commandos.

25.8.21 Inform ministry of defence, ministry of home, ministry of external affairs and consulates of countries to which vessel/hijackers belong.

25.8.22 After apprehension inform following and also inform them on every development.

(a) IMO and Piracy Reporting Centre.

(b) Indian Navy.

(c) Police authorities.

(d) Central Bureau of Investigation.

(e) Intelligence Bureau.

(f) Customs authorities.

(g) Directorate of Revenue Intelligence.

(h) Mercantile Marine Department.

(j) Director General Shipping.

(k) Ministry of Surface Transport.

(l) Port Trust.

(m) Owner.

(n) Agent.

(p) Immigration authorities.

(q) P&I club.

25.8.23 Escort vessel to an Indian port (preferably Mumbai/ Chennai/ Kochi).

25.8.24 Prepare press brief. Issue guidelines to PRO so as to get maximum publicity. Collect newspaper cuttings.

25.8.25 Inform port control regarding arrival details to arrange suitable berth/ anchorage (preferably anchorage) and another nearby anchorage for escorting ship.

25.8.26 Nominate CG boarding party to board the vessel on arrival. Boarding party to be guided by CGBR 691. Status regarding issue of arms and ammunitions and photograph. Issue detailed orders.

25.8.27 No person is to be permitted to embark/disembark without prior approval of RHQ. All apprehended crew are to be kept in isolation and no interviews permitted.

25.8.28 On arrival, arrange for the security of vessel till handed over to police/ owner and also ensure the following.

(a) Keep one ship at anchorage near the vessel.

(b) Continuous patrol by IB/ ICs.

(c) Keep armed personnel on board the patrol vessels.

(d) Request police authorities to provide police team onboard.

25.8.29 Lodge FIR in designated police station along with following details.

(a) List of charts, items compartment wise, costly items, navigation publications, navigational and communication equipment and ship's documents.

(b) Particulars of ship.

(c) List of items confiscated.

(d) Statement of detainees and master (typed and manuscript).

(e) Boarding clearance certificate by master of apprehended vessel.

(f) Passport of detainees and crew.

(g) Details of Oil/ fuel/ provisions/ fresh water.

(h) Certificate of transfer of physical custody of detainees/ crew.

25.8.30 Raise a signal to Naval Headquarters keeping informed NAI, NAD, to depute suitable team to study damages caused by firing or caused by stowaways/ hijackers if any.

25.8.31 Boarding party is to board the vessel only if situation permits Specific tasks, if any are to be mentioned.

25.8.32 Write a letter to immigration authorities for issue of temporary visa at airport, if anybody from abroad is to come to India to deal with the case.

25.8.33 Write a letter to Police Commissioner to provide bomb disposal squad if required.

25.8.34 Write a letter to Navy, Police, CBI, IB, customs and DRI for joint interrogation of hijackers. Project requirement of interpreter, if required.

25.8.35 Nominate CG joint interrogation team and designate coordinator.

25.8.36 Arrange embarkation of joint interrogation team by IB/ any other boat.

25.8.37 Inform MRCC/ MRSC/ NMSARCA, IB, CBI, DRI, Customs, Navy, MOST, DG Shipping, Port trust, agent and owner the result of boarding party, bomb disposal squad and joint interrogation team.

25.8.38 Plan repatriation of hijackers or handing over to police and obtain certificate of transfer of physical custody. Involve immigration authorities. .

25.8.39 Write letter to P and I vessel to owner/ agent P and I club and owner for payment of operational charges and hand over I club after getting operational charges/ securities for payment.

25.8.40 Prepare detailed report and inform the following:-

(a) MRCC/ MRSC/ NMSARCA

(b) Piracy Reporting Centre

(c) IMO

25.9 Vessel in Distress

25.9.1 Plot the position and find out the SRR in which the position of distress lies.

25.9.2 Inform MRSC/ MRCC/ NMSARCA. (If Position is in Indian SRR).

25.9.3 Find out the following details of vessel/ company/ owner from the sources as discussed in vessel identification system.

(a) Name, Call sign, MMSI number and IMO number.

(b) Position, course and speed.

(c) Port of registration.

(d) Nature of distress and assistance required.

(e) Name of Captain and nationality.

(f) Number of crew and nationality.

(g) Life saving appliances onboard. (Number of life boats and life rafts).

(h) Facility for helicopter landing and winch operations.

(j) Length, breadth and draught of the ship.

(k) Contact details (telephone/ fax numbers) of the vessel.

(l) Contact details (telephone/ fax numbers) of company/ owner and agent in India.

(m) Quantity and type of fuel, Lub oil cargo, chemicals, explosive and hazardous materials onboard.

(n) Brief on incident leading to distress.

25.9.4 Find out bearing and range of CG ships/ Naval ships (if available) at sea from position of distress.

25.9.5 Find out bearing and range of CG Dornier/ Naval Dornier (if available) operating at sea from position of distress.

25.9.6 Divert ships at sea/ Dornier in area for investigation and rendering assistance.

25.9.7 Promulgate HF R/T primary and alternate frequency to be manned by ships.

25.9.8 Activate International Safety Net (ISN) broadcast requesting merchant ships in area to proceed for assistance.

25.9.9 Deploy CG ship/ Dornier for search operation. if required.

25.9.10 Examine requirement of rescue of crew by CG/ *IN* helicopter, including *IN* Sea King/ Kamov.

25.9.11 Inform NAVAREA VIII coordinator for NAVAREA promulgation.

25.9.12 Inform MOST, MMD and DG shipping regarding the distress and also subsequent developments.

25.9.13 Access threat of pollution.

25.9.14 Coordinate rescue operation by Coast Guard, Naval and Merchant ships.

25.9.15 Issue press release. (If Position is not in Indian SRR)

25.9.16 Find out contact details of MRCC responsible for coordinating SAR in SRR in which position of distress lies.

25.9.17 Relay distress to MRCC with copy to vessel in distress/ company/ owner for coordinating SAR operation. MRCC to assume responsibility and acknowledge receipt of distress relay. The distress relay to contain available details of vessel.

25.10 Aircraft in Distress

25.10.1 Plot position of the aircraft in distress and find out in which FIR/SRR the position of distress lies. Notify appropriate ATS/ FIC authorities, if message received from other sources.

25.10.2 Inform MRCC/ MRSC/ NMSARCA as applicable. (If Position is within Indian SRR)

25.10.3 Find out following details of aircraft/ company/owner/operator from the FIC/ ATS authorities.

(a) Type of aircraft, Call sign.

(b) Number of persons onboard.

(c) Nature of distress and assistance required.

(d) Confirm state of crew/ passengers if possible.

(e) Details of life saving appliances onboard, including number of life rafts.

(f) Endurance remaining onboard.

(g) Confirm the intentions whether carrying precautionary force landing or ditching.

(h) Request ATS authority to impose radio silence on the frequency in use and advise all the aircraft to monitor the distress frequency.

(j) Request ATS authorities to make arrangement at the nearest airfield for landing or emergency landing of the aircraft.

(k) Request ATS authorities to direct the nearby traffic to fly over the distressed aircraft and obtain first hand information and about condition of Survivors.

25.10.4 Find out bearing and range of CG ships/ Naval ships (if available) at sea from the position of distress.

25.10.5 Find out bearing and range of CG Dornier/ Naval aircraft (if available) operating at sea from the position of distress.

25.10.6 Divert ships at sea/ Dornier in area for investigation and rendering assistance if possible.

25.10.7 Promulgate HF R/T primary and alternate frequency to be manned by ships.

25.10.8 Activate International Safety Net (ISN) broadcast requesting merchant ships in area to proceed for assistance.

25.10.9 Deploy CG ship/ Dornier for rescue operation.

25.10.10 Examine requirement of rescue of crew by CG/ *IN* helicopter including *IN* Sea King/ Kamov.

25.10.11 Inform NMSARCA, AAI, MMD and DG shipping regarding the distress situation and also subsequent developments.

25.10.12 Coordinate rescue operation by Coast Guard, Naval and merchant ships.

25.10.13 Issue press release. (If Position is not in Indian SRR)

25.10.14 Find out contact details of MRCC responsible for coordinating SAR in SRR in which position of distress.

25.10.15 Relay distress to MRCC/ FIC/ ATS for coordinating SAR operation. Maintain SAR coordination until the concerned MRCC acknowledge receipt of distress

relay and assumes responsibility. The distress relay to contain available details of vessel. (In case of False/ Inadvertent Distress Activation)

25.10.16 Ascertain reasons of activation.

25.10.17 Obtain information from the concerned ATS/ FIC authorities regarding the safety of the aircraft.

25.10.18 Request ATS/ FIC authorities to take appropriate action against the aircraft for inadvertent activation.

25.11 SAR for Fishing Boat

25.11.1 Plot the last known position of fishing boat or establish area of operation. Obtain details of the missing vessel from REAL Craft database.

25.11.2 Find out bearing and range from nearest harbour and Coast Guard ships operating at sea.

25.11.3 Find out the following details from source reporting incident/other agencies.

(a) Name, registration number, Port of registration, length, height, colour of the boat (both cabin and hull).

(b) Number of crew onboard.

(c) Last known position/area of operation.

(d) Nature of distress and assistance required.

(e) Estimated time of departure and planned ETA at the harbour.

(f) Name and contact details of owner.

(g) Contact details of fishing association of the area and fisheries authorities.

(h) A telephone/mobile number for round the clock exchange of information.

(j) Contact details of nearby fishing harbour and association to check arrival of the boat at that harbour.

(k) Food, water and fuel available on board.

(l) Communication/ life saving equipment onboard and frequency manned.

25.11.4 Request fishing community to deploy local fishing boats for first aid response activities and report result to MRCC/ MRSC.

25.11.5 If the probability of drifting of boat to mid sea is high, promulgate the incident through ISN broadcast. Request vessels operating/passing through area to maintain lookout.

25.11.6 Alert Coast Guard ships for deployment.

25.11.7 If search by local fishing boats fails, establish search area and deploy Dornier in SAR configuration.

25.11.8 If required, direct Dornier to drop food and water packets.

25.11.9 On locating the boat, sail/ divert Coast Guard units for assistance. Indian Naval Ships operating nearby may be diverted, if possible.

25.11.10 If required promulgate message through ISN broadcast requesting ships nearby to render assistance.

25.11.11 Inform NAVAREA VIII Coordinator for NAVAREA promulgation.

25.11.12 Examine probability of drifting of boat to adjacent SRR. If so, notify the incident to the appropriate MRCC.

25.12 Life-Saving and Rescue equipment to be carried by SRU

25.12.1 Vessel en route to assist a distressed craft should have the following equipment ready for use if possible:-

(a) Life-saving and rescue equipment.

(i) Specialized recovery equipment.

(ii) Lifeboat.

(iii) Inflatable liferaft.

(iv) Lifejackets.

(v) Survival suits.

(vi) Lifebuoys.

(vii) Breeches buoys.

(viii) Portable VHF radios for communication with the ship and boats deployed.

(ix) Line-throwing apparatus.

(x) Buoyant lifelines.

(xi) Hauling lines.

(xii) Non-sparking boat hooks or grappling hooks.

(xiii) Hatchets.

(xiv) Rescue baskets.

(xv) Stretchers.

(xvi) Pilot ladders.

(xvii) Scrambling nets.

(xviii) Copies of the International Code of Signals.

(xix) Radio equipment operating on MF/ HF and/or VHF/ UHF and capable of communicating with the RCC and rescue facilities, and with a facility for direction finding (DF).

(xx) Supplies and survival equipment, as required.

(xxi) Fire-fighting equipment.

(xxii) Portable ejector pumps.

(xxiii) Binoculars.

(xxiv) Cameras.

(xxv) Bailers and oars.

(b) Signaling equipment.

(i) Signaling lamps.

(ii) Searchlights.

(iii) Torches.

(iv) Flare pistol with colour-coded signal flares.

(v) Buoyant VHF/ UHF marker beacons.

(vi) Floating lights.

(vii) Smoke generators.

(viii) Flame and smoke floats.

(ix) Dye markers.

(x) Loud hailers.

(c) Preparations for medical assistance.

(i) Stretchers.

(ii) Blankets.

(iii) Medical supplies and medicines.

(iv) Clothing.

(v) Food.

(vi) Shelter.

(d) Miscellaneous equipment.

(i) A crane or other lifting equipment on either side of the ship, fitted with a recovery device.

(ii) Line running from bow to stern at the water's edge on both sides for boats and craft to secure alongside.

(iii) On the lowest weather deck, pilot ladders and manropes to assist survivors boarding the vessel.

(iv) Vessel's lifeboats ready for use as a boarding station.

(v) Line-throwing apparatus ready for making connection with either ship in distress or survival craft.

(vi) Floodlights set in appropriate locations, if recovery at night.

APPENDICES

Appendix A
(Refers to Para 1.3.1 & 2.9.1)

NATIONAL MARITIME SEARCH AND RESCUE PLAN 2013

Policy

1. It is the policy of the signatory agencies to provide a national plan for coordinating Maritime Search and Rescue (M-SAR) services to meet the national needs as well as regional and international commitments. Guidance for implementing this plan is amplified in the National Maritime Search and Rescue (SAR) Manual, IMO International Aeronautical and Maritime Search and Rescue (IAMSAR) manual and other relevant directives of the agencies to this plan.

Purpose

2. This plan construes by inter-agency agreement, the effective use of all available resources and facilities to assist persons and property in potential or actual distress at sea within the Indian Search and Rescue Region (ISRR) regardless of the nationality or circumstances in which that person is found.

Terms and Definitions

3. Following are the terms and definitions based on International Maritime Organization usage for M-SAR:-

   (a) **SAR Coordinator.** A person or agency with overall responsibility for establishing and providing SAR services within the SRR and ensuring that planning for those services is properly coordinated for which India is obliged under Maritime SAR Convention 1979.

   (b) **Search and Rescue Region (SRR).** An area of defined dimensions recognized by International Maritime Organisation (IMO) and International Civil Aviation Organisation (ICAO) or other cognizant international body and associated with a Rescue Co-ordination Centre, within which SAR services are provided.

   (c) **Search and Rescue Sub-region (SRS)**. A specified area within a SRR associated with a rescue sub-centre.

   (d) **SAR Services.** The performance of distress monitoring, communication, coordination and SAR functions, including provision of medical advice, initial medical assistance or medical evacuation, through the use of public and private

resources including co-operating aircraft, vessels and other craft and installations.

(e) **Maritime Rescue Co-ordination Centre (MRCC)**. A unit responsible for promoting efficient organisation of SAR services at sea and coordinating the conduct of maritime - SAR operations within a SRR.

(f) **Maritime Rescue Sub-Centre (MRSC)**. A unit subordinate to a MRCC established to complement the latter according to particular provisions of the responsible authorities.

(g) **Search and Rescue Unit (SRU)**. A unit composed of trained personnel and provided with equipment suitable for the expeditious conduct of search and rescue operations.

(h) **On-scene Co-ordinator (OSC)**. A person designated to co-ordinate SAR operations within a specified area.

(j) **SAR Mission Co-ordinator (SMC)**. An official temporarily assigned to co-ordinate response to an actual or apparent distress situation.

(k) **Search and Rescue Point of Contact (SPOC)**. Rescue Co-ordination Centres and other established and recognized national points of contact which can accept responsibility to receive COSPAS-SARSAT alert data to enable the rescue of persons in distress.

(l) **Mission Control Centre (MCC)**. Part of the COSPAS-SARSAT System that accepts alert messages from the local user terminal(s) and other mission control centres to distribute to the appropriate Rescue Co-ordination Centres or other search and rescue points of contact.

(m) **Search and Rescue Data Provider (SDP)**. A source for a Rescue Co-ordination Centre to contact for obtaining data to support search and rescue operations, including emergency information from communications equipment registration databases, ship reporting systems and environmental data systems (e.g. weather or sea current).

Objectives

4. Having known the obligations under several international conventions, Government directives, agreements and instruments to render assistance to persons in distress at sea and to the establishment of effective SAR services, the participating agencies to this plan recognise the need for co-operation and co-ordination of activities

regarding safety on and over the sea and desire to:-

(a) Provide a national plan for co-ordinating SAR services, effective use of all available resources, mutual assistance and efforts to improve such co-operation and services for greater protection of life and property with economy of effort.

(b) Support in implementing the provisions of International Maritime SAR Convention 1979 of IMO and other conventions to which India is a party.

Scope

5. This plan is solely intended to provide internal guidance to all signatory agencies. No provisions of this plan or any supporting plan are to be construed in any way to contravene responsibilities and authorities of any participant as defined by statute, executive orders or international agreements or of established responsibilities of other agencies and organisations, which regularly assist persons and property in distress resulting from incidents. The participating members by signing this National Maritime SAR Plan, are obliged to fully extend all possible support and co-operation for effective conduct of SAR operations at sea.

Participating Agencies

6. The participating agencies to this plan are:-

(a) **Ministry of Shipping**. Ministry of Shipping carries out broad responsibility w.r.t. Navigation and Port State Control of vessels and transportation safety. The Director General of Shipping, implementing agency for international conventions on maritime matters, shall promulgate all SAR preventive programmes on advise from the National Maritime SAR Board for commercial vessels operating in the Indian waters. They also maintain database of Maritime Mobile Service Identity (MMSI) numbers of all vessels registered with them and extend other assistance regarding LRIT information on data maintained with DG Comm Centre, Mumbai.

(b) **Indian Coast Guard**. Indian Coast Guard has been designated as the national coordinator for the conduct of maritime SAR operations on and over the sea areas of the Indian SRR. Towards this, the Indian Coast Guard develops, establishes, maintains and operates SAR facilities for maritime SAR operations. The operation is coordinated through Maritime Rescue Co-ordination Centres (MRCCs) and Maritime Rescue Sub Centres (MRSCs) located in maritime states of India.

(c) **Indian Navy**. Indian Navy has facilities and resources that are used to support their own operations. These facilities may be used for maritime SAR needs on a 'not-to- interfere' basis with military missions.

(d) **Indian Air Force**. Indian Air Force has SAR facilities for their own operations over land and sea. These facilities may be used for maritime SAR needs on a 'not-to- interfere' basis with military missions.

(e) **Shipping Industry**. Shipping industry operates a fleet of merchant ships for national use and promotes a safe merchant marine, which should assist and support when called upon in maritime SAR operations, in accordance with the national and international conventions and provisions.

(f) **Airports Authority**. Airports Authority of India provides Air Traffic Management services over entire Indian Air Space and adjoining oceanic areas assigned by ICAO, and is also responsible for establishment and provision of search and rescue services in coordination with other agencies.

(g) **Meteorological Department**. Meteorological Department shall support SAR operations through timely input of weather messages, marine environment forecasts and warnings for the coastal and high seas and provide weather information on demand to SAR coordinator and coordinating agency.

(h) **Department of Space (DoS)**. Department of Space (DoS) shall provide satellite "alert" services as per the guidelines of COSPAS-SARSAT, for detection and location of aircraft, ships and individuals in potential distress situation that carry recommended distress beacons. DoS also maintains beacon registration data base of DATs and also maintain emergency contact details as provided by the users and also distributes the same to concerned rescue co-ordination centre for SAR mission planning.

(j) **Chief Hydrographer**. Chief Hydrographer to Govt of India shall assist the maritime SAR agencies by timely promulgation of navigational warnings through NAVAREA and other measures.

(k) **Customs and Excise**. Customs and Excise provide rescue facility assistance, and equipment clearance during SAR operation involving foreign crew/ passengers.

(l) **Major Ports**. Major Ports provide rescue facility assistance to the SAR agencies during SAR operations occurring near ports and offshore areas. The major ports shall also provide berthing, towing, tug assistance to SAR agencies, when requested.

(m) **Department of Telecommunication (DoT)**. Department of Telecommunication (DoT) on advice from the coordinating agency, promulgates rules and regulations for non-government use of wireless and radio facilities for promoting safety of life and property and co-operation in SAR operations by relaying inputs obtained from Coast Radio Stations.

(n) **INCOIS**. The Indian National Centre for Search Information Service under the Ministry of Earth Science shall provide ocean information parameter to MRCC/ MRSC and also maintain special software for establishing search area which would contribute to the effective SAR operation when requested by MRCC/ MRSC and other agencies as required.

(p) **Coastal State Government**. Coastal State Government shall provide assets, emergency medical and other facilities that would contribute to the effective SAR operations when requested by the coordinating agencies.

(q) **Fishing Community**. Fishing Community representing fisher-folk and operating around our coasts shall provide assets to the coordinating agencies, when requested to augment SAR effort.

(r) **Sailing Vessel Operators**. Sailing vessels operating around our coasts for commercial purposes shall provide assistance to the coordinating agencies, when requested to augment SAR effort.

(s) **Director General of Civil Aviation (DGCA)**. Director General of Civil Aviation (DGCA) is to provide an updated list of civil aircraft registered in India, coordinate flexi use of air space by civil and military air traffic and issue air safety notices during a particular SAR operation involving various air units.

(t) **Bureau of Immigration**. Bureau of Immigration to assist SAR agencies by expediting immigration clearance during SAR operation involving foreign crew/ passengers and also provide Regional and Foreign Language Experts whenever requisitioned by SAR agencies.

(u) **Minor Ports**. Minor Ports to provide rescue facility assistance to the SAR agencies during SAR operations occurring near ports and nearby areas. The minor ports shall also provide priority berthing, towing, tug assistance to SAR agencies when requested.

(v) **Private Ports**. Private Ports to provide rescue facility assistance to the SAR agencies during SAR operations occurring near ports and nearby areas. The private ports shall also provide priority berthing, towing, tug assistance to SAR agencies when requisitioned by SAR agencies.

(w) **Oil Exploration Agencies**. Oil Exploration agencies (Government, PSUs and Private) to provide offshore Supply Vessels, Tugs, helicopters, extend helipad of oil platforms/ drill ships, medical facility whenever requisitioned by SAR agencies.

(x) **Airlines**. Airlines (Government, PSUs and Private) are to extend facilities to maritime SAR agencies whenever requisitioned. The airlines to provide passenger list of the aircraft in distress at sea and diversion of other aircraft, if feasible, to locate vessel/ aircraft in distress.

(y) **Marine Police/ Coastal Security Police (CSP)**. Marine Police/ Coastal Security Police (CSP) shall provide boats and other assistance to the coordinating agencies, when requested to augment SAR effort.

Indian Search And Rescue Region (ISRR)

7. SRR is established by a country solely to ensure the primary responsibility for coordinating or providing effective SAR services, communication network and routing of distress alerts to MRCC responsible for that geographic area.

8. India's maritime and aeronautical SRR is harmonised with each other to the extent practicable. The delimitation of SRR is not related to and shall not prejudice the delimitation of any maritime boundary between neighbouring countries.

9. SRR is sub-divided into sub-regions into three SRRs viz. SRR West coordinated by MRCC Mumbai, SRR East coordinated by MRCC Chennai and for Andaman and Nicobar SRR, the coordination is undertaken by MRCC Port Blair.

10. Each SRR is to be associated with a MRCC. For SRR West MRRC Mumbai, SRR East, MRCC Chennai and for SRR (A&N), MRCC (Port Blair) will be responsible for coordinating the conduct of SAR operations within a SRR. The standards and guidance for the MRCCs has been developed by the IMO and can be found in international conventions and IAMSAR manual and also reflected National Maritime SAR manual. They are to be kept in the MRCCs for reference.

Participant Primary Responsibilities

11. The ICG being the National SAR coordinator is responsible for arranging SAR services and establishing the MRCCs within the SRR. The system established should meet International standards and to facilitate integration into the global maritime SAR system support outside Indian Search and Rescue Region.

12. The SAR coordinator may support maritime SAR operations outside the Indian SRR when requested, consistent with the expertise, capabilities and legal authority. This is in keeping with India's concern for safety of life at sea and the humanitarian nature of SAR and the advantages of national and international co-operation.

13. The Maritime Rescue Coordination Centre compatible with their capabilities and expertise will support maritime SAR operations in the neighbouring States territorial and international waters beyond Indian SRR when requested, in accordance with the international laws. In such cases, SAR operations shall, as far as practicable, be coordinated by the MRCC, which may request SRU entry to the designated authority by the State concerned.

14. In carrying out Maritime SAR support functions with other nations, such as training, exercises, and liaison, each Participant will co-ordinate its activities with other resource agencies having maritime SAR expertise with respect to the support concerned.

15. While it is appropriate, that the Participants have the authority to do so, to co-operate and maintain liaison with maritime SAR authorities of other nations, such support should be dealt in co-ordination with the maritime SAR Co-ordinator and neighbouring SAR authorities. Such co-ordination will normally include Indian Coast Guard Headquarters, New Delhi, to ensure consistency with India's obligations under international agreements to which India is a Party, and compliance with the IAMSAR Manual and other relevant international guidance relevant to implementing such agreements.

16. Resource agencies should not accept SAR Coordinator or MRCC role for maritime SAR operations of SRRs for which other nations are responsible. However, the Participants may provide and support maritime SAR operations in such areas when:

    (a) Assistance is requested (normally this should be in accordance with MRCC to MRCC procedures) prescribed in the IAMSAR Manual.

    (b) If Indian citizens are involved or Indian facilities become aware of a distress situation to which no other suitable facilities are responding, or where other available SAR services appear to be inadequate. The MRCCs should make all endeavor to co-ordinate SAR actions taking all necessary steps to bring them to a place of safety.

17. When assisting maritime SAR authorities of other nations, or agencies or organisations support our SAR cases, Participants to this Plan should ensure that:-

(a) Have expertise and appropriate agreement to do so.

(b) Provisions of conventions or agreements to which India is Party are not violated.

(c) Relevant procedures set forth in the IAMSAR manual, National Maritime SAR manual and other relevant directives are known and complied.

(d) Such efforts are carried out in consultation with Participants to this Plan.

(e) Authorities assisted in that country are responsible for the SAR functions.

18. Policies on rendering assistance in neighbouring States' territorial waters must have the objective of balancing concerns for saving lives, for sovereignty, and for national security. Provisions for territorial entry should be addressed in international SAR agreements and care should be taken to ensure that such agreements are compatible with the national policies.

19. Participants to this Plan if addressing maritime SAR-related inquiries or proposals from other nations or organisations outside India, or when hosting or attending international meetings on maritime SAR, care should be taken that interested Indian agencies, organizations, or persons are consulted and involved as appropriate.

Maritime SAR Agreements

20. Bilateral or multilateral SAR agreements with other Participating agencies or organisations, or with authorities of other nations, are of practical value to improve or simplify maritime SAR operations, and beneficial for purposes including:-

(a) Helping to fulfill national or international obligations and needs.

(b) Enabling more effective use of all available national resources.

(c) Integration of Indian maritime SAR services with the global SAR system.

(d) Identifying types of co-operative matters and efforts to build commitments that may enhance or support maritime SAR operations, such as access to medical or fuelling facilities; training and exercises; meetings; information exchanges and use of communications capabilities.

21. Negotiation and conclusion of such agreements should consider: -

(a) Which authorities of the governments, agencies, or organizations concerned are the appropriate ones to have a formal agreement with.

(b) Which types of SAR operations (e.g., aeronautical, maritime) or SAR support functions should be included within the scope of the agreement.

(c) Congenial with international and national maritime SAR policies.

(d) Relevant guidance of the IAMSAR manual and National maritime SAR manual.

22. Any such international agreement may not be signed or concluded without prior consultation with the Chairman, National SAR Board/ MoS.

National Search And Rescue Board

23. The National Search and Rescue Board is the principal patron of this Plan. The Board, consistent with applicable laws and executive orders is to:-

(a) Formulate and promulgate National SAR Plan in regular intervals.

(b) Co-ordinate measures to be adopted by Participating agencies and formulate contingency plan.

(c) Review and update matters relating to the Plan affecting more than one Participant, including recommendations for Plan revision or amendment.

(d) Define functions to be performed by participating agencies.

(e) Attending to matters relating to Maritime SAR as per IMO requirements in consultation with Ministry of Shipping.

24. The Board in particular, is intended to accomplish the following:-

(a) Oversee this Plan and develop and maintain National Maritime SAR Manual. The applicability of the rules for SAR for defence forces should be in conformity with the provisions as enshrined in their respective Acts and practice in vogue.

(b) Provide a standing national forum for co-ordination of administrative and operational Maritime SAR matters.

(c) Provide an interface with other national, regional, and international organisations involved with providing or supporting maritime SAR services.

(d) Develop and maintain suitable guidance for implementation of this Plan, such as a National Maritime SAR manual, supplement to the IAMSAR Manual etc.

(e) Promote effective use of all available national resources for support of M-SAR.

(f) Promote close co-operation and co-ordination with Armed Forces and other SAR communities for provision of effective maritime SAR services.

(g) Improve co-operation among Maritime and Aeronautical SAR communities for the provision of effective Maritime SAR services.

(h) Determine other ways to enhance the overall effectiveness and efficiency of M-SAR services, and to standardize procedures, equipment, and personnel training where practicable.

Maritime SAR Services

25. This Plan covers maritime SAR operations such as:-

(a) Provision of initial assistance at or near the scene of a distress situation. (e.g., initial medical assistance or advice, medical evacuations, provision of needed food or clothing to survivors etc).

(b) Delivery of survivors to place of safety or where follow up assistance can be provided.

(c) Saving of property when it can be done in conjunction with saving lives.

26. Maritime SAR does not include operations such as:-

(a) Air ambulance services, which did not result from a distress situation or a medical emergency at sea.

(b) Military operations, such as combat SAR or other types of recovery by military operations to remove military or civilian personnel.

(c) Salvage operations.

(d) Overall response to natural or man-made disasters or terrorist incidents.

Mutual Assistance

27. The Participants agree to co-operate:-

(a) Support each other by pooling relevant facilities and resources as appropriate for M-SAR operations within the SRR.

(b) Make, and respond to, requests for operational assistance between the designated MRCCs, MRSCs, of the Participants as capabilities permit.

(c) Develop procedures, communications, and databases appropriate for coordination of facilities responding to distress incidents, and for co-ordination between the MRCCs, MRSCs of the Participants.

(d) Follow applicable guidance of the IMO or other relevant international laws regarding M-SAR operational procedures and communications.

Charging for M-SAR Services

28. In accordance with customary international laws, when a nation requests help from another nation to assist a person(s) in danger or distress, if such help is provided, it will be undertaken voluntarily in good faith, and India will neither request nor pay reimbursement of cost for such assistance.

29. Participants agree that maritime SAR services they provide to persons in danger or distress will be without subsequent cost-recovery from the person(s) assisted.

30. Participants are to fund their own activities in relation to this Plan unless otherwise arranged by the Participants in advance, and will not allow a matter of reimbursement of cost among them to delay response to any person in danger or distress.

Principles Accepted by the Participants

General

31. Participants coordinating operations should, consistent with applicable laws and executive orders, organise existing agencies and their facilities through suitable agreements into a basic network to assist military and non-military persons and property in actual or potential danger or distress, and to carry out obligations under customary international laws and instruments to which India is or may become a Party.

32. Participants will seek to keep political, economic, jurisdictional, or other such factors as secondary when dealing with lifesaving matters, i.e., where possible, what is best for lifesaving will govern their decisions.

33. Consistency and harmonisation will be fostered wherever practicable among plans, procedures, equipment, agreements, training, terminology, etc., for the various types of lifesaving and recovery operations, taking into account terms and definitions adopted internationally as much as possible.

34. If a distress situation appears to exist or may exist, rescue or similar recovery efforts will be based on the assumption that a distress situation does actually exist until it is known differently.

35. Assistance will always be provided to persons in distress without regard to their nationality, status, or circumstances.

36. Generally, cost-effective safety, regulatory, or diplomatic measures that tend to minimize the need for M-SAR services will be supported.

37. Recognising the importance of reduced response time to the successful rescue and similar recovery efforts, a continual focus will be maintained on developing and implementing measures to reduce the time required for:-

    (a) Receiving alerts and information associated with distress situations.

    (b) Planning and coordinating operations.

    (c) Facility transits and searches.

    (d) Rescues or recoveries.

    (e) Providing immediate assistance, such as medical assistance, food and clothing to survivors, as appropriate.

Research and Development

38. Research and development efforts for SAR need to be undertaken for improvements in SAR services. The focus of such efforts usually, is to develop Programmes/ Software, procedures or equipment which enables SAR services to be more effective. Finding ways to exploit new and emerging technologies for SAR to make it a common focus for research and development. Participants are encouraged to share their programmes/ software, research material as appropriate to strengthen the SAR efficiency of our nation.

Training, Qualification and Certification

39. Training and experience are crucial for effective SAR response and efficient conduct of any operations. Officer-in-charge, MRCCs and MRCC/ MRSC staffs need specialized training in watch keeping, coordination of available resources, search planning and rescue planning. SAR coordinator has the responsibility to ensure an

effective overall training programme. It will normally be the responsibility of the Officer-in-Charge (Oi/c) of the MRCCs to ensure that personnel manning RCCs/ MRCCs are adequately trained for undertaking SAR Operations. Qualification and certification processes are to be ensured, so that, sufficient experience, maturity and judgments are gained. During a qualification process, the individual must, by demonstration of abilities, show mental and physical competence to perform as part of a team. Officer-in- charge, MRCCs/ MRSCs need to issue a certificate to all personnel prior independent watch keeping in MRCCs/ MRSCs.

40. **Validation of National SAR Plan**

(a) The requirement of a SAR mission is called for without any prior notice or appointment. The agencies likely to be involved in the SAR operations are to be geared up in all respects so as to be ready to render assistance, if required. Also, the procedures involved in undertaking such an operation with various agencies on the scene are to be very well known to the agencies and also to the personnel of every faculty. Therefore, to ensure that everyone is prepared in all respects and work in cohesion, SAR training and exercises involving all the agencies are to be conducted periodically by simulating a SAR scenario. This will enhance the capabilities of the SAR system further and allow every agency to evaluate their capabilities to respond to any actual SAR requirement. The frequency of exercises will be as follows:-

(i)	National Level Exercise involving National and International Participants	-	Biennially
(ii)	Regional Level Exercise	-	Annually

(b) **Inter Agency Liaison**

(i) All personnel involved in the SAR operations should maintain constant liaison with the MRCC and the co-ordinating MRCC should, in turn, maintain constant touch with the military authorities providing SRUs and other SAR agencies involved in the operation to help coordinate the activities, provide briefing and debriefing and keep Search & Rescue Mission Co-ordinator (SMC) informed on the SRU availability. Adequate background information must be provided so as to develop a picture on, what actions might have been taken by the missing craft and provide expertise about the craft to aid in search planning during all joint operations. This will also enable conduct of coordinated studies, review of procedures and equipment and recommendation of better method of

operation. Any development in this regard should be informed to the SMC in an ongoing operation.

(ii) The inter agency liaison will enable review of SAR matters affecting more than one agency, including recommendations of participating agencies for revision and amendment of the plan. This will also encourage all the agencies involved to develop equipment and procedures to enhance the national SAR capability and promote coordinated development of all national SAR resources.

Maritime Search and Rescue (M-SAR)

41. Personnel associated with the SAR activities should be familiar with the International Convention on Maritime Search and Rescue, IAMSAR manual, National maritime SAR manual and other relevant documents and information applicable to M-SAR.

42. SAR principles and procedures of relevant customary international Conventions and IAMSAR Manual will serve as guidelines for co-ordination and conduct of SAR operations especially when dealing with other countries, organisations or jurisdictions. National maritime SAR manual and the SAR plan will be consistent with these international provisions to the extent practicable.

43. Indian Coast Guard will operate and maintain a ship reporting system (INDSAR) exclusively for maritime SAR operations, which is voluntary for ships transiting the Indian SRR. The information collated would enable identification of potential ship in the area to quickly respond to the distress situation. The ships send their data through the INMARSAT on entering SRR and every 24 hours thereafter and prior exiting the SRR. (This system will be used only for SAR with its information being treated as "commercial proprietary" as promised to the ships reporting).

44. Operational responsibilities for maritime SAR will generally be associated with internationally recognised geographic maritime SRR. Indian Coast Guard has been assigned the responsibility for co-ordinating M-SAR operations in Indian SRR with other agencies and organisations providing support as appropriate.

45. Distress situations involving airborne aircraft ditching in sea, will be handled by the maritime SAR authorities (i.e. Coast Guard) in co-ordination with the aeronautical SAR authorities.

46. Agencies responsible for SAR operations under this Plan will:-

(a) Keep information readily available on the status and availability of key SAR facilities or other resources, which may be needed for SAR operations.

(b) Keep each other fully and promptly informed of operations of mutual interest, or which may involve use of facilities of another Participant.

47. SAR Co-ordinator will delegate to their MRCCs the authority to:-

(a) Request assistance via the MRCC/ MRSC of other nations, and to provide all pertinent information on the distress situation and the scope of assistance needed.

(b) Promptly respond to requests for assistance from other MRCC/ MRSC, including those of other nations.

(c) Grant permission for entry into Indian waters for SAR facilities of other nations if need arises.

(d) Make arrangements with customs, immigration, health or other authorities to expedite entry of foreign SAR facilities as appropriate.

48. SAR Co-ordinator will authorise the MRCCs to arrange promptly or in advance for entry of foreign rescue units into India should it ever become necessary. Such arrangements should involve appropriate authorities in India as well as proper authorities of the nation or SAR facility involved with the entry. Such entry may include over flight or landing of SAR aircraft, and similar for surface SAR units as circumstances dictate for fueling, medical, or other appropriate and available operational support, or delivery of survivors. It could also be in response to a request made by the Indian MRCC to the MRCC of another nation for assistance of those facilities.

49. Operations of SAR facilities committed to any SAR mission normally should be coordinated, and directed, by an appropriate MRCC or MRSC consistent with the provisions of this plan.

50. On-scene co-ordination may be delegated to any appropriate unit participating in a particular incident by the SAR mission coordinator of a MRCC.

51. No provision of this Plan or any supporting plan is to be construed as an obstruction to prompt an effective action by any agency or individual to relieve distress whenever and wherever found.

52. SAR Co-ordinator shall arrange for the receipt of distress alerts originating from within SRR for which they are responsible, and ensure that every MRCC and MRSC can communicate with persons in distress, with SAR facilities, and with other MRCCs/ MRSCs.

Armed Forces - Civilian Relationships

53. Arrangements between Armed Forces and civilian agencies should provide for co-operation among themselves, consistent with statutory responsibilities and assigned SAR functions.

54. Co-operative arrangements involving Navy, Air Force and Coast Guard commands should provide for the effective use of their facilities for maritime SAR on a not-to interfere basis with military missions, consistent with statutory responsibilities and assigned agency functions.

55. Participants with operational responsibilities should develop plans and procedures for effective use of all available SAR facilities, and for contingencies to continue maritime SAR operations if military forces are withdrawn because of another emergency or a change in military missions.

56. Navy and Air force responsibilities under this Plan include support of maritime SAR on a not-to-interfere basis with their primary military duties, in accordance with applicable national directives, plans, guidelines, agreements, etc.

57. To optimise delivery of efficient and effective SAR services, and, where practicable and consistent with objectives of this plan, the organisations and persons interested in supporting these services will be given the opportunity to do so, at their own cost in aiding the maritime SAR. Certain State and local Governments, civil and volunteer organisations, and private enterprises have facilities, which contribute to the effectiveness of the over-all SAR network, although they are not participants to this Plan.

58. To help identify, locate and quantify primary SAR facilities, Navy, Air force and Coast Guard commands may designate facilities which meet international standards for equipment and personnel training as SAR units (SRUs). (Such facilities need not be dedicated exclusively to the associated type of operations, and this designation is not intended to preclude use of other resources).

59. Recognising the critical role of communication in receiving information about distress situations and co-coordinating responses, and noting that such responses sometimes involve multiple organisations and jurisdictions, the participants will work aggressively to develop suitable SAR provisions for:-

(a) Interoperability.

(b) Means of sending and receiving alerting.

(c) Means of identification.

(d) Effective provisions for equipment registration and continual access to registration data by SAR authorities.

(e) Rapid, automatic, and direct routing of emergency communications.

(f) High system reliability.

(g) Pre-emptive or priority processing of distress communications.

Assistance During National Disasters

60. National Disaster Management (NDM) Policy 2009 also stipulates general responsibilities for the armed forces during a national disaster. The NMSAR Board forms an important part of the Government's response capacity and the resource agencies are the immediate responders in all serious disaster situations along the coast and at sea. On account of its vast potential to meet any adverse challenge, speed of operational response and the resources and capabilities, the NMSAR Board through its resource agencies in past, has played a major role in emergency support functions including communication, search and rescue operations, health & medical facilities and transportation, especially in the immediate aftermath of a disaster. NMSAR Board will always remain prepared and will coordinate Search and Rescue (SAR) cyclonic passages and flooding operation at sea by the resource agencies during national disasters like Tsunami and provide assistance to neighbouring countries whenever called upon by the Government.

Mass Rescue Operation (MRO)

61. Mass Rescue Operations (MROs) often need to be carried out and coordinated within a broader emergency response context that may involve hazards mitigation, damage control and salvage operations, pollution control, complex traffic management, larger-scale logistics, medical and coroner functions, accident-incident investigation, and intense public and political attention, etc. Efforts must often start immediately at an intense level and be sustainable for days or weeks.

62. SAR Participants and other relevant agencies should co-ordinate MRO plans with respective Stage Governments, resource agencies and relevant companies that operate aircraft and ships designed to carry large number of persons. Such companies should share in preparation to prevent MROs and to help ensure success if they become necessary.

63. Since opportunities to handle actual incidents involving mass rescues are rare and challenging, exercising MRO plans is particularly important.

Suspension or Termination of Operations

64. Maritime SAR operations shall normally continue until all reasonable hope of rescuing survivors or victims has lapsed.

65. The responsible MRCC/MRSC concerned shall decide when to discontinue these operations. If no such centre is involved in coordinating the operations, the OSC may take this decision. If there is no OSC involved, the decision will be made at appropriate level of the chain-of-command of the SAR facility conducting the operations.

66. When a MRCC/MRSC or an appropriate authority considers, on the basis of reliable information that a rescue or recovery operation has been successful, or that the emergency no longer exists, it shall terminate the SAR operations. The authority terminating should inform the authority, facility or service which has been activated or notified.

67. If an operation on scene becomes impracticable and the MRCC/MRSC or an appropriate authority concludes that survivors might still be alive, it may temporarily suspend the on-scene activities pending further developments. They should promptly inform the authority, facility or service which has been activated or notified. Information subsequently received shall be evaluated and operations resumed when justified based on the information.

Entry into Force Amendment or Termination

68. This Plan shall enter into force effective from 05 Apr 2013. The plan may be terminated or superseded by a new plan or by written agreement amongst the participants and approved by SAR Board.

Appendix B
(Refers to Para 2.8.1)

CONTACT DETAILS OF RESOURCE AGENCIES

S.No		Agency	Telephone	Fax
1.		**Indian Coast Guard**		
	(a)	**NMSARCA, CGHQ, New Delhi**	011 23384934 011 23073995	011 23383196
	(b)	**Western Seaboard**		
		MRCC Mumbai	022 24383592 022 24388065	022 24316558
		MRSC Jakhau	02831 286302	02831 286432
		MRSC Mundra	02838 271403	02838 271404
		MRSC Vadinar	02833 256560	02833 256560
		MRSC Okha	02892 262261	02892 263421
		MRSC Porbander	0286 2242451	0286 2210559
		MRSC Veraval	02876 241352	02876 241353
		MRSC Pipavav	02794 221603	02794 221600
		MRSC Dahanu	02528 225050	02528 223030
		MRSC Murud Janjira	02144 274420	02144 274421
		MRSC Ratnagiri	02352 224555	02352 224088
		MRSC Karwar	08382 263100	08382 263100
		MRSC Goa	0832 2521718	0832 2520584
		MRSC New Mangalore	0824 2405278	0824 2405267
		MRSC Kochi	0484 2218969	0484 2217164

S.No	Agency		Telephone	Fax
		MRSC Minicoy	04892 222477	04892 223232
		MRSC Androth	04893 232224	04893 232645
		MRSC Kavaratti	4896 263491	4896 263497
		MRSC Beypore	0495 2417995	0484 2417994
		MRSC Vizhinjam	0471 2481855	0471 2486484
	(c)	**Eastern Seaboard**		
		MRCC Chennai	044 25395018	044 23460405
		MRSC Tuticorin	0461 2352046	0461 2353503
		MRSC Mandapam	04573 241634 04573 242020	04573 241142
		MRSC Puducherry	0413 2257950	0413 2257954
		MRSC Karaikal	04368 226500	04368 224900
		MRSC Krishnapatnam	0861 2377730	0861 2377740
		MRSC Nizampatnam	08648 257357	08648 257457
		MRSC Kakinada	0884 2342175	0884 2342171
		MRSC Visakhapatnam	0891 2547266	0891 2741130
		MRSC Gopalpur	g-pur@indiancoastguard.nic.in	
		MRSC Paradip	06722 223359	06722 220174
		MRSC Haldia	03224 267755	03224 264541
		MRSC Frazerganj	cgs-fzr@indiancoastguard.nic.in	

S.No	Agency		Telephone	Fax
	(d)	**Andaman and Nicobar Region**		
		MRCC Port Blair	03192 245530 03192 246081	03192 242948
		MRSC Diglipur	03192 272332	03192 272345
		MRSC Mayabundar	03192 276449	03192 276449
		MRSC Hutbay	03192 284199	03192 284194
		MRSC Kamorta	03192 263053	03192 263030
		MRSC Campbell Bay	03193 264666	03193 264215
2.	**Indian Navy**			
	(a)	IHQ, MoD(Navy)	011 23010143	011 23793007
	(b)	War Room	011 23011252	011 23011204
	(c)	JOC Mumbai	022 22751022 022 22751026	022 22663583
	(d)	JOC Kochi	0484 2668889	0484 2668889
	(e)	MOC Chennai	044 25317211	044 25394240
	(f)	JOC Visakhapatnam	0891 2703432 0891 2812871	0891 2512161 0891 2812771
	(g)	JOC Port Blair	03192 242833	
3.	**Indian Air Force**			
	(a)	Air Headquarters	011 23063708	011 23016354
	(b)	IAF Mumbai	022 22054401	022 22054403
	(c)	IAF Chennai	044 26841194	044 - 22395553
4.	**DG Shipping**		022 25752040 022 25752045 022 22614646	022 25752035 022 25752039 022 22613636

S.No	Agency	Telephone	Fax
5.	**Chief Hydrographer of India**	0135 2746290 0135 2746295	0135 2748373
6.	**Airport Authority of India**		
	(a) AAI Delhi	011 24610776	011 24657898
	(b) AAI Mumbai	022 26819573	022 26828784
	(c) AAI Chennai	044 22561122	044 22560512
	(d) AAI Kolkata	033 25119223	033 25119223
7.	**Indian Mission Control Center (Bangalore)**	080 28094273	080 28371857
8.	**Department of Telecommunication (DOT)**	011 23036019 011 23372494	011 23372493 011 23739191
9.	**Major Ports**		
	(a) Kandla Port Trust (Deendayal Port Trust)	02836 221347	02836 232040 kpt@kandlaport.com
	(b) Mumbai Port Trust	022 66565036/ 35/48	022 22614325 mumbaivts@mbptmail.com pfso@mbptmail.com dc@mbptmail.com
	(c) Jawaharlal Nehru Port Trust	022 27244170	022 27246178 portcontrol@jnpt.gov.in
	(d) Mormugao Port Trust	0832 2594802 0832 2521150	0832 2521105 dc@mptgoa.gov.in
	(e) New Mangalore Port Trust	0824 2408390	0824 2408390 0824 2408528 dyconservator@nmpt.gov.in nmpttrafficmanager@gmail.com

S.No	Agency		Telephone	Fax
	(f)	Kochi Port Trust	0484 2666417 0484 2582006	0484 2582500 dc@cochinport.gov.in
	(g)	Tuticorin Port Trust	0461 2372999	0461 2372999 dc@vocport.gov.in chairman@vocport.gov.in
	(h)	Chennai Port Trust	044 25366366 044 25388216 044 25312777	044 25393929 044 26384012 tm@chennaiport.gov.in dc@chennaiport.gov.in
	(j)	Ennore Port Limited	044 27950030-39	044 27950002 info@kplmail.in gm-ms@kplmail.in
	(k)	Visakhapatnam Port Trust	0891 2875503	0891 2875502 dc.vpt@gov.in
	(l)	Paradip Port Trust	06722 222256	06722 222256 chmppt@paradipport.gov.in
	(m)	Kolkatta Port Trust	033 22303451 033 22305370	033 22310105 dmd@kolkataporttrust.gov.in chairman@kolkataporttrust.gov.in
10.	**Shipping Corporation of India**		022 22772850 022 22026908	022 22026917 ism.cell@sci.co.in ashwini@sci.co.in
11.	**Coastal States (Chief Secretaries)**			
	(a)	Gujarat	079 23250301 079 23250302	079 23250305 chiefsecretary@gujarat.gov.in
	(b)	Maharashtra	022 22025042	022 22028594 cs@maharashtra.gov.in

S.No	Agency		Telephone	Fax
	(c)	Goa	0832 2419402 0832 2419401	0832 2415201 cs-goa@nic.in
	(d)	Karnataka	080 22252442	080 22258913 cs@karanataka.gov.in
	(e)	Kerala	0471 2333147	0471 2327176 chiefsecy@kerala.gov.in
	(f)	Tamil Nadu	044 25671555	044 25672304 cs@tn.gov.in
	(g)	Puducherry	0413 2335512	0413 2337575 cs.pon@nic.in
	(h)	Andhra Pradesh	0863-2441024	0863-2441029 cs@ap.gov.in
	(j)	Odisha	0674 2534300	0674 2536660 csori@.nic.in
	(k)	West Bengal	033 22145858	033 22144328 cs-westbengal@nic.in
	(l)	Andaman and Nicobar Islands	03192 233110	03192 232656 cs-andaman@nic.in
	(m)	Lakshadweep Islands	04896 262255	04896 262184 lk-admin@nic.in
	(n)	Daman & Diu	0260 2230700	0260 2230775 administrator-dd@gov.in
12.	**National Fish Workers Forum**		02525 224028 02525 224029	02525 224142
13.	**Sailing Vessel Operators**		0288 2557491	0288 2258491

S.No	Agency		Telephone	Fax
14.	**IMD**		011 43824313	011 24623220
	(a)	Regional Met Centre Mumbai	022 22150517 022 22174707	022 22150517
	(b)	Regional Met Centre Chennai	044 28271951	044 28271581
	(c)	Regional Met Centre Pune	020 25535877	020 25535435
	(d)	Regional Met Centre Kolkata	033 24793167	
15.	**MMD**			
	(a)	Mumbai	022 22039881	022 22013307
	(b)	Chennai	044 25251107 044 25251108 044 25255555	044 25232929
	(c)	Kolkata	033 22230236 033 22230238	033 22230853 033 22230229
	(d)	Kochi	0484 2666489 0484 2587000	0484 2667424 0484 2587038
	(e)	Haldia	03224 253986	03224 253986
	(f)	Goa	0832 2520617	0832 2520739
	(g)	Tuticorin	0461 2352872	0461 2352852
	(h)	Paradip	06722 220053	06722 220053
	(j)	Jamnagar	0288 2752873	0288 2753693
	(k)	Visakhapatnam	0891 250148 0891 2525475	0891 2568342
	(l)	Port Blair	03192 232530	03192 234830

S.No	Agency		Telephone	Fax
	(m)	New Mangalore	0824 2400430	0824 2407572
	(n)	Kandla	02836 225373	02836 225272
16.	**Customs**			
	(a)	Commissioner of Customs - Mumbai	022 23482255	022 26828187
	(b)	Commissioner of Customs - Chennai	044 22560012	
	(c)	Commissioner of Customs - Kolkata	033 22436493	033 22435998
17.	**ONGC**			
	(a)	Head Office - Dehradun	01352759561 01352759567 0135 2752161 0135 2752165	
	(b)	Regional Office -Vadodara	02652638864	02652641260
	(c)	Regional Office - Mumbai	02226562000 02226563000	
	(d)	Regional Office - Chennai	04428542500 04428542501	044 28542555 04426520150
	(e)	Regional Office - Kolkata	03322887544 03322887476	03322881936 03322885632
18.	**Pawan Hans**		0120 2476700 0120 2476703 0120 2476756	0120 2476971
19.	**Dredging Corporation of India**		0891 2871230	0891 2565362 0891 2560581
20.	**NIOT**		044 66783399	044 66783395

Appendix C
(Refers to Para 2.8.1)

POINT OF CONTACT OF NATIONAL MARITIME SAR BOARD MEMBERS

Address	Tele/ Fax
The Chairman National Maritime Search and Rescue Board Indian Coast Guard Headquarters National Stadium Complex New Delhi – 110001	Tel : 011- 23384934 23384425 Fax : 011- 23383196 Email : nmsarb@indiancoastguard.nic.in
The Director General Nautical Surveyor-cum-DDG (Tech) The Directorate General of Shipping 9th floor, Beta Building I. Think Techno Campus, Kanjur Marg (East), Mumbai – 400042	Tel : 022-25752040-45 Fax : 022-25752035/39/22613636 Email : dgship-dgs@nic.in
The Principal Director Naval Operations Integrated Headquarters Ministry of Defence (Navy) Room No. 186, South Block, New Delhi – 110001	Tel : 011-23010143 Fax : 011-23793007/23011252 Email : dno-navy@nic.in
The Director Operations (Navigation) Directorate of Ops (T&H) Air Headquarters(VB) Rafi Marg, New Delhi – 110011	Tel : 011-23063708 Fax : 011-23016354 Email : navd@nic.in
The Chief Hydrographer National Hydrographic Office, Post Box No. 75 107- A Raipur Road Dehradun – 248001	Tel : 0135-2746290-95 Ext-117 Fax : 0135-2748373 Email : inho@navy.gov.in msis-inho@navy.gov.in

The Executive Director (ATM) General Manager (AIS & SAR), AAI Headquarters Rajiv Gandhi Bhawan Safdarjung Airport, New Delhi -110 003	Telefax: 011-24631684/24610776 Fax : 011-24657898/24611078 Email : edatm@aai.aero gmsar@aai.aero/gmais@aai.aero <u>Ops Control Room</u> Tele : 011-24610843/848/204 Fax : 011-24693963 Email : opsctrl@aai.aero
The Director (SU-I) Department of Telecommunication Room No. 1106, Sanchar Bhawan, 10 Asoka Road, New Delhi – 110001	Tel : 011-23036019/23372494 Fax : 011-23372493 Email : pawan.gupta.dot@gov.in
The Director (SCNP) ISRO Headquarters (SASAR) Antriksh Bhavan New BEL Road, Bangalore – 560231	Tel : 080-23415301/22172314 Fax : 080-23412141 Email : rayappa@isro.gov.in inmcc@istrac.gov.in inmcc_ops@istrac.gov.in suresh_naik@istrac.gov.in
The Commissioner of Customs (Marine & Preventing wing) Clock Tower Building, 2nd floor, Masjid (E), P&V Docks, Mumbai – 400009	Tel : 022- 22757628/23482255 Fax : 022- 23482424 Email : commrprev-cusmum@nic.in rsr.admn@gmail.com
The Director General of Meteorology Room No. 305, Mausam Bhawan, India Meteorological Department, Lodhi Road, New Delhi – 110003	Tel : 011- 43824334, 43824313 Fax : 011- 24626815, 24623220 Email : dgmmet@gmail.com s.sunitha@imd.gov.in

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The Principal Secretary Commerce & Transport Department Government of Odisha Odisha Secretariat, Bhubaneswar – 751001	Tel : 0674-2536857 Fax : 0674-2536750 Email : ctsec.or@nic.in
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Appendix D
(Refers to Para 2.16.1)

LIST OF IMO DOCUMENTS AND PUBLICATION TO BE HELD BY MRCC/ MRSC

Title	Reference
IMO Publications	
International Convention for the Safety of Life at Sea (SOLAS)	IF-110 A/C/E/F/R/S-2014
SAR Convention (2006 edition)	IB-955 E/S EB-955 A/C/F/R
International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual, Volume l (latest edition)	ll-960 E Kl-960 F/S
International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual, Volume ll (latest edition)	lF-961 E/F/S
International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual, Volume lll (latest edition)	ll-962 E Kl-962 F/S
GMDSS Manual	lG-970 E
GMDSS Operating guidance Card	l-969 E
IMO Standard Marine Communication Phrases (SMCP)	lA-987 E/F/S
International Safety NET Manual (2011 edition) See also MSC.1/Circ. 1364/Rev.1	lB-908 E/F/S
NAVTEX Manual (2012 edition) See also MSC.1/ Circ.1403/Rev.1	lD-951 E/F/S
Joint IMO/IHO/WMO Manual on Maritime Safety Information (MSI Manual)	lB-910 E/F/S
International Code of signals (2005 edition)	lA-994 E/F/S
International Maritime Dangerous goods code (IMDG Code)	lK-200 E/F/S
IMDG Code Supplement	ll-210 E/F/S

Title	Reference
IMO documents:	
Promulgation of Maritime Safety Information (MSI) dated 06/11/91	Res.A.705(17), as amended on 24/06/13 (MSC.1/ Circ.1287.Rev.1)
World-wide Navigational Warning Service dated 06/11/91	Res.A.706(17), as amended on 24/06/13 (MSC.1/ Circ.1288.Rev.1)
Guidelines for the Avoidance of False Distress Alerts dated 23/11/95	Res.A.814(19)
Standards for onboard helicopter facilities	Res.A.855(20) dated 27/11/97
Guidance to Administrations on development of a shore-based SAR telecommunication infrastructure	Res.A.856(20) dated 27/11/97
Establishment, updating and retrieval of the information contained in the registration databases for the global Maritime Distress and Safety System (GMDSS)	Res.A.887(21) dated 25/11/99
Acceptance and implementation of the International Convention on Maritime Search and Rescue, 1979, as amended	Res.A.919(22) dated 29/11/01
Review of safety measures and procedures for the treatment of persons rescued at sea	Res.A.920(22) dated 29/11/01
Guidelines on places of refuge for ships in need of assistance	Res.A.949(23) dated 05/12/03
Maritime Assistance Services (MAS)	Res.A.950(23) dated 05/12/03
Proper use of VHF channels at sea	Res.A.954(23) dated 05/12/03
Guidelines on voyage planning for passengers ships operating in remote areas	Res.A.999(25) dated 29/11/07
Piracy and armed robbery against ships in waters off the coast of Somalia	Res.A.1044(27) dated 30/11/11
IMO/WMO worldwide Met-Ocean Information and warning service Guidance Document	Res.A.1051(27) dated 30/11/11

Title	Reference
Maintenance of a continuous listening watch on VHF channel 16 by SOLAS ships whilst at sea after 01 Feb 99 and installation of VHF DSC facilities on non-SOLAS ships	Res.MSC.131(75) dated 21/05/02
Guidelines on the treatment of persons rescued at sea	Res.MSC.167(78) dated 20/05/04
Rescue at Sea – a guide to principles and practice as applied to refugees and migrants	IMO/ UNHCR/ ICS leaflet
Adoption of amendments to provision of radio services for the Global Maritime Distress and Safety System (GMDSS) – {Resolution A. 801 (19)}	Res.MSC.199(80) dated 16/05/05
Guidelines on Operational Procedures for the promulgation of Maritime Safety Information concerning acts of Piracy and Piracy counter-measure operations	Res.MSC.305(87) dated 17/05/10
Relations between NAVAREA Coordinators and Rescue Coordination Centers	COMSAR/Circ.3 dated 19/04/96
Guidance on data fields for SAR databases	COMSAR/Circ.22 dated 20/06/00
Guidance for Central Alerting Posts (CAPs)	COMSAR/Circ.23 dated 20/06/00
Procedure for responding to DSC distress alerts by ships	COMSAR/Circ.25 dated 15/03/01
Guidance for the voluntary use of the standardized questionnaires and formats for reporting false alerts in collecting data on false alerts	COMSAR/Circ.29 dated 27/05/02
Guidance for Mass Rescue Operations (MROs)	COMSAR/Circ.31 dated 06/02/03
Recommendations on Medium Frequency/ High Frequency (MF/ HF) digital selective calling (DSC) test calls to coast stations	COMSAR/Circ.35 dated 21/05/04
Guidance on minimum communication needs of Maritime Rescue Coordination Centers (MRCCs)	COMSAR/Circ.37 dated 28/02/05

Title	Reference
Analysis of Maritime Safety Information Promulgated via the EGC Safety Net system & recommendations on improving its quality	COMSAR/1/Circ.41 dated 16/10/07
Guidance on distress alerts	COMSAR.1/Circ.45 dated 04/02/09
Distress priority communications for RCC from shore to ship via INMARSAT	COMSAR.1/Circ.50/Rev.3 dated 13/01/12
List of NAVAREA Coordinators	COMSAR.1/Circ.51/Rev.8 dated 06/09/16
List of Land Earth Station (LES) Operation Coordinators in the INMARSAT System	COMSAR.1/Circ.53/Rev.2 dated 22/07/13
Guidance on smart phone and other computer device SAR applications	COMSAR.1/Circ.55 dated 30/11/12
Guidance for the use of radio signals by ships under attack or threat of attack from pirates or armed robbers	MSC/Circ.805 dated 06/06/97
Recommendation on helicopter landing areas on ro-ro passenger ships	MSC/Circ.895 dated 04/02/99
Interim measures for combating unsafe practices associated with the trafficking or transport of migrants by sea	MSC/Circ.896/Rev.2 dated 26/05/16
Medical Assistance at sea	MSC/Circ.960 dated 20/06/00
List of contents of the "Emergency Medical Kit/ Bag" and medical consideration for its use on eo-ro passenger ships not normally carrying a medical doctor	MSC/Circ.1042 dated 28/05/02
Guidance on ships daily reporting of their positions to their companies	MSC/Circ.1043 dated 31/05/02
Measures to enhance maritime security – directives for Maritime Rescue Coordination Centres (MRCCs) on acts of violence against ships	MSC/Circ.1073 dated 10/06/03

Title	Reference
Guidelines to administrations on reporting false alerts	MSC/Circ.1078 dated 06/06/03
Guidelines for preparing plans for cooperation between search and rescue services and passenger ships (in accordance with SOLAS regulation V/7.3)	MSC/Circ.1079 dated 10/07/03
Guidance on responsibility and liability issues related to the use of the emergency medical kit/ bag and evaluation of its use in emergency incidents	MSC/Circ.1105 dated 25/02/04
Identification of passenger ships, other than ro-ro passenger ships, which should benefit from being equipped with the Emergency Medical Kit/ Bag (EMK)	MSC/Circ.1172 dated 23/05/05
Guide to recovery techniques	MSC.1/Circ.1182/Rev.1 dated 21/11/14
Guidelines on the provision of external support as an aid to incident containment for SAR Authorities and other concerned	MSC.1/Circ.1183 dated 31/05/06
Enhanced contingency planning guidance for passenger ships operating in areas remote from SAR facilities	MSC.1/Circ.1184 dated 31/05/06
Guide for cold water survival	MSC.1/Circ.1185/Rev.1 dated 23/05/12
Guidelines on the training of SAR service personnel working in major incidents	MSC.1/Circ.1186 dated 01/06/06
Promoting and verifying continued familiarization of GMDSS operators on board ships	MSC.1/Circ.1208 dated 22/05/06
COSPAS-SARSAT International 406 MHz beacon registration database	MSC.1/Circ.1210/Rev.1 dated 21/11/14
Guidance on exchange of medical information between Tele-Medical Services (TMAS) involved in international SAR operations	MSC.1/Circ.1218 dated 15/12/06
Minimizing delays in search and rescue response to distress alerts	MSC.1/Circ.1248 dated 16/10/07

Note:-

1. List has been kept to a minimum and only covers search and rescue and no other tasks which MRCC/MRSCs are often required to perform. National Authorities responsible for SAR additional documents may be added to this list to improve Centers' documentation.

2. Governments may replace the documents/publications by national equivalents.

Source:- IMO Circular SAR 7/Circ. 13 dated 10 Mar 17.

Appendix E
(Refers to Para 5.16.2)

MESSAGE FORMAT FOR INTERNATIONAL SAFETY NET (ISN) ACTIVATION

1. THE VESSEL _____ CALL SIGN _____

2. MMSI NUMBER _____ FLAG _____

3. SATCOM ID A/B/C TERMINAL NO._____ MANNING FREQUENCY_____

4. POSITION _____N/S_____ E/W_____ COURSE/ SPEED _____ AT _____ HRS (UTC) IS IN DISTRESS _____ (NATURE OF DISTRESS) AND IS IN NEED OF ASSISTANCE.

5. VESSELS IN VICINITY ARE REQUESTED TO CONTACT MRCC/ MRSC _____ ON TELEPHONE _____ FAX _____ INMARSAT 'C' _____ E-MAIL _____ WITH FOLLOWING DETAILS FOR COORDINATION.

(A) NAME , C/S, FLAG AND MMSI NUMBER.

(B) SATCOM ID NUMBER AND COMMUNICATION FREQUENCY.

(C) POSITION, COURSE AND SPEED WITH TIME (UTC).

(D) ETA DISTRESS POSITION.

(E) SAR/ MEDICAL CAPABILITIES AVAILABLE ONBOARD.

(F) ANY OTHER RELEVANT INFORMATION.

REGARDS.

DUTY OFFICER
MRCC/ MRSC

Appendix F
(Refers to Para 5.21.2)

MOBILE TELECOMMUNICATIONS DEVICE LOCATION PROCESS

1. The services available to mobile telecommunications device users utilize terrestrial radio systems which are then linked to large computer servers which, amongst other functions; record: activity; cell site to which a user is connected and general location of the user. This information provides data which is of use to Search and Rescue authorities who may need to identify the location of persons in actual or possible danger, e.g. overdue vessel, aircraft or missing persons on land.

2. Mobile/ Cellular telecommunications devices have also become a popular means of reporting emergencies either at sea or on land, in the coastal environment and/or other remote areas, e.g. swimmers, surfers, overdue hikers, climbers, etc. Leisure boaters, aviators and small fishing craft might report their emergencies by cell/ mobile phone and these devices can often provide an effective signal over considerable areas, depending on the location, height and power of the terrestrial aerial infrastructure.

3. Survivors from distressed vessels or crashed aircraft may be able to use mobile telecommunications devices to call for assistance or their devices may remain switched on and may provide signals that can be detected by the cell/ mobile telecommunications system which may provide current location; or the last activity of a device may provide a clue to calculate a last known position. The development of procedures to exploit location data from these devices to determine survivor location is important for effective SAR response, particularly when other sources of location information are not available or are inconsistent or inaccurate.

4. This annex is focused on search planning techniques for situations where a mobile telecommunications device can only be located using the terrestrial radio signal information obtained from the aerial site the device was or is connected to. Where Global Navigation Satellite Systems (GNSS) information is available on the location of a mobile telecommunications device (i.e. the user has a GNSS enabled device), the SMC may be able to apply normal search planning procedures and techniques to the GNSS position. However, information on the cell-site signal location may also be a useful confirmation of a GNSS position.

5. The processes outlined below are offered as manual search planning processes and do not take into account any computerized search planning computer systems or applications.

6. Mobile telecommunications aerial (cell) sites are commonly fitted with three aerials (covering 360° in azimuth) which provide the mast/cell with three communications "sectors" (each of 120° of arc) on which mobile/cell phone calls and data traffic can be exchanged or mobile/cell phones/devices can be polled. For SAR purposes this usually means that, as a minimum, a mobile/cell device can be located to within a particular aerial site "sector". This is, essentially, a crude direction-finding method but with a large arc of error.

7. MRCCs are recommended to establish what types of systems are in use in their SRRs and ensure that they understand the technical processes and how those systems can be used to provide data of use to SAR response and search planning.

8. For 4G-capable mobile phones or devices within coverage of a 4G network cell/ tower, mobile communications service providers may also be able to provide information on the distance of the phone or device from the cell/ tower. This then provides the ability to plot an arc within a particular aerial site sector.

9. **Mobile telecommunications devices are radio transmitters:** This means that the signals behave in a similar way to VHF radio signals – they tend to work over "line of sight" to and from the aerial/ mast site. The signals can however be distorted, reflected, propagated (by atmospheric conditions or their position in relation to bodies of water) or shielded by buildings, passing traffic or terrain. This creates a particular problem with emergency calls from mobile telecommunications devices in that the communications data might "predict" that a phone is within the coverage of a mobile telecommunications aerial site but, it can also be the case that the phone or device is connected to the aerial from outside the normally predicted coverage.

10. Mobile Communications service providers can provide terrain models of each aerial site and these can show, in more detail, any masking effects based on transmitter height and terrain contours, buildings, etc. between various locations in a cell tower's coverage area. It can be useful to ask providers to assist the RCC/ MRCC in determining the area where the mobile communications device may be located.

Appendix G

(Refers to Para 5.26.4)

SAR COMMUNICATION FREQUENCIES

Sl	Frequency	Description
(a)	2182 kHz	International voice distress, safety and calling.
(b)	3023 kHz	International voice ICW SAR on scene.
(c)	4125 kHz	International voice distress safety, distress and calling back up frequency.
(d)	5680 kHz	International voice ICW SAR on scene.
(e)	121.5 MHz	International voice aeronautical emergency, ELTs and EPIRBs.
(f)	123.1 MHz	International voice SAR on scene.
(g)	156.8 MHz	Channel 16 - VHF FM international voice distress and international voice safety and calling.
(h)	156.3 Mhz	Channel 06 - VHF FM merchant ship and Coast Guard SAR on scene.
(j)	243.0 MHz	Joint/ combined military voice aeronautical emergency and international survival craft and ELTs and EPIRBs.
(k)	282.8 MHz	Joint/ combined on scene and DF.

Appendix H

(Refers to Para 8.3.1)

TEMPLATE FOR A JOINT SEARCH AND RESCUE EXERCISE (SAREX)

GUIDELINES FOR EXERCISE BETWEEN TWO MARITIME STATES

1. Objectives

1.1 State the objectives of the joint SAREX and what the participants want to achieve from it. SAREX can be in different formats; for example, Table Top SAREX which involves, Simulation SAREX Live or Full Scale SAREX and Command Post SAREX. For example:-

1.2 The objectives of the joint SAREX are:

(a) To provide improved search and rescue (SAR) cooperation between..... (participating agencies or State MRCC) and ..... (participating agencies or State MRCC).

(b) To provide continuation training for personnel of SAR organizations from ..... (participating agencies or State MRCC) and ..... (participating agencies or State MRCC).

(c) To test the communication facilities and procedures between .....(participating agencies or State MRCC) and ..... (participating agencies or State MRCC), and

(d) To test and determine the effectiveness of the Search and Rescue Units (SRUs) of ..... (participating agencies).

1.3 Date and Timing of SAREX

1.3.1 State the agreed date and time for the joint SAREX. Have alternate or contingency plans in the event that a full scale SAREX cannot be conducted due to bad weather or any unforeseen circumstances. Pre and post SAREX briefing is also recommended to be conducted for all participants.

For example:

1.3.2 Table Top SAREX or A Full Scale Exercise will be held between ..... (participating agencies or State) and ..... (participating agencies or State)

on .....(day of the week, date/ month/ year) from ..... (time in UTC) to ..... (time in UTC).

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

1.3.4 A Pre-SAREX brief will be held on ..... (day of the week, day/ month/ year) in ..... (location of the pre-SAREX brief) commencing at ..... (time in UTC).

1.3.5 A Post-SAREX de-Brief will be held on ..... (day of the week, day/ month/ year) in ..... (location of the de-brief) commencing at ..... (time in UTC).

1.4 Scenario

1.4.1 Discussion and development of exercise scenario with participating State or States and agencies involved. Scenario created should be as realistic as possible to simulate a real incident. A fictitious flight plan or ship's passage plan can be included to provide additional information pertaining to the distressed aircraft/ ship. Using fictitious names and/ or call signs for the distressed aircraft/ ship and its airline/ operator including fictitious manifest will avoid confusion on, for example, social media. For example:-

1.4.2 At ..... (time in UTC), a .....(type of aircraft/ship), ... (name/callsign of distressed aircraft/ship), departed from ..... (point of departure) to ..... (destination) with ..... (persons on board). At ..... (time in UTC), aircraft/ ship declared "MAYDAY"due to ..... (nature of emergency) at ..... (location in Lat and Long or with reference to aprominent location known to all). .....(further details of the scenario, as required).

1.4.3 Other information, for example Pilot-in-command/ Master's actions, ... equipment carried on board ....., description of aircraft/ ship, etc.

1.5 Participating Organizations

1.5.1 Identify and list all participating agencies. As many responding agencies as possible should be included, both government and private. Air Navigation Service

Provider, Aircraft Investigation Bureau, airlines, shipping companies, harbour authorities, etc. should be involved in a SAREX, as they would be directly involved in any real incident. For example:-

1.5.2 From ..... (State: list participating local agencies, for example, MRCC, Civil Aviation Authority, Air Force, Navy, etc.)

1.6 Deployment of Exercise Search and Rescue Facilities and Callsigns.

1.6.1 State all the SAR facilities that will take part in the SAREX. It is recommended that SRU call signs should be pre-fixed with the word "SAREX" to indicate that it is an exercise aircraft or surface vessel to avoid confusion between a SAREX and a real incident. A call sign assigned to a particular SAR facility should not be changed and should be used throughout the exercise. Each SRU should have a unique call sign. For example:-

Type of SRUs	**Callsign**	**Remarks**
Dornier	SAREX 01	Search Aircraft Medium Range
C130	SAREX 02	Search Aircraft Long Range
Chetak Helicopter	SAREX 03	Search and Rescue Helicopter
.....	SAREX.....	.....
.....	SAREX.....	.....
.....	SAREX.....	.....

1.7 Communications

1.7.1 State the agreed radio frequencies and other communications facilities to be used in the SAREX. List communication arrangements between the MRCCs involved and between the RCCs and the SRUs and other mobile SAR facilities. It is recommended that a communication check (COMMCHECK) be conducted between all parties before the SAREX to ensure serviceability of communication equipment. A standby day may be necessary if the communication check is not satisfactory. For example:-

(a) Between ..... (participating agency or MRCC) and ..... (other agencies or participating MRCC).

1.7.2 A communication test between ..... (participating agency or MRCC) and ..... (the other participating agencies or MRCC) will be conducted prior to the SAREX. The test will be conducted on ..... (day of the week, date/ month/ year) from ..... (time in UTC) to ..... (time in UTC).

1.7.3 In the case of an unsatisfactory communication test, another test will be conducted on ..... from ..... (time in UTC) to ..... (time in UTC).

1.7.4 All messages pertaining to the exercise shall be prefixed and ended with the words "EXERCISE EXERCISE EXERCISE". Exercise participants must not use any internationally recognized Distress or Urgency Procedure words (for example, "MAYDAY", "PAN PAN") on radio or telephone systems. Radio communications procedure words should be replaced as follows. This will help to avoid confusion between a SAREX and an actual SAR incident.

1.8 Search Object

1.8.1 In a Full Scale SAREX, States should consider the deployment of a search object (including a locator beacon) to add realism to the exercise. This will enable participating SRUs to practice visual and/ or electronic search techniques. The search object can be deployed at the proposed distress location at the SAREX start time. Search objects should be clearly marked as being deployed for exercise purposes. For example:-

1.8.2 A ..... (description of the search object) will be provided by ..... (one of the participating agencies) and will be deployed at ..... (time in UTC) on .....(date of the SAREX) at the distress position.

1.9 Alerting and activation

1.9.1 State clearly the alert and activation processes for the SAREX, including which agency will initiate the distress phase and how the other participating agencies will be notified. In a joint SAREX, if the distress location is within the area of responsibility of a particular State, the State concerned should initiate the alerting and activation phase. For example:-

1.9.2 Since the distress location is within the area of responsibility of ..... (State), ... (name) MRCC will notify ..... (participating agencies) to initiate joint SAR operations.

1.10 Search Area

1.10.1 Discuss how to determine the search area and which MRCC will do so. In a joint SAR effort, the MRCCs involved can determine their own search areas and agree an overall area. For example:-

1.10.2 The respective SAR Mission Coordinators (SMCs) will work out a search area upon receipt of the distress location.

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

1.11 Diplomatic Clearance

1.11.1 In a joint SAREX, make necessary arrangements for applying for diplomatic clearance if State assets may be or are required to enter another State's territorial airspace or waters. The application process should be made known to all relevant participating agencies. If there is an agreement in place between participating States, then the agreed procedure should be followed. Provide information regarding the SRUs and particulars of the personnel on board. It is recommended that particulars of the SRUs be provided to the State(s) concerned prior to the SAREX. This will assist in the diplomatic clearance process. For example:-

(a) ..... (State) RCC will send a request to ..... (State) for diplomatic clearance to allow ..... (State's) SRUs to enter ..... (State's) territorial airspace/ waters.

(b) The details of the SRUs concerned shall be provided ..... (days/ weeks) before the exercise. Application for diplomatic clearances should be made through the normal channels in order to accelerate the diplomatic clearance process.

1.12 Search Operations

1.12.1 Ensure the safe conduct of the SAREX, especially as regards the air assets. It is recommended that there should be one coordinating MRCC providing instructions to SRUs prior to entering the search area. It is also recommended that an Aircraft Coordinator be deployed to provide instructions to aircraft during

transit to and from the search area as well as within the search area. Assign one of the SRUs as the On Scene Coordinator, coordinating all the SAR facilities in the search area as well as providing an important communication link with the distressed aircraft/ ship. For example:-

1.12.2 All SRUs shall report to the coordinating MRCC or On Scene Coordinator prior to entering the search area and while conducting SAR operations in the search area to ensure safety and efficiency in the joint SAR effort. All aircraft involved must adhere to ATC instructions.

1.12.3 Non-exercise aircraft/ surface vessels shall keep clear of the search area unless clearance has been obtained for them to transit through.

1.13 Rescue Operations

1.13.1 Discuss how the rescue operation is to be executed. Live rescue operations provide training and testing opportunities. If personnel are deployed at the scene to simulate a rescue operation, it is recommended to have a safety boat in the vicinity to ensure that the operation is closely monitored and all safety procedures are adhered to. Each SRU will report to the coordinating RCC or On Scene Coordinator the number of survivors rescued and the state the survivors are in. This will assist in accounting for all at risk and whether immediate evacuation is required. If possible, recover the search object after the exercise: this will help avoid unnecessary subsequent SAR action. If recovery is not possible, make general broadcasts to warn of the object's location. For example:-

1.13.2 When the search object is sighted, the SRU shall inform the coordinating MRCC. The MRCC will disseminate the information to all other participants.

1.13.3 Recovery of the search object after the exercise will be undertaken by ..... (agency responsible for recovering the search object).

1.13.4 Recovery of the search object after the exercise will be undertaken by ..... (agency responsible for recovering the search object).

1.13.5 If the search object cannot be recovered, urgent safety information broadcast action will be taken by ..... (agency responsible).

1.14 Emergency Landing of participating aircraft

1.14.1 In a joint SAREX, make arrangements for participating aircraft to land in the event of an emergency. For example:-

(a) ..... (State's) aircraft participating in the SAREX will be given permission to land at ..... (name of airport or airfield) if an emergency landing is required.

1.15 Termination or Suspension of SAREX

1.15.1 State how and under what circumstances the SAREX will terminate. Make response arrangements in the event of a real incident occurring during the SAREX. Agree a code word or words which will be understood by all participating agencies and units. Once the code word is broadcast the SAREX will be converted into real SAR operations, at least for the duration of the real emergency. For e.g. the SAREX may be terminated or temporarily suspended when there is an actual emergency.

1.15.2 In the case of a real emergency, the exercise will be converted into a real SAR operation. The code words "NO DUFF NO DUFF" will be broadcast. All participating agencies and units will cease the exercise immediately and await instructions from the coordinating MRCC.

1.15.3 The exercise may be resumed when the real emergency has been resolved, if the participating agencies agree. Resumption of the exercise will be notified to all participants by the coordinating MRCC. Alternatively the real emergency may require the exercise to be terminated.

1.16 SAREX De-brief

1.16.1 Conduct of a SAREX de-brief is important as this is where the evaluation process of the exercise is presented by evaluation experts who observed the exercise, together with observations by people who actually participated in the exercise scenarios. Agree on a date and venue to conduct a SAREX de-brief including all exercise participants. For example:-

1.16.2 SAREX Debrief will be held on ..... (day of the week, date/ month/ year) commencing at ..... (time in UTC).

1.16.3 The venue for the SAREX De-brief will be ..... (name the venue and give its address).

1.17 SAREX Controllers/ Evaluators/ Observers

1.17.1 Name the personnel who will be involved in the SAREX as observers, evaluators and exercise controllers. Evaluators and controllers in particular must have SAR expertise so that they will understand what is to be evaluated and how to control the exercise to maximize its value. For e.g. Personnel involved in the SAREX as exercise controllers, evaluators and observers will be as follows:-

1.18 Invitation to Observers

1.18.1 Agencies or States may consider inviting observers from other agencies or foreign countries or international organizations to attend and observe the SAREX. These personnel can provide valuable feedback for improvement to the system. For example:-

1.18.2 Invitations to observers to observe the SAREX will be provided by ..... (agency providing the invitation). Observers will be positioned at ..... (venue(s) for observation of the SAREX) and will be escorted by officers of ..... (agency or agencies providing escorts).

1.19 News Media Coverage

1.19.1 If there is provision for news media coverage of the SAREX, agree the necessary arrangements (spokespeople, drafting of press releases, etc.). During a SAREX, it is recommended that a joint information centre be set up as this will ease the burden on MRCCs. Updates by MRCCs are provided to one source thus ensuring the provision of timely, clear, accurate and consistent reports to the news media. This will provide a training opportunity in dissemination of information in a real incident. For example:-

1.19.2 Information updates will be provided by the MRCC(s) to a Joint Information Centre for reports/ updates/ press releases to the news media.

1.19.3 If there is a requirement for a joint press release on the SAREX to be issued, ...(agency that will produce the draft) will draft the press release and

forward it to ..... (other participating agencies, as agreed) for concurrence before it is issued.

1.20 SAREX Report

1.20.1 A SAREX report is important as it will serve as a permanent record of the exercise. Each element of the exercise should be recorded and lessons learnt during the exercise captured. For example:-

1.20.2 (Insert Agency or State) will produce the SAREX Report with assistance from ..... (the other participating agencies or State(s)). Photographs will be made available for the SAREX report.

1.20.3 A copy of the report will be sent to each of the following participating agencies, countries and international organizations.

1.21 Venue for the next SAREX

1.21.1 It is good to plan for an annual joint SAREX with relevant agencies and/or neighbouring States. State the date and venue if possible for the next SAREX coordination meeting and the proposed SAREX type and date. For example:-

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

1.21.3 The next SAREX is scheduled to be held on ..... (date/ month/ year). It is proposed that this SAREX will be a ..... (type) exercise.

Appendix J
(Refer to Para 9.17.3)

SITUATION REPORT (SITREP)

1. The SITREPs rendered during the progress of the SAR operations (numbered serially commencing 01) will be prefixed as follows:-

SAR No. / Name / SITREP No. (.)

Example: E 08/012/MV LUCNAM/21. SITREP No.21 on SAR mission No.12 by MRSC Haldia on the eastern seaboard.

Note: The year is not to be mentioned in SITREP.

2. On completion, a SITREP is to be raised with the following text.

SAR No. / Name / SITREP No (.) Case closed.

(a) **Short SITREP.** To pass urgent essential details when requesting assistance, or to provide the earliest notice of causality, the following information should be provided.

TRANSMISSION	(Procedure/ Security Classification)
DTG	(UTC or Local Time Group)
FROM	(Originating MRCC/MRSC)
SAR SITREP NUMBER	(As promulgated vide CGHQ letter OP/0815/Policy date 01 Aug 01)

A	IDENTITY OF CASUALITY	(Name/ Call Sign/ Flag State)
B	POSITION	(Latitude/ Longitude)
C	SITUATION	(Type of message, e.g., Distress/ Urgency/ Date/ Time/ Nature of Distress/ Urgency, e.g. Fire, Collision, MEDICO)
D	NUMBER OF PERSONS	
E	ASSISTANCE REQUIRED	
F	CO-ORDINATING MRCC	

(b) **Normal SITREP.** To pass amplifying or updating information during SAR Operations, the following additional sections should be used as necessary.

G	DESCRIPTION OF CASUALITY	(Physical description, owner/ charter, cargo carried, passage from/ to, life saving equipment carried)
H	WEATHER ON SCENE	(Wind, sea state/ swell, air/ sea temperature, visibility, cloud cover/ceiling, barometric pressure)
J	INITIAL ACTION TAKEN	(By casualty and MRCC/MRSC)
K	SEARCH AREA	(As planned by MRCC/MRSC)
L	CO-ORDINATING INSTRUCTIONS	(OSC designated, units participating communications)
M	FUTURE PLANS	
N	ADDITIONAL INFORMATION	(Include time SAR operation terminated)

Notes:

(1) Each SITREP concerning the same casualty should be numbered sequentially.

(2) If help is required from the addressee, the first SITREP should be issued in short from if remaining information is not readily available.

(3) When time permits, the full form may be used for the first SITREP, or to amplify it.

(4) Further SITREPs should be issued as soon as other relevant information has been obtained already passed should not be repeated.

(5) During the prolonged operations, 'no change' SITREPs, when appropriate, should be issued at intervals of about 3 hours to reassure recipients that nothing has been missed.

(6) When the incident is conducted, a final prescribed SITREP is to be issued as confirmation of conclusion of SAR mission.

Example :

DTG	231000/Apr 20
FROM	MRCC PORT BLAIR
TO	NMSARCA (NATIONAL MARITIME SEARCH AND RESCUE COORDINATING AUTHORITY VIZ CGHQ)

DIG (.) A00 002/MV FRONT LORD/002(.)

(A) MV FRONT LORD/ SINGAPORE/ S6MU

(B) 06 00 N 090 02 E

(C) DISTRESS / EXPLOSION IN ER / CASEVAC

(D) 02

(E) IMMEDIATE CASEVAC

(F) MRCC PORT BLAIR

(G) 02 ENGINEERS BADLY BURNT

(H) SEA 3 SWELL LOW LONG SW VIS MODERATE BMP 1002

(J) BKC SAILED 230300/DO 764 LAUNCHED 0730/ ESTB COMM 0925/SHIP NUC /INJURED STABLE

(K) TARASSA DIVERSION REQUESTED / EXPECTED R/V 232300.

= 231000/Apr 20

Appendix K
(Refer to Para 14.8.1)

TMAS MEDICAL INFORMATION EXCHANGE FORM

PRIVATE MEDICAL INFORMATION OF PATIENT

Nationality :

Spoken Language :

Medical Circumstances

Time of onset of injury/ illness		
Mechanism of injury (if applicable)		
Injuries suspected/ working diagnosis		
Signs and symptoms		
Heart rate		
Blood pressure		
Respiratory rate		
O^2 Saturation		
Conscious level (GCS or AVPU)		
Treatment administered and care gien on board before evacuation		
Patient Height		
Patient Weight		
Is patient obese?		
Are there known additional risks for medical evacuation?		
Is patient able to wear an immersion suit? (for helicopter/rescue boat evacuation)		
Does patient need to be carried and transported on stretcher?		
Is condition contagious?		
Is the patient's mental state alerted? If yes please confirm patient consent for : - Transport in a stretcher - Intravenous cannulation prior to transfer		
Previous Medical History	Ongoing treatments	Care on board before teleconsultation

Diagnosis given:

Identification of the requiring TMAS

Name:

Address:

Tel:

Fax:

e-mail:

Medical Instructions:

Medical Assistance Required

Medical decision:	Medical Evacuation:
Ship diversion to port (Name):	MEDEVAC Time Frame: {Immediate/Daylight Hours within 6,12,24 hours etc. (Delete as required)}
Ambulance:	MEDEVAC method (Delete as required): Boat/ Helicopter: Land on/ Winch by stretcher/ Winch by strop
Medical Team: Doctor/Nurse/ Paramedic (Delete as required)	Additional Information if required:
Additional Information if required:	Quarantine situation:
Air drop of supplies:	

Vessel Details

Ship Name:	Call Sign: IMO Number:
Type of vessel:	Flag:
Location:	Departure DTG:
Ports visited during the last 30 days Destination:	ETA DTG:
Contact:	

Please send back all the available follow-up Information to:-

TMAS Name: Tel:

Address: Fax:

E-mail:

Appendix L
(Refer to Para 14.10.1)

MEDICO OR MEDEVAC CHECKLIST

1. Initial reporting source (parent agency, radio station, name/ call sign if craft, name/ telephone or address if person).
2. Patient name, nationality, age, sex, race.
3. Patient symptoms.
4. Medication given.
5. Standard medicine chest or other medication available.
6. Radio frequencies in use, monitored, or scheduled.
7. Craft description.
8. Vessel's local agent.
9. Craft's last port of call, destination, ETA.
10. Assistance desired, or as recommended by a telemedical assistance service. Note: If required the TMAS – TMAS Medical Information Exchange Form. See Appendix R.
11. Assistance being received.
12. Other pertinent information.

When medical advice by a TMAS or a similar medical consultation service is not available to the RCC SUIC, then the following medical consultation questions may be appropriate for the RCC/ SMC to consider asking a doctor based on the information provided from the vessel:

1. *What is the most likely diagnosis based on the symptoms and signs? .....* The doctor is making a preliminary diagnosis on information which could be incomplete and may be inaccurate. However, this is the best information available and leads to the next questions.
2. *What do they need, taking into account the medical competencies, equipment and medications on board the vessel? .....*

3. *What medical care, intervention or procedure does the patient require to address the medical condition?*.....
This may include a specific doctor's prescription for care on scene and en route to a medical facility.

4. *Where can they get the required medical attention?*.....
Which medical facilities have the required capability to meet the needs of the patient? If the specific or specialized medical requirements, then delivery is to the nearest hospital recommendation must also consider the responding craft (e.g. weather, fuel, endurance/ range, etc.)

5. *How soon do they need treatment?* .....
There may be a need for an immediate launch of a helicopter or vessel; or, a need to ad to divert towards a port with the appropriate medical facilities; or, maybe the MEDEVAC should wait for better weather, daylight hours, etc.

Based on the replies to the questions above, the doctor could then make one of three recommendations to the RCC/SMC:

1. MEDEVAC recommended:

   (a) with medical personnel/paramedics, as appropriate, or

   (b) medical personnel/paramedics delivered to vessel (patient evacuation to be decided by medical personnel/paramedics), or

   (c) by providing advice to the ship to divert towards a port with appropriate medical facilities.

2. MEDEVAC not recommended - not deemed medically necessary person can be treated on board or can wait vessel’s arrival in port.

3. MEDEVAC not recommneded at the time because it is assessed that transport would not increase the risk to the patient if possible, medical personnel/ paramedic should be delivered to the vessel to provide further medical assistance.

Appendix M

(Refer to Para 15.2.17 & 15.13.2)

TEMPLATE FOR FORMULATING LOCAL CONTINGENCY PLAN FOR MASS RESCUE OPERATION (MRO) AT SEA

1. **Activation**. On occurrence of incident/ mass casualty scenario requiring large scale rescue operation at sea involving various agencies.

2. **MRO Contingency Plan**

   (a) **Objective of Plan** - Plan for large scale rescue capability at sea.

   (b) **Aim** - Ensure prompt, well planned & coordinated response to Mass Rescue Operation (MRO) for saving maximum lives at sea.

   (c) **Location** - Description of Geographical Sea Area.

   (d) **Design of MRO Contingency Plan** - A centrally coordinated & agreeable plan detailing all resource agencies to respond to crisis.

   (e) **Risk Assessment** - Summary of risks/ incidents associated with envisaged Mass Rescue Operation scenario in the designated area.

   (f) **Compatibility** - MRO Contingency plan capability to interface with overall response mechanism and Contingency plan for major incidents/ disasters.

3. **Resource Agencies**

   (a) **Participating Agencies** - List of rescue agencies participating in MRO along with available resources including Nodal officers of each agency.

   (b) **Lead Agency** - Details including MRO/ SAR Coordinator.

   (c) **Additional Resources** - Rescue agencies envisaged for augmentation including associated contingencies.

   (d) **Capability** - Summary of each participating agencies capability & limitations envisaged wrt MRO.

4. **Organisation**

   (a) **Command and Control Structure** - Sea and Ashore Organisation (akin to other disaster management in state).

(b) **MRO-Crisis Management Group (MRO-CMG)** - To include senior level officials from State & Central government agencies functioning under State Disaster Management Authority and envisaged to be related with MRO.

(c) **Functions of MRO-CMG** - Responsibilities of the MRO-CMG to undertake management of multi-agency, multi-jurisdiction and multi- mission scenario of large scale rescue operation at sea.

(d) **Nominations** - MRCC, MRO/ SAR Coordinator, SAR Mission Coordinator (SMC), On-Scene Commander(s), Aircraft Coordinator.

5. **Response Strategy**

(a) **Response Strategy** - Quick mobilisation/ deployment of resources at sea and setting up of shore based facilities for large scale rescue operation.

(b) **Risk Assessment** - Situation assessment for planning response strategy.

(c) **Response Capability** - Participating agencies response capability and mechanism.

(d) Critical Vulnerabilities Analysis of capability gaps and vulnerabilities during the operation.

(e) **Responsibilities** - Division of responsibility of each participating agencies.

(f) **Preparedness** - Response mechanism for various type of MRO associated contingencies viz. pollution, fire, salvage, safety of shipping and fishing traffic, etc.

(g) **Weather Consideration** - Weather conditions and its impact.

(h) Setting up of

(i) Incident Command System (ICS).

(ii) Medical Triage.

(iii) Place of Safety to land persons rescued.

(iv) Hospital facilities including Hospital Ship and Ambulance.

(v) Airlift and road transport facility for casualty transfer.

(vi) Transit accommodation.

(vii) Control and Communication Centre.

(viii) Security arrangements ashore.

(ix) Joint Information Centre (JIC) for Media.

6. **Alerting & Situation Update**

(a) **Alerting** - Methodology & format for alerting agencies.

(b) **Situation Report** - Procedure, frequency and format for regular Situation Reports (SITREP).

7. **Response Mechanism**

(a) **Mobilisation** - Deployment of SAR resources to Area/ Scene of Action.

(b) **Rescue/ Retrieval** - Plans and arrangements for rescue/ retrieval of persons.

(c) **Initial Assistance** - Arrangement of initial medication, foods, clothing, sanitation etc.

(d) **Executions Plans** - For associated eventualities like pollution, fire, damage control, salvage operations.

(e) **Medical Triage** - Procedure and means of transfer of the Survivors to Triage for medical requirements.

(f) **Transfer** - Procedure and resources for transfer of the survivors to Place of Safety ashore.

(g) **Accounting** - Identification and Accounting of all the survivors and dead bodies.

(h) **Shifting** - Transfer of rescued/ retrieved person from Place of Safety to designated place.

8. **Communication**

(a) Communication structure and plans for multi-agency integrated operation.

(b) SITREP reporting network.

9. **Media Management**

(a) **Arrangements** - Joint Information Centre for public relation.

(b) **Nomination** - Nodal/ Public Relation Officer to deal with media.

10. **VIP Visits**

    (a) **Arrangement** - Handling visits of VIPs.

11. **Termination of MRO**

    (a) **Process** - Conditions, initiation and authority for termination of the operation.

    (b) **Procedure** - Actions by participating agencies on termination.

Appendix N
(Refers to Para 15.5.5)

GUIDELINES/ INFORMATION ON MRO EXERCISE

1. Since opportunities to handle actual incidents involving mass rescues are rare and challenging, exercising MRO plans is particularly important. MRO exercises provide opportunities to improve MRO preparedness by:

   (a) Validating plans, policies, doctrine, procedures and the ability to conduct contingency operations.

   (b) Building, clarifying and strengthening relationships with partners and stakeholders prior to an actual MRO incident.

   (c) Assessing preparedness/ readiness with an emphasis on identifying shortfalls and closing gaps.

   (d) Refining plans, identifying available resources and capabilities, conducting training and evaluating training plans, and

   (e) Providing familiarization and on-the-job training for players in their roles and responsibilities for conducting contingency operations.

2. Full-scale live MRO exercises are difficult and costly to arrange, requiring hundreds of people to be rescued and multiple SAR facilities. MRO exercise objectives needs not be addressed in a single large exercise, but may be satisfied in part by incorporation into multiple drills, tabletop exercises, command post exercises, etc. However, realistic drills are still necessary.

3. MRO exercises should ideally achieve the following objectives:-

   (a) Test:

      (i) RCC procedures and processes.

      (ii) SAR coordination and communication procedures.

      (iii) Communications planning and management.

      (iv) Information coordination and management.

      (v) Search planning and search area coverage, and

      (vi) Use of systems, equipment and SAR techniques.

(b) Account for:

(i) All involved in the operation.

(ii) Rescued passengers and crew until they can return to their homes.

(iii) All persons associated with the rescue and aftermath operations, and

(iv) Survival craft, including empty boats or rafts.

(c) Identity and available resources:

(i) Use of Amver or other ship reporting system.

(ii) Other potential resources ashore and afloat including military and other government resources.

(iii) Resources from local agencies (medical personnel, hospital facilities, fire department general community, transportation resources, etc.).

(iv) On-board support resources, and

(v) National and regional resources.

(d) Evaluate notification processes, resource availability, timeliness of initial response, real-time elements, conference capabilities and overall coordination.

(e) Ensure all agency roles are specified, understood and properly followed.

(f) Test capabilities of potential OSCs and ability to transfer OSC duties.

(g) Test capabilities of potential ACOs and ability to transfer ACO duties.

(h) Evacuate a ship or aircraft.

(j) Coordinate search and rescue activities and achieve information exchanges.

(i) Communications (RCC-RCC, Government-industry, RCG-OSC-ACO, on-scene, shore-ship, ground-air, ship-air, SAR facility-survival craft, etc.).

(ii) Information for all concerned (identify, merge, purge, retrieve and transfer to the right place in the right form at the right time).

(iii) New communication and information management technologies, and

(iv) Media and next of kin.

(k) Test all communication links that may be needed for notification, coordination and support.

(l) Test capabilities and techniques for retrieving people into SAR facilities, taking into account high freeboard issues etc.

(m) Safely transfer and care for passengers (evacuation in survival craft, rescue, medical, protection from environment, post-rescue transfers etc.).

(n) Provide food, water, lifejackets and other protective clothing to survivors.

(p) Conduct medical triage and provide first aid.

(q) Identify place(s) of safety and test landing and transfer procedures.

(r) Exercise coordination between all responding agencies.

(s) Test mass rescue plans of:

(i) SAR services.

(ii) Operating company (airline, ship operator, etc).

(iii) Any other relevant emergency response organizations, e.g. disaster response, military, fire fighting and medical, and

(iv) Transportation and accommodation companies.

(t) Assess how effectively lessons previously identified have been accounted for in updated plans and how well these lessons were shared.

(u) Exercise salvage and pollution abatement capabilities.

(v) Carry out emergency relocation of the disabled craft, and

(w) Exercise external affairs, such as international and public relations taking into account:

(i) Necessary participants involved.

(ii) Joint information centre established quickly and properly staffed.

(iii) Press briefings handled effectively, e.g consistent information from different sources.

(iv) Notification of the next of kin and family briefings.

(v) Staff and equipment capacity to handle incoming requests for information, and

(vi) Rescued persons tracked, kept informed, needs monitored, and noted with belongings.

4. The following steps are normally carried out during exercise planning:-

(a) Agree on the exercise scenario, goals and extent.

(b) Assemble a multi-disciplinary planning team and agree on objectives for each aspect of the exercise.

(c) Develop the main events and associated timetables.

(d) Confirm availability of agencies to be involved, including any media representatives or volunteers.

(e) Confirm availability of transportation, buildings, equipment, aircraft, ships or other needed resources.

(f) Test all communications that will be used, including test of radio and mobile phones at or near the locations where they will be used.

(g) Identify and brief all participants and people who will facilitate the exercise, and ensure that facilitators have good independent communications with person who will be controlling the exercise.

(h) Ensure that everyone involved knows what to do if an actual emergency should arise during the exercise.

(j) If observers are invited, arrange for their safety and keep them informed about the exercise progress.

(k) For longer exercises, arrange for food and toilet facilities.

(l) Use ‘exercise in progress’, signs, advance notifications and other means to help ensure that persons not involved in the exercise do not become alarmed.

(m) Schedule times and places for debriefs.

(n) Agree and prepare conclusions and recommendations with the entity responsible for handling each recommendation along with the due date for any actions.

(p) Prepare a clear and concise report and distribute it as appropriate to the participating organizations and more widely, as agreed, and

(q) Consider the outcome of this exercise in planning future exercises and operations.

MRO industry roles

5. SAR authorities should coordinate MRO plans with companies that operate aircraft and ships designed to carry large numbers of persons. Such companies should share in preparations to minimize the chances that MROs will be needed, and to ensure success if they are. This section provides guidance on industry roles, and discuss how companies could arrange for use of company field teams and emergency response centres as possible means of carrying out their MRO responsibilities.

6. Early notification of potential developing MROs is critical due to the level of effort required to mount a very large-scale response. It is much better to begin the response process and abort it should it become unnecessary, than to begin it later than necessary should the actual need exist. Pilots and masters should be advised and trained to notify SAR services at the earliest indication of a potential distress situation.

7. Company response organizations should be able to help SAR services by organizing support equipment, advice and liaison with any of their ships of aircraft.

8. Companies should be prepared to provide information to preclude the need for multiple sources attempting communications with the aircraft pilot in command or ship captain for information that is unavailable or available from another source. Receiving and handling requests for information aboard the distressed craft can interfere with the pilot's or master's ability to handle the emergency and manage critical on scene leadership needs.

9. Companies operating large aircraft or ships should be advised to prepare a coordinated team that can handle emergency response functions around the clock should the need arise. Such a team might include staff as indicated in the following table:-

TYPICAL COMPANY FIELD TEAM

Team leader	Maintains overview, directs operations and keeps management informed.
Communicator	Maintain open (and possibly sole) line of communications to craft in distress.
Coordinating representative	Usually a pilot or master mariner, who coordinates with SAR and other emergency response authorities, organizes tugs, looks at itineraries, arranges to position ships or ground facilities that may be able to assist and organizes security and suitable delivery points for passengers and crew when they are delivered to safety.
Technical representative	Maintains contact with regulatory authorities, classification societies, insurers and investigators and provides liaison and advice for fire fighting, damage control, repairs and other specialized or technical matters.
Environmental representative	Involved with environmental impact and spill response.
Medical representative	Gives medical advice, tracks casualties and arranges medical and identification services for survivors.
Passenger and crew representatives	Provides information and support to whoever is designated to care for next of kin and keep them informed, identifies transportation needs, and may need to deal with various countries, languages and cultures.
Media representative	Gathers information, coordinates public affairs matters with counterparts in other organizations, prepares press releases, briefs spokespersons and arranges availability of information by phone and web sites.
Specialists	From within or outside the company who may facilitate some special aspect of the response or follow up.

10. The company may operate an **Emergency Response Centre (ERC)** to maintain communications with the craft in distress, remotely monitor on-board sensors if feasible, and keep emergency information readily available Such information might include passenger and crew data, aircraft or ship details, incident details, number of survival craft and status of the current situation. Transportation companies should have readily available contacts with tour companies, shore excursion companies, airlines and cruise lines, hotels, etc., since such resources can be used to address many problems experienced with landing large numbers of survivors into a community. Contingency plans for cooperation should be developed between SAR authorities and transportation companies, and these plans should be sufficiently exercised to ensure they would be effective should an actual mass rescue situation arise. Such plans should identify contacts, coordination procedures responsibilities, and information sources that will be applicable for MROs. These plans should be kept up to date and readily available to all concerned.

11. Respective functions of the ERC and RCC should be covered in coordinated pre-established plans, and refined as appropriate for an actual incident. These centres must maintain close contact throughout the SAR event, coordinating and keeping each other appraised of significant plans and developments.

12. There are other steps the transportation industry could be urged to undertake to improve preparedness MROs. The following are some examples:-

(a) Carry SAR plans on board aircraft or ships.

(b) Provide water and thermal protection for evacuees appropriate for the operating area.

(c) Provide a means of rescue to bring people from the water to the deck of ship. (A means of rescue is a requirement for ro-ro passenger ships, and ships on international voyages are required to have ship-specific plans and procedures for recovery of persons from the water).

(d) Use preparation checklists provided by SAR authorities.

(e) Conduct an actual physical exercise in addition to simulation.

(f) Provide the capability to retrieve fully loaded lifeboats and rafts.

(g) Enhance lifeboat life-saving capabilities.

(h) Provide ways to assist persons in survival craft who are seasick, injured or weak.

(j) Provide on board helicopter landing or winching areas.

(k) Prepare to assist survivors until and after they have been delivered to a place of safety.

(l) Have aircraft or ship status and specifications readily available, such as inspection records, design plans, communication capabilities, stability calculations, life-saving appliances, classification society contacts, passenger and cargo manifests, etc., so that such information will not need to be obtained directly from a pilot or master, and

(m) Work with SAR authorities to develop and be able to rapidly deploy air droppable equipment or supplies for survivors, maintain strategically located caches for this purpose.

13. Acceptance of certain responsibilities by industry demonstrates commitment to passenger safety and can free SAR services to handle critical arrangements relating to SAR resources, coordination and communication.

MRO incident management

14. For major incident, crisis management or the overall response will also be needed. **The Incident Command System (ICS)**, one widely used means of meeting this need works best with some advance familiarization and exercising within and among the transportation and emergency response communities. Since SAR and transportation authorities are likely to encounter use of the ICS within emergency response communities, this appendix provides general information for familiarization with ICS.

15. The following terms are relevant to the ICS:-

(a) **Incident Commander (IC)**: the primary person functioning as a part of the incident command system, usually at or near the scene responsible for decisions, objectives, strategies and priorities relating to emergency response.

(b) **Incident Command Post (ICP)**: the location at which primary functions are carried out for the Incident Command System.

(c) **Incident Command System (ICS)**: and on-scene emergency management concept that provides an integrated organizational structure adaptable to the complexity and demands of a major incident involving multiple missions response organizations or jurisdiction.

(d) **Unified Command (UC)**: the incident commander role of the incident command system expanded to include a team of representatives that manages a major incident by establishing common objectives and strategies and cooperatively directing their implementation.

16. The ICS is designed for use when multiple organizations and jurisdictions need to be jointly involved in a coordinated emergency response activity.

17. While organizations have their respective systems of command and control or co-ordination, these should be compatible with systems in use by others so that organizations can function jointly and effectively when necessary. Commonality and similarities among crisis management systems locally, regionally and internationally foster effective joint efforts.

18. The ICS does not take control responsibility or authority away from SAR Services; SAR services remain focused on life-saving, while the ICS focuses on promoting an effective overall incident response.

19. The ICS training, advance coordination and liaison will be rewarded by better performance and success when a crisis situation arises.

20. As a tool for managing major incidents, the ICS:-

(a) Accommodates all risks and hazards.

(b) Is simple powerful and flexible.

(c) Can easily expand or contract as the incident warrants.

(d) Relieves the SAR system of coordinating non-SAR missions.

(e) Enables SMCs to use the ICS contacts to draw on additional resources, and

(f) Ensure better communication and cooperation between agencies.

21. The ICS organization can grow or shrink as the situation dictates, and provides a logical process and progression to achieve results. Its organization should be allowed to grow with increased demand and shrink when operations decline, both of which require anticipation.

22. Advantages of the ICS can be lost when organizations develop their own unique and relatively complex versions of the ICS; it works best when it remains simple, flexible and standardized so everyone on scene from all organizations understands it.

23. In its basic form a person is designated as the IC to handle overall coordination, including setting objectives and priorities.

24. Support functions (sections supported by one or more persons) can be established as needed and on the scale needed to keep the IC informed and assist in certain areas.

25. The four support sections in the ICS organization are as follows:-

(a) **Operations Section**: helps manage resources to carry out the operations.

(b) **Planning Section**: helps develop action plans, collect and evaluate information, maintain resource status and arrange to scale up or scale down activities.

(c) **Logistics Section**: helps provide resources and services needed to support the incident response including personnel transportation supplies, facilities and equipment, and

(d) **Finance-Administration Section**: assists with monitoring costs, providing accounting and procurements, keeping time records doing cost analysis and other administrative matters.

26. Other additions to directly assist the IC might include:-

(a) **An Information Officer**: assists the media and others seeking incident information, ensures the IC has appropriate information available, and helps to provide information to the public and families of persons in distress.

(b) **A Safety Officer**: monitors safety conditions and develops measures to ensure safety and reduce risks, and

(c) **Liaison Officers**: serve as primary contacts for on-scene representatives of their respective organizations.

27. The following figure illustrates the basic ICS organization:

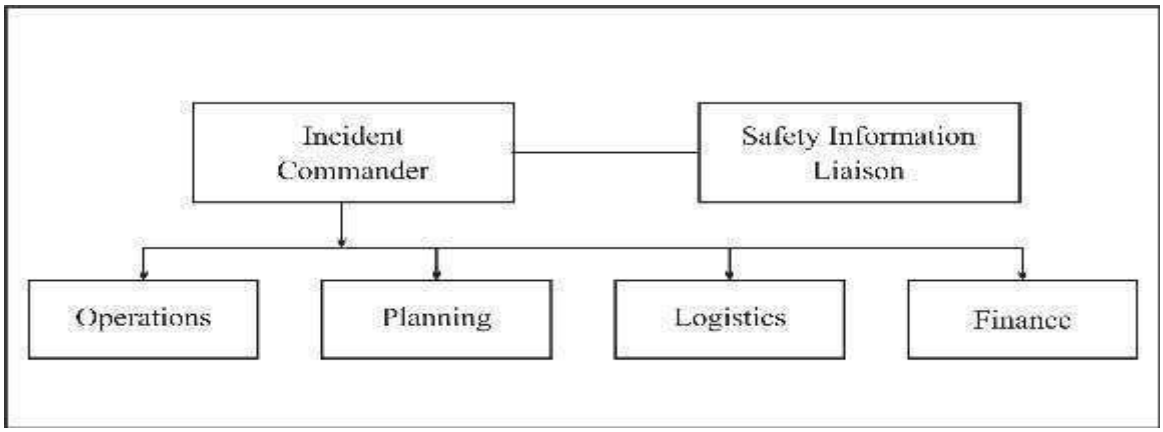

Figure C-1 - *Incident Command System Organization*

28. The IC usually establishes an **Incident Command Post (ICP)** as a base for ICS activities. For particularly demanding incidents, the ICS organization can be expanded. For example, for operations that are particularly Large-scale, sustained or complex, the IC can be augmented by establishment of an actual or virtual (i.e. without everyone co-located) **Unified Command (UC)** populated by operational managers representing the primary response organizations involved. If the UC is made up of linked independent command posts, Government post and an industry post for example, ideally there should still be a person from each command post assigned to work at the other posts involved.

29. For a situation like a major passenger aircraft or ship disaster, a **Joint Information Centre (JIC)** should be established, perhaps in association with the Information Officer position, to facilitate and coordinate the vast amount of information that will need to be managed internally and shared with the public.

30. Whether the ICS should be used depends on the duration and complexity of the incident. If it is used, coordination of SAR functions with other functions is usually achieved by assigning a representative of the SAR agency or of the SMC to the Operations Section of the ICS organization.

31. This allows SAR services to be plugged into the ICS and overall operations while still being able to function with relative Independence in accordance with normal SAR procedures. The ICS has an overall incident focus, while SAR services must remain focused on life-saving.

32. A determination should be made as early as possible regarding the person responsible for overall coordination, and how the overall response will be organized and managed. Procedures should be understood by all and overall response managed to ensure mutual support, effort prioritization, and optimal use of available resources, and to enhance on-scene safety and effectiveness.

33. Inter-agency contingency planning should identity who the IC should be for various scenarios. Typically, the IC will be assigned from the Government organizations with primary responsibility for the type of function most prominent in the response to the particular incident. However, with appropriate access to experts and information from all agencies concerned, a key consideration in selecting the IC should be familiarity and experience with the IC function, i.e. the IC should be a person who can best handle the responsibility.

34. The IC should be someone skilled at managing on-scene operations and should usually be located at or near the scene. Everyone involved, regardless of rank or status, will normally be in a support role for the IC, similar to the SMC support structure within an RCC.

35. The IC function can be transferred as the situation warrants, although such transfers should be minimized as is the case for transfers of SMC functions during a mission. It is important to designate an IC early, in contingency plans if possible, and to make a transfer later as appropriate, as delay in designated an IC can be quite detrimental.

36. Except when functions other than SAR are relatively insignificant to the incident response, the IC should normally be someone other than the SMC. The priority mission will always be life-saving and the SMC should normally remain unencumbered by additional non-SAR duties.

37. Similarly, the IC's command post should normally be at a location other than in the RCC, because the RCC needs to remain focused on, and be vigilant and responsive to, its normal SAR responsibilities in addition to handling SAR aspects of the major incident.

Appendix P
(Refers to Para 18.2.2, 18.3.2 & 18.4.1)

FORMAT FOR REQUISITION OF RESOURCES

FROM	MRCC _____	OPS IMMEDIATE
TO	CG/IN/IAF AUTHORITIES (as applicable)	UNCLAS
INFO	NMSARCA MRSC IN/IAF authorities as applicable)	

= SARREQ (.) MISSION TASK (.)

(A) TYPE OF MISSION/MISSION TASK NUMBER/DATE.

(B) BRIEF OF THE INCIDENT WITH POSITION AND TIME.

(C) NATURE OF EMERGENCY, ASSISTANCE REQUIRED INCLUDING NUMBER OF POB TO BE RESCUED.

(D) NAME AND DESCRIPTION OF VESSEL/CRAFT/ AIRCRAFT IN DISTRESS.

(E) NUMBER AND TYPE OF SRUs REQUIRED.

(F) TIME ON TASK AND DURATION OF OPERATION.

(G) AREA OF OPERATION.

(H) DATUM AND TYPE/PATTERN OF SEARCH.

(J) PRIMARY SEARCH OBJECT.

(K) SECONDARY SEARCH OBJECT.

(L) SRU SHIP/ AIRCRAFT IN THE AREA WITH CALL SIGN.

(M) COMPLAN.

(N) WEATHER IN AREA.

(P) ANY OTHER RELEVANT INFORMATION.

Appendix Q
(Refers to Para 18.4.4)

FORMAT FOR MISSION RESULT

FROM	IN/IAF AUTHORITIES (as applicable)	OPS IMMEDIATE
TO	OSC/SMC/MRCC _____ (as applicable)	UNCLAS
INFO	NMSARCA MRSC IN/IAF AUTHORITIES (as applicable)	

= SARREQ (.) MISSION RESULT (.)

(A) MISSION RESULT NUMBER/DATE

(B) MISSION TASK NUMBER/ DATE

(C) SRU TYPE/ CALL SIGN

(D) TIME ON TASK/TIME OFF TASK

(E) AREA OF OPERATION

(F) DETAILS OF VESSEL/CRAFT IN DISTRESS SIGHTED

(G) DETAILS OF ASSISTANCE PROVIDED/SURVIVORS RESCUED OBJECTS RECOVERED

(H) DETAILS OF OTHER SRU IN AREA

(J) WEATHER IN AREA

(K) RECOMMENDATIONS

(L) ANY OTHER RELEVANT INFORMATION

Appendix R
(Refers to Para 19.5.6)

FORMAT OF PRE-ARRIVAL NOTIFICATION OF SECURITY (PANS)

PRE-ARRIVAL NOTIFICATION OF SECURITY (PANS) FOR:

(a) Passenger ships including high speed passenger craft.

(b) Cargo ships, including high-speed craft, of 500 GRT and upwards, and;

(c) Mobile offshore drilling units.

This form is to be submitted to the Mumbai Port Authorities at least 96 hrs prior to the arrival of the vessel.

1. Particulars of the ship and contact details		
1.1 IMO Number	1.2 Name of the Ship	
1.3 Port of registry:	1.4 Flag State:	1.5 Type of Ship:
1.6 Call Sign	1.7 Inmarsat Call Numbers	1.8 Gross Tonnage
1.9 Name of Company:		
1.10 Name and 24 hour contact details of Company Security Officer Name: ……..…Tel. No…….		
2. Port and Port Facility Information		
2.1 Port of arrival and port facility where the ship is to berth, if known		
2.2 Expected date and time of arrival of the ship in port (paragraph B/4.39.3 of the ISPS Code:		
2.3 Primary purpose of call: Cargo operation/ Taking Bunkers/ taking supplies/ repair/ Changing Crew/ Passengers (Embarking/Disembarking)/ Others (Delete as appropriate) If others, please specify purpose: …….		

3. Information required by SOLAS Regulation XI-2/9.2.1.
3.1 The ship is provided (SOLAS Regulation 9.2.1.1) with a valid: International Ship Security Certificate ____ YES ____ NO Interim International Ship Security Certificate ____ YES ____ NO
3.1.1. Certificate indicted in 3.1 has been issued by: Name of issuing authority: …… Date of Issue: …….. Date of expiry: ……
3.1.2. If the ship is not provided with a valid International Ship Security Certificate or a valid Interim International Ship Security Certificate, explain why?
3.1.2.1. Does the ship have an approved Ship Security Plan on board? ____ YES ____ NO
3.2 Current Security level (SOLAS regulation XI-2/9.2.1.2.):
3.2.1. Location of ship at the time the report is made (paragraph B/4.39.2 of the ISPS Code): Latitude: …… Longitude: …… or Port ……...……
3.3. List the last 10 calls in chronological order with the most recent call first, at port facilities at which the ship conducted ship/port interface together with the security level at which the ship operated (SOLAS Regulation XI-2/9.2.1.3):

No.	Date		Port Country, Port Facility and UNLOCODE	Security Level
	From	To		
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

3.3.1. Did the ship, during the period specified in 3.3, take any special or additional security measures, beyond those specified in the approved ship security plan?

____ Yes ____ No

3.3.2. If your answer to 3.3.1 is YES, for each of such occasions please indicate the special or additional security measures which were taken by the ship (SOLAS Regulation XI-2/9.2.1.4)

No.	Date		Port Country, Port Facility and UNLOCODE	Special or additional measures
	From	To		
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				

3.4 List the ship to ship activities in chronological order with the most recent ship-to-ship activity first, which have been carried out during the period specified in 3.3:

____ NOT APPLICABLE

No.	Date		Security measures applied	Ship-to-ship Activity
	From	To		
1.				
2.				
3.				
4.				
5.				

3.4.1 Have the ship security procedures, specified in the approved ship security plan, been maintained during each of the ship-to-ship activities specified in 3.4 (SOLAS Regulation XI-2/9.2.1.5)?

____ YES ____ NO

3.4.2. If the answer to 3.4.1 is NO, identify the ship to ship activities for which the ship security procedures were not maintained and indicate, for each, the security measures which were applied in lieu:

No.	Date		Port Country, Port Facility and UNLOCODE	Ship-to-ship Activity
	From	To		
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				

3.5 Provide a general description of cargo aboard the ship (SOLAS Regulation XI-2/9.2.1.6. and paragraph B/4.39.5 of the ISPS Code):
3.5.1 Is the ship carrying any dangerous substances as cargo? ____ YES ____ NO
3.5.2 If the answer to 3.5.1. is YES, provide details or attach a copy of the Dangerous Goods Manifest (IMO FAL FORM 7).
3.6 A copy of the ship's Crew List (IMO FAL Form 5 is attached) (SOLAS regulation XI-2/9.2.1.6 and paragraph B/4.39.4 of the ISPS Code) ☐
3.7 A copy of the ship's Passenger List 9 IMO FAL Form 6 is attached) (SOLAS regulation XI-2/9.2.1.6 and paragraph B/4.39.6 of the ISPS Code) ☐
4. Other Security related information:
4.1 Is there any security related matter you wish to report? ____ YES ____ NO
4.1.1. If the answer to 4.1 is YES, provide details:
5. Agents of the ship at the intended port of arrival:
5.1 Name and 24-hour contact details of Agent in intended port of call: .....…… Tel.No……..…..…… Fax No.:……..

6. Identification of the person providing the information:
6.1 Name: ……..…….
6.2 Title or position: ……..
6.3 Signature: …….
This report is dated at (Place) ……..……   On (Date and time) ……..……

Appendix S
(Refers to Para 22.1.2)

GUIDELINES FOR ALLOCATION OF SAR INCIDENT NUMBER

1. On commencement, every SAR incident responded to by the District Headquarters/ MRCC/ MRSC/ ICG Station will be allocated a running serial number form 001 commencing 01 Jan for each year as follows:

REGION	DISTRICT	SMC	SL.NO.	YEAR

2. **Code Word**

(a) **Regions**

(i) North West	N	W
(ii) West	-	W
(iii) East	-	E
(iv) North East	N	E
(iv) A and N	A	N

(b) **District Codes** The Code Word for District is the respective District number in two digits. For example: CGDHQ-1, the code word is:- **01**

(c) **SAR Mission Coordinator (SMC)**. For the mission coordinated by MRCC/ ICG Station as SAR Mission Coordinator (SMC), following Code Word will be allocated:-

(i) MRCC Mumbai, Chennai & Port Blair : 0 0 0

(ii) District/ MRSC/ ICG Stations/ Unit : Three letter used for **Key Indicators/Signal Addressee** of the respective ICG Unit

(d) Examples

(i) E 05 TUT 010 2020

10th SAR mission of DHQ-5 in the year 2020 executed by MRSC Tuticorin in the Region 'East'.

(ii) W 02 000 150 2020

150th SAR mission of DHQ-2 in the year 2020 executed by MRCC (Mumbai) in the Region 'West'.

(iii) AN 10 KAM 03 2020

03rd SAR mission of DHQ-10 in the year 2020 executed by ICGS Kamorta in the Region 'Andaman and Nicobar'.

Appendix T
(Refers to Para 22.6.1)

SAR SL No.

(For CGHQ use only)

SAR INCIDENT PROCESSING FORM

(To be filled by SMC / Ops Room In-charge on receipt of SAR information)

SAR Case No.											
	Region		District		SMC			Sl. No.			Year

Name of Vessel	MV/FB

1.	**Nature of Emergency (Please tick)**	Fire		Collision	
		Grounding		Man Over Board	
		Disabled		Overdue	
		Air crash		Medical Emergency	
2.	**Position & Time**	Latitude		Longitude	
		Time			
		Bearing			
		(From prominent landmark /passing vessel)			
		Course		Speed	
		Altitude (for Aircraft)			
		Sounding (for boats)			
3.	**Informer / SAR Reporter**	Name			
		Telephone Nos.			
		Address			
		Contact No.			
		Call Sign (if in vessel)			
		Frequency			

4.	**Distressed Vessel**	Name			
		Type			
		Call Sign			
5.	**Person onboard/ Condition**	POB			
		Condition			
6.	**Sighting Location**	**Description**	**Nos.**	**Position**	**Time**
		Survivors			
		Parachute			
		Life boat			
		Life raft			
		Life buoy			
7.	**Distressed craft description**	Size		Type	
		Regn. No.		Funnel	
		Cabin		Colour	
		Mast			
8.	**Secondary Search**	Catamaran			
		Life raft			
		Life buoy			
		Empty drum			
		Jerry can			
9.	**Radio Frequency**	Used			
		Monitored			
		Scheduled			
10.	**Emergency Radio**	Frequency			
		EPIRB			

11.	**On-Scene weather**	Visibility	Sky	
		Sea State	Wind	
		BMP	Temp	
12.	**Assistance desired**			
		Received / Extended		
13.	**Fuel onboard (KL)**			
14.	**Navigation equipment held**			
15.	**Survival equipment**	Life buoy		
		Life raft		
		Any other		
16.	**Fresh water/ food held (No. of days survived)**			
17.	**First information received**	Date		
		Time		
		Mode		
18.	**Local agent (in case of M/V)**	Name		
		Telephone		
		Address		
19.	**Any other information**			

DTG | | |

(Signature)
(SMC / Incident Recording Officer)

Appendix U
(Refers to Para 22.7.1)

SAR SL No.

(For CGHQ use only)

FORMAT FOR SAR CASE SUMMARY

SAR Case No.					
	Region	District	SMC	Sl. No.	Year

Name of Vessel	MV/FB

1.	**DETAILS OF DISTRESS**	
	(A) NATURE	
	(B) MMSI NO.	
	(C) DATE & TIME	
	(D) POSITION	
	(E) AREA	
	(F) TX MODE	
	(G) RELAY BY	
	(H) ANY OTHER INFO	
2.	**DETAILS OF VESSEL**	
	(A) INMARSAT TEL/FAX NO.	
	(B) FLAG	
	(C) OWNER	
	(D) TYPE	

	(E) CREW / NATIONALITY			
	(F) CARGO / TONNAGE			
	(G) LPC / DATE			
	(H) NPC / DATE			
	(J) ANY OTHER INFO			
	DURATION			
3.	**CG SAR UNITS**	**UNIT**	**FROM**	**TO**
	(A) SURFACE			
	(B) AIR			
4.	**EXTERNAL RESOURCES**			
	(A) IN SHIPS			
	(B) IN AIRCRAFT			
	(C) AIR FORCE			
	(D) MERCHANT VESSELS			
	(E) DRI / CUSTOMS			
	(F) FISHING BOATS			
	(G) OTHERS			
5.	**MET DATA**			
	(A) SEA STATE			
	(B) SWELL			
	(C) WIND			
	(D) VISIBILITY			

6.	**MISSION RESULT**	**DATE**	**TIME**
	(A) CASUALTIES EVACUATED		
	(B) LIVES SAVED		
	(C) FIRE FIGHTING		
	(D) DAMAGE CONTROL		
	(E) ANY OTHER INFORMATION		
7.	**MISSION ANALYSIS**		
	EVENT	**DATE & TIME**	**TIME LAPSE SINCE DISTRESS OCCURRED**
	(A) DISTRESS OCCURRED		
	(B) DISTRESS RECEIVED		
	(C) AUTHENTICATION CHECKS (IF ANY)		
	(D) UNIT SAILED / DEPLOYED		
	(E) UNIT ARRIVED DATUM		
	(F) LIVES RESCUED		
	(G) PERSONNEL SHIFTED TO SHORE HOSPITAL (IF ANY)		
8.	**MISSION SUMMARY (IN BRIEF)**		
9.	**CONCLUSION**		
10.	**RECOMMENDATIONS**		

(Signature)

Date: **Mission Co-ordinator**

Appendix V

(Refers to Para 22.10.1)

GUIDELINES FOR SAR CASE STUDY EVALUATION

S No.	Description	
1.	**Description of Incident**	
2.	**Details of Incident**	
	Incident Number	
	DTG	
	Type	
	Position (Lat/Long)	
3.	**Weather Conditions**	
	Wind direction/force	
	Cloud	
	Visibility	
	Current direction/speed	
4.	**Units**	
	Maritime	
	Aircraft	
	Emergency services land	
	Any other relevant information (include as an attachment but list here) Scan of nautical chart showing positioning of incident in relation to land/familiar point of reference, to help build up a clear picture	
	Photographs	
5.	**Description of Incident** (Stick to facts, no value judgements)	

S No.	Description	
6.	**Reason for evaluation** (Brief explanation of reasons why this incident is subject to evaluation)	
7.	**Source of Distress Incident**	
8.	**Explanation** (The first step in activating an incident response organization is to acknowledge a reported incident and alert the emergency services. A report has to be converted rapidly into an effective alert if emergency assistance is to arrive quickly. To do that, a fixed structure must be observed for processing reports and alerting units)	
9.	**MRCC/MRSC Response, Response Time and Communications Standard** (The MRCC/MRSC receives a report. The contents of the report must be clarified quickly (three minutes). In order to make a report complete as quickly as possible, questions must be asked briefly and to-the-point, professionally and assertively. The information ascertained is then used to create an alert and, as a part thereof, an initial deployment. To check this, listen to the recorded audio material from the incident)	
	Assessment	
	Sub-Conclusion	
	Recommendation(s)	

S No.	Description	
10.	**Incident Records**	
	Standard (Records of the incident need to be kept as stipulated. The information included also needs to be complete. A layperson should be able to follow and understand the incident on the basis of the records kept. Essential information is marked).	
	Assessment	
	Sub-Conclusion	
	Recommendation(s)	
	Explanation (An incident response organization can scale up or scale down depending on several factors, which are: - The severity of the incident. - The extent of the incident. - The location of the incident. - The seriousness of the situation for external organizations. Ultimately, in the event of scaling up it must be ensured that a suitable number and suitable standard of people and resources are deployed)	

S No.	Description	
11.	**Estimation of severity of incident**	
	Standard (The information available must be fully used and interpreted at all times. A picture of the incident should be built up as soon as possible and a worst case scenario should be assumed. If the severity was underestimated, how did this happen?)	
	Assessment	
	Sub-Conclusion	
	Recommendation(s)	
12.	**Leadership and Coordination**	
	Explanation (Some of the aspects relating to leadership and coordination include: setting priorities in mutual consultation in dealing with the incident (the decision-making process), but also coordinating and leading the actual response workers or the response procedures themselves. The results of this should be monitored in order that assessment and adjustment be possible)	
13.	**Leadership**	
	Standard (The watch manager should lead his team. As events occur, he/she should clearly take the lead. People work together as a team and share information with each other directly. All this is in line with the training)	
	Assessment	
	Sub-Conclusion	
	Recommendation(s)	

S No.	Description	
14.	**Coordination by the MRCC/MRSC**	
	Standard (The MRCC/MRSC should provide strong leadership for the deployed emergency services and ensure there is coordination between the parties. The MRCC/MRSC therefore needs to have an accurate picture of the situation at all times. Also ask the deployed emergency services how they experienced the MRCC/MRSC 's role)	
	Assessment	
	Sub-Conclusion	
	Recommendation(s)	
15.	**Information Management**	
	Explanation (Information management is both a technical and organizational process. The more quickly and more comprehensively information becomes available, structured incident response options increase accordingly)	
16.	**Sharing Information**	
	Standard (Information needs to be available in the right format and at the right time for the people who need it. They include the deployed units and the MRCC/MRSC itself)	
	Assessment	
	Sub-Conclusion	
	Recommendation(s)	

S No.	Description	
17.	**Use of IT Sources**	
	Standard (The watch standers need to be sufficiently trained and experienced in using various IT resources and applications. Were all of the available IT resources suitable for this incident used correctly and smoothly? All this is in line with training).	
	Assessment	
	Sub-Conclusion	
	Recommendation(s)	
18.	**Use of means of communication**	
	Standard **(Technical:** The watch standers need to be sufficiently trained and experienced in using various means of communication. Are they using the correct frequencies, are they making the correct connections? Are the available means of communication being used in the correct way? All this is in line with what was learnt in training for this role. **Skills:** There should be effective outward communication with the emergency services, other parties and other individuals. This includes when asking for further information but also cutting conversations short when necessary).	
	Assessment	
	Sub-Conclusion	
	Recommendation(s)	

S No.	Description	
19.	**Use of Procedures (Applicable to this incident)**	
	Standard Incident responses often automatically take the form of established procedures and action plans. These must be adhered to. If the applicable procedures and/ or action plans are not carried out, or are carried out differently, this should be accounted for and justified, including in the incident records. Are the procedures up to date?	
	Assessment	
	Sub-Conclusion	
	Recommendation(s)	
20.	**Reconstruction (Optional)**	
	Introduction (In some cases it may be useful to reconstruct the incident in the form of a training session with another team. This makes it possible to assess whether another team would have handled the incident differently and/ or would have arrived at a different outcome. This gives a clearer perspective on the incident response in question)	
	Findings	
	Conclusion on the reconstruction	

S No.	Description	
21.	**Overall Conclusion**	
	MRCC/ MRSC's role and outcomes for this incident (Here, try to give an idea of what would have happened if the RCC had not responded to the incident, i.e. the worst-case scenario)	
	Sub-conclusion and Recommendations	
	Overall Conclusion {Attachments (including notes from meetings, photographs, etc.) Each evaluation should include a scan of a nautical chart showing the positioning of the incident in relation to land/ familiar point of reference, to help build up a clear picture}	

INDIAN SEARCH AND RESCUE REGION

AT SEA
For Search and Rescue Incident

CALL 1554
&
INMARSAT 'C'
CODE 43
(TOLL FREE)

NATIONAL MARITIME SEARCH AND RESCUE BOARD

NATIONAL MARITIME SEARCH AND RESCUE COORDINATING AUTHORITY

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