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CAMSAR

CANADIAN AERONAUTICAL AND MARITIME SEARCH AND RESCUE MANUAL

Combined Edition – Volumes I, II and III

(ENGLISH)

Supplement to the IAMSAR Manual

Issued on the Authority of the Chief of the Defence Staff and
Commissioner Canadian Coast Guard

Canada

INTERNATIONAL AERONAUTICAL AND MARITIME SEARCH AND RESCUE MANUAL (IAMSAR) VOLUME IV – CANADIAN SUPPLEMENT

“CANADIAN SAR MANUAL”

OPI: Canadian Joint Operations Command J3 SAR, Canadian Armed Forces
Director Operational Support, Canadian Coast Guard

Record of Amendments

Amendment	Date	Date Entered	Entered By

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Foreword

Purpose

The purpose of the *Canadian Aeronautical and Maritime Search and Rescue (CAMSAR) Manual* is to supplement the *International Aeronautical and Maritime Search and Rescue (IAMSAR) Manual* by providing national guidelines and standard operating procedures (SOPs) specific to the Canadian Federal Aeronautical and Maritime Search and Rescue (SAR) System. In turn, the *CAMSAR Manual* is meant to be augmented by regional and local SOPs.

There are three volumes to the *CAMSAR Manual*:

- *Volume I – Organization and Management*, called *CAMSAR I*, for short, and is intended to be used in conjunction with the other two *CAMSAR* volumes and the *IAMSAR Manual, Volume I*;
- *Volume II – Mission Coordination*, called *CAMSAR II*, and is intended to be used in conjunction with the other two *CAMSAR* volumes and the *IAMSAR Manual, Volume II*; and
- *Volume III – Mobile Facilities*, called *CAMSAR III*, and is intended to be used in conjunction with the other two *CAMSAR* volumes and the *IAMSAR Manual, Volume III*. Vol III is for Mobile Facilities (Vessels and Aircraft)

For ease of reference, each of the *CAMSAR* volumes bears the same title as the corresponding *IAMSAR Manual* volume, and is also divided into corresponding chapters.

The three volumes of the *CAMSAR Manual* supersede all previous versions of the Canadian *National SAR Manual (NSM)* or *IAMSAR IV,* and are effective upon receipt.

The three *CAMSAR* volumes are issued under the joint authority of the Chief of Defence Staff, Department of National Defence (DND), and of the Commissioner, Canadian Coast Guard (CCG).

In addition to the IAMSAR Manual, all Joint Rescue Coordination Centres (JRCCs) and the Maritime Rescue Sub-Centre (MRSC) Quebec will hold current copies of the CAMSAR Manual

Forward

Amendments to the CAMSAR will be issued under the joint authority of the Commander Canadian Joint Operations Command (CJOC), the Commander of the Royal Canadian Air Force, and the Commissioner Canadian Coast Guard (CCG). Amendments are to be forwarded through the chain of command to Canadian Joint Operations Command J3 (SAR) or to the CCG Director Operation Support.

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Abbreviations and Acronyms

NOTE:	The abbreviations are listed alphanumerically. When there is a French equivalent, it is shown in square brackets; **bold characters** indicate universality.

1 Cdn Air Div [1DAC] .... 1 Canadian Air Division

A .... search area

A_{mc} .... midpoint compromise search area

A_n .... individual adjusted search area

A_t .... total search area

A/C [–] .... aircraft

AC [CA] .... Assistant Commissioner

ACC .... area control centre

ACO .... aircraft coordinator

ACOP .... Air Command Operation Plan

ACSO [OSCA] .... air combat systems officer

ADIS .... Automated Data Interchange System

AGL .... above ground level

AIS .... Automatic Identification System

AM .... amplitude modulation

AMVER .... “Automated Mutual-Assistance Vessel Rescue”

AOC .... air operations centre

AOR [–] .... area of responsibility

ASCC .... Air Standardization Coordination Committee

ASM [–] .... assistant searchmaster

ASW .... average surface wind

ATC .... air traffic control

C .... coverage factor

C_{mc} .... midpoint compromise coverage factor

C/S [–] .... call sign

CAMSAR .... Canadian Aeronautical and Maritime Search and Rescue

[CJOC] .... Canadian Joint Operations Command

CANSARP .... Canadian Search and Rescue Planning Program

Abbreviations and Acronyms

CANUTEC .... Canadian Transport Emergency Centre

CASARA [ACRSA] .... Civil Air Search and Rescue Association

CCG [GCC] .... Canadian Coast Guard

CCGA [GCAC] .... Canadian Coast Guard Auxiliary

CCGS [NGCC] .... Canadian Coast Guard Ship

CAF [FAC] .... Canadian Armed Forces

CF .... drift error confidence factor

CFACC [Cmdt CAFM] .... Combined Forces Air Component Commander

CFICC .... Canadian Forces Integrated Command Centre

CFIOG [GOIFC] .... Canadian Forces Information Operations Group

CFS [SFC] .... Canadian Forces Station

CFWS [SMFC] .... Canadian Forces Weather Service

CMCC.......... Canadian Mission Control Centre

Comd [Cmdt] .... Commander

Comd RCAF.......... Commander Royal Canadian Air Force

COMSAR.......... Sub-Committee on Radiocommunications and Search and Rescue

COSPAS .... "Cosmicheskaya Sistyema Poiska Avariynich Sudow" (space system for the search of vessels in distress)

CPI [IPE] .... crash position indicator

CLA .... creeping line ahead

CSA, 2001 [*LMMC, 2001*] .... *Canada Shipping Act, 2001*

CSAD [–].......... Canadian Search Area Definition method

CSP .... commence search point

d .... surface drift distance

d_a .... aircraft glide

d_e .... individual drift error

d_{max} .... maximum drift distance

d_{min} .... minimum drift distance

d_p .... parachute glide drift

D.......... total drift

D_a .... aeronautical drift

Abbreviations and Acronyms

D_e .... total drift error
D_{ea} .... aeronautical drift error
DART [EICC] .... Disaster Assistance Response Team
DF .... radio direction finding
DFO [MPO] .... Department of Fisheries and Oceans
DGPS .... Differential Global Positioning System
DIMTPS [DTPSGI] .... Director, Information Management Technologies, Products and Services
DMB .... datum marker buoy
DMS [DSM] .... Director, Maritime Services
DND [MDN] .... Department of National Defence
DR .... dead reckoning
DR_e .... navigational dead reckoning error
DSC .... digital selective calling
E .... total probable error
ECAREG .... Eastern Canada Traffic System
EGC .... enhanced group call system
EIP .... estimated incident position
ELT .... emergency locator transmitter
EPIRB .... emergency position-indicating radio beacon
ESCP [–] .... expendable surface current probe
ETA .... estimated time of arrival
ETD .... estimated time of departure
f_f .... fatigue correction factor
f_s .... optimal search factor
f_v .... search facility velocity correction factor
f_w .... weather correction factor
F/V [n/p] .... fishing vessel
FAA [*LGFP*] .... *Financial Administration Act*
FIC .... flight information centre
FIX_e .... navigational fix error

Abbreviations and Acronyms

FLIR .... forward-looking infrared radar
FM .... frequency modulation
FSS .... flight service station
GEOREF .... geographic reference system
GMDSS [SMDSM] .... Global Maritime Distress Safety System
GPS .... Global Positioning System
HF .... high frequencies (3 to 30 MHz)
HQ [AC] .... headquarters (Canadian Coast Guard)
HQ [QG] .... headquarters
IAMSAR .... International Aeronautical and Maritime Search and Rescue
ICAO [OACI] .... International Civil Aviation Organization
ICSAR [CIRS] .... Interdepartmental Committee on Search and Rescue
IFR .... instrument flight rules
IMO [OMI] .... International Maritime Organization
INMARSAT/IMSO .... International Mobile Satellite Organization
INNAV .... Integrated Information System on Marine Navigation
IRB [ESC] .... inshore rescue boat
ISM (Code) .... International Safety Management Code
ITU [UIT] .... International Telecommunication Union
JCOC [COCI] .... joint command operations centre
JETS .... Joint Enroute/Terminal System
JRCC .... Joint Rescue Coordination Centre
JTF [FOI] .... Joint Task Force
KHz .... kilohertz
kt .... knot (nautical mile per hour)
l .... search area length (actual)
l’ .... search area length (estimated)
LES .... land earth station
LKP .... last known position
LM SAR [MP-SAR] .... Lead Minister for Search and Rescue
LUT .... local user terminal (COSPAS-SARSAT ground receiving station)

Abbreviations and Acronyms

LW .... leeway
m .... metre
M/V .... merchant vessel
MAJAID .... major aeronautical disaster
MAJMAR .... major marine disaster
MANOT .... missing aircraft notice
MARB [–] .... maritime assistance request broadcast
MARLANT [FMAR (A)] .... Maritime Forces Atlantic
MARPAC [FMAR (P)] .... Maritime Forces Pacific
MCC .... mission control centre
MCTS (SCTM) .... Marine Communications and Traffic Services
MEDEVAC .... medical evacuation
MEDICO .... medical advice, usually by radio
MF .... medium frequencies (300 to 3000 kHz)
MHz .... megahertz
MMSI .... maritime mobile service identity
MOU [PE] .... memorandum of understanding
MRO .... mass rescue operation
MRSC .... maritime rescue sub-centre
MSS [SSM] .... Maritime Safety Systems
MSI .... maritime safety information
n .... number of tracks required (rounded up to the next whole number)
n’ .... number of tracks required
NATO [OTAN] .... North Atlantic Treaty Organization
NBDP [IDBE] .... narrow band direct printing (telegraphy)
NDHQ [QGDN] .... National Defence Headquarters
NIF [FNI] .... New SAR Initiatives Fund
NM .... nautical mile
NOCL .... notice of crash/casualty location
NOK [–] .... next-of-kin
NORAD .... North American Aerospace Defence Command

Abbreviations and Acronyms

NORDREG.......Arctic Canada Traffic System
NOTAM.......notice to airmen
NOTSHIP [AVNAV] ....notice to shipping
NSS (SNRS).......National Search and Rescue Secretariat
NVG [–] ....night vision goggles
OBS [BSN] ....Office of Boating Safety
OIC [–] ....officer in charge
OPP ....Ontario Provincial Police
OS.......contour search
OSC ....on-scene coordinator
PEP ....Provincial Emergency Program (in British Columbia)
PFD [VFI] ....personal flotation device
PIW ....person in water
PLB.......personal locator beacon
POB ....persons on board
POC ....probability of containment
POD ....probability of detection
PS ....parallel sweep search
R.......search radius (desired)
R_o ....search radius (rounded up to the next whole number)
RCC ....rescue coordination centre
RCMP [GRC] ....Royal Canadian Mounted Police
ROC [COR] ....regional operations centre
RS [SS].......rescue specialist
RSMS [RRSM] ....Regional Supervisor, Maritime SAR
S ....track spacing
S_a.......track spacing (assignable)
S_{mc} ....track spacing (midpoint compromise)
S/V [–].......sailing vessel
SAR Tech [Tech SAR] ....search and rescue technician
SAR ....search and rescue

Abbreviations and Acronyms

SAREX .... search and rescue exercise
SAR-IF [FI-SAR] .... search and rescue interagency frequency
SARNOCC .... SAR Network Operations Control Centre
SARSAT .... Search and Rescue Satellite-Aided Tracking
SARSUM [–] .... search and rescue incidents summary
SART .... search and rescue transponder
SC .... sea current
[SERABEC] .... “Sauvetage et recherche aériens du Québec” (refer to CASARA)
SES .... ship earth station
SICOFAA .... “Sistema de Cooperación entre las Fuerzas Aéreas Americanas” (System of Cooperation among the Air Forces of America)
SISAR .... "Système d’information de recherche et sauvetage" (search and rescue information management system)
SITREP .... situation report
SLDMB .... self-locating datum marker buoy
SM [–] .... searchmaster
SMC .... search and rescue mission coordinator
SMMS .... Search and Rescue Mission Management System
SOLAS .... Safety of Life at Sea
SOP [PNO] .... standard operating procedure
SPOC .... search and rescue point of contact
SQ .... “Sûreté du Québec” (Quebec Provincial Police)
SRR .... search and rescue region
SRS .... search and rescue sub-region
SRU .... search and rescue unit
SS .... expanding square search
SSO [OSEM] .... Senior Staff Officer
SUBMISS .... submarine missing
SUBSAR .... submarine search and rescue
SUBSUNK .... submarine sunk
SURPIC .... surface picture

Abbreviations and Acronyms

T .... search time available (search endurance)
TC .... tidal current
TC .... Transport Canada
TMS [SGT] .... Traffic Management System (Seaway)
TRACS [SRTC] .... Terminal Radar and Control System
TS .... track line search
TSB [BST] .... Transportation Safety Board of Canada
TSN .... track line search, non-return
TSR .... track line search, return
TWC .... total water current
UHF .... ultra high frequencies (300 to 3000 MHz)
UK .... United Kingdom
UNSAR .... unnecessary SAR alert
US or USA .... United States of America
USAF .... United States Air Force
USCG .... United States Coast Guard
UTC .... coordinated universal time
v .... speed of search object
V .... search facility ground speed
VFR .... visual flight rules
VHF .... very high frequencies (30 to 300 MHz)
VMS [–] .... Vessel Monitoring System
[VMSL] .... "Voie maritime du Saint-Laurent" (St. Lawrence Seaway)
VS .... sector search
VTS [STM] .... Vessel Traffic Services
w .... search area width (actual)
w' .... search area width (estimated)
W .... sweep width
W_u .... sweep width (uncorrected)
WC .... wind current
X .... initial position error

Abbreviations and Acronyms

XSB .... barrier single unit search
Y .... search facility position error
Z .... search effort
Z_n .... individual effort
Z_t .... total effort

Abbreviations and Acronyms

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Glossary and Terminology

aeronautical drift (D_a)	The drift caused by bailout trajectory or aircraft gliding distance. *“dérive aéronautique”*
aeronautical search and rescue incident	A search and rescue incident involving an aircraft. *“incident de recherche et sauvetage aéronautique”*
aircraft coordinator (ACO)	A person or team who coordinates the involvement of multiple aircraft in search and rescue (SAR) operations in support of the SAR mission coordinator and on-scene coordinator. *“coordonnateur d’aéronefs”*
aircraft glide	The maximum ground distance an aircraft could cover during unpowered descent. *“vol plané d’un aéronef”*
alert phase	A situation wherein apprehension exists as to the safety of an aircraft or a vessel and of the persons on board. *“phase d’alerte”*
area control centre (ACC)	An air traffic control (ATC) facility primarily responsible for providing ATC services to instrument flight rules aircraft in controlled areas under its jurisdiction. *“centre de contrôle régional”*
Automated Mutual-Assistance Vessel Rescue (AMVER)	A world-wide ship reporting system for search and rescue. *“Amver”*
awareness stage	A period during which the search and rescue system becomes aware of an actual or potential incident. *“stade de l’avertissement”*
Canadian Mission Control Centre (CMCC)	The focal point of Canada’s COSPAS-SARSAT participation, the CMCC at 8 Wing Trenton, is responsible for the receipt and dissemination of distress beacon messages from national and international sources. *“Centre canadien de contrôle de mission”*

Glossary and Terminology

Canadian Transport Emergency Centre (CANUTEC)	A public service operated by the Transport of Dangerous Goods Branch of Transport Canada, CANUTEC provides immediate advice to those who need or request help in case of an emergency situation involving dangerous goods resulting in a spill, leak, fire or human exposure. *“Centre canadien d’urgence transport”*
casualty staging area	An intermediate forward location where a large number of survivors can be treated prior to evacuation to appropriate medical facilities. *“aire de rassemblement des blessés”*
Combined Forces Air Component Commander (CFACC)	As the CFACC, the Commander of 1 Canadian Air Division assigns priority of effort and rapidly relocates assets based on guidance and direction provided by the Commander of Canadian Joint Operations Command. *“commandant de la Composante aérienne de la Force multinationale”*
commence search point (CSP)	The point normally specified by the search and rescue (SAR) mission coordinator where a SAR facility is to begin its search pattern. *“point de départ de la recherche”*
conclusion stage	A period during a search and rescue (SAR) incident when SAR facilities return to their regular location and prepare for another mission. *“stade de l’achèvement”*
coordinated universal time (UTC)	The international term for time at the prime meridian. *“temps universel coordonné”*
COSPAS-SARSAT	International satellite system for search and rescue, Cospas-Sarsat detects distress beacons signals on the 406 megahertz frequency. *“Cospas-Sarsat”*
course	The intended horizontal direction of travel of a craft. *“route”*

Glossary and Terminology

coverage factor (C)	• The ratio of the search effort (Z) to the area searched (A): C = Z/A. • For parallel sweep searches, it may be computed as the ratio of sweep width (W) to track spacing (S): C = W/S. *“indice de couverture”*
craft	Any air or sea-surface vehicle, or submersible of any kind or size. *“véhicule”*
datum	• The most probable position of a search object, corrected for drift, at any specific time. • A geographic point, line, or area used as a reference in search planning. *“datum, repère”*
datum – area	The area in where it is estimated that the search object is most likely to be located. *“zone de repère”*
datum – line	A line , such as the distressed craft’s intended track line or a line of bearing, which defines the centre of the area where it is estimated that the search object is most likely to be located. *“ligne de repère”*
datum – point	A point, such as a reported or estimated position, at the centre of the area where it is estimated that the search object is most likely to be located. *“point de repère”*
datum marker buoy (DMB)	A droppable floating beacon used to determine actual total water current, or to serve as location reference. *“bouée-repère”*
dead reckoning (DR)	The determination of the position of a craft by adding to the last fix the craft’s course and speed for a given time. *“navigation à l’estime”*

Glossary and Terminology

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. *"appel sélectif numérique"*
direction finding (DF)	Homing on signals to pinpoint a position. *"radiogoniométrie"*
direction of current	• The direction toward which a current is flowing. • Also called "**set**". *"direction du courant"*
direction of waves, swells, or seas	The direction from which the waves, swells or seas are moving. *"direction des vagues, de la houle ou des creux"*
direction of wind	The direction from which the wind is blowing. *"direction du vent"*
disabled	A situation wherein a vessel or aircraft afloat and not in distress or potential of distress, has lost all means of propulsion, steering or control to such a degree as to be incapable of proceeding to safety without assistance. *"désemparé"*
distress	A search and rescue incident where there is a reasonable certainty that one or more individuals are threatened by grave and imminent danger and require immediate assistance. *"détresse"*
distress beacon	A generic term used to describe any emergency locator transmitter, emergency position-indicating radio beacon or personal locator beacon. *"radiobalise de détresse"*
distress phase	A situation wherein there is reasonable certainty that a vessel or other craft, including an aircraft or a person, is threatened by grave and imminent danger and requires immediate assistance. *"phase de détresse"*

Glossary and Terminology

ditching	The forced landing of an aircraft on water. *"amerrissage"*
divergence distance	The distance between the left and right leeway divergence datums. *"distance de divergence"*
drift	The movement of a search object caused by environmental forces. *"dérive"*
duckbutt	An airborne standby posture carried out by Canadian Armed Forces aircraft to provide navigation or other assistance to aircraft during a specific operation. *"« duckbutt »"*
emergency locator transmitter (ELT)	An aeronautical radio distress beacon for alerting and transmitting homing signals. *"émetteur localisateur d'urgence"*
emergency phase	A generic term meaning, as the case may be, uncertainty phase, alert phase or distress phase. *"phase d'urgence"*
emergency position-indicating radio beacon (EPIRB)	A device usually carried aboard maritime craft that transmits a signal which alerts search and rescue authorities and enables rescue units to locate the scene of the distress. *"radiobalise de localisation des sinistres"*
false alarm	A distress alert initiated for other than an appropriate test, by communications equipment intended for alerting, when no distress situation actually exists. *"fausse alarme"*
false alert	A 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. *"fausse alerte"*

Glossary and Terminology

fetch	The distance over which the wind blows in a constant direction, without obstruction. *"fetch"*
first rescue coordination centre (first RCC)	• The first rescue coordination centre (RCC) that is made aware of a search and rescue (SAR) distress alert. • The first RCC should assume responsibility for all subsequent SAR coordination unless and until responsibility is accepted by another RCC or Provincial/Territorial agency better able to take action. *"premier centre de coordination de sauvetage"*
fix	A geographical position determined with certainty by one or more of the following: visual references, radio navigation aids, celestial plotting, or any other navigation device. *"point observé"*
forward base	A base, located as close as possible to an incident site, which is capable of handling large aircraft and has sufficient facilities (with augmentation, if necessary) to support a major aeronautical or marine disaster operation. *"base avancée"*
forward-looking infrared (FLIR)	An imaging system, mounted on board vessels or aircraft, designed to detect thermal energy (heat) emitted by objects and convert it into a visual display. *"radar thermique à balayage frontal"*
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. *"Système mondial de détresse et de sécurité en mer"*
Global Positioning System (GPS)	A specific satellite-based system used in conjunction with mobile equipment to determine the precise position of the mobile equipment. *"Système mondial de localisation"*
grid	Any set of intersecting perpendicular lines spaced at regular intervals. *"grille"*

Glossary and Terminology

ground search and rescue incident	Any search and rescue incident not otherwise classified as an aeronautical or maritime incident, and involving missing persons or persons in distress. *“incident de recherche et sauvetage au sol”*
ground speed	The speed a craft is making relative to the earth’s surface. *“vitesse au sol”*
heading	The horizontal direction in which a craft is pointed. *“cap”*
humanitarian search and rescue incident	A search and rescue incident not otherwise classified as an aeronautical or maritime incident. *“incident de recherche et sauvetage humanitaire”*
hypothermia	Abnormal lowering of internal body temperature (heat loss) from exposure to cold air, wind, or water. *“hypothermie”*
initial action stage	A period during which preliminary action is taken to alert search and rescue facilities and obtain amplifying information. *“stade des mesures initiales”*
initial position error (X)	The estimated probable error of the initial position(s) at the beginning of a drift interval. o For the first drift interval, this will be the probable error of the initially reported or estimated position of the search and rescue incident. o For subsequent drift intervals, it will be the total probable error of the previous datum position(s). *“erreur initiale de position”*
INMARSAT	A system of geostationary satellites for world-wide mobile communications services and which support the Global Maritime Distress and Safety System and other emergency communications systems. *“Inmarsat”*

Glossary and Terminology

instrument flight rules (IFR)	• Rules governing the procedures for conducting instrument flight. • Also a term used by pilots and controllers to indicate the type of flight plan. *“règles de vol aux instruments”*
joint rescue coordination centre (JRCC)	A unit, jointly operated by the Canadian Armed Forces and Canadian Coast Guard, solely responsible for promoting efficient organization of search and rescue (SAR) services and for coordinating the conduct of SAR operations within an associated search and rescue region. *“centre conjoint de coordination de sauvetage”*
Joint Task Force (JTF)	A Canadian Armed Forces regional command responsible for the conduct of all routine and contingency operations in its respective area of responsibility within Canada. Canadian Joint Operations Command possesses six regional commands: o North – JTF(N) o Pacific – JTF(P) o West – JTF(W) o Central – JTF(C) o East – JTF(E) o Atlantic – JTF(A) *“Force opérationnelle interarmées”*
knot (kt)	A unit of speed equal to one nautical mile per hour. *“nœud”*
last known position (LKP)	Last witnessed, reported, or computed dead reckoning position of a distressed craft. *“dernière position connue”*
leeway (LW)	The movement of a search object through water caused by winds blowing against exposed surfaces. *“dérive éolienne”*

Glossary and Terminology

leeway divergence angle	The average angle between an object's direction of leeway and the downwind direction. o Leeway may diverge to either the right of the left of the downwind direction. o Current evidence indicates that objects with significant leeway divergence angles rarely jibe or tack downwind. *"angle de divergence de la dérive éolienne"*
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 beacons and forwards the signals. *"station de réception au sol"*
major aeronautical disaster (MAJAID)	An aeronautical incident occurring in a remote area of Canada which, because of the number of people involved, requires augmentation of established search and rescue facilities. *"catastrophe aéronautique"*
major search and rescue operations	• Aeronautical and maritime search and rescue (SAR) incidents where primary SAR units, aeronautical and/or maritime, are tasked on an incident for more than four calendar days. • Incidents which the SRR Commander assesses as being potentially sensitive. • Special cases, as directed by the Canadian Joint Operations Command or Canadian Coast Guard Headquarters. *"opérations majeures de recherche et sauvetage"*
maritime search and rescue incident	A search and rescue incident on any Federal waterway involving a vessel or person(s) from a vessel, including the medical evacuation of person(s) from a vessel. *"incident de recherche et sauvetage maritime"*
maritime rescue sub-centre (MRSC)	A unit operated by the Canadian Coast Guard, subordinate to a joint rescue coordination centre and established to complement the latter within a specific area. *"centre secondaire de sauvetage maritime"*

Glossary and Terminology

mass rescue operation (MRO)	Search and rescue (SAR) services characterized by the need for immediate response to large numbers of persons in distress, such that the capabilities normally available to SAR authorities are inadequate. *"opération de sauvetage de grande ampleur"*
MAYDAY	The international radiotelephony distress signal; it is repeated three times. *"MAYDAY"*
Medical evacuation (MEDEVAC)	Evacuation of a person for medical reasons. *"évacuation médicale"*
Medical evacuation – Critical	The transfer of persons under medical care where the situation is deemed to be life threatening in terms of either the patient's serious condition or isolated location. *"évacuation médicale critique"*
Medical evacuation – Rescue	The critical evacuation of injured or stranded persons from isolated areas, or the recovery of sick or critically injured persons from vessels at sea. *"évacuation médicale de sauvetage"*
Medical evacuation – Routine	The transfer of a patient from one medical facility to another where delay would not unduly compromise the patient's condition. *"évacuation médicale de routine"*
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. *"MEDICO"*
mission control centre (MCC)	Part of the COSPAS-SARSAT system that accepts alert messages from the local user terminal(s) and other MCCs to distribute to the appropriate rescue coordination centres to other search and rescue points of contact. *"centre de contrôle de mission"*

Glossary and Terminology

narrow-band direct printing (NBDP)	HF-NBDP, is offered at Iqaluit MCTS for the broadcast of NavAREA and MetAREA navigational warnings and weather/ice forecasts as a supplement to the Inmarsat-C SafetyNET Service. *“impression directe à bandes étroites”*
NAVTEX	The system for the broadcast and automatic reception of maritime safety information, navigation and meteorological warnings and urgent information to ships, by means of narrow-band direct printing telegraphy. *“NAVTEX”*
on-scene	The search area or the actual distress site. *“sur les lieux, sur place”*
on-scene coordinator (OSC)	A person designated to coordinate search and rescue operations within a specified area. *“coordonnateur sur les lieux”*
on-scene endurance	The amount of time an asset may spend at the scene, engaged in search and rescue activities. *“autonomie sur les lieux”*
operations stage	A period during a search and rescue (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. *“stade des opérations”*
optimal search area	The search area which will produce the highest probability of success when searched uniformly with the search effort available. *“zone de recherche optimale”*
optimal search factor (f_s)	A value based on the amount of relative effort available, which is used to estimate the optimal area to search so the chances of finding the search object are maximized. *“coefficient de recherche optimale”*
optimal search plan	A plan that maximizes the probability of success of finding the search object, using the available search effort. *“plan de recherche optimale”*

Glossary and Terminology

overdue	A situation where a craft has failed to arrive at its intended destination when expected and remains missing.	*"en retard"*
PAN-PAN	The international radiotelephony urgency signal. When repeated three times, indicates uncertainty or alert, followed by nature of urgency.	*"PAN-PAN"*
personal locator beacon (PLB)	Personal radio distress beacon for alerting and transmitting homing signals.	*"balise personnelle de localisation"*
place of refuge	A place where a vessel in need of assistance can take action to enable it to stabilize its condition and reduce the hazards to navigation, and to protect human life and the environment.	*"lieu de refuge"*
planning stage	A period during a search and rescue incident when an effective plan of operations is developed.	*"stade de la planification"*
position	A geographical location normally expressed in degrees and minutes of latitude and longitude.	*"position"*
probability of containment (POC)	The probability that the search object is contained within the boundaries of an area or sub-area.	*"probabilité de confinement"*
probability of detection (POD)	The probability of the search object being detected, assuming it was in the areas that were searched. o POD is a function of coverage factor, sensor, search conditions and the accuracy with which the search facility navigates its assigned search pattern. o It measures sensor effectiveness under the prevailing search condition.	*"probabilité de détection"*

Glossary and Terminology

ramp (or strip) alert	An increased standby posture maintained by Canadian Armed Forces search and rescue facilities during periods of increased Air Defence or other notable activity. *“alerte « aire de trafic » ou « piste d’envol »”*
rescue	An operation to retrieve persons in distress, provide for their initial medical or other needs and deliver them to a place of safety. *“sauvetage”*
rescue action plan	A plan for rescue operations normally prepared by the search and rescue mission coordinator for implementation by the on-scene coordinator and facilities. *“plan du sauvetage”*
rescue coordination	The function of integrating the efforts of search and rescue (SAR) facilities and other resources to achieve concerted and harmonized resolution of SAR incidents in an effective and efficient manner. *“coordination des opérations de sauvetage”*
rescue coordination centre (RCC)	A unit responsible for promoting efficient organization of search and rescue (SAR) operations within a SAR region. *“centre de coordination de sauvetage”*
SafetyNET	A service of the Inmarsat enhanced group call system specifically designed for promulgation of maritime safety information as a part of the Global Maritime Distress and Safety System. *“SafetyNET”*
scenario	A consistent set of known facts and assumptions describing what may have happened to the survivors. *“scénario”*
sea current (SC)	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. *“courant marin”*

Glossary and Terminology

sea state	Condition of the water surface resulting from waves and swells. *"état de la mer"*
search	An operation, normally coordinated by a joint rescue coordination centre or maritime rescue sub-centre, using available personnel and facilities to locate persons in distress. *"recherche"*
search action plan	Message, normally developed by the search and rescue (SAR) mission coordinator, for passing instructions to SAR facilities and agencies participating in a SAR mission. *"plan de la recherche"*
search and rescue (SAR)	SAR comprises the search for, and provision of aid to, persons, ships or other craft which are, or are feared to be, in distress or imminent danger. *"recherche et sauvetage"*
search and rescue case	Any situation where the search and rescue system responds or would have responded had it been alerted at the time the situation was happening. *"cas de recherche et sauvetage"*
search and rescue asset	Any mobile resource, including designated search and rescue (SAR) units, used to conduct SAR operations. *"moyen de recherche et sauvetage"*
search and rescue incident	• Any reported situation which has the potential to require a response from the search and rescue (SAR) system. • A SAR incident becomes a SAR case when the SAR system responds or would have responded had it been alerted at the time of the incident. *"incident de recherche et sauvetage"*
search and rescue mission coordinator (SMC)	The rescue coordinator temporarily assigned to coordinate response to an actual or apparent distress situation at a JRCC. *"coordonnateur de mission de recherche et sauvetage"*

Glossary and Terminology

search and rescue point of contact (SPOC)	Rescue coordination 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. *“point de contact de recherche et sauvetage”*
search and rescue radar transponder (SART)	A self contained, waterproof and manually activated radar transponder intended for emergency use at sea. The SART is used to locate a survival craft or distressed vessel: each radar pulse received by the SART causes it to transmit a response which is swept repetitively across the complete radar frequency band, creating a series of dots on the radar display of any vessel within radar range. *“transpondeur radar de recherche et sauvetage”*
search and rescue region (SRR)	An area of defined dimensions, associated with a joint rescue coordination centre, within which search and rescue services are provided. *“région de recherche et sauvetage”*
search and rescue region commander **(SRR Comd)**	The person designated by the Chief of Defence Staff and authorized by the *Canada Shipping Act, 2001* as being responsible for search and rescue (SAR) operations within a SAR region. *“commandant d’une région de recherche et sauvetage”*
search and rescue response	The actions required from the search and rescue (SAR) system to resolve a situation. These may include: o Tasking a SAR facility o Issuing an “All Stations” broadcast (e.g., distress, urgency, missing aircraft notice, maritime assistance request, etc.) o Monitoring, when situation dictates, for one half hour of working time o Investigating, for one half hour working time, to determine if a SAR incident is occurring o Investigating an official aeronautical or maritime distress alert, as defined under regulations, regardless of the amount of working time o Performing other actions as defined in this manual *“intervention de recherche et sauvetage”*

Glossary and Terminology

search and rescue service	The performance of distress monitoring, communication, coordination and search and rescue functions, including provision of medical advice, initial medical assistance, or medical evacuation, through the use of public and private resources including cooperating aircraft, vessels and other craft and installations. *"service de recherche et sauvetage"*
search and rescue stage	A typical step in the orderly progression of search and rescue missions. The stages are, normally: o Awareness o Initial Action o Planning o Operations o Mission Conclusion *"stade de recherche et sauvetage"*
search and rescue sub-region (SRS)	A specified area associated with a maritime rescue sub-centre. *"sous-région de recherche et sauvetage"*
search and rescue system	The coordinated search and rescue (SAR) system is the combined facilities, equipment and procedures established in each SAR region to provide the response to SAR incidents. *"système de recherche et sauvetage"*
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. *"unité de recherche et sauvetage"*
search and rescue units – primary	• Federal search and rescue (SAR) aircraft or vessels established and equipped specifically for SAR with SAR trained crews aboard. • Primary search and rescue units are under the direct operational control of the SAR Region Commander for SAR taskings. *"unités primaires de recherche et sauvetage"*

Glossary and Terminology

search and rescue units – secondary	All units of the Federal government that are not primary search and rescue units but which may be tasked to aid in the resolution of a search and rescue incident. *“unités secondaires de recherche et sauvetage”*
search and rescue units – other	• Units, other than primary or secondary search and rescue units, which participate in search and rescue activities when required. • This includes civilian agencies, volunteers and partially Federal Government funded facilities such as the Canadian Coast Guard Auxiliary and the Civil Air Search and Rescue Association. *“autres unités de recherche et sauvetage”*
search area (A)	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. *“zone de recherche”*
search effort (Z)	• A measure of the area a search facility can effectively search within the limits of search speed, endurance, and sweep width. • Search effort is computed as the product of search speed (V) search endurance (T), and sweep width (W): Z = V x T x W. *“effort de recherche”*
search endurance (T)	• The amount of “productive” search time available at the scene. • This figure is usually taken to be 85 % of the on-scene endurance, leaving a 15 % allowance for investigating sightings and navigating turns at the ends of search legs. *“autonomie de recherche”*
search facility position error (Y)	The probable error in a search craft’s position, based on its navigational capabilities. *“erreur de position du moyen de recherche”*

Glossary and Terminology

search object	A ship, aircraft, or other craft missing or in distress or survivors or related search objects or evidence for which a search is being conducted. *“objet d’une recherche, objet recherché”*
search pattern	A track line or procedure assigned to a search facility for searching a specified area. *“circuit de recherche”*
search speed (V)	The speed (or velocity) with which a search facility moves over the ground when searching. *“vitesse de recherche”*
search sub-area	A designated area to be searched by a specific assigned search facility or possibly two facilities working together in close coordination. *“sous-zone de recherche”*
searchmaster (SM)	An individual who has been appointed by a search and rescue region commander to coordinate and direct a specific search and rescue operation. *“chef des opérations de recherche”*
self-locating datum marker buoy (SLDMB)	A datum marker buoy that determines its own position and includes the position information in the transmission of the beacon signal. These beacons usually transmit through satellite services. *“bouée-repère auto-localisée”*
sensors	Human senses (sight, hearing, touch, etc.), those of specially trained animals (such as dogs), or electronic devices used to detect the object of a search. *“capteurs”*
set	Refer to “direction of current”.
surface picture (SURPIC)	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. *“tableau de la situation en surface*

Glossary and Terminology

sweep width (W)	A measure of the effectiveness with which a particular sensor can detect a particular object under specific environmental conditions. *"largeur de la bande de ratissage"*
swell	Condition of the water surface caused by a distant wind system. The individual swell appears to be regular and smooth with considerable distance between rounded crests. *"houle"*
tidal current (TC)	Near-shore currents caused by the rise and fall of the tides. *"courant de marée"*
total probable error (E)	• The estimated error in the datum position. • E is equal to the square root of the sum of the squares of the total drift error (D_e), initial position error (X), and search facility position error (Y). *"erreur probable totale"*
total surface drift (TD)	Vector sum of total water current and leeway. *"dérive totale à la surface"*
total water current (TWC)	The vector sum of currents affecting search objects. *"courant total de l'eau"*
track spacing (S)	The distance between adjacent parallel search tracks. *"écart entre les parcours, espacement des parcours"*
uncertainty phase	A situation wherein doubt exists as to the safety of an aircraft or a vessel, and of the persons on board. *"phase d'incertitude"*
unknown search and rescue incident	A search and rescue incident of unknown origin, its source remaining untraced at the conclusion of the incident. *"incident de recherche et sauvetage de source inconnue"*
unnecessary search and rescue alert (UNSAR)	A message sent by a joint rescue coordination centre to the appropriate authorities as a follow-up when the search and rescue system is unnecessarily activated by a false alert. *"alerte de recherche et sauvetage inutile"*

Glossary and Terminology

unreported	A situation where a craft has failed to report its location or status or did not arrive at its destination when expected and remains missing. *“silence ou retard insolite”*
vector	A graphic representation of a physical quantity or measurement, such as wind velocity, having both magnitude and direction. *“vecteur”*
vessel	Any displacement or non-displacement vehicle that uses water as a means of navigation; a maritime craft. *“bateau”*
visual flight rules (VFR)	• Rules governing the procedures for conducting flight under visual meteorological conditions. • Also a term used by pilots and controllers to indicate the type of flight plan. *“règles de vol à vue”*
wave (or chop)	The condition of the water surface caused by local wind and characterized by irregularity, short distance between crests, whitecaps, and breaking motion. *“vague (ou clapotis)”*
when ice is present	Situation where a vessel is located in the immediate vicinity of ice of any type, thicker than 10 centimetres (nilas, brash, pancake ice formation). *“en présence de glace”*
wind current (WC)	The water current generated by wind acting upon the surface of water over a period of time. *“courant dû au vent”*

National Defence
Fisheries and Oceans Canada
Canadian Coast Guard

Défense nationale
Pêches et Océans Canada
Garde côtière canadienne

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CAMSAR I

CANADIAN AERONAUTICAL AND MARITIME SEARCH AND RESCUE MANUAL

Volume I – Organization and Management

(ENGLISH)

Supplement to the IAMSAR Manual, Volume I

Canada

Chapter 1 GENERAL SYSTEM CONCEPT

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Chapter 1 GENERAL SYSTEM CONCEPT

1.01 National SAR Objective

The National Search and Rescue (SAR) Objective is to prevent loss of life and injury through SAR alerting, responding and aiding activities that use public and private resources.

Where possible and directly related thereto, reasonable efforts will be made to minimize damage to or loss of property.

Through prevention measures focused on owners and operators most commonly involved in SAR incidents, the National SAR Program will attempt to reduce the number and severity of SAR incidents.

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1.01 National SAR Objective

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1.02 National SAR Program

General

1.02.1 In 1986, the Government of Canada directed the establishment of a National Search and Rescue (SAR) Program. The National SAR Program is a cooperative effort by federal, provincial and municipal governments along with other SAR organizations. The objective of the National SAR Program is to save lives by enhancing SAR prevention and provide effective and affordable SAR services in Canada's SAR areas of responsibility.

Components

1.02.2 The National SAR Program is characterized by the three complementary components of:

.1 Aeronautical SAR;

.2 Maritime SAR; and

.3 Ground SAR.

1.02.3 Within any component, one of the two following pillars of the National SAR program might exist:

.a SAR Prevention; and/or

.b SAR Response.

Jurisdictions

1.02.4 Membership in the National SAR Program does not in any way change existing jurisdictions, responsibilities or authorities, nor requires the mandatory expenditure of resources. Membership does, however, provide a structure and process to produce effective, efficient and economical use of resources.

1.02.5 **Federal –** In Canada, the provision of aeronautical SAR and maritime SAR[1] services is a federal government mandate. The National SAR Program is supported by the Canadian Armed Forces and the Canadian Coast Guard through two areas of activity related to the aeronautical and maritime SAR services:

.1 SAR operations, aimed at detection, response and rescue; and

.2 SAR mutual training.

[1] In waters of federal jurisdiction.

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1.02 National SAR Program

1.02.6 Provincial / Territorial – Ground SAR is conducted under the legal authority of the individual provinces and territories. This authority is delegated for operational response to the police service of jurisdiction. At the provincial and territorial level, the Royal Canadian Mounted Police are the operational authority for ground SAR in all Canadian provinces and territories except Ontario, Quebec, Nunavut and parts of Newfoundland and Labrador.

1.02.7 Although numerous federal, provincial, territorial, municipal, commercial and volunteer groups contribute to the National SAR Program, this manual will focus on the federal responsibility for aeronautical and maritime SAR activity.

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1.03 International SAR Treaties, Conventions and Agreements

Legal Basis for Services

1.03.1 Participation – Canada participates in a number of international organizations such as the International Civil Aviation Organization (ICAO) and the International Maritime Organization (IMO), and has agreed to adopt search and rescue (SAR) standards and practices in accordance with the *Convention on International Civil Aviation*, the *International Convention for the Safety of Life at Sea (SOLAS), 1974, International Convention on Maritime Search and Rescue, 1979* and the *Agreement on Cooperation on Aeronautical and Maritime Search and Rescue in the Arctic, 2011.* Standardization is also achieved by membership in international military organizations such as the North Atlantic Treaty Organization and the Air Standardization Coordinating Committee. Similarly, the Canadian Coast Guard seeks standardization of maritime SAR procedures through IMO forums such as the Maritime Safety Committee and the Radiocommunications and Search and Rescue Sub-Committee. Finally, agreements between SAR agencies from Canada and bordering countries enhance coordination and mutual support operations adjacent to common borders.

International Convention for the Safety of Life at Sea, 1974

1.03.2 Legislative Support – The *SOLAS Convention* has the objective of promoting safety of life at sea by the contracting governments, through adoption and pursuance of common laws and regulations and all other steps which may be necessary to ensure, from the point of view of safety of life, that a ship is fit for the service for which it is intended. Each contracting government also undertakes to ensure that necessary arrangements are made for coast watching and for the rescue of the persons in distress at sea and around its coasts. Canada is a signatory to the *SOLAS Convention* and has accepted the obligation to establish the facilities required for coast watching and rescuing persons in distress at sea, along its coasts and off-shore areas for which it has accepted the responsibility.

International Convention on Maritime Search and Rescue, 1979

1.03.3 The main purpose of the *International Convention on Maritime Search and Rescue, 1979,* is to facilitate cooperation between governments and to facilitate cooperation between those participating in SAR operations at sea. In this regard the IMO has established an International SAR Plan and published, in conjunction with ICAO, the *International Aeronautical and Maritime Search and Rescue Manual* to assist governments. The *International Convention on Maritime Search and Rescue, 1979,* has been in effect in Canada since June 22, 1985.

NOTE:	Refer to *Annex 1 – Excerpts from the International Convention on Maritime Search and Rescue, 1979*.

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1.03 International SAR Treaties, Conventions and Agreements

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1.04 Area of Responsibility for SAR

Federal AOR

1.04.1 For aeronautical and maritime search and rescue (SAR) incidents, the Canadian federal area of responsibility (AOR) is as defined under International Civil Aviation Organization (ICAO) agreements for aeronautical SAR, and as defined under International Maritime Organization (IMO) agreements for maritime SAR.

Search and Rescue Regions

1.04.2 In accordance with the IMO SAR Plan and ICAO Regional Air Navigation Plans, the Canadian federal SAR AOR has been divided into three search and rescue regions (SRRs) for maritime and aeronautical SAR coordination. The boundaries of these SRRs, respectively under the responsibility of the Victoria, Trenton and Halifax Joint Rescue Coordination Centres, are defined as follows:

- **Victoria SRR –** 54°42.5'N 130°36.5'W, along the Alaska/Canada border to the Beaufort Sea, east along the shoreline to the Yukon/North West Territory border, south along the Yukon/North West Territory border to 60°00'N, east along 60°00'N to the British Columbia/Alberta border, south along the British Columbia/Alberta border to the Canada/United States border, west along the Canada/United States border to 48°30'N 124°45'W, 48°30'N 125°00'W, 48°20'N 128°00'W, 48°20'N 145°00'W, 54°40'N 140°00'W, 54°40'N 136°00'W, 54°00'N 136°00'W, 54°13'N 134°57'W, 54°39.45'N 132°41'W and 54°42.5'N 130°36.5'W.

- **Trenton SRR –** 70°00'N 080°00'W, 64°00'N 080°00'W, 62°00'N 070°00'W, 46°42'N 070°00'W, westerly along the Canada/United States border to the Alberta/British Columbia border, north along the Alberta/British Columbia border to 60°00'N 120°00'W, westerly to 60°00'N 124°00'W, north along the Yukon/North West Territory border to the Beaufort Sea, westerly along the coast to the Canada/Alaska border, north along 141°00'W to the North Pole, south to 82°00'N 060°00'W, 78°00'N 075°00'W, 76°00'N 076°00'W, 70°00'N 063°00'W and west to 70°00'N 080°00'W.

- **Halifax SRR –** 64°00'N 080°00'W, 70°00'N 080°00'W, 70°00'N 063°00'W, 65°00'N 057°45'W, 63°00'N 055°40'W, 58°30'N 050°00'W, 58°30'N 030°00'W, 45°00'N 030°00'W, 45°00'N 053°00'W, 43°36'N 060°00'W, 41°52'N 067°00'W, 44°30'N 067°00'W, north to the Canada/United States border, westerly along the Canada/United States border to the 70th meridian, north along the 70th meridian to 62°00'N 070°00'W and north-west to 64°00'N 080°00'W.

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1.04 Area of Responsibility for SAR

NOTE: For maritime SAR purposes, the SRRs include all oceanic, coastal[1] and secondary waters[2] but not inland waters[3], except for the Canadian inland waters of the Great Lakes, St. Lawrence River System[4] and Lake Melville.

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[1] Coastal waters include any tributary's estuary.

[2] As defined in the *Canada Shipping Act, 2001*.

[3] As defined in section 2 of the *Customs Act*.

[4] The St. Lawrence River System includes all navigable waters of the Gulf, Estuary and River of St. Lawrence, the St. Lawrence Seaway, and the three main tributaries: the Saguenay River, up to the City of Saguenay; the Richelieu River, up to the Canada/United States border; and the Ottawa River, up to the Carillon Lock.

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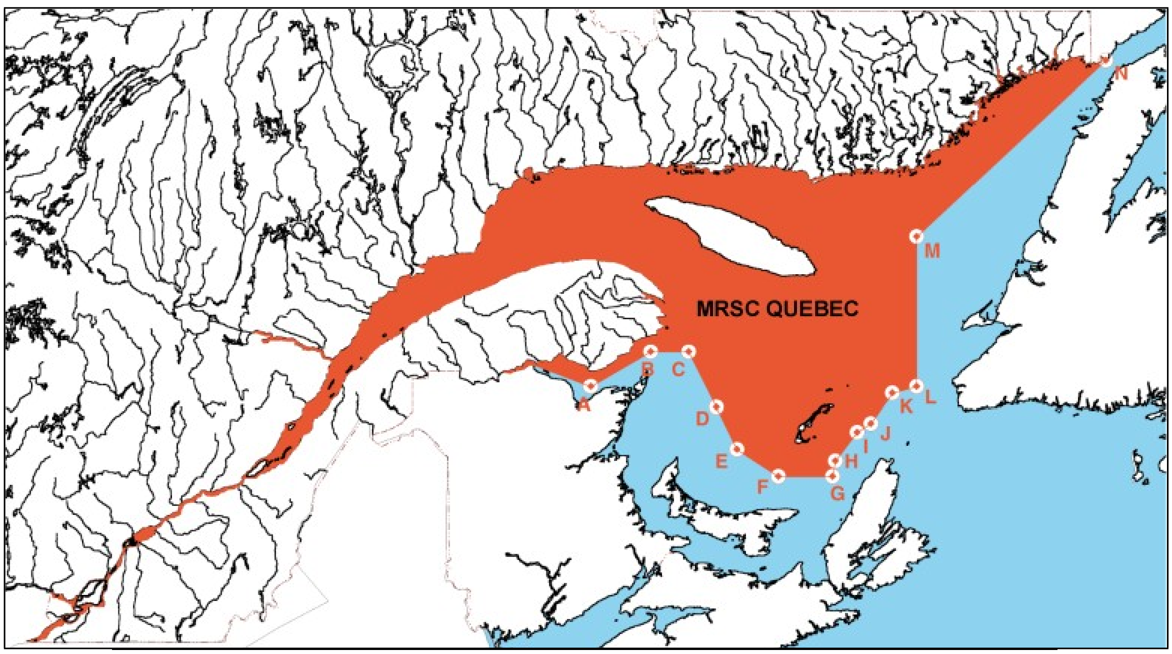
1.04 Area of Responsibility for SAR

Search and Rescue Sub-regions

1.04.3 A Maritime Rescue Sub-Centre (MRSC) exists at Quebec City, Québec. and is defined as follows:

- **Québec SRS –** The Québec SRS includes all waters and major tributaries of the St. Lawrence River east of longitude 74°46'W, and is bounded to the east by a line extending from Dalhousie, New Brunswick, through the points listed below, to Pointe Amour, Newfoundland and Labrador. It also includes the Ottawa River east of the Carillon Lock (74°24'W).



	Latitude	Longitude		Latitude	Longitude
A	47° 50' 00" N	65° 25.0 W	**H**	47° 00.0 N	61° 21.1 W
B	48° 13'.3 N	64° 25.4 W	**I**	47° 19.7 N	60° 59.6 W
C	48° 13.3 N	63° 47'.5 W	**J**	47° 25.4 N	60° 45.8 W
D	47° 36.4 N	63° 19.9 W	**K**	47° 45.7 N	60° 24.3 W
E	47° 08.4 N	62° 59.2 W	**L**	47° 50'.0 N	60° 00.0 W
F	46° 50.4 N	62° 18.1W	**M**	49° 30.0 N	60° 00.0 W
G	46° 50.4 N	61° 24.0W	**N**	51° 27.0 N	56° 52.0 W

NOTE: The Québec SRS waters west of the 70th meridian are within the Trenton SRR; those to the east of the 70th meridian are within the Halifax SRR.

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1.04 Area of Responsibility for SAR

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1.05 Federal SAR Organization

Lead Minister

1.05.1 The Lead Minister for search and rescue is the single spokesperson for the government on overall search and rescue (SAR) matters.

1.05.2 Within the federal system, the focus on SAR as a distinct integrated activity is maintained through the Interdepartmental Committee on Search and Rescue (ICSAR) and the National Search and Rescue Secretariat (NSS).

Interdepartmental Committee on Search and Rescue

1.05.3 ICSAR is made up of senior federal officials representing departments and central agencies involved in the National SAR Program. This committee is the primary forum for the development of advice for the Lead Minister. ICSAR is responsible for identifying SAR requirements and advising the government on how best to respond to these requirements. ICSAR exists to provide interdepartmental coordination and advice to the ministers in the areas of SAR policy, planning, resources, and effectiveness.

1.05.4 **ICSAR Composition –** ICSAR is chaired by the executive director of the NSS and consists of members from the Department of National Defence (Canadian Armed Forces); the Department of Fisheries and Oceans (Canadian Coast Guard); Transport Canada; Environment Canada (Meteorological Service of Canada); Parks Canada; and Public Safety Canada (Royal Canadian Mounted Police). Additional ICSAR representatives include the Department of Natural Resources; Aboriginal Affairs and Northern Development Canada; the Treasury Board; and the Privy Council Office.

National Search and Rescue Secretariat

1.05.5 Accountable to the LM SAR, NSS is an independent body outside the line authorities of SAR delivery departments. It plays a central managerial support role of the overall SAR objectives of departments. The role of the NSS is to enhance the provision of effective, efficient and economical SAR services in Canada by facilitating the development of the National SAR Program. This includes facilitating the cooperation, communication and coordination among National SAR Program members in the development of policy, resource planning, research and development, analysis and review. The executive director of the NSS has been designated the Chair of ICSAR. Operational departments deliver SAR service and, via ICSAR and/or departmental lines of communication, advise the LM SAR in areas of SAR policy, planning, resources and effectiveness. This management process allows the LM SAR to receive the advice of the departments and the independent advice of the NSS if there is not consensus with which to make program recommendations to Cabinet. The SAR delivery departments thus retain full control of SAR operations and execute their components of the National SAR Program.

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1.05 Federal SAR Organization

Federal Search and Rescue Operational Governance Committee

1.05.6 The Federal Search and Rescue (SAR) Operational Governance Committee (OGC) is the principal oversight body for the effective coordination of aeronautical and maritime SAR operations conducted by the Canadian Coast Guard and the Canadian Armed Forces as part of the federal component of the National SAR Program. The Deputy Commander Continental Canadian Joint Operations Command and the Deputy Commissioner Operations Canadian Coast Guard are designated co-chairs of the Federal SAR OGC. The Committee will ensure that operations for the Canadian Coast Guard and Canadian Armed Forces federal components of the National Search and Rescue Program are delivered through:

- An annual review of the TORs to ensure that the governance structure remains focused on operations oversight;
- Oversight of operations and the effective application of the resources controlled by their Departments;
- The development and approval of operational principles, policies, standards and plans that support the SAR corporate program's strategic priorities; and
- The review of exposure to operational risks such as the compliance with acts and regulations and resourcing levels which could affect system integrity.

The committee shall meet bi-annually but inter-sessional meetings may be called by either Co-chair as circumstances dictate. The Committee will provide as a minimum, two updates to the Commissioner of the Canadian Coast Guard and the Commander of Canadian Joint Operations Command to coincide with scheduled meetings. These updates shall include a summary of discussion and any key recommendations or decisions taken by the Committee. The reports will include an update on key indicators of performance of the federal aeronautical and maritime search and rescue program. The Committee will prepare an annual report on operations for the Commander of Canadian Joint Operations Command and the Commissioner of the Canadian Coast Guard that would form the basis of independent departmental reporting to respective Ministers as required.

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1.05 Federal SAR Organization

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Chapter 1 GENERAL SYSTEM CONCEPT

1.06 National Defence SAR Responsibilities

Canadian Armed Forces

1.06.1 The primary responsibility for the provision of aeronautical search and rescue (SAR) services and effective operation of the coordinated aeronautical and maritime SAR system is assigned to the Canadian Armed Forces (CAF). The provision of assistance to aircraft in distress through a federal aeronautical SAR service arises out of Canada's signatory status in 1944 to the *Convention on International Civil Aviation, Article 25*. As well, on June 18, 1947, the Cabinet authorized the Royal Canadian Air Force to establish facilities and equipment to meet this commitment. In 1951, the Cabinet further delegated responsibility for maritime SAR coordination to the Royal Canadian Air Force.

Commander, Canadian Joint Operations Command

1.06.2 The Commander, Canadian Joint Operations Command, is responsible for

.1 the coordination, control and conduct of SAR operations in the Canadian area of responsibility (AOR),

.2 the Operational CAF SAR policy,

.2 the liaison with other SAR operating departments and agencies, nationally and internationally, and

.3 the oversight of annual coordinating activities between the CAF and Canadian Coast Guard (CCG) national and regional SAR staffs.

Commander, Royal Canadian Air Force

1.06.3 The Commander of the Air Force is responsible for

.1 the strategic CAF SAR policy,

.2 the CAF SAR unit allocation,

.3 the liaison with the National Search and Rescue Secretariat, and

.4 the provision of a CAF Interdepartmental Committee on Search and Rescue (ICSAR) representative responsible for departmental SAR policy coordination.

Joint Forces Air Component Commander

1.06.4 The Commander, 1 Canadian Air Division, (1 CAD) is the Joint Forces Air Component Commander. As such, he is responsible for

Chapter 1 GENERAL SYSTEM CONCEPT

1.06 National Defence SAR Responsibilities

.1 the provision of aeronautical SAR Squadrons,

.2 the staffing and operational oversight of the joint rescue coordination centres (JRCCs) and the Canadian Mission Control Centre (CMCC),

.3 the provision of ground search in support of aeronautical incidents,

.4 the interface between the Civil Air Search and Rescue Association (CASARA), and the CAF at the operational level, and

.5 the implementation and coordination of academic SAR training.

Commander, Joint Task Force Atlantic

1.06.5 The Commander, Joint Task Force (JTF) Atlantic, as Commander of the Halifax Search and Rescue Region (SRR), is accountable for the coordination, control and conduct of CAF SAR operations in the Halifax SRR.

Commander, 1 Canadian Air Division

1.06.6 The Commander, 1 CAD, as Commander of the Trenton SRR, is accountable for the coordination, control and conduct of CAF SAR operations in the Trenton SRR, and the effective operation of the CMCC.

Commander, Joint Task Force Pacific

1.06.7 The Commander, JTF Pacific, as Commander of the Victoria SRR, is accountable for the coordination, control and conduct of CAF SAR operations in the Victoria SRR.

CAF SAR Activities

1.06.8 The SAR activities of the CAF are

.1 the efficient operation of the aeronautical and maritime components of the coordinated SAR system;

.2 the provision and operation of the JRCCs, CMCC and other SAR installations, in conjunction with the CCG;

.3 the coordination, control, and conduct of aeronautical SAR operations within the Canadian AOR and between Canada and other countries, in accordance with existing agreements;

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1.06 National Defence SAR Responsibilities

.4 the provision of SAR aircraft in response to aeronautical SAR incidents within the Canadian AOR;

.5 the setting of priorities pertaining to the allocation of SRUs to SAR operations;

.6 the provision of ground SAR and humanitarian assistance, as a complementary tasking;

.7 the formulation and promulgation of SAR policy (in collaboration with ICSAR);

.8 the establishment of operating standards and the provision of SAR training for the coordinated SAR system in collaboration (when appropriate) with CCG authorities;

.9 the evaluation of SAR equipment and procedures in collaboration (when appropriate) with CCG authorities;

.10 the review of SAR services, facilities and SRUs in collaboration (when appropriate) with CCG;

.11 the evaluation of CASARA capabilities and readiness, and coordination of CASARA operational activities; and

.12 the efficient operation of the Canadian components of the COSPAS-SARSAT system including CMCC and associated ground stations (local user terminals).

CAF SAR Tasks

1.06.9 **Basic SAR Tasks –** The CAF has the following basic SAR tasks:

.1 To coordinate, control and conduct SAR operations in relation to aeronautical SAR incidents within the Canadian AOR.

.2 To provide SRUs in support of the prosecution of maritime SAR operations and to exercise ultimate authority in the allocation of all SRUs during a SAR incident.

.3 To conduct and/or coordinate ground searches in relation to aeronautical SAR incidents.

.4 To provide the resources to operate the Canadian components of the COSPAS-SARSAT system.

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1.06 National Defence SAR Responsibilities

1.06.10 Complementary SAR Tasks – The CAF has the following complementary SAR tasks:

.1 To provide SRUs when and where available, to assist in the prosecution of ground SAR and humanitarian incidents in support of a province or territory which occur within provincial or territorial areas of responsibility.

.2 To advise the appropriate agencies of areas of concern identified in SAR operations.

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1.07 Fisheries and Oceans SAR Responsibilities

Department of Fisheries and Oceans

1.07.1 General – The responsibility for the provision of the maritime component of the federal search and rescue (SAR) program rests with the Department of Fisheries and Oceans (DFO) and the Canadian Coast Guard (CCG). This responsibility is assigned to DFO through the *Oceans Act*.

1.07.2 History – In 1948, Canada signed the *Convention for the Safety of Life at Sea,* wherein, under *Chapter 5, Regulation 15*, each contracting state is required to undertake and ensure necessary arrangements for coast watching and for the rescue of persons in distress at sea. In 1958, Canada became a signatory to the *Convention on the High Seas*, wherein, under *Article 12 (2)*, every coastal state is required to maintain an adequate and effective SAR service regarding safety on and over the sea. These responsibilities are further reflected and amplified in subsequent Cabinet decisions, and legislation such as the *Canada Shipping Act, 2001* and the *Oceans Act*. The *International Convention on Maritime Search and Rescue, 1979*, further defines these responsibilities.

NOTE: Refer to *Annexes 1, 2 and 3* for excerpts from the latter three documents.

Canadian Coast Guard

1.07.3 The CCG has primary responsibility for the provision of the maritime component of the federal SAR program.

CCG SAR Activities

1.07.4 The SAR activities of the CCG are

.1 the provision of and participation in the maritime component of the joint rescue coordination centres (JRCCs) as well as the provision, operation and equipping of the Quebec Maritime Rescue Sub-Centres (MRSC) and other SAR installations, in cooperation with the Canadian Armed Forces (CAF);

.2 in collaboration with the CAF, the coordination, control and conduct of maritime SAR operations within the Canadian area of responsibility (AOR);

.3 the provision of maritime advice and assistance to the CAF in the coordination of aeronautical SAR and other emergencies which may require the use of maritime facilities;

.4 the provision of maritime SAR units (SRUs) in response to SAR incidents within the Canadian AOR, the activities of which SRUs are coordinated by JRCCs and Quebec MRSC;

Chapter 1 GENERAL SYSTEM CONCEPT

1.07 Fisheries and Oceans SAR Responsibilities

.5 the provision of humanitarian assistance, as a secondary task, when such is deemed best provided by CCG SRUs;

.6 the formulation and promulgation of federal SAR policy (in collaboration with the Interdepartmental Committee on Search and Rescue);

.7 the establishment of levels of service, performance and operating standards;

.8 the provision of maritime SAR training for the coordinated SAR system in collaboration (when appropriate) with the CAF;

.9 the organization, coordination and administration of Canadian Coast Guard Auxiliary activities;

.10 the evaluation of SAR services, equipment and procedures, in collaboration with the CAF;

.11 the review of SAR services, installations and units, in collaboration with the CAF; and

.12 the provision of maritime distress and safety communications and alerting services.

CCG SAR Tasks

1.07.5 Basic SAR Tasks – The CCG has the following basic SAR tasks:

.1 To detect maritime incidents and, in collaboration with the CAF, coordinate, control and conduct SAR operations relating to maritime SAR incidents within the Canadian AOR.

.2 To provide maritime units and communications in support of the prosecution of aeronautical SAR operations where applicable.

1.07.6 Complementary SAR Tasks – The CCG has the following complimentary SAR tasks:

.1 To provide SRUs, when and where available, to assist in the prosecution of humanitarian incidents.

.2 To support Transport Canada (Office of Boating Safety) in SAR prevention through participation in related educational programs and by advising the appropriate agencies of areas of concern identified in SAR operations.

Chapter 1 GENERAL SYSTEM CONCEPT

1.08 Other Federal SAR Responsibilities

All Federal Government Departments

1.08.1 As directed by the Cabinet, aircraft, vessels and other facilities of all departments of the federal government are considered secondary search and rescue (SAR) units and will respond to taskings or calls for SAR assistance whenever possible.

Transport Canada

1.08.2 Transport Canada (TC) is responsible for transportation policies and programs. It ensures that air, marine, road and rail transportation are safe, secure, efficient and environmentally responsible. Through its Safety Programs, TC develops and enforces safety regulations, and works with national and international partners to prevent and manage security risks in all transportation modes.

1.08.3 Aeronautical Safety

.1 **Prevention –** TC has the primary responsibility for the provision of the Aeronautical Search and Rescue (SAR) Prevention Program, under the authority of the *Aeronautics Act*. This responsibility is met through education programs, regulation and enforcement and is executed in close consultation with the Canadian Armed Forces SAR authorities in an effort to optimize program priorities and effectiveness. Coordination is effected through the Interdepartmental Committee on Search and Rescue.

.2 **SAR Roles –** TC has the following roles in aeronautical SAR:

.a To provide means and methods in respect to civil aircraft in distress in the Canadian area of responsibility to achieve efficiency in alerting the appropriate Joint Rescue Coordination Centre to aid in locating distressed aircraft.

.b To provide specialized departmental resources and expertise as a functional part of the SAR program.

.c To coordinate, control and conduct a prevention program designed to reduce the number and severity of aeronautical incidents.

1.08.4 Maritime Safety

.1 **Activities –** TC acts to enforce Canadian legislation and international rules intended to ensure safety of life at sea and protect the maritime environment. Broad areas of maritime safety activity include the following:

- Setting standards for vessel crew, design, equipment and use
- Monitoring and compliance of Canadian and foreign vessels

Chapter 1 GENERAL SYSTEM CONCEPT

1.08 Other Federal SAR Responsibilities

- Licensing pleasure craft
- Pleasure Craft Operator Competency Requirements
- Pollution prevention and response
- Inspection of dangerous goods containers
- Protecting the navigability of Canada's waterways
- Cargo handling and ship-port interface
- Navigation and radio communications
- Environmental protection and response systems
- Ship operations and inspection
- Vessel registration

.2 **Office of Boating Safety –** The Office of Boating Safety (OBS) delivers prevention-based programs and vital information for users and builders of recreational boats. The Manager OBS, through the Director General, Marine Safety and Security, is the senior officer responsible for the exercise of functional authority and direction in relation to recreational boating safety and SAR prevention activities aimed at reducing risk and at reducing the impact to the environment by pleasure craft. The authority and direction noted include

.a OBS policy and resource allocation;

.b safety regulations and standards for all recreational boating activity on all Canadian waters, which includes standards for vessel construction, safety equipment specific to recreational boats, (notably personal flotation devices) and administration of an operator competency program; and

.c SAR Loss-Of-Life

- courtesy examinations,
- 1-800 information line,
- demonstrations and lectures, and
- awareness campaigns.

.3 Canadian Coast Guard Environmental Response – CCG (ER) program mission is to ensure an appropriate level of preparedness and response capability for all ship-source and mystery source pollution incidents in waters under Canadian Jurisdiction. To that end the Coast Guard implements a consistent approach for responding to marine pollution incidents in all regions of Canada.

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1.08 Other Federal SAR Responsibilities

Transportation Safety Board

1.08.5 The Transportation Safety Board of Canada (TSB) is an independent agency created by the *Canadian Transportation Accident Investigation and Safety Board Act*, which came into force on 29 March 1990. It reports directly to Parliament through the Leader of the Government in the House of Commons. Its mandate is to advance transportation safety through the investigation of occurrences, notably in the maritime and aeronautical modes of transportation.

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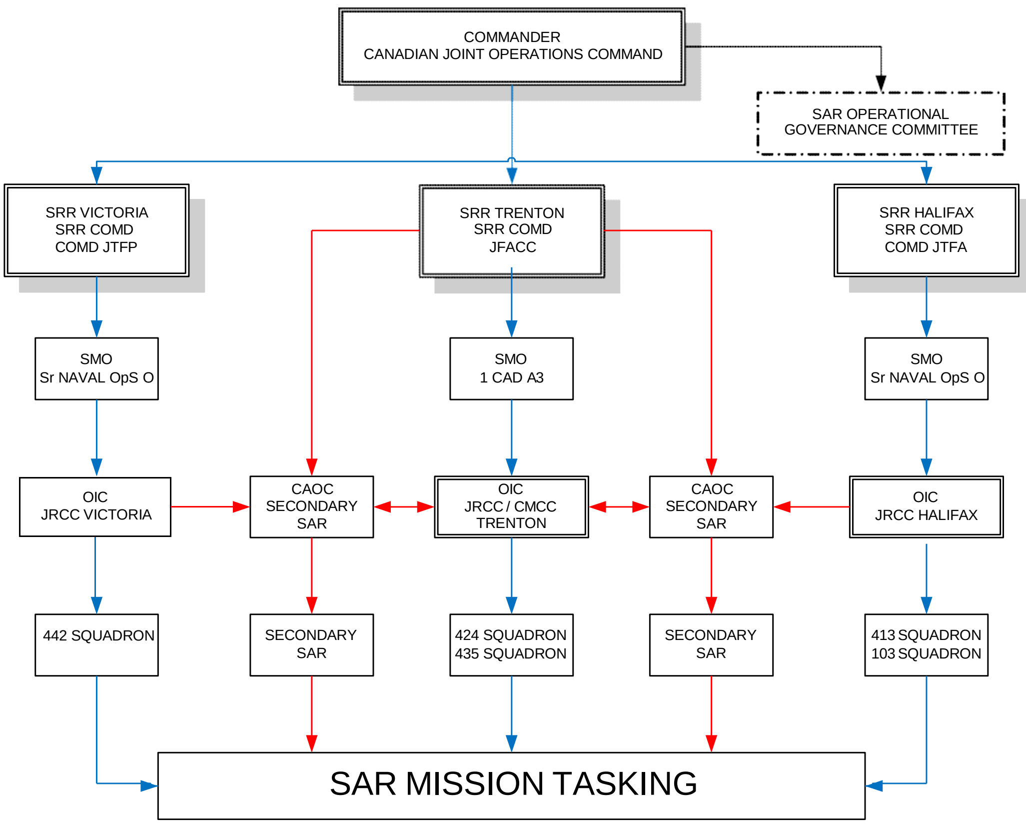
2.01 SAR Organization Charts

2.01.1 CAF SAR Management Structure



Primary SAR – Blue (All RCAF Aircraft are Considered Secondary SAR Assets) Secondary SAR - Red

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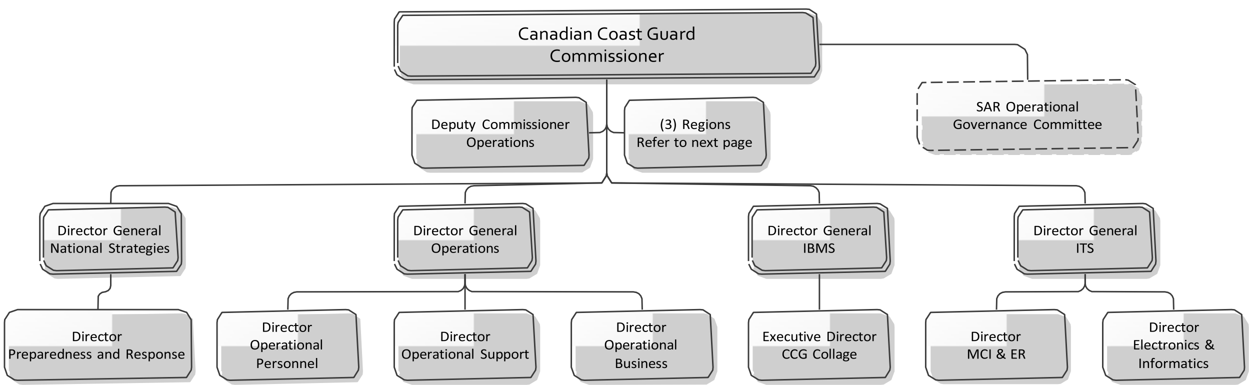
2.01 SAR Organization Charts

2.01.2CCG SAR Management Structure – The Canadian Coast Guard (CCG) is a Special Operating Agency within the Department of Fisheries and Oceans.



The 3 CCG regions are: Western, Central &Arctic and Atlantic

(continued on next page)

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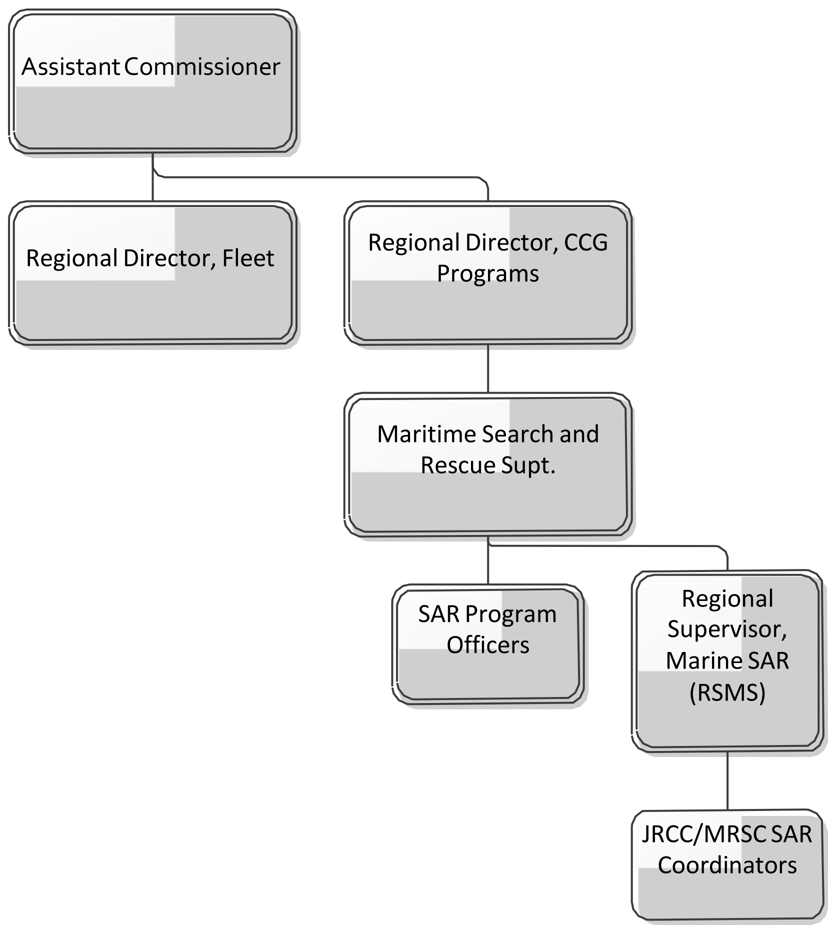
2.01 SAR Organization Charts

2.01.2 – CCG SAR Management Structure *(continued)*

STANDARD REGIONAL ORGANIZATION



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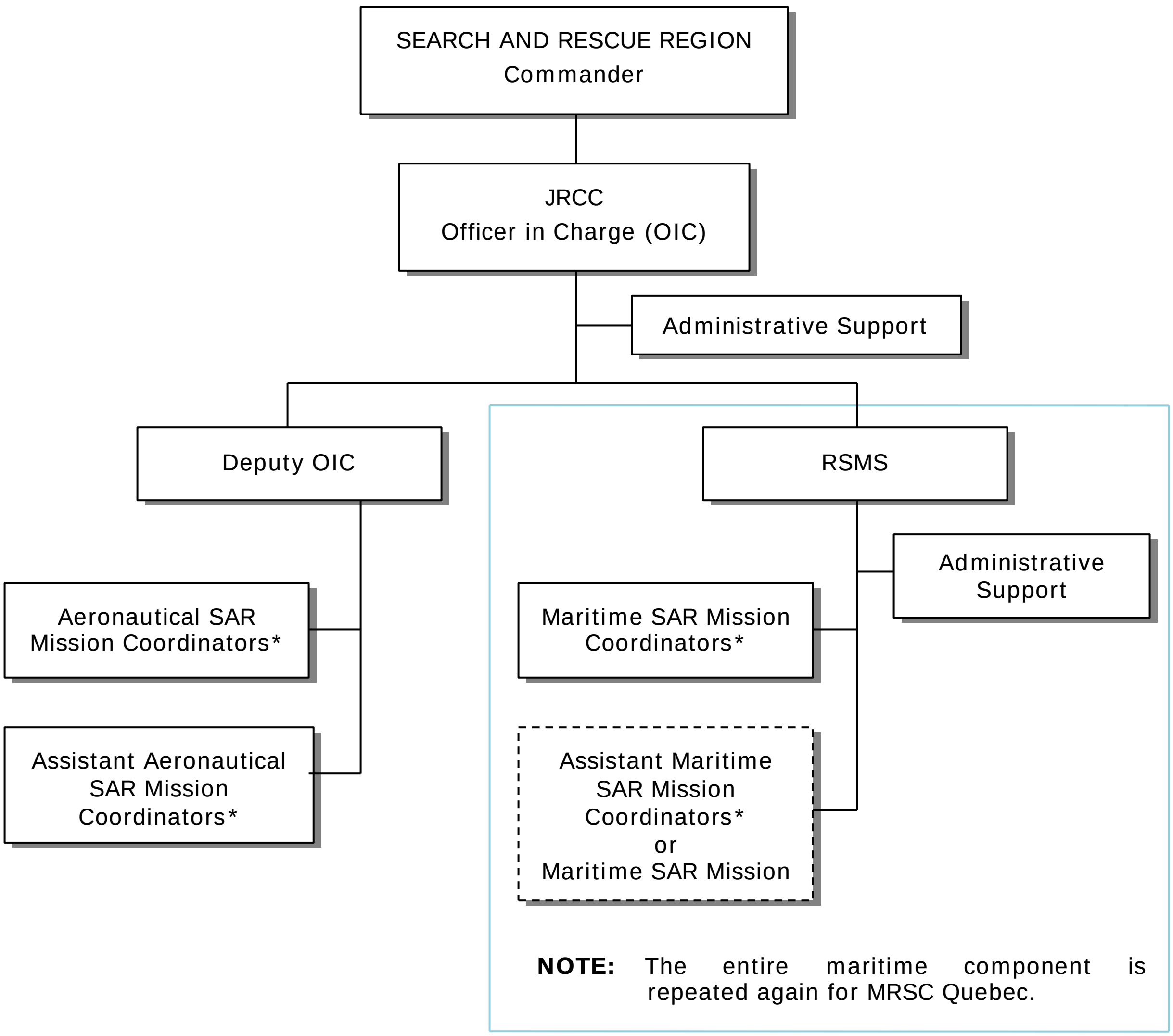
2.01 SAR Organization Charts

2.01.3 SAR Coordination Operational Structure

STANDARD ORGANIZATION



* Numbers vary depending on Centre.

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2.02 Canadian Armed Forces

DEPUTY COMMANDER CONTINENTAL CJOC

The Deputy Commander Continental - is the co-chair of the Federal Search and Rescue Operations Governance Committee. The Federal Search and Rescue (SAR) Operations Governance Committee shall be the principal oversight body for the effective coordination of aeronautical and maritime SAR operations conducted by the Canadian Armed Forces and the Canadian Coast Guard as part of the federal component of the National SAR System.

CJOC J3 SAR

2.02.1 The Canadian Joint Operations Command (CJOC) J3 SAR staff is responsible to the Commander, CJOC, for

.1 the liaison with the Canadian Coast Guard (CCG), the National SAR Secretariat (NSS) and other agencies involved in the National SAR Program;

.2 the development and promulgation of Operational CAF SAR policy in accordance with ministerial direction;

.3 the liaison with the Regional Joint Task Forces Headquarters (HQs) on SAR matters;

.4 the liaison with the 1 Canadian Air Division (1 Cdn Air Div) SSO SAR and the Joint rescue Coordination Centres (JRCCs) on SAR operational and force generation issues;

.5 the monitoring of major SAR operations and the processing of major search reduction requests;

.6 the participation in the COSPAS-SARSAT program, in conjunction with 1 Cdn Air Div SSOSAR, NSS and the Canadian Mission Control Centre (CMCC);

.7 the membership in the Interdepartmental Committee on Search and Rescue (ICSAR) Coordination Sub-Committee;

.8 the provision of Canadian representation on operational level SAR working groups such as the International Civil Aviation Organization (ICAO)/International Maritime Organization Joint SAR Working Group;

.9 the co-chairing with the CCG an annual coordination meeting of CAF and CCG HQ SAR staffs with the officers in charge and regional supervisor, maritime SAR, of the JRCCs and maritime rescue sub-centres, to resolve current operational SAR issues and prioritize the next year's program;

.10 CJOC J3 SAR in collaboration with the CCG will produce the annual Federal SAR Operations Governance Committee report;

.11 SAR statistical reports to be incorporated into the annual Federal SAR Operations Governance Committee Report produced in collaboration with Canadian Coast Guard;

.12 the processing of ministerial or other inquiries regarding CAF aspects of the Canadian SAR Program; and

.13 the Office of Primary Interest duties regarding the *Major Aeronautical Disaster Operation Plan*.

Directorate of Air Requirements

2.02.2 The Directorate Air Requirements staff is responsible to the Commander of the Royal Canadian Air Force (RCAF) for

.1 the coordination of equipment procurement and other requirements of the CAF SAR system;

.2 the coordination of all CAF inputs to the New SAR Initiatives Fund; and

.3 the monitoring of research and development for potential improvements in CAF SAR equipment.

Directorate of Air Readiness and Plans

2.02.3 The Directorate of Air Readiness and Plans staff is responsible to the Commander RCAF for

.1 the development and promulgation of Strategic CAF SAR policy in accordance with ministerial direction;

.2 the processing of ministerial or other inquiries regarding CAF policy aspects of the Canadian SAR program;

.3 the provision of information to other NDHQ staffs on matters concerning SAR;

.4 the coordination of staff support to the Comd RCAF ICSAR representative;

.5 the provision of Canadian representation for SAR policy matters at the System of Cooperation among the Air Forces of America (SICOFAA) and ICAO; and

.6 Management of the CASARA and CASARA North program.

Senior Staff Officer SAR (SSOSAR)

2.02.4 The SSOSAR is responsible to the Commander, 1 Cdn Air Div, for

.1 the preparation and publishing of the CAF SAR operational procedures in accordance with current policy;

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2.02 Canadian Armed Forces

.2 the administration, standardization and determination of readiness levels of CAF SAR formations;

.3 the operational readiness, by performing regular evaluations of CAF SAR units and facilities, including JRCCs;

.4 SAR statistical reports to be incorporated into the annual Federal SAR Operations Governance Committee Report produced by CJOC J3 SAR staff;

.5 the liaison with the Civil Air Search and Rescue Association (CASARA), and the coordination of CASARA activities;

.6 the provision of staff support to the Trenton SAR Region Commander;

.7 the provision of operational guidance and support to the JRCCs and CMCC;

.8 the processing of ministerial or other inquiries related to SAR operational and force generation matters;

.9 the liaison with the North Atlantic Treaty Organization and the Air Standardization Coordinating Committee;

.10 the preparation and delivery of the 1 Cdn Air Div Assistant Search master Course, and, in collaboration with the CCG, the coordination of the SAR Mission Coordinator Course;

.11 the operational oversight of the SAR Mission Management System (SMMS) program;

.12 in concert with DIMTPS, the development and management of short and long term life cycle management plans for the Canadian components of the COSPAS-SARSAT system, including the CMCC; and

.13 the management and accountability of all SAR operational funding to the JRCCs through 1 Cdn Air Div business planning process.

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2.02 Canadian Armed Forces

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2.03 Canadian Coast Guard

Deputy Commissioner – Operations

2.03.1 The Deputy Commissioner – Operations is the co-chair of the Federal Search and Rescue Operations Governance Committee. The Federal Search and Rescue (SAR) Operations Governance Committee shall be the principal oversight body for the effective coordination of aeronautical and maritime SAR operations conducted by the Canadian Coast Guard and the Canadian Armed Forces as part of the federal component of the National SAR System.

Director Preparedness and Response (National Strategies)

2.03.2 The Director Preparedness and Response (National Strategies), sets national direction for emergency preparedness and response in line with Government of Canada strategies and policies on emergency management, and provides strategic oversight of the Environmental Response, maritime Search and Rescue, and Marine Communications and Traffic Services (i.e. the emergency response programs of the CCG). The authority and direction noted include

.1 the CCG SAR policy, levels of service and performance standards;

.2 the interface with and coordination of the Canadian Coast Guard Auxiliary's (CCGA) Contribution Agreement renewals;

.3 the liaison with the National Search and Rescue Secretariat;

.4 the liaison with and administration of the CCGA and its authorized activities;

.5 the processing of ministerial or other inquiries regarding CCG aspects of the National SAR Program;

.6 the maintenance of international maritime SAR liaison through the International Maritime Organization and other international bodies;

Director Operational Support (Operations)

2.03.3 The Director Operational Support (Operations) is responsible for translating the strategic and policy direction from CCG National Strategies into the delivery of CCG program directives through national operational oversight functions. The authority and direction noted include

.1 the co-chairing of an annual coordination meeting of CCG and Canadian Armed Forces (CAF) Headquarters (HQ) SAR staffs with the Officer in Charge (OIC) and Regional Supervisor, Maritime SAR (RSMS) of each joint rescue coordination centre (JRCCs) and maritime rescue sub-centre (MRSC), to resolve current operational SAR issues.

.2 the development and approval by appropriate authority of CCG operational SAR policy and operating standards;

.3 establishing national operational policy and standards with respect to the delivery and administration of the rescue specialist program;

.4 the coordination of equipment procurement and other requirements of the maritime SAR system;

.5 the provision of analysis of operational matters concerning maritime SAR;

.6 the operational readiness, by development and participation in a National Exercise Program for CCG SAR units (SRUs) and facilities (including JRCCs and MRSC);

.7 the office of primary interest duties regarding primary maritime SAR craft types, under the CCG Fleet Readiness profile;

.8 the conduct and monitoring of research and development for potential improvements in CCG SAR equipment and procedures;

.9 the provision of technical and maritime expertise.

Director Preparedness and Response (National Strategies) and the Director Operational Support (Operations)

2.03.4 The Director Preparedness and Response (National Strategies) and the Director Operational Support (Operations) are jointly responsible for:

.1 the liaison with the CAF and other agencies involved in the National SAR Program;

.2 the provision of support to the Interdepartmental Committee on Search and Rescue (ICSAR) concerning maritime SAR policy, standards, procedures, planning, resources and program effectiveness;

.3 the provision of staff assistance to ICSAR on maritime SAR interests;

Director Operational Personnel (Operations)

2.03.5 The Director Operational Personnel (Operations) is responsible for:

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.1 the development and maintenance of crewing profiles of CCG SRUs;

.2 The development and maintenance of work descriptions, competency profile, qualification standards, training standards and training plans for CCG operational personnel involved in maritime SAR. CCG operational personnel includes rescue specialists and maritime SAR Mission Coordinators and other CCG staff working at JRCC and MRSC;

.3 analyze lessons learned from the SAR National Exercise Program to determine if amendments to competency profiles, qualifications standards and/or training intervention standards are required;

Director Operational Business (Operations)

2.03.6 The Director Operational Business (Operations) is responsible for:

.1 the coordination of all CCG inputs to the New SAR Initiative Fund;

.2 the management of financial aspects (payments) of the partnership agreement with the Canadian Coast Guard Auxiliary (CCGA).

Director, Marine and Civil Infrastructure and Director, Electronics and Informatics

2.03.7 The Director, Marine and Civil Infrastructure and Director, Electronics and Informatics are responsible for providing adequate telecommunications and electronic facilities to support the detection of SAR incidents and coordination of distress communications in the Canadian area of responsibility (AOR).

Assistant Commissioners

2.03.8 The Assistant Commissioners (ACs), CCG, are designated, on behalf of the Commissioner, as the senior officers responsible to effect, on a regional basis, in collaboration with the appropriate SAR Region (SRR) Commander, implementation of those CCG policies, standards and objectives designed to provide an effective SAR service to the maritime community. CCG ACs are responsible to the Commissioner to ensure, on a daily basis, the adequate provision and disposition of resources within their respective Regions in support of SAR operations.

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2.03 Canadian Coast Guard

Regional Directors, CCG Programs (or delegate)

2.03.9 The Regional Directors, CCG Programs (RDP) (or delegate) are responsible for planning, organizing, and directing the activities of the CCG maritime SAR program, and managing and coordinating the activities of the CCGA for their assigned geographical AOR. The RDP (or delegate) are responsible to

.1 the SRR Commander, through the AC, CCG, for

.a providing expert maritime advice in matters of CCG policy and procedures concerning maritime SAR,

.b ensuring that qualified maritime SAR coordinators are selected and appointed in collaboration with the RSMS and the OIC of the appropriate JRCC(s),

.c selecting and appointing a qualified RSMS,

.d ensuring provision of the JRCC/MRSC equipment for which CCG is responsible, and

.2 the AC, CCG, for

.a implementing CCG SAR policy and ensuring that CCG SAR procedures are followed,

.b maintaining liaison with the appropriate branches of CCG to ensure the best possible level of support to the SAR program,

.c evaluating effectiveness of SAR programs according to the National Exercise Program through training exercises, and determining the resource requirements,

.d developing and maintaining public information and communications programs,

.e establishing and maintaining liaison with relevant departments of federal and provincial governments and other groups, public or private, involved in maritime SAR and safety,

.f developing and maintaining liaison at an operational level with neighbouring foreign maritime SAR related agencies engaged in maritime SAR coordination.

.g the continuous monitoring of international distress and calling frequencies to detect distress situations and ensure speedy resolution of SAR incidents, including the operation of a network of very high

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2.03 Canadian Coast Guard

frequency direction finding equipment to improve SAR response time and reduce associated costs; and

.h the broadcasting of maritime safety information such as weather bulletins, ice information and notices to shipping concerning dangers to navigation by means of NAVTEX, Continuous Marine Broadcast and other electronic systems.

Regional Directors, CCG Fleet (or delegate)

2.03.10 The Regional Directors, CCG Fleer (RDF) (or delegate) are responsible to:

.3 the SRR Commander, through the AC, CCG, for

.a ensuring adequate deployment of CCG SRUs against current levels of SAR activity and trends

.1 the AC, CCG, for

.b ensuring that operationally ready maritime SRUs are available for tasking by the JRCC/MRSC.

Regional Directors, CCG Programs and Regional Directors, CCG Fleet (or delegates)

2.03.11 The Regional Directors, CCG Program and Regional Director, CCG Fleet (or their delegates) are responsible to the AC, CCG for:

.a developing regional plans to ensure that CCG SAR levels of service, performance and operating standards are met,

.b administrating the maritime SAR program,

.c planning and monitoring the CCG maritime SAR coverage

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2.03 Canadian Coast Guard

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2.04 Search and Rescue Regions

Coordination of SAR Services

2.04.1 As summarized in Cabinet Directives, the Canadian Armed Forces (CAF) has overall responsibility for the efficient operation of the coordinated aeronautical and maritime search and rescue (SAR) system. The statutory authority for the coordination of maritime SAR response is assigned to the Minister of Fisheries and Oceans by the *Oceans Act*. Under this authority, the Search and Rescue Region (SRR) Commanders have been designated as Rescue Coordinators.

NOTE:	Refer to *Annex 3 – Excerpts from the Oceans Act*

SRR Commander

2.04.2 The SRR Commander is responsible to the Commander, Canadian Joint Operations Command, for

.1 authorizing the states of readiness of aeronautical primary SAR Squadrons (*Canada Command Letter 3385-1 [J3SAR] 23 Mar 2009)*;

NOTE:	Refer to *section 2.10 – Aeronautical SAR Squadrons*.

.2 initiating and coordinating SAR operations, and authorizing the reduction of search operations;

NOTE:	Refer to *CAMSAR II, section 8.01 – Reduction of Search Operations*.

.3 carrying out the duties of rescue coordinator pursuant to *section 130 (2) of* the *Canada Shipping Act, 2001*;

NOTE:	Refer to *Annex 2 – Excerpts from the Canada Shipping Act, 2001*.

.4 formally appointing a searchmaster as required;

.5 approving the use of CF SRUs for humanitarian incidents; and

.6 establishing channels of communication to allow the expeditious flow of information between the SRR Commander and the Officer-in-Charge of the joint rescue coordination centre.

Senior Military Officer

2.04.3 A senior military officer may be assigned specific duties and responsibilities by the SRR Commander in respect to the coordinated SAR system.

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2.04 Search and Rescue Regions

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2.05 Joint Rescue Coordination Centres

General

2.05.1 A joint rescue coordination centre (JRCC) is an agency established within each search and rescue (SAR) region (SRR) for the purposes of coordinating and controlling aeronautical and maritime SAR operations. In addition, JRCCs will coordinate SAR units (SRUs) response to humanitarian incidents in accordance with national and regional policy and directives. For this, a rescue centre requires

.1 trained staff, capable of controlling and coordinating operations;

.2 a reference library;

NOTE: Refer to *section 5.04 – JRCC/MRSC SAR Documentation*.

.3 a detailed plan formulating the basis of SAR operations;

.4 specific plans to meet the SAR demands of the region;

.5 communications equipment, which will ensure a timely alerting procedure and provide an efficient network for coordinating and monitoring SAR missions and facilities; and

.6 installations and equipment for the efficient coordination and control of operations to include, as a minimum, wall charts, plotting tables, SAR Mission Management System (SMMS), Electronic monitors with VTMIS, VMS feeds, and other computer aids.

2.05.2 Within the JRCCs, Canadian Armed Forces (CAF) personnel conduct the coordination and control of aeronautical SAR operations and Canadian Coast Guard (CCG) personnel conduct the coordination and control of maritime SAR operations, all functioning together as a team to ensure that response to distress incidents is coordinated effectively.

NOTE: Administrative procedures that affect or concern both the CAF and the CCG should be published under the joint authority of the Officer in Charge (OIC) of the JRCC and the Regional Supervisor, Maritime SAR (RSMS).

Officer in Charge (OIC)

2.05.3 The OIC of a JRCC is responsible

.1 to the SRR Commander for

.a coordinating, controlling and conducting SAR operations within the JRCCs SRR;

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2.05 Joint Rescue Coordination Centres

.b ensuring the effective operation of the coordinated SAR system;

.c ensuring that the JRCC communications and other equipment is operational, and that appropriate authorities are notified of any deficiencies;

.d advising on the adequacy and deployment of SRUs to meet operational requirements;

.e assigning of priorities pertaining to the allocation of aeronautical SRUs, as and if required, in response to multiple and/or simultaneous SAR distress incidents; and delegating this task to a duty SAR coordinator to address those instances in which the OIC JRCC cannot be contacted;

.f if deemed necessary, transferring or assuming control of a particular SAR incident to or from the maritime rescue sub-centre (MRSC); and delegating this task to a duty SAR coordinator to address those instances in which the OIC JRCC cannot be contacted;

NOTE: When deemed necessary, the OIC JRCC may assume control of any SAR incident. Assuming or transferring control of a SAR incident is a formal event and shall be done officially, in accordance with *CAMSAR II, section 2.04, paragraphs 2.04.23 to 2.04.25 – Transferring control of an incident*.

.g approving requests from the MRSC to charter civilian resources if the accounting base of the JRCC will be held responsible for payment; and delegating this task to a duty SAR coordinator to address those instances in which the OIC JRCC cannot be contacted;

.h recommending search reduction;

.i certifying SAR Mission Coordinators (SMCs), in collaboration with the CCG RSMSs;

.j liaising with the RSMSs on the day-to-day operation and deployment of SRUs and on the participation and performance of the staff in the operation of the JRCC/MRSCs;

.k liaising with the CCG Director, Maritime Services (DMS) (or delegate) on the operations interface between JRCCs and MRSCs, and on the deployment of CCG SRUs;

.l establishing and maintaining liaison with relevant departments of federal and provincial governments and other groups, public or private, concerning SAR matters;

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.m coordinating SAR training exercises which involve more than one agency (when appropriate);

.n coordinating the JRCC input to SAR educational programs, displays and visits within the SRR;

.o approving all public information releases on aeronautical SAR services and all JRCC/MRSC coordinated SAR incidents;

NOTE: Refer to *section 5.05 – Access to Information*.

.p providing staff assistance in SAR matters;

.q preparing reports, returns and records;

.r collecting and managing SAR incident statistical information; and

.s handling all CAF administrative matters pertaining to the JRCC; and

.2 to the Commander, 1 Cdn Air Div, through SSOSAR, for

.a supervising CAF JRCC personnel; and

.b ensuring CAF JRCC personnel are adequately trained to standard and kept informed of current policy and procedures.

Regional Supervisor, Maritime SAR

NOTE: For the RSMS MRSC, refer to *section 2.06 – Maritime Rescue Sub-Centres*.

2.05.4 The RSMS of a JRCC is the senior CCG officer assigned to a JRCC to ensure the continuing effectiveness of the maritime SAR system within the SRR, except for those SAR sub-regions (SRSs) assigned to the MRSC. The RSMS JRCC is responsible

.1 to the SRR Commander, through the OIC JRCC, for:

.a coordinating, controlling and conducting maritime SAR operations within the JRCC's area of responsibility,

.b ensuring the effectiveness of SAR coordination and control duties performed by the CCG component of the JRCC,

.c providing expert advice on maritime SAR operations and their coordination for appropriate areas of the SRR,

.d providing the maritime expertise necessary to evaluate the adequacy and deployment of SRUs to meet maritime SAR requirements,

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2.05 Joint Rescue Coordination Centres

.e ensuring that the CCG communications and other equipment within the JRCC is operational and that appropriate CCG authorities are notified of any deficiencies or breakdowns of CCG equipment and communications networks,

.f making recommendations to the OIC JRCC on the selection and appointment of SMCs;

.g liaising with the OIC JRCC on the day-to-day participation and performance of staff in the operations of the JRCC,

.h liaising with the OIC JRCC on the day-to-day operation and deployment of SRUs,

.i ensuring that all relevant information pertaining to CCG SAR coordination and control activities in the JRCC are duly recorded in the official log and files designated,

.j in collaboration with the OIC JRCC, ensuring that all relevant SAR statistical data are recorded, and

.k preparing, in concert with the OIC JRCC, the recommendation for search reduction of maritime SAR operations; and

.2 to the DMS, (or delegate) for

.a supervising JRCC CCG personnel and ensuring they are adequately trained to standard and kept informed of current policy and procedures,

.b monitoring the operations of maritime SRUs and prosecution of maritime SAR incidents within the SRR, except for SRSs under MRSC responsibility, and making recommendations designed to achieve improved effectiveness and efficiency,

.c making recommendations on the optimum deployment of maritime SRUs for SAR purposes, taking into account the cyclical nature of certain maritime activities,

.d ensuring the efficient management, administration, supervision, training and effective performance of the CCG component of the JRCC,

.e handling all CCG administrative matters pertaining to the JRCC, including collecting maritime SAR incident statistical information and program management information,

.f coordinating the JRCC maritime input into SAR education programs, displays and visits within the CCG Region, and

Chapter 2 SYSTEM COMPONENTS

2.05 Joint Rescue Coordination Centres

.g reporting on the general effectiveness of CCG participation in JRCC activities and on purely CCG matters.

Deputy OIC

2.05.5 The duties of the Deputy OIC of a JRCC include

.1 acting as OIC JRCC in his absence, and

.2 fulfilling duties as duty aeronautical SAR Mission Coordinator when so employed.

Aeronautical SAR Mission Coordinator

2.05.6 The duty Aeronautical SAR Mission Coordinator of a JRCC is responsible to the OIC JRCC for

.1 acting as an SMC by planning, coordinating, controlling and directing the response to aeronautical SAR incidents,

.2 tasking primary aeronautical SRUs and initiating requests for secondary aeronautical SRUs and other SRUs, as appropriate,

.3 appointing an on-scene coordinator (OSC) and/or an aircraft coordinator when appropriate and, where necessary, recommending the deployment of an SMC to a location near the incident,

.4 tasking and coordinating aircraft in support of maritime incidents as requested by the SMC,

.5 assisting the maritime SAR Mission Coordinator or other SMC as necessary,

.6 updating logs and case files with pertinent data in a neat, timely, and accurate manner,

.7 ensuring that all releases to the press or other public agencies are approved by the OIC JRCC in accordance with standard operating procedures (SOPs),

.8 processing a search reduction recommendation, and

.9 performing other duties as may be assigned by an SMC or the OIC JRCC.

Chapter 2 SYSTEM COMPONENTS

2.05 Joint Rescue Coordination Centres

Maritime SAR Mission Coordinator

2.05.7 The duty Maritime SAR Mission Coordinator of a JRCC is responsible to the OIC JRCC, through the RSMS of the JRCC for the following;

.1 acting as SMC by planning, coordinating, controlling and directing the response to maritime SAR incidents;

.2 tasking primary and secondary maritime SRUs and initiating requests for other SRUs, as required;

.3 appointing an OSC when appropriate;

.4 where necessary, tasking and coordinating maritime SRUs in support of aeronautical incidents;

.5 assisting the aeronautical SAR Mission Coordinator or other SMC as necessary;

.6 updating logs and case files with pertinent data in a neat, timely, and accurate manner,

.7 ensuring that all releases related to a SAR incident, to the press or other public agencies, are approved by the OIC JRCC in accordance with SOPs;

.8 processing a search reduction recommendation; and

.9 performing other duties as may be assigned by an SMC, the OIC JRCC or the RSMS.

Assistant Aeronautical SAR Mission Coordinator

2.05.8 The Assistant Aeronautical SAR Mission Coordinator of a JRCC is responsible to the OIC JRCC, through the duty aeronautical SAR Mission coordinator, for

.1 assisting the duty SAR Mission Coordinators in SAR operations,

.2 ensuring that the duty SAR Mission Coordinators are kept aware of any actions taken in conjunction with SAR operations,

.3 updating logs and case files with pertinent data in a neat, timely, and accurate manner, and

.4 performing other duties as may be assigned.

Chapter 2 SYSTEM COMPONENTS

2.05 Joint Rescue Coordination Centres

Assistant Maritime SAR Mission Coordinator

2.05.9 The Assistant Maritime SAR Mission Coordinator of a JRCC is responsible to the OIC and the RSMS of the JRCC, through the duty maritime SAR Mission Coordinator, for

.1 assisting the duty maritime SAR Mission Coordinator in SAR operations,

.2 ensuring that the duty SAR Mission Coordinators are kept aware of any actions taken in conjunction with SAR operations,

.3 updating logs and case files with pertinent data in a neat, timely, and accurate manner, and

.4 performing other duties and projects as may be assigned.

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2.05 Joint Rescue Coordination Centres

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2.06 Maritime Rescue Sub-Centre

General

2.06.1 The Quebec maritime rescue sub-centre (MRSC) exists to enable SAR coordination.

2.06.2 SAR coordination functions under the authority of the SRR Commander through the joint rescue coordination centre (JRCC). The MRSC must also keep the Assistant Commissioner, Canadian Coast Guard (CCG), informed of activities.

2.06.3 The responsibilities of an MRSC are similar to those of a JRCC, but on a smaller scale. MRSCs normally coordinate, conduct and control response to maritime SAR incidents which occur within their SRS. They also coordinate maritime SAR units (SRUs) response to humanitarian incidents in their SRS, in accordance with national and regional policy and directives.

NOTE: The JRCC aeronautical SAR coordinator must perform the tasking of Canadian Armed Forces (CAF) aeronautical facilities and the coordination of all other aeronautical facilities involved in SAR operations.

NOTE: Refer to *section 2.05 – Joint Rescue Coordination Centres, paragraph 2.05.1*, for the MRSC operational requirements.

Regional Supervisor, Maritime SAR

NOTE: For the RSMS JRCC, refer to *section 2.05 – Joint Rescue Coordination Centres*.

2.06.4 The Regional Supervisor, Maritime SAR, (RSMS) of the MRSC is the senior CCG officer assigned to the MRSC to ensure the continuing effectiveness of the maritime SAR system within the SRS. The RSMS is responsible to

.1 the SRR Commander, through the Officer in Charge (OIC) of the JRCC, for

- .a coordinating, controlling and conducting maritime SAR operations within the MRSC's area of responsibility,
- .b ensuring the effectiveness of SAR coordination and control duties performed by the personnel of the MRSC,
- .c providing expert advice on maritime SAR operations and their coordination for the appropriate areas of the SRS,
- .d providing the maritime expertise necessary to evaluate the adequacy and deployment of SRUs to meet maritime SAR requirements,

Chapter 2 SYSTEM COMPONENTS

2.06 Maritime Rescue Sub-Centre

.e ensuring that the MRSC communications and other equipment is operational, and that appropriate authorities are notified of any deficiencies,

.f making recommendations to the OIC JRCC on the selection and appointment of SAR mission coordinators (SMCs);

.g liaising with the OIC of the parent JRCC(s) on the day-to-day operations interface between the MRSC and JRCC,

.h liaising with the OIC of the parent JRCC(s) on the day-to-day operation and deployment of CAF SRUs,

.i ensuring that all relevant information pertaining to CCG SAR coordination and control activities in the MRSC are duly recorded in official log books and files designated,

.j in collaboration with the OIC of the parent JRCC(s), ensuring that all relevant SAR statistical data are recorded,

.k ensuring that all releases to the press or other public agencies are approved by the OIC JRCC in accordance with standard operating procedures (SOPs), and

.l preparing, in concert with the OIC JRCC, the recommendation for search reduction of SAR operations; and

.2 the Director, Maritime Services, (or delegate) for

.a supervising MRSC personnel and ensuring they are adequately trained to standard and kept informed of current policy and procedures,

.b monitoring the operations of SRUs and prosecution of maritime SAR incidents within the SRS and making recommendations designed to achieve improved effectiveness and efficiency,

.c making recommendations on the optimum deployment of maritime SRUs for SAR purposes within the SRS, taking into account the cyclical nature of certain maritime activities,

.d ensuring the efficient management, administration, supervision, training and effective performance of the MRSC,

.e handling all CCG administrative matters pertaining to the MRSC , including collecting maritime SAR incident statistical information and program management information,

.f coordinating the MRSC input into SAR education programs, displays and visits within the CCG Region, and

Chapter 2 SYSTEM COMPONENTS

2.06 Maritime Rescue Sub-Centre

.g reporting on the general effectiveness of MRSC activities and on purely CCG matters.

Maritime SAR Mission Coordinator

2.06.5 The duty Maritime SAR Mission Coordinator of an MRSC is responsible to the OIC JRCC, through the RSMS MRSC when applicable, for

.1 acting as SMC by planning, coordinating, controlling and directing the response to maritime SAR incidents,

.2 tasking primary and secondary maritime SRUs and initiating requests for other units, as required,

.3 appointing an on-scene coordinator when appropriate and, where necessary, recommending the deployment of an SMC to a location near the incident,

.4 where necessary, tasking and coordinating maritime SRUs in support of aeronautical incidents,

.5 assisting the aeronautical SAR coordinator or other SMC as required,

.6 updating logs and case files with pertinent data in a neat, timely, and accurate manner,

.7 ensuring the JRCC is kept fully informed of all MRSC SAR activities and recommending that the JRCC assume control of particular SAR incidents,

NOTE: Assuming or transferring control of a SAR incident is to be considered a formal action and is to be completed in conjunction with the communications procedures described in *CAMSAR II, section 2.04 – Mission Coordination Communications*.

.8 providing local expertise and assistance to the JRCC or the deployed SMC, when any of these have taken over control of the response to a particular SAR incident,

.9 ensuring that all SAR incident related releases, to the press or other public agencies, are approved by the OIC JRCC in accordance with SOPs,

.10 processing a search reduction recommendation, and

.11 performing other duties as may be assigned by an SMC, OIC JRCC or the RSMS.

Chapter 2 SYSTEM COMPONENTS

2.06 Maritime Rescue Sub-Centre

Assistant Maritime SAR Coordinator

2.06.6 The Assistant Maritime SAR Coordinator of an MRSC is responsible to the OIC JRCC and the RSMS MRSC, through the duty maritime SAR coordinator, for

.1 assisting the duty maritime SAR coordinator in SAR operations,

.2 ensuring that the duty SAR coordinators are kept aware of any actions taken in conjunction with SAR operations,

.3 updating logs and case files with pertinent data in a neat, timely, and accurate manner, and

.4 performing other duties and projects as may be assigned.

Chapter 2 SYSTEM COMPONENTS

2.07 Canadian Mission Control Centre / SAR Network Operations Control Centre

General

2.07.1 The Canadian Mission Control Centre (CMCC) is the focal point in Canada for the receipt of distress beacon messages from national and international sources, in accordance with procedures prescribed in national agreements and COSPAS-SARSAT documentation. The data is then redistributed as required, in accordance with the above procedures. For this, the CMCC requires

.1 trained staff, capable of controlling, coordinating and conducting operations,

.2 trained technicians to develop and maintain the numerous required communications networks;

.3 trained staff capable of administering the Canadian Beacon Registry (CBR);

.4 detailed procedures and computer software for the collection and dissemination of distress data, and

.5 communications equipment, which will ensure a timely alerting procedure to Joint Rescue Coordination Centres (JRCCs), the Maritime Rescue Sub-Centres (MRSC), other mission control centres (MCCs) and Provincial/Territorial SAR authorities.

Officer in Charge

2.07.2 The Officer in Charge (OIC) of the CMCC is also in charge of the Search and Rescue (SAR) Network Operations Control Centre (SARNOCC) and the Canadian Beacon Registry (CBR) office. The OIC CMCC is responsible to the Commander, 1 Canadian Air Division, through SSO SAR, for

.1 managing and administering CMCC and SARNOCC;

.2 ensuring the effective operation of the Canadian COSPAS-SARSAT ground segment, including local user terminals (LUTs), the CMCC and the related communications interfaces;

.3 ensuring, through SARNOCC, the effective operation of the SAR Mission Management System (SMMS);

.4 advising SSO SAR, J3 SAR CJOC, and the National Search and Rescue Secretariat on policy, operational and technical matters which may affect the Canadian COSPAS-SARSAT ground segment;

Chapter 2 SYSTEM COMPONENTS

2.07 Canadian Mission Control Centre / SAR Network Operations Control Centre

.5 establishing and maintaining liaison with relevant departments of federal and provincial governments and other public or private groups concerning COSPAS-SARSAT matters;

.6 acting as the SAR Point of Contact (SPOC) for Canada with regard to operational and technical matters pursuant to the COSPAS-SARSAT system;

.7 providing trained staff and material supplies to support 24/7 operations;

.8 distributing operational SAR data to Canadian JRCCs/MRSCs, provincial points of contact for SAR and other MCCs in accordance with national and international agreements;

.9 providing data analysis to support Canadian JRCCs/MRSCs on specific cases;

.10 serving as a member of the Canadian delegation to COSPAS-SARSAT international meetings;

.11 Collecting and managing SAR incident statistical information;

.12 monitoring the performance of the LUTs and initiating corrective action as required; and

.13 identifying problems.

Deputy OIC CMCC / Chief Operator

2.07.3 The Deputy OIC CMCC is responsible to the OIC CMCC for;

.1 In his absence, the completion of the OIC CMCC duties

.2 assisting the OIC with the general operations of CMCC, including management, administration and monitoring of leave;

.3 monitoring and the administration of the unit budget and the coordination of the yearly Business Plan;

.4 as required, representing Canada at national and international meetings;

.5 preparing the unit Annual Historical Report;

.6 having signing authority in accordance with *sections 32 and 34 of the Financial Administration Act (FAA)*;

.7 coordinate updates to unit SOPs;; and

Chapter 2 SYSTEM COMPONENTS

2.07 Canadian Mission Control Centre / SAR Network Operations Control Centre

.8 performing other duties as assigned by the OIC CMCC.

Deputy Chief Operator

2.07.4 The CMCC Chief Operator is responsible to the OIC CMCC for:

.1 ensuring the effective general operations of the MCC, including the management, administration, and monitoring leave of the MCC section;

.2 monitoring the schedule to ensure there is always a qualified operator designated as Duty Operator;

.3 ensuring operational records are properly maintained;

.4 ensuring the timely distribution of distress data to Canadian JRCCs, provincial SPOCs and other MCCs in accordance with established national and international procedures;

.5 representing Canada's interests at national and international meetings as required;

.6 having signing authority in accordance with sections 32 and 34 of the Financial Administration Act (FAA); and

.7 performing other duties as assigned by the OIC CMCC.

CMCC Duty Operator

2.07.5 The duty Operator of the CMCC is responsible to the OIC CMCC/SARNOCC, through the Chief Operator, for

.1 monitoring the status of the LUTs, CMCC communications and satellite tracking schedule, and taking corrective actions as applicable;

.2 ensuring operational distress beacon information is distributed to the JRCCs/MRSCs, provincial points of contact for SAR and other MCCs in a timely manner;

.3 conducting detailed analysis of all Canadian alerts and briefing the appropriate JRCC, MCC, and/or provincial/territorial SPOC as applicable;

.4 performing all duties as outlined in the CMCC Operator's Checklist;

.5 conducting CMCC tour briefings, course lectures and course directing staff duties when assigned; and

Chapter 2 SYSTEM COMPONENTS

2.07 Canadian Mission Control Centre / SAR Network Operations Control Centre

.6 performing other duties as assigned by the OIC CMCC or the Chief Operator.

CMCC Systems Officer

2.07.6 The CMCC Systems Officer is responsible to the OIC CMCC for:

.1 managing and administering the SARNOCC section;

.2 ensuring the continued operation of all SMMS computer hardware and software in the CMCC and the JRCCs;

.3 ensuring regular backups of systems are completed;

.4 managing and administering SMMS and all the Wide Area Network (WAN) and Local Area Network (LAN) connections and components required to support the Canadian SAR Program and objectives;

.5 managing and administering the CMCC ground segment of the SMMS WAN to include the CMCC Operations Control Centre, all LUTs, and any agency connected to the cmcc.dnd.ca domain;

.6 supervising the administration of sarnet.dnd.ca and cmcc.dnd.ca domain user accounts;

.7 ensuring the CMCC and JRCC emergency deployment kit software and hardware are kept current and functional;

.8 performing the duties of Information Systems Security Officer for the SMMS system;

.9 performing, in conjunction with the Functional Application Systems Manager (FASM), the duties of Life Cycle Material Manager for the SMMS system;

.10 ensuring that all proper technical and operational documents are available to all users of SMMS;

.11 liaising with other agencies to maintain currency and awareness of new technology and hardware or software availability;

.12 representing Canada's interests at national and international meetings as required;

.13 having signing authority in accordance with *sections 32 and 34 of the FAA*; and

Chapter 2 SYSTEM COMPONENTS

2.07 Canadian Mission Control Centre / SAR Network Operations Control Centre

.14 performing other duties as assigned by the OIC CMCC.

Canadian Beacon Registry CBR

2.07.7 The Canadian Beacon Registry is an integral part of COSPAS-SARSAT, the search and rescue satellite system designed to provide distress alert and location data to search and rescue authorities. The Canadian Beacon Registry is co-located with the Canadian Mission Control Centre (CMCC) at Trenton, for use by responders in search and rescue operations.

When a 406 MHz emergency beacon signal is received, search and rescue authorities at CMCC can retrieve information from the CBR database. This includes beacon owner contact information, emergency contact information, and vessel/aircraft identifying characteristics and equipment. Having this information allows search and rescue services to respond appropriately.

CBR Manager

2.07.8 The CBR Manager is responsible to the OIC CMCC for:

.1 management and quality control of the Canadian Beacon Registry;

.2 coordination of outreach efforts to the public and industry sources;

.3 communication/coordination with CMCC operators on strategic and operational issues;

.4 management of CBR staff and office; and

.5 performing other duties as assigned by the OIC CMCC.

Chapter 2 SYSTEM COMPONENTS

2.08 Alerting Post / Canadian Point of Contact for Maritime SAR

Alerting Post

2.08.1 In Canada, JRCC Halifax is the designated alerting post for notification of maritime search and rescue (SAR) incidents originating seaward of the Newfoundland and Labrador coasts.

Canadian Point of Contact for Maritime SAR

2.08.2 JRCC Halifax has been designated as the "Canadian Point of Contact for Maritime SAR" for the International community. This means that JRCC Halifax guarantees assistance on request to foreign rescue coordination centres coordinating SAR measures for Canadian vessels in foreign waters.

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2.08 Alerting Post / Canadian Point of Contact for Maritime SAR

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Chapter 2 SYSTEM COMPONENTS

2.09 SAR Mission Coordinator / Searchmaster

SAR Mission Coordinator SMC

2.09.1 A search and rescue (SAR) mission coordinator (SMC) is appointed or assumes control under the authority of the SAR Region (SRR) Commander, in response to each unique SAR incident. The SMC is responsible to the SRR Commander through the Officer in Charge (OIC) of the joint rescue coordination centre (JRCC) and, for maritime incidents, through the Regional Supervisor, Maritime SAR, (RSMS). The SMC will normally control and coordinate the mission from within the JRCC or the maritime rescue sub-centre (MRSC).

2.09.2 **Assistants –** One or more qualified assistant SMCs may also be appointed to assist the SMC.

Search Master SM

2.09.3 In the Canadian context, a Canadian Armed Forces (CAF) Searchmaster (SM) is an officer appointed as the SMC of an extended aeronautical SAR incident. The SM normally operates from a deployed search headquarters (SHQ).

2.09.4 **Assistants –** Assistant SMs (ASMs) may be deployed in support of a search HQ. ASMs shall assist in the conduct of the search as directed by the SM. Normally; a maritime SAR Mission Coordinator should be included as one of the ASMs where, during an aeronautical search, a portion of the missing aircraft's route occurred over water.

2.09.5 **Detachment Commander –** In SAR operations requiring the deployment of a search HQ, the appointment of a detachment commander may be required. The Detachment Commander is a senior officer normally appointed by the commanding officer of the primary SAR squadron first tasked on the case. The Detachment Commander is responsible to the SM for all administrative, disciplinary and other matters as detailed in the *CAF Searchmaster Handbook*.

Duties of the SMC / SM

NOTE:	The duties of these temporary positions are defined in the *IAMSAR Manual, Volume II, paragraph 1.2.3*, and in the *CAF Searchmaster Handbook*.

2.09.6 Further duties include but are not limited to:

.1 Ensuring that the MRSC is kept informed of the progress of incidents it initially coordinated.

.2 Advising the OIC JRCC and, in the case of a maritime incident, the RSMS, of significant incidents, in accordance with local procedure.

.3 Ensuring that all releases to the media or other public agencies are approved by the OIC JRCC, in accordance with standard operating procedures.

Chapter 2 SYSTEM COMPONENTS

2.09 SAR Mission Coordinator / Searchmaster

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Chapter 2 SYSTEM COMPONENTS

2.10 Aeronautical SAR Squadrons

State of Readiness

2.10.1 Primary SAR Squadrons – The Search and Rescue (SAR) Region (SRR) Commander has operational control of primary SAR Squadrons and is the approving authority for states of readiness of aeronautical primary Squadrons.

NOTE:	**All** Canadian Armed Forces (CAF) aircraft are subject to recall to meet SAR requirements.

2.10.2 SAR crews shall respond immediately to all SAR taskings and SAR aircraft shall be airborne as soon as safely possible.

2.10.3 Primary SAR Readiness Posture **–** Unless otherwise directed, Tier 1 SAR readiness posture shall be a dedicated aircraft and crew capable of becoming airborne within 30 minutes. Tier 2 SAR readiness posture shall be a dedicated aircraft and crew capable of becoming airborne within two hours.

2.10.4 Secondary SAR Readiness Posture: Tier 3 readiness posture shall apply to all other CAF aircraft and crews capable of responding to a SAR mission within approved operations and training limitations.

2.10.5 The minimum aircraft state of readiness for each rescue squadron shall be:

103 Search and Rescue Squadron, Gander, Newfoundland and Labrador	➢ 1 Rotary Wing
413 Transport and Rescue Squadron, Greenwood, Nova Scotia	➢ 1 Fixed Wing + 1 Rotary Wing
424 Transport and Rescue Squadron, Trenton, Ontario	➢ 1 Fixed Wing + 1 Rotary Wing
435 Transport and Rescue Squadron, Winnipeg, Manitoba	➢ 1 Fixed Wing
442 Transport and Rescue Squadron, Comox, British Columbia	➢ 1 Fixed Wing + 1 Rotary Wing

2.10.6 When a SAR aircraft is deployed on a SAR operation, the minimum state of readiness for that type of aircraft is waived for the applicable squadron until the aircraft returns to home base. However, should another incident occur which requires the urgent deployment of additional SAR units (SRUs); the commanding officer of the squadron

Chapter 2 SYSTEM COMPONENTS

2.10 Aeronautical SAR Squadrons

concerned shall make every effort to provide the necessary aircraft and crews. Similarly, if the SAR deployment is for a protracted period or in a location that significantly inhibits the SRR Commander's response capability, then every reasonable effort shall be made to provide a viable SAR coverage until the normal posture is restored.

2.10.7 Approval from the SRR Commander must be obtained for any other planned changes to normal SAR readiness posture and/or degradation of the minimum aircraft state of readiness.

2.10.8 For the purpose of optimizing SAR responsiveness, SRR Commanders shall periodically review SAR incidents data for their regions. SRR Commanders have the authority to realign SAR readiness postures so that they coincide with periods of greatest SAR activity. Tier 1 readiness posture shall normally be a minimum of 40 hours per week. Tier 1 readiness posture beyond 40 hours per week will require 1 Canadian Air Division approval.

Royal Family, Governor General and Prime Minister Flights

2.10.9 For Royal Family, Governor General and Prime Minister flights, the appropriate SAR authorities shall be notified by the Canadian Forces Integrated Command Centre and the following posture shall be maintained by SAR aircraft:

.1 **Domestic and Oceanic Flights –** Normal standby posture (30-minutes standby during work hours and 2-hours standby during quiet hours and statutory holidays).

.2 **Flights North of 60°N –** Winnipeg CC130 to maintain 30-minutes standby while the VIP aircraft is airborne and north of 60°N.

Duckbutt

2.10.10 The CAF has periodic requirements for SAR aircraft to orbit certain positions or fly along specified routes in support of military operations. This airborne escort service is called "Duckbutt".

Chapter 2 SYSTEM COMPONENTS

2.11 Maritime SAR Units

State of Readiness

2.11.1 **Primary SRUs –** Canadian Coast Guard (CCG) primary search and rescue (SAR) units (SRUs), when underway, shall be capable of responding to SAR taskings immediately or shall otherwise maintain a 30-minute standby posture.

2.11.2 Chartered vessels shall be on similar standby unless specified otherwise in their charter-party agreements.

2.11.3 The commanding officer of an SRU referred to above shall inform the appropriate joint rescue coordination centre/maritime rescue sub-centre of any change in the unit's state of readiness as may be caused by a reduction in its efficiency or capability. In order to preserve the availability of SAR capability as much as possible, the affected SRU may continue SAR activities upon initial approval by the Director, Maritime Services (or delegate). However, if the SRU is expected to remain affected over a prolonged period, its retention on SAR duties shall be subject to approval by the Regional Superintendant SAR, CCG.

Assistance to other CCG Programs

2.11.4 Subject to SAR priorities, Regional Supervisors, Maritime SAR, shall facilitate the use of CCG primary SRUs to support other CCG programs within their patrol area.

2.11.5 The Inshore Rescue Boat (IRB) program runs typically from May long weekend to Labour day and are strategically located in high traffic areas in each region. Details of locations and crew are maintained at each JRCC.

Chapter 2 SYSTEM COMPONENTS

2.12 Ground Search Parties

Civilian Ground Search Teams

2.12.1 Civilian ground search teams may be available through the Royal Canadian Mounted Police, provincial police forces or provincial emergency response organizations.

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2.12 Ground Search Parties

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Chapter 2 SYSTEM COMPONENTS

2.13 Civilian Associations

NOTE: Procedures pertaining to the hiring, use and carriage of civilians are detailed in *CAMSAR II, section 1.04 – Civilian Agencies and Volunteers*.

CASARA

2.13.1 The Canadian Armed Forces (CAF) assist in the training of the Civil Air Search and Rescue Association (CASARA) volunteers and the operational evaluation of certified members on a regular basis.

2.13.2 **SERABEC –** In the Province of Quebec, the CASARA branch is designated by the acronym SERABEC, for “Sauvetage et recherche aériens du Québec”.

CCGA

2.13.3 The Canadian Coast Guard Auxiliary (CCGA) have contractual agreements to provide members/vessels to augment the existing Canadian Coast Guard (CCG) search and rescue (SAR) capability in SAR operations and to assist the CCG in delivering the National SAR Program.

Chapter 2 SYSTEM COMPONENTS

2.13 Civilian Associations

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Chapter 3 TRAINING, QUALIFICATION, CERTIFICATION AND EXERCISES

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Chapter 3 TRAINING, QUALIFICATION, CERTIFICATION AND EXERCISES

3.01 JRCC / MRSC SAR Personnel Qualifications

OIC

3.01.1 The Officer in Charge (OIC) of a joint rescue coordination centre (JRCC) shall be a 1 Canadian Air Division (1 Cdn Air Div) search and rescue (SAR) pilot or air combat systems officer (ACSO).

3.01.2 Qualifications shall include the successful completion of the

.1 Assistant Searchmaster (ASM) course, and

.2 SAR Mission Coordinator (SMC) course.

Deputy OIC

3.01.3 The Deputy OIC JRCC shall be a qualified aeronautical SAR Mission Coordinator.

Aeronautical SAR Coordinator

3.01.4 A duty Aeronautical SAR Mission Coordinator of a JRCC shall be a 1 Cdn Air Div SAR pilot or ACSO.

3.01.5 To certify, candidates require successful completion of the

.1 ASM course,

.2 SMC course, and

.3 applicable unit on-job-training (OJT).

3.01.6 The following courses should also be attended and completed successfully:

.1 Maritime Search Planning (MSP) course

.2 SAR Mobile Facilities/On-scene Coordinator (SMF/OSC) course

NOTE:	The 1 Cdn Air Div SSOSAR and the appropriate SAR Region (SRR) Commander must approve any exception to the above qualification requirements.

Assistant Aeronautical SAR Coordinator

3.01.7 An Assistant Aeronautical SAR Mission Coordinator of a JRCC shall be either an aerospace control operator or a SAR Technician.

3.01.8 To certify, candidates require successful completion of the applicable unit OJT.

NOTE:	The OIC of the applicable JRCC must approve any exception to the assistant aeronautical SAR coordinator qualification requirements.

Chapter 3 TRAINING, QUALIFICATION, CERTIFICATION AND EXERCISES

3.01 JRCC / MRSC SAR Personnel Qualifications

RSMS

3.01.9 The Regional Supervisor, Maritime SAR (RSMS) of a JRCC/maritime rescue sub-centre (MRSC) shall be an experienced maritime SAR Mission Coordinator.

Maritime SAR Mission Coordinator

3.01.10 A duty Maritime SAR Mission Coordinator of a JRCC/MRSC shall shall meet the essential qualifications as defined in the national Statement of Merit Criteria. This would encompass all essential qualifications including language profile, education, certification and experience required. To certify, candidates require successful completion of the

.1 SMF/OSC course,

.2 MSP course,

.3 SMC course, and

.4 applicable unit OJT.

3.01.11 The ASM course should also be attended and completed successfully.

NOTE:	The Director General , Operations, and the appropriate SRR Commander must approve any exception to the RSMS and maritime SAR coordinator qualification requirements.

Assistant Maritime SAR Mission Coordinator

3.01.12 An Assistant Maritime SAR Mission Coordinator of a JRCC/MRSC requires successful completion of the applicable unit OJT.

Chapter 3 TRAINING, QUALIFICATION, CERTIFICATION AND EXERCISES

3.02 CMCC / SARNOCC SAR Personnel Qualifications

OIC CMCC

3.02.1 The Officer in Charge (OIC) of the Canadian Mission Control Centre (CMCC) is responsible to SSO SAR 1 CAD. The position is normally held by a CAF SAR pilot or Air Combat Systems Officer (ACSO).

Deputy OIC CMCC

3.02.2 The Deputy OIC CMCC shall be an experienced and qualified CMCC duty operator appointed by the OIC CMCC.

CMCC Chief Operator

3.02.3 The CMCC Chief Operator shall be an experienced and qualified CMCC duty operator appointed by the OIC CMCC.

CMCC Duty Operator

3.02.4 The CMCC Duty Operator shall be an air operations officer with a SAR background. He/she is appointed by the OIC CMCC after successful completion of:

.1 CMCC Duty Operator Course; and

.2 applicable unit on-job-training.

CMCC Systems Officer

3.02.5 The CMCC Systems Officer shall be an experienced and qualified Air Force Communications and Electronics Engineering Officer (CELE Air).

CBR Manager

3.02.6 The CBR Manager shall be an experienced manager with experience in dealing with the public and who possesses data processing and data mining skills.

Chapter 3 TRAINING, QUALIFICATION, CERTIFICATION AND EXERCISES

3.02 CMCC / SARNOCC SAR Personnel Qualifications

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Chapter 3 TRAINING, QUALIFICATION, CERTIFICATION AND EXERCISES

3.03 SMC and SM Qualifications

3.03.1 In the Canadian context, the responsibilities of the Searchmaster are the same as those established for a search and rescue mssion co-ordinator under the IAMSAR.

SMC

3.03.2 The Search and Rescue (SAR) Mission Coordinator (SMC) normally shall be

.1 a qualified aeronautical or maritime SAR Mission Coordinator approved by the Officer in Charge of the Joint Rescue Coordination Centre and, for maritime incidents, by the Regional Supervisor, Maritime SAR; or

.2 A qualified Canadian Armed Forces (CAF) searchmaster (SM) recommended by a SAR Squadron commander.

SM

3.03.3 A CAF qualified SM must

.1 have successfully completed the Assistant SM (ASM) course;

.2 have acted as an ASM for at least one major SAR operation or SAR exercise (SAREX);

.3 be a SAR pilot or a SAR ACSO; and

.4 be qualified by his/her Commanding Officer.

Chapter 3 TRAINING, QUALIFICATION, CERTIFICATION AND EXERCISES

3.03 SMC and SM Qualifications

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4.01 Forwarding Alerts to a Rescue Centre

4.01.1 The need for the earliest possible alerting of a rescue coordinator to actual or potential aeronautical and maritime incidents cannot be overemphasised. Any installation or facility that detects an alert of an actual or potential incident shall forward to a joint rescue coordination centre (JRCC) or the maritime rescue sub-centre (MRSC), as soon as possible, all related information, including information on any actions taken. Actual or potential incidents include

.1 all maritime or aeronautical search and rescue (SAR) incidents;

.2 any situation, which may develop into a SAR incident; and

.3 any incident, which may involve or lead to danger to life, the environment or to property, which may require action from the SAR services and/or other authorities.

NOTE: Refer to *CAMSAR II, Annex 1 – Excerpts from the MCTS Standards Manual.*

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4.01 Forwarding Alerts to a Rescue Centre

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Chapter 4 COMMUNICATIONS

4.02 JRCC/MRSC Communication Systems

Minimum Requirements

4.02.1 Joint rescue coordination centres (JRCCs) and the maritime rescue sub-centre Quebec (MRSC) are the "hub" of Canada's search and rescue (SAR) system and shall effectively coordinate multi-agency responses to aeronautical or maritime SAR incidents. To support coordination, the following communications systems shall be provided in each JRCC/MRSC:

.1 Telephone links, including toll-free and regular emergency lines that are widely published, sufficient non-emergency lines, non-sequential and non-published, and lines for the press;

.2 Fax links;

.3 Pre-programmed direct emergency lines to all neighbouring JRCC's;

.4 Updated phone systems that have pre-programmed contact numbers for all coast guard departments that work with Search & Rescue;

.5 Long range HF AGA facilities for fixed wing and Satellite phones on SAR aircraft;

.6 Military Messaging System links (JRCCs only);

.7 Internet links;

.8 E-mail links;

.9 Dedicated data links (as required);

.10 Dedicated voice links (as required);

.11 INMARSAT-C terminals, for GMDSS A3 sea area SafetyNET monitoring;

.12 Wireless contingency back-up communications links (terrestrial and satellite); and

.13 Contact list of facilities available to support SAR.

Chapter 4 COMMUNICATIONS

4.02 JRCC/MRSC Communication Systems

Recording Equipment

4.02.2 Operational communications links at JRCCs and MRSC Quebec are to be equipped with recording equipment.

4.02.3 The policy applied to the custody and operations of the recording equipment is as follows:

.1 All conversations on JRCC/MRSC operational communications lines shall be recorded.

.2 Electronic recorded tapes/disks shall be kept, numbered and dated.

.3 Electronic recorded tapes/disks shall be impounded by the Officer in Charge (OIC) of the JRCC or by the Regional Supervisor, Maritime SAR, (RSMS) of the MRSC whenever an investigation, judicial inquiry, etc. has been ordered or is anticipated. The OIC JRCC or RSMS MRSC shall be responsible for providing continuity of possession ensuring that the tapes/disks are not recycled.

.4 Requests for recordings and transcripts should be directed to the OIC JRCC or RSMS MRSC in writing.

.5 Electronic recorded tapes/disks or transcripts are not to be released to other than National Defence/Canadian Armed Forces, Fisheries and Oceans/CCG or Transportation Safety Board personnel, unless approved by the National Defence Headquarters or required by law.

NOTE: Refer to *section 5.05 – Access to Information*.

4.02.4 Instantaneous playback of all operational telephone lines is immediately available and stored electronically.

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5.01 SAR Agreements with Neighbouring States

Cooperation

5.01.1 In order to work towards a seamless global search and rescue (SAR) system, the *International Convention on Maritime Search and Rescue, 1979,* requires neighbouring states to enter into agreements.

NOTE: Refer to *Annex 1 – Excerpts from the International Convention on Maritime SAR, 1979*.

5.01.2 Canadian SAR procedures should be compatible with those used by nations participating in the International Maritime Organization (IMO), the International Civil Aviation Organization (ICAO), the North Atlantic Treaty Organization (NATO), the Air Standardization and Coordination Committee (ASCC), the System of Cooperation among the Air Forces of America (SICOFAA) and *Agreement on Cooperation on Aeronautical and Maritime Search and Rescue in the Arctic*. This requires a high degree of liaison and the acceptance of mutual agreements, terminology and standards. It is essential, therefore, that close cooperation be maintained between Canadian SAR authorities and those of other nations.

SAR Organizations and Agreements

5.01.3 Canada is a signatory to, or member of, the following agreements or organizations. Copies of these agreements are held at Canadian Joint Operations Command J3 Operations (SAR) and/or CCG HQ Ottawa.

NOTE: Each SAR region (SRR) will have regional agreements between local agencies and authorities as necessary to facilitate the coordination and conduct of regional SAR operations. Each joint rescue coordination centre (JRCC) and maritime rescue sub-centre will maintain copies of their relevant agreements.

5.01.3.1	**INTERNATIONAL**
SAR Organizations and Agreements	
ICAO	
NATO	
ASCC	
IMO	
Convention on International Civil Aviation	
International Convention on Maritime Search and Rescue, 1979	
International Convention for the Safety of Life at Sea	

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5.01 SAR Agreements with Neighbouring States

Agreement on Cooperation on Aeronautical and Maritime Search and Rescue in the Arctic 2011

5.01.3.2	**CANADA / USA / UK**	
Date	Authorities	Agreement
1999/09/14	CF, CCG, USCG, USAF, UK Maritime and Coast Guard Agency, UK Civil Aviation Division of the Department of Environment, Transport and the Regions, UK Ministry of Defence	MOU defining the respective operational and administrative responsibilities of the agencies in conducting SAR activities and allowing for cooperation on operations, planning, training, and research and development.

5.01.3.3	**CANADA / USA**	
Date	Authorities	Agreements
1972/04/27	Maritime Forces Pacific (MARPAC)/ 17th District USCG	Provide for mutual assistance, delineating responsibility and control.
1973/05/18	MARPAC/13th District USCG	Provide for mutual assistance, delineating responsibility and control.
2003/02/13	Maritime Forces Atlantic/ USCG Atlantic	MOU concerning SAR services involving offshore petroleum exploration.

5.01.3.4	**DOMESTIC**	
Date	Authorities	Agreements
1987/04/27	CF/Transport Canada (TC)	SAR training.
2010/04/30	CF	Joint sponsorship and cost-sharing of the Civil Air Search and Rescue Association.

Canada / USA / UK

5.01.4 Trilateral Agreement on SAR – A memorandum of understanding (MOU) for cooperation among SAR service organizations in Canada, the United States of America (US or USA) and the United Kingdom (UK) allows for better collaboration in aeronautical and maritime SAR operations, training, and research and development.

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5.01 SAR Agreements with Neighbouring States

Canada / USA

5.01.5 Liaison Visits – To ensure smooth coordination in cross-border SAR operations, periodic liaison visits are required between SAR personnel from Canada and the USA. Visits by personnel of Canadian SAR units (SRUs) to adjacent United States Coast Guard (USCG) and United States Air Force (USAF) installations may be made on the approval of the commander responsible for the particular SRU concerned. Canadian Armed Forces (CAF) personnel shall comply with current visit clearance procedures. Canadian Coast Guard (CCG) personnel shall travel in accordance with guidelines provided in the *Treasury Board Security Policy*. Details including reports of such visits shall be passed to the appropriate headquarters.

5.01.6 Joint Areas of SAR Responsibility – The following outline the working arrangements for SAR operations in Canadian territory where Canadian and US SRUs are operating together:

.1 When a SAR incident occurs in Canadian territory, involving a US aircraft other than military, US SAR forces may be permitted to provide SRUs they consider necessary, but the appropriate Canadian JRCC will be responsible for the search. USAF or USCG SAR forces will inform the Canadian JRCC of action taken or proposed, but all decisions and activity shall be under the control of, and subject to, ratification by the Canadian JRCC.

.2 When an emergency incident occurs involving a US military aircraft in Canadian territory (for which search participation may become necessary), USAF forces may be permitted to take any action that is necessary, consulting with the appropriate Canadian JRCC as soon as possible. Under such conditions, a USAF SAR mission coordinator (SMC) will be designated as well as a Canadian SAR Liaison Officer, to act as liaison between local Canadian authorities and the US. The US SMC will report details to the Canadian JRCC and the JRCC will be kept informed of developments. However, the SRR Commander may assume control of any search that arises in his area. This power normally will only be exercised when CAF search aircraft are participating or when, in his opinion, the CAF are better qualified to conduct the search. When a USAF SRU gains knowledge of an incident involving a US military aircraft in Canadian territory, immediate notification will be given to the appropriate Canadian JRCC, giving

.a full information on flight plan,

.b action taken or being taken,

.c safety and environment risk assessment, and

.d future plans.

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5.01 SAR Agreements with Neighbouring States

.3 Canadian and US SRUs will provide mutual assistance when such assistance is requested and is available.

5.01.7 SAR Aircraft and Canada Border and Security Agency (CBSA) – The following procedures are to be employed between JRCCs and CBSA officers in dealing with SAR aircraft of either Canada or the USA crossing the international boundary while engaged in SAR operations:

.1 When US aircraft are to be employed on a SAR operation in Canada, the JRCC in charge of the search shall obtain from US authorities the number of aircraft participating and the identification markings of the aircraft. This information, along with the additional information of the territory to be searched and the possible duration of the stay of the US aircraft, shall be relayed to the Collector of Customs and the appropriate immigration official for the area involved.

.2 When Canadian aircraft are to be employed on a SAR operation in the US, the particular Canadian JRCC that is dispatching the aircraft shall pass all pertinent details to the US JRCC in charge of the search, and in addition, shall inform the appropriate Canada Border and Security Agency official of the intended operations giving the following details:

.a the territory to be searched,

.b the possible duration of the stay of the aircraft,

.c the identification markings of each aircraft, and

.d the number of persons comprising the crew of each aircraft.

.3 Should an unscheduled landing be made by US aircraft while employed on a SAR mission in Canada, the JRCC in charge of the operation shall notify the appropriate CBSA officials of

.a the name of the airport at which the aircraft landed,

.b the identification of the aircraft, and

.c the duration of the stay, if known.

NOTE: Should any merchandise, carried in the aircraft in question from one country to the other in the course of SAR operations, remain in the latter country on conclusion of an operation, it will be subject to customs treatment normally accorded to import merchandise.

.4 At Canadian locations where there is no CBSA service available, the nearest CBSA office will be notified.

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5.02 Major Aeronautical Disaster Contingency Plans

SAR Contingency Planning

5.02.1 The Canadian Armed Forces are responsible for preparing the response to a major aeronautical disaster (MAJAID) within Canada's SAR area of responsibility. The specific details are outlined in the Canadian Joint Operations Command Contingency Plan: Response to a Major Air Disaster (MAJAID) 16 August 2010.

Implementation

5.02.2 The JRCC on behalf of its SRR Comd coordinates the SAR response to a distress case. Response to a confirmed or potential MAJAID situation will be initiated by the JRCC. In addition to launching their own Primary SAR resources and requesting through the CAOC SAR Squadron recalls of personnel and preparation of all serviceable aircraft for launch, the JRCC shall consider requesting resources from the other two SRRs. If the magnitude of the incident warrants, the JRCC will recommend to the SRR Comd that a MAJAID be declared. The SRR Comd will in turn recommend to Comd CJOC that a MAJAID be declared and that the MAJAID CONPLAN be implemented. The JRCC will make recommendations to the SRR Comd regarding proposed location(s) for a FB. Upon declaration of a MAJAID by Comd Canadian Joint Operations Command, Canadian Joint Operations Command CFICC will issue an Implementation Order via the Automated Defence Data Network (ADDN). Telephone calls and e-mail will most likely precede the official order.

5.02.3 Comd Canadian Joint Operations Command will designate a MAJAID Comd who is normally the SRR Comd of the region in which the incident occurred. The MAJAID Comd will be the Supported Comd and will be given OPCON of all assigned primary SAR resources. The RJTF Comd of the region in which the incident site is located will be appointed as a Supporting Comd. As such, the MAJAID Comd will be assigned OPCON over apportioned CAF resources when OPRED for employment. This includes personnel while travelling on apportioned air resources. RJTF Comd will be assigned OPCON in the redeployment phase. If required, other RJTFs, ECS or Commands may be required to provide resources to support the incident RJTF Comd and MAJAID Comd. The MAJAID Comd will normally set up a MAJAID Command Post at an appropriate location.

5.02.4 8 Wing Trenton shall prepare an aircraft with a MAJAID kit for response to the incident regardless of the SRR. Response to a MAJAID shall be limited to contingency planning until a MAJAID has been declared.

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5.02 Major Aeronautical Disaster Contingency Plans

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5.03 Major Maritime Disaster Contingency Plans

SAR Contingency Planning

5.03.1 The response to a major maritime disaster shall be in accordance with contingency plans published by each search and rescue (SAR) region (SRR) commander. These plans are to be developed according to the following guidelines.

Foreword

5.03.2 There is no fundamental distinction between a major maritime disaster and other maritime distress incidents except in scale, and in the scope of the response that is required.

5.03.3 For the purposes of this plan, the term “major maritime disaster” means a maritime distress incident or other distress incident occurring on the waters of the SRR/sub-region (SRS) for which the joint rescue coordination centre (JRCC)/maritime rescue sub-centre (MRSC) is responsible, and of such scale that the federal SAR system alone can no longer coordinate, control and respond to all aspects of the search for and recovery of survivors, and/or the preservation of life. Normally in a major maritime disaster the number of persons in distress is unusually large and vital support from other agencies not normally party to, or used by, the SAR system is required.

5.03.4 The purpose of this contingency plan is to provide a framework for the expeditious and effective resolution of a major maritime disaster by means of using all available resources to their full advantage.

Situation

5.03.5 As part of its responsibility for conducting SAR services, the federal government may be required to respond under extremely unfavourable weather and sea conditions to a maritime disaster of such magnitude that augmentation of the normal SAR system may become necessary. Examples of such an event are the mass evacuation of an oil rig or the rescue of survivors of a large passenger vessel in difficulty.

5.03.6 The SAR system is capable of providing adequate response to most cases but, at some point, a maritime distress could escalate to such a degree that vital support from other agencies is required.

5.03.7 Because of the necessity for fast reaction when a maritime incident occurs, as much organization as possible must be pre-planned and possible available resources identified beforehand. To accomplish this, formal agreements must be established with outside agencies, which include matters such as single point of contact for SAR and on-scene communication frequencies.

5.03.8 Contingency plans, particularly those involving outside agencies, must be regularly subjected to formal exercises.

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5.03 Major Maritime Disaster Contingency Plans

Mission

5.03.9 To ensure the expeditious and effective use of all available resources in the event of a major maritime disaster in the Canadian SAR area of responsibility.

Execution

5.03.10 Concept of Operation

.1 **General**

.a Factors to be considered include the number of persons involved and their needs, the environment, the location of the incident, the resources available and the survivor handling installations.

.b Speed and flexibility of response are essential. Primary SAR units (SRUs) and vessels of opportunity can be expected to provide the initial response, and may provide on-scene coordination and control. Depending on the nature and magnitude of the incident, augmentation of these facilities from other sources may be required. Such response must be pre-planned and be included in the plan in the form of single points of contact, agreed upon tasking/communications procedures, and capabilities.

.c The main objective is to remove survivors from the distress situation to appropriate medical or other installations in the shortest possible time. If evacuation to such installations is not possible, all available steps must be taken to sustain life until evacuation can be accomplished.

.d If the major maritime disaster involves a large number of survivors, the requirement to establish one or more casualty staging areas may arise. From this point casualties will normally be turned over to the appropriate medical authorities; however, further SAR support, in the form of medical evacuations, for example, may be required beyond the casualty staging areas.

.2 **Response**

.a The initial response to any maritime incident shall be consistent with international conventions and constitute an appropriate first level of response regardless of the subsequent escalation of an incident into a major disaster.

.b A major maritime disaster will likely require the assistance of agencies not normally part of the SAR system. The plan shall identify such agencies in the SRR/SRS and reflect the development of liaison and agreements with them through the proper authorities to ensure that necessary assistance will be available and effective when required.

.c Should the augmentation of SAR facilities be required, the JRCC/MRSC shall use all available means to locate and task suitable vessels or aircraft.

.d When it becomes apparent that a major maritime incident is in progress, on duty personnel must be authorized to call in additional personnel to meet the requirements of the SAR mission coordinator (SMC) organization until an SMC is appointed. The SRR Commander shall appoint an SMC who shall be responsible for the coordination of the incident until its termination. The SMC along with an appropriate staff may be detached from the JRCC/MRSC to a more suitable location from which to coordinate the extraordinary response that may be called for by the major maritime disaster. JRCC/MRSC standard operating procedures are to establish appropriate procedures.

.3 **Rescue**

.a Depending upon the number of persons involved in a major maritime disaster it may be necessary for the SMC to formulate a detailed plan to allow the appropriate disposition of survivors, and to ensure that adequate medical and other post-rescue care will be available at the proper time and in the correct locations. It will be important to maintain a high degree of flexibility in this respect, as there will be many variables such as the weather, the number and condition of the casualties, the availability of evacuation units and the availability of suitable medical facilities.

.b To this end, SRR Commanders shall ensure the establishment and maintenance of communication lines between JRCCs/MRSCs and the outside agencies specified in the plan. This includes the regular exercising of the plan.

.c A successful response to a major maritime disaster will probably result in the recovery of a large number of survivors. These will require evacuation from the scene, possibly through an intermediate location which may not be particularly well suited for handling survivors, to the casualty staging area. Further transportation may be required to deliver the casualties to suitable medical facilities. As soon as it is apparent that a large number of persons are involved, the SMC shall canvass all appropriate authorities that may be able to make suitable units available, so that these units may be tasked when necessary. The location and availability of all such units shall be monitored and updated throughout the incident.

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5.03 Major Maritime Disaster Contingency Plans

.d Because of the number of agencies which may become involved in the rescue and disposition of survivors in a major maritime disaster, and the possible difficulty in assigning responsibility for survivors at different stages of the events, SRR Commanders shall ensure that the advice of authorities such as medical and emergency measures will be readily available to the staff. Prior consultation in this area ensures quick and effective response in situations where the identification of the responsible agency might otherwise not be clear-cut. Agreed procedures, together with the names and locations of key personnel, should be readily available to JRCC/MRSC coordinators, and should be exercised regularly.

.e **Readiness –** The Readiness status for primary SRUs applies to major maritime disasters. SRR Commanders will of course make use of all primary or any other units when and if they become needed and available.

Support

5.03.11 Concept of Support

.1 **General –** The response to major maritime disasters will be supported initially by the normal SAR system. As requirements become known, that system will be supported by all available and suitable agencies and resources.

.2 **Canadian Armed Forces/Canadian Coast Guard –** As in other SAR incidents, Commands or Regions may be requested to provide additional primary or secondary SRUs in the event of a major maritime disaster.

.3 **Other Departments –** All federal departments, by government direction, are committed to respond to maritime SAR incidents when available and capable. The SRR Commander shall ensure that current lists of key personnel in the appropriate federal and provincial departments are available to the JRCC/MRSC coordinators.

.4 **Civilian Resources –** There are, in Canada, extensive resources available through civilian authorities, private companies and individuals for possible use in responding to a major maritime disaster. SRR Commanders shall ensure that these are identified to the extent possible, and that adequate liaison is maintained to facilitate their effective participation in an emergency. Lists of key (single point of contact) personnel shall be available in the plan.

.5 **Foreign Support –** Resources of other nations, in particular the United States Coast Guard, may be available to assist in a major maritime disaster. The use of these resources shall be in accordance with current SAR agreements.

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5.03 Major Maritime Disaster Contingency Plans

5.03.12 SAR Communications – SAR communication procedures shall be in accordance with regional communications plans. In general, SAR communication procedures must remain flexible and will depend on the capabilities of the resources involved, the nature and location of the incident and the response required. The plan must indicate all agreed upon on-scene frequencies.

5.03.13 Public Information – The initial announcement of a potential or actual major maritime disaster should be issued by the Officer in Charge (OIC) of the JRCC, if possible through the appropriate Department of National Defence Public Affairs officer.

NOTE: Refer to *CAMSAR II, section 1.06 – Public Relations*.

5.03.14 Reports and Returns

.1 In the case of major maritime incidents, situation reports (SITREPs) shall be issued at least daily throughout the rescue stage.

.2 Following the *Final SAR SITREP*, the JRCC shall submit a *SAR Operation Report* within 30 days after the conclusion of a major maritime disaster. This report is to be forwarded to the Commander Canadian Joint Operations Command and to the Director Operational Support, Canadian Coast Guard Headquarters, through the appropriate channels.

NOTE: Refer to *CAMSAR II, Appendices B.03 – JRCC Final SAR SITREP* and *B.07 – SAR Operation Report*.

Command

5.03.15 The SRR Commander shall command a major maritime disaster SAR response; he will normally appoint an SMC.

5.03.16 The SMC shall normally report to the SRR Commander through the OIC of the JRCC.

5.03.17 Because of the urgency associated with a major disaster, tasking is to be accomplished by the most expeditious means available. Where tasking is directed by telephone or other verbal means, efforts should be made to confirm by message or other written form.

NOTE: Refer to *CAMSAR II, section 2.04 – Mission Coordination Communications*.

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5.03 Major Maritime Disaster Contingency Plans

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5.04 JRCC / MRSC Operational Procedures and SAR Documentation

Reference Library

5.04.1 To support their functional requirements, joint rescue coordination centres (JRCCs) and maritime rescue sub-centre Quebec, (MRSC) need to maintain a reference library. This library shall include, as a minimum:

.1 the three volumes of this manual,

.2 the three volumes of the *International Aeronautical and Maritime Search and Rescue Manual*,

.3 other related International Maritime Organization (IMO) and International Civil Aviation Organization (ICAO) documents such as the *Global Maritime Distress Safety System Master Plan*,

.4 the *International Convention for the Safety of Life at Sea*,

.5 *IMO/ICAO Circulars*,

.6 *Regional Standard Operating Procedures (SOPs)*, and

.7 a contact list for search and rescue (SAR) resources.

5.04.2 In addition, JRCCs will hold:

.1 *Regional Air Navigation Plans*, and

.2 the *Transport Canada Aeronautical Information Manual* and the aeronautical information publication *AIP Canada (ICAO)*, published by NAV CANADA.

Standard Operating Procedures

5.04.3 Each JRCC is responsible for preparing a comprehensive document detailing the SOPs for the conduct of SAR in its SAR region (SRR). Local amplification of national policy and procedures must be included where necessary. MRSC Quebec must also have SOPs for the conduct of operations in their SAR sub-region (SRS), approved by the parent JRCC(s).

5.04.4 The SOPs must set out the details for the conduct of SAR at the operational levels. They should state precisely which agencies are responsible for activating the SAR facilities, and the methods of communicating with them. They should also indicate by whom, and to what extent, any of these facilities can be requested to participate in an operation, so that no party will be in doubt as to its authority. Further, JRCCs and MRSC must have business continuity and resumption procedures to ensure the delivery of SAR coordination services in the event that equipment, facility or infrastructure are disabled due to a localized failure or larger natural or technical disaster.

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5.04 JRCC/MRSC Operational Procedures and SAR Documentation

5.04.5 The SOPs must be brought up to date whenever a change in conditions or experience in actual operations and exercises makes this necessary or advisable. The SOPs should be published regionally and the information therein should be made available to any interested parties.

5.04.6 SOPs normally include the following information, as applicable:

.1 **General Information**

.a Conduct of joint operations with adjacent JRCCs/MRSCs, including:

- Notification of emergencies between rescue centres
- Joint use of resources
- Coordination of SAR operations

.b Any special provisions for redeployment of equipment and resources to expedite access to the area of the operation or to avoid or overcome difficulties caused by meteorological disturbances, communication failures, major disaster (both aeronautical and maritime), etc.

.c Methods of alerting mobile facilities (e.g., vessels at sea, aircraft, ground search parties), including broadcast information.

.d Methods of obtaining ship and aircraft position information from various sources.

.e Procedures for assisting aircraft which must ditch and to arrange rendezvous with suitable and available vessels.

.f Procedures for underwater SAR relating to offshore exploration activities including contacts, phone numbers, etc. of agencies having suitable equipment.

.g Details of agreements of mutual assistance with various other organizations and agencies, such as:

- Police forces
- Local/provincial emergency planning departments
- Marine Communications and Traffic Services
- The Civil Air Search and Rescue Association (CASARA)
- The Canadian Coast Guard Auxiliary (CCGA)
- The Provincial Emergency Program (PEP) – in British Columbia
- EMO and FES in Maritime provinces
- Private industry aircraft and vessel operations

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5.04 JRCC / MRSC Operational Procedures and SAR Documentation

- Organizations involved in operations peculiar to the SRR/SRS (e.g., oil and gas, sealing, herring roe, aquaculture)
- Medical installations and agreements in place for providing medical advice.
- Other federal government departments and agencies
- Procedures for assisting disoriented vessels

.2 **Personnel –** The responsibilities, duties, authority and limitations of personnel assigned to SAR operations and involved in the SRR command structure (i.e. Canadian Forces and Canadian Coast Guard).

.3 **Resources –** The description of the available resources, including but not limited to:

.a JRCCs and MRSC

.b Alerting posts

.c Primary SAR units (SRUs), including inshore rescue boats (IRBs)

.d Secondary SRUs

.e CASARA

.f CCGA

.4 **Business Continuity and Resumption Procedures –** Procedures must be in place to ensure that SAR can be effectively coordinated in the event of a natural or technical disaster affecting the JRCC/MRSC. These procedures shall include, as a minimum:

.a a suitable alternate site to relocate to that allows for the re-establishment of full SAR operations within two hours from the time of primary location evacuation,

.b stand-alone methods/tools for SAR coordination,

.c supplies and installations at the alternate location sufficient to sustain operations for a minimum of 14 days,

.d contingency communications equipment and procedures sufficient to permit full operations,

.e suitable contingency power supply equipment and procedures, and

.f notification and call-out procedures.

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5.04 JRCC/MRSC Operational Procedures and SAR Documentation

.5 **Information –** Methods of obtaining essential information and accessing databases.

.6 **Training and Standards**

.a A unit training plan

.b Arrangements for SAR personnel liaison/familiarization visits to other SAR authorities and agencies.

.c A plan for conducting periodic reviews of case files to ensure that established procedures are followed.

5.04.7 The above lists are by no means exclusive. Practices and procedures that it is felt would improve the conduct of SAR operations within the SRR/SRS should be included by the JRCC/MRSC.

SAR Log

5.04.8 A SAR log shall be kept in which all JRCC/MRSC actions are recorded, with times entered in coordinated universal time (UTC). All JRCC/MRSC Mission Coordinators shall sign the log at the beginning and end of each shift. SAR logs from SAR Mission Coordinators (SMCs) deployed to a remote location shall be submitted to the JRCC/MRSC at the termination of a search.

5.04.9 Retention and Storage – Hardcopy documents shall be retained in the JRCC/MRSC for one year and then forwarded to the Regional Archives Centre.

SAR Case Files

5.04.10 Files shall be kept on individual SAR cases. The case file will be the primary record of a case and shall include all pertinent information on the incident, including all message traffic, records of telephone conversations and, where applicable, such information as coroner's reports and press clippings. Case files from SMCs deployed to a remote location shall be submitted to the JRCC/MRSC at the termination of a search.

5.04.11 Retention and Storage – To meet the legal retention period for JRCCs/MRSCs/Canadian Mission Centre (CMCC) data of seven years *(JA Ont: 33385-1, 6 Nov 1995)*, and the requirement to store SAR files at the National Archives for historical purposes *(Telecom SO SAR 2/Marsden-Military Archivist, Nov 1995)*, case files will be retained and stored as follows:

.1 Case files shall be retained at the JRCC/MRSC/CMCC for a minimum of two years after the date of the last entry. Major SAR operations, unresolved incidents or other cases of interest may be retained longer at the discretion of the centre. If files are retained at the centre, the SAR name, date and case

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5.04 JRCC/MRSC Operational Procedures and SAR Documentation

number of the retained file(s) shall accompany the applicable records box sent to the Archives.

.2 After the JRCC/MRSC/CMCC retention period, case files are to be sent to the respective Regional Archives Centre (i.e. JRCC Victoria to Vancouver, JRCC Halifax to Halifax, and JRCC Trenton to Rexdale).

.3 The Regional Archives Centre will retain the case files for a period of time stated in the *Records Scheduling and Disposal Manual* (for SAR files, this period is five years from the date they receive the files). After this time has past, the Regional Archives Centre will forward a letter to the appropriate JRCC/MRSC/CMCC requesting permission to dispose of the files. If the legal time period has been met and the JRCC/MRSC/CMCC can see no reason to retain the files further, they shall advise the Regional Archives Centre to dispose of the files.

.4 The Regional Archives Centre will then forward all files to the Government Archives Division in Ottawa for permanent storage in accordance with the *Records Scheduling and Disposal Manual*.

NOTE: The policy for storing audio tapes is described in *section 4.02 – JRCC/MRSC Communication Systems, paragraph 4.02.3*.

Statistics

5.04.12 JRCCs and MRSCs are required to maintain statistical records of SAR activity in addition to operational records (log). These statistics will be shared with other agencies such as Transport Canada, the Transportation Safety Board, the Royal Canadian Mounted Police and the National SAR Secretariat.

Chapter 5 SYSTEM MANAGEMENT

5.04 JRCC / MRSC Operational Procedures and SAR Documentation

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Chapter 5 SYSTEM MANAGEMENT

5.05 Access to Information

Access to Information and *Privacy Act* Legislation

5.05.1 All records, logs and reports created during the resolution of an incident are accessible to the Canadian public and are controlled by the Department of National Defence (DND). Information requests to DND will be forwarded to the Privacy and Access to Information Section of the Joint Task Force (JTF) (Pacific), JTF (Atlantic), or 1 Canadian Air Division, for onward transmission to the appropriate joint rescue coordination centre (JRCC) or maritime rescue sub-centre. If the information request is of a factual nature and does not impinge on the privacy of other individuals then the Officer in Charge (OIC) of the JRCC may authorize the release of that information. If the documents to be released contain any information that is contrary to the tenets of the *Access to Information Act* or the *Privacy Act*, this information must be severed in accordance with the applicable section of the aforementioned Acts. Consult the local Access to Information expert if in doubt as to what portion should be severed.

Release of Documents for the Casualty Investigation

5.05.2 To expedite investigations by Coroner Boards of Inquiry, Transportation Safety Board of Canada (TSB) members, Transport Canada (TC) or local police, the OIC JRCC is authorized to release copies of pertinent documents and tape transcripts to these authorities.

NOTE: Tapes or original documents are not to be released to other than Canadian Armed Forces (CAF), Canadian Coast Guard, TC or TSB personnel unless ordered by the National Defence Headquarters or required by of law.

Release of Photographs

5.05.3 Search and rescue incident photographs may be provided to the TSB, TC, the Coroner, and the Royal Canadian Mounted Police, who shall request these through the JRCC when it appears that an investigation will take place. Requests from media sources for the release of photographs should be directed to CAF or Department of Fisheries and Oceans Public Affairs, as appropriate, for OIC approval.

Chapter 5 SYSTEM MANAGEMENT

5.05 Access to Information

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Chapter 5 SYSTEM MANAGEMENT

5.06 Legal Proceedings

5.06.1 The Crown will indemnify, according to Treasury Board policy, joint rescue coordination centres/maritime rescue sub-centres personnel and the servants of the Crown if they were acting within the scope of their employment and not acting maliciously or dishonestly.

5.06.2 If legal action is commenced against a member of the Canadian Armed Forces (CAF) or other servant of the Crown, they may apply through the chain of command for legal representation at public expense.

5.06.3 An employee summoned to give evidence at a Coroner's Inquest, Board of Inquiry or other body engaged in the investigation of a search and rescue (SAR) related misadventure is entitled to legal advice. The employee's departmental office of litigation should be contacted according to procedures in force.

5.06.4 Depending on the nature of the inquiry, where Canadian Coast Guard (CCG) personnel are subpoenaed to testify during formal SAR investigations, there may be a requirement for a CAF legal representative to be present, in recognition of the CAF overall responsibility in SAR coordination. In the case of investigations into incidents having maritime implications, the appropriate CCG SAR expert shall be in attendance to give advice.

Chapter 5 SYSTEM MANAGEMENT

5.06 Legal Proceedings

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Chapter 6 IMPROVING SERVICES

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Chapter 6 IMPROVING SERVICES

6.01 Photographic Libraries

6.01.1 Photographs taken during search and rescue (SAR) operations shall form a photographic library at SAR units. Those photographs shall be used in training crews and spotters and briefing them during future searches. In addition to this, during all active SAR cases, if digital pictures are forwarded to the JRCC, they will be attached electronically and stored within the case database.

6.01.2 Copies of photographs considered useful for briefing and training purposes shall be forwarded to the Canadian Joint Operations Command /J3 (SAR) and to the Director Operational Support, CCG and /or the CCG National Coordination Centre, as applicable.

Chapter 6 IMPROVING SERVICES

6.01 Photographic Libraries

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Annex 1 Excerpts from the *International Convention on Maritime SAR, 1979*

ANNEX[1]

CHAPTER 2 – ORGANIZATION AND CO-ORDINATION

2.1 Arrangements for provision and co-ordination of search and rescue services

2.1.1 Parties shall, as they are able to do so individually or in co-operation with other States and, as appropriate, with the Organization, participate in the development of search and rescue services to ensure that assistance is rendered to any person in distress at sea. On receiving information that any person is, or appears to be, in distress at sea, the responsible authorities of a Party shall take urgent steps to ensure that the necessary assistance is provided. *The notion of a person in distress at sea also includes persons in need of assistance who have found refuge on a coast in a remote location within an ocean area inaccessible to any rescue facility other than as provided for in the annex.*[2]

2.1.2 Parties shall, either individually or, if appropriate, in co-operation with other States, establish the following basic elements of a search and rescue service:

.1 legal framework;

.2 assignment of a responsible authority;

.3 organisation of available resources;

.4 communication facilities;

.5 co-ordination and operational functions; and

.6 processes to improve the service including planning, domestic and international cooperative relationships and training.

Parties shall, as far as practicable, follow relevant minimum standards and guidelines developed by the Organization.

2.1.9 Parties having accepted responsibility to provide search and rescue services for a specified area shall use search and rescue units and other available facilities for providing assistance to a person who is, or appears to be, in distress at sea.

2.1.10 Parties shall ensure that assistance be provided to any person in distress at sea. They shall do so regardless of the nationality or status of such a person or the circumstances in which that person is found.

[1] As revised by *Resolution MSC.70(69)*, adopted on 18 May 1998 and in force 1 January 2000.
[2] Amended by *Resolution MSC.155(78)*, adopted on 20 May 2004 and in force 1 July 2006.

Annex 1 Excerpts from the *International Convention on Maritime SAR, 1979*

2.2 Development of national search and rescue services

2.2.1 Parties shall establish appropriate national procedures for overall development, co-ordination, and improvement of search and rescue services.

2.2.2 To support efficient search and rescue operations, Parties shall:

.1 ensure the co-ordinated use of available facilities; and

.2 establish close co-operation between services and organizations which may contribute to improve the search and rescue service in areas such as operations, planning, training, exercises and research and development.

2.3 Establishment of rescue co-ordination centres and rescue sub-centres

2.3.1 To meet the requirements of paragraph 2.2, Parties shall individually or in co-operation with other States establish rescue co-ordination centres for their search and rescue services and such rescue sub-centres as they consider appropriate.

2.3.2 Each rescue co-ordination centre and rescue sub-centre, established in accordance with paragraph 2.3.1, shall arrange for the receipt of distress alerts originating from within its search and rescue region. Every such centre shall also arrange for communications with persons in distress, with search and rescue facilities, and with other rescue co-ordination centres or rescue sub-centres.

2.3.3 Each rescue co-ordination centre shall be operational on a 24-hour basis and be constantly staffed by trained personnel having a working knowledge of the English language.

2.4 Co-ordination with aeronautical services

2.4.1 Parties shall ensure the closest practicable co-ordination between maritime and aeronautical services so as to provide for the most effective and efficient search and rescue services in and over their search and rescue regions.

2.4.2 Whenever practicable, each Party should establish joint rescue co-ordination centres and rescue sub-centres to serve both maritime and aeronautical purposes.

2.4.3 Whenever separate maritime and aeronautical rescue co-ordination centres or rescue sub-centres are established to serve the same area, the Party concerned shall ensure the closest practicable co-ordination between the centres or sub-centres.

2.4.4 Parties shall ensure as far as is possible the use of common procedures by search and rescue units established for maritime purposes and those established for aeronautical purposes.

Annex 1 Excerpts from the *International Convention on Maritime SAR, 1979*

2.5 Designation of search and rescue facilities

Parties shall identify all facilities able to participate in search and rescue operations, and may designate suitable facilities as search and rescue units.

2.6 Equipment of search and rescue units

2.6.1 Each search and rescue unit shall be provided with equipment appropriate to its task.

CHAPTER 3 – CO-OPERATION BETWEEN STATES

3.1 Co-operation between States

3.1.1 Parties shall co-ordinate their search and rescue organizations and should, whenever necessary, co-ordinate search and rescue operations with those of neighbouring States.

3.1.2 Unless otherwise agreed between the States concerned, a Party should authorize, subject to applicable national laws, rules and regulations, immediate entry into or over its territorial sea or territory of rescue units of other Parties solely for the purpose of searching for the position of maritime casualties and rescuing the survivors of such casualties. In such cases, search and rescue operations shall, as far as practicable, be co-ordinated by the appropriate rescue co-ordination centre of the Party which has authorized entry, or such other authority as has been designated by that Party.

3.1.3 Unless otherwise agreed between the States concerned, the authorities of a Party which wishes its rescue units to enter into or over the territorial sea or territory of another Party solely for the purpose of searching for the position of maritime casualties and rescuing the survivors of such casualties, shall transmit a request, giving full details of the projected mission and the need for it, to the rescue co-ordination centre of that other Party, or to such other authority as has been designated by that Party.

3.1.4 The responsible authorities of Parties shall:

.1 immediately acknowledge the receipt of such a request; and

.2 as soon as possible indicate the conditions, if any, under which the projected mission may be undertaken.

3.1.5 Parties should enter into agreements with neighbouring States setting forth the conditions for entry of each other's search and rescue units into or over their respective territorial sea or territory. These agreements should also provide for expediting entry of such units with the least possible formalities.

Annex 1 Excerpts from the *International Convention on Maritime SAR, 1979*

3.1.6 Each Party should authorize its rescue co-ordination centres:

.1 to request from other rescue co-ordination centres such assistance, including vessels, aircraft, personnel or equipment, as may be needed;

.2 to grant any necessary permission for the entry of such vessels, aircraft, personnel or equipment into or over its territorial sea or territory;

.3 to make the necessary arrangements with the appropriate customs, immigration, health or other authorities with a view to expediting such entry*; and*

.4 to make the necessary arrangements in co-operation with other RCCs to identify the most appropriate place(s) for disembarking persons found in distress at sea.[1]

3.1.7 Each Party shall ensure that its rescue co-ordination centres provide, when requested, assistance to other rescue co-ordination centres, including assistance in the form of vessels, aircraft, personnel or equipment.

3.1.8 Parties should enter into agreements with other States, where appropriate, to strengthen search and rescue co-operation and co-ordination. Parties shall authorize their responsible authority to make operational plans and arrangements for search and rescue co-operation and co-ordination with responsible authorities of other States.

3.1.9 *Parties shall co-ordinate and co-operate to ensure that masters of ships providing assistance by embarking persons in distress at sea are released from their obligations with minimum further deviation from the ships´ intended voyage, provided that releasing the master of the ship from these obligations does not further endanger the safety of life at sea. The Party responsible for the search and rescue region in which such assistance is rendered shall exercise primary responsibility for ensuring such co-ordination and co-operation occurs, so that survivors assisted are disembarked from the assisting ship and delivered to a place of safety, taking into account the particular circumstances of the case and guidelines developed by the Organization. In these cases, the relevant Parties shall arrange for such disembarkation to be effected as soon as reasonably practicable.*[2]

CHAPTER 4 – OPERATING PROCEDURES

4.1 Preparatory measures

4.1.1 Each rescue co-ordination centre and rescue sub-centre shall have available up-to-date information especially concerning search and rescue facilities and available communications relevant to search and rescue operations in its area.

4.1.2 Each rescue co-ordination centre and rescue sub-centre should have ready access to information regarding the position, course and speed of vessels within its area

[1] Amended by *Resolution MSC.155(78)*, adopted on 20 May 2004 and in force 1 July 2006.

[2] Idem.

Annex 1 Excerpts from the *International Convention on Maritime SAR, 1979*

which may be able to provide assistance to persons, vessels or other craft in distress at sea, and regarding how to contact them. This information should either be kept in the rescue co-ordination centre, or be readily obtainable when necessary.

4.1.3 Each rescue co-ordination centre and rescue sub-centre shall have detailed plans of operation for the conduct of search and rescue operations. Where appropriate, these plans shall be developed jointly with the representatives of those who may assist in providing, or who may benefit from, the search and rescue services.

4.1.4 Rescue co-ordination centres or sub-centres shall be kept informed of the state of preparedness of search and rescue units.

4.2 Information concerning emergencies

4.2.1 Parties, either individually or in co-operation with other States shall ensure that they are capable on a 24-hour basis of promptly and reliably receiving distress alerts from equipment used for this purpose within their search and rescue regions. Any alerting post receiving a distress alert shall:

.1 immediately relay the alert to the appropriate rescue co-ordination centre or sub-centre, and then assist with search and rescue communications as appropriate; and

.2 if practicable acknowledge the alert.

4.2.2 Parties shall, where appropriate, ensure that effective arrangements are in place for the registration of communication equipment and for responding to emergencies, to enable any rescue co-ordination centre or sub-centre to access pertinent registration information quickly.

4.2.3 Any authority or element of the search and rescue service having reason to believe that a person, a vessel or other craft is in a state of emergency shall forward as soon as possible all available information to the rescue co-ordination centre or rescue sub-centre concerned.

4.2.4 Rescue co-ordination centres and rescue sub-centres shall, immediately upon receipt of information concerning a person, a vessel, or other craft in a state of emergency, evaluate such information and determine the phase of emergency [...] and the extent of operations required.

4.3 Initial action

Any search and rescue unit receiving information of a distress incident shall initially take immediate action if in the position to assist and shall, in any case without delay, notify the rescue co-ordination centre or rescue sub-centre in whose area the incident has occurred.

Annex 1 Excerpts from the *International Convention on Maritime SAR, 1979*

4.7 On-scene co-ordination of search and rescue activities

4.7.1 The activities of search and rescue units and other facilities engaged in search and rescue operations shall be co-ordinated on-scene to ensure the most effective results.

4.7.2 When multiple facilities are about to engage in search and rescue operations, and the rescue co-ordination centre or rescue sub-centre considers it necessary, the most capable person should be designated as on-scene co-ordinator as early as practicable and preferably before the facilities arrive within the specified area of operation. Specific responsibilities shall be assigned to the on-scene co-ordinator taking into account the apparent capabilities of the on-scene co-ordinator and operational requirements.

4.7.3 If there is no responsible rescue co-ordination centre or, by any reason, the responsible rescue co-ordination centre is unable to co-ordinate the search and rescue mission, the facilities involved should designate an on-scene co-ordinator by mutual agreement.

4.8 Termination and suspension of search and rescue operations

4.8.1 Search and rescue operations shall continue, when practicable, until all reasonable hope of rescuing survivors has passed.

4.8.2 The responsible rescue co-ordination centre or rescue sub-centre concerned shall normally decide when to discontinue search and rescue operations. If no such centre is involved in co-ordinating the operations, the on-scene co-ordinator may take this decision.

4.8.3 When a rescue co-ordination centre or rescue sub-centre considers, on the basis of reliable information that a search and rescue operation has been successful, or that the emergency no longer exists, it shall terminate the search and rescue operation and promptly so inform any authority, facility or service which has been activated or notified.

4.8.4 If a search and rescue operation on-scene becomes impracticable and the rescue co-ordination centre or rescue sub-centre concludes that survivors might still be alive, the centre may temporarily suspend the on-scene activities pending further developments, and shall promptly so inform any authority, facility or service which has been activated or notified. Information subsequently received shall be evaluated and search and rescue operations resumed when justified on the basis of such information.

4.8.5 *The rescue co-ordination centre or rescue sub-centre concerned shall initiate the process of identifying the most appropriate place(s) for disembarking persons found in distress at sea. It shall inform the ship or ships and other relevant parties concerned thereof.* [1]

Canadian ratification 18 June 1982; entry into force 22 June 1985.

[1] Amended by *Resolution MSC.155(78)*, adopted on 20 May 2004 and in force 1 July 2006.

Annex 2 Excerpts from the *Canada Shipping Act, 2001*

PART 5 – NAVIGATION SERVICES

[in this Part]

"Minister" means the Minister of Fisheries and Oceans.

Search and Rescue

Designation of rescue coordinators

130. (1) The Minister may designate persons as rescue coordinators to organize search and rescue operations.

Power of rescue coordinators

(2) On being informed that a person, a vessel or an aircraft is in distress or is missing in Canadian waters or on the high seas off any of the coasts of Canada under circumstances that indicate that they may be in distress, a rescue coordinator may

(a) direct all vessels within an area that the rescue coordinator specifies to report their positions;

(b) direct any vessel to take part in a search for that person, vessel or aircraft or to otherwise render assistance;

(c) give any other directions that the rescue coordinator considers necessary to carry out search and rescue operations for that person, vessel or aircraft; and

(d) use any lands if it is necessary to do so for the purpose of saving the life of a shipwrecked person.

Duty to comply

(3) Every vessel or person on board a vessel in Canadian waters and every vessel or person on board a vessel in any waters that has a master who is a qualified person shall comply with a direction given to it or them under subsection (2).

Answering distress signal

131. (1) Subject to this section, the master of a vessel in Canadian waters and every qualified person who is the master of a vessel in any waters, on receiving a signal from any source that a person, a vessel or an aircraft is in distress, shall proceed with all speed to render assistance and shall, if possible, inform the persons in distress or the sender of the signal.

Annex 2 Excerpts from the *Canada Shipping Act, 2001*

Distress signal – no assistance

(2) If the master is unable or, in the special circumstances of the case, considers it unreasonable or unnecessary to proceed to the assistance of a person, a vessel or an aircraft in distress, the master is not required to proceed to their assistance and is to enter the reason in the official log book of the vessel.

Ships requisitioned

(3) The master of any vessel in distress may requisition one or more of any vessels that answer the distress call to render assistance. The master of a requisitioned vessel in Canadian waters and every qualified person who is the master of a requisitioned vessel in any waters shall continue to proceed with all speed to render assistance to the vessel in distress.

Release from obligation

(4) The master of a vessel shall be released from the obligation imposed by subsection (1) when the master learns that another vessel is complying with a requisition referred to in subsection (3).

Further release

(5) The master of a vessel shall be released from an obligation imposed by subsection (1) or (3) if the master is informed by the persons in distress or by the master of another vessel that has reached those persons that assistance is no longer necessary.

Assistance

132. The master of a vessel in Canadian waters and every qualified person who is the master of a vessel in any waters shall render assistance to every person who is found at sea and in danger of being lost.

Aircraft treated as if vessel

133. Sections 130 to 132 apply in respect of aircraft on or over Canadian waters as they apply in respect of vessels in Canadian waters, with any modifications that the circumstances require.

Annex 2 Excerpts from the *Canada Shipping Act, 2001*

Offences and Punishment

Contravention of Act

137. (1) Every person who, or vessel that, contravenes any of the following commits an offence:

(a) subsection 131(1) (assist persons in distress);

(b) subsection 131(3) (comply with requisition to assist person in distress); or

(c) section 132 (assist a person found at

sea). Punishment

(2) Every person who, or vessel that, commits an offence under subsection (1) is liable on summary conviction to a fine of not more than $1,000,000 or to imprisonment for a term of not more than 18 months, or to both.

Defence

(3) No person on board a vessel may be convicted of an offence under paragraph (1)(*a*), (*b*) or (*c*) if they had reasonable grounds to believe that compliance with subsection 131(1) or (3) or section 132, as the case may be, would have imperilled life, the vessel or another vessel.

PART 6 – INCIDENTS, ACCIDENTS AND CASUALTIES

Salvage

Aircraft treated as if vessel

146. The provisions of this Part with respect to salvage apply in respect of aircraft on or over Canadian waters as they apply in respect of vessels, with any modifications that the circumstances require.

Rights Not Affected

147. Compliance with section 130 (direction of rescue coordinator), 131 (distress signals) or 132 (assisting a person found at sea) does not affect the right of a master or of any other person to salvage.

Annex 2 Excerpts from the *Canada Shipping Act, 2001*

Obligations in Case of Collisions

Duty of masters in collision

148. If vessels collide, the master or person in charge of each vessel shall, if and in so far as they can to do so without endangering their vessel, crew or passengers,

(a) render to the other vessel, its master, crew and passengers the assistance that may be necessary to save them from any danger caused by the collision, and to stay by the other vessel until the master or person has determined that it has no need of further assistance; and

(b) give the name of their vessel, if any, the name and address of its authorized representative, if any, and any other prescribed information to the master or person in charge of the other vessel.

Offences and Punishment

Contravention of paragraph 148(*a*) or the regulations

151. (1) Every person commits an offence who contravenes

(a) paragraph 148(*a*) (render assistance after a collision); or

(b) a provision of the regulations made under paragraph

150(1)(*a*). Punishment

(2) Every person who commits an offence under subsection (1) is liable on summary conviction to a fine of not more than $1,000,000 or to imprisonment for a term of not more than 18 months, or to both.

Contravention of Act or regulations

152. (1) Every person commits an offence who contravenes

(a) paragraph 148(*b*) (failure to provide information after a collision); or

(b) a provision of the regulations made under paragraph 150(1)(*c*) or subsection 150(2).

Punishment

(2) Every person who commits an offence under subsection (1) is liable on summary conviction to a fine of not more than $10,000.

Royal Assent granted 1 November 2001.

Annex 3 Excerpts from the *Oceans Act*

Interpretation

2. In this Act,

"Department" means the Department of Fisheries and Oceans;

"Minister" means the Minister of Fisheries and Oceans.

Coast Guard Services

41. (1) As the Minister responsible for coast guard services, the powers, duties and functions of the Minister extend to and include all matters over which Parliament has jurisdiction, not assigned by law to any other department, board or agency of the Government of Canada, relating to

(a) services for the safe, economical and efficient movement of ships in Canadian waters through the provision of

(i) aids to navigation systems and services,

(ii) marine communications and traffic management services,

(iii) ice breaking and ice management services, and

(iv) channel maintenance;

(b) the marine component of the federal search and rescue program;

(*c*) [Repealed, 2005, c. 29, s. 36]

(d) marine pollution response; and

(e) he support of departments, boards and agencies of the Government of Canada through the provision of ships, aircraft and other marine services.

Royal Assent granted 18 December 1996.

Annex 3 Excerpts from the *Oceans Act*

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Annex 4 Excerpts from the CCG *Policy on Assistance to Disabled Vessels*

1. *Policy Statement*

This policy will be followed when a request for assistance from a disabled vessel is received to determine whether, how, and to what extent assistance shall be provided based on the risks involved. All relevant risks will be considered, including those related to persons requiring assistance, the disabled vessel, CCG and its employees.

2. *Application*

2.1 This policy applies to CCG and will take precedence over all internal CCG policies, directives, procedures, and instructions concerning assistance to non-CCG disabled vessels.

2.2 CCG employees will follow the *Fleet Safety and Security Manual* procedures when a CCG vessel is disabled and requires assistance.

2.3 However, when a CCG SAR resource is on scene and when lives are in immediate danger, i.e., *in extremis*, the Commanding Officer shall take any actions he or she deems necessary to save lives, including towing with persons on board. In this event, and when lives are no longer in immediate danger, Commanding Officers must re-evaluate the risks to determine how to evacuate the persons onboard.

2.4 CCG will follow the *Operational Procedures for Assistance to Disabled Vessel*[1].

3. *Guiding Principle*

For vessels in distress, potential distress, capsized vessels or situations in doubt, the first consideration shall always be to save the lives in danger including measures to evacuate all persons from the distressed vessel and recover any persons from the water.

4. *General*

4.1 Assistance at sea is a mutual service between mariners based on need and isolation. Assistance is typically provided without pause, as the providers know they may need assistance in the future.

4.2 Given the foregoing, it is recognized that the timely provision of technical assistance to, or towing of, disabled vessels can be an effective way of meeting the national search and rescue (SAR) objective of preventing loss of life and injury.

4.3 However, CCG will not assist disabled vessels merely on request and will not compete with commercial or private interests to provide assistance. Some incidents that involve CCG resources or the use of the SAR system are either preventable or unreasonable given limited

[1] Different excerpts of the CCG *Operational Procedures for Assistance to Disabled Vessels* are shown in *CAMSAR II, Annex 4,* and in *CAMSAR III, Annex 1.*

Annex 4 Excerpts from the CCG *Policy on Assistance to Disabled Vessels*

resources that are available to respond to more serious incidents. Furthermore, they may place responders in unnecessary danger.

4.4 Resources of CCG will not be tasked nor provide a tow to disabled vessels for the sole purpose of transiting from one place of refuge to another.

4.5 If a disabled vessel requesting assistance refuses commercial or private assistance when available, this shall be considered a cancellation of the initial request for assistance. CCG will notify the master of the disabled vessel accordingly.

4.6 If a disabled vessel refuses to evacuate when the Commanding Officer of the mobile facility responding requires the personnel to evacuate, this shall be considered a cancellation of the initial request for assistance. CCG will notify the master of the disabled vessel accordingly.

4.8 CCG employees involved in the provision of assistance are not personally liable for any death, injury or property damage that could occur as a result of the assistance operation if they exercised due diligence and acted in good faith, within the responsibilities attached to their position, and within the mandate of CCG.

21 December 2010

NOTE: The complete text of this document is available on the CCG Intranet web site: http://ccg-gcc.ncr.dfo-mpo.gc.ca/commissioner-commissaire/policies-eng.html.

Annex 5 SAR Authorities Contact Information

J3 (SAR) Canadian Joint Operations Command 101 Colonel By Drive Ottawa (Ontario) K1A 0K2	
SSO SAR 1 Canadian Air Division HQ P.O. Box 17000 Stn Forces Winnipeg (Manitoba) R3J 3Y5	
Director General, Operations Canadian Coast Guard Headquarters 200 Kent Street, Ottawa (Ontario) K1A 0E6	
JRCC Victoria Joint Rescue Coordination Centre Canadian Forces Base, Esquimalt P.O. Box 17000 Stn Forces Victoria (British Columbia) V9A 7N2	(All numbers are 24/7) 1-800-567-5111 1-250-413-8933 Fax: 1-250-413-8932 AFTN-CYYJYCYX
JRCC Trenton Joint Rescue Coordination Centre Canadian Forces Base, Trenton P.O. Box 810 Trenton (Ontario) K8V 5W6	(All numbers are 24/7) 1-800-267-7270 1-613-965-3870 Fax: 1-613-965-7190 AFTN-CYTRZSYX
JRCC Halifax Joint Rescue Coordination Centre Canadian Forces Base, Halifax P.O. Box 99000 Stn Forces Halifax (Nova Scotia) B3K 5X5	(All numbers are 24/7) 1-800-565-1582 1-902-427-8200 Fax: 1-902-427-2114 AFTN-CYHZYCYX
MRSC Québec Centre secondaire de sauvetage maritime Base de la Garde côtière canadienne 101, Boul. Champlain Québec (Québec) G1K 7Y7	(All numbers are 24/7) 1-800-463-4393 1-418-648-3599 Fax: 1-418-648-3614
Canadian Forces Integrated Command Centre (CFICC) (Ottawa)	1-613-945-2702 (24/7)
CMCC Trenton (COSPAS-SARSAT) Ops)	1-613-965-7265 (24/7)
Combined Air Operations Centre (CAOC) (Winnipeg)	1-204-833-2500, extension 2650 (24/7)

Annex 5 SAR Authorities Contact Information

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National Defence
Fisheries and Oceans Canada
Canadian Coast Guard

Défense nationale
Pêches et Océans Canada
Garde côtière canadienne

B-GA-209-001/FP-001
DFO 5449

CAMSAR II

CANADIAN AERONAUTICAL AND MARITIME SEARCH AND RESCUE MANUAL

Volume II – Mission Coordination

(ENGLISH)

Supplement to the IAMSAR Manual, Volume II

Canada

Chapter 1 THE SAR SYSTEM

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Chapter 1 THE SAR SYSTEM

1.01 Search and Rescue Units

Primary SRUs

1.01.1 As described in *CAMSAR I*, the Canadian Armed Forces (CAF) and the Canadian Coast Guard (CCG) are required to provide primary search and rescue (SAR) units (SRUs).

NOTE: Refer to *CAMSAR I, sections 1.06 – National Defence SAR Responsibilities,* and *1.07 – Fisheries and Oceans SAR Responsibilities*.

Secondary SRUs

1.01.2 All CAF and CCG units that are not designated primary SRUs are considered secondary SRUs. While secondary SRUs do not maintain a SAR standby posture, they may be tasked to aid in the resolution of a SAR incident.

Tasking of SRUs

1.01.3 Aeronautical or Maritime SAR – SAR Region (SRR) Commanders may utilize all primary and secondary SRUs available in providing aeronautical or maritime SAR services. In instances where an SRR Commander's SRUs are considered to be inadequate for a specific task, he should request assistance from any suitable source. These may include

.1 CAF secondary SRUs, which shall be requested through the Combined Air Operations Centre (CAOC),

.2 CCG secondary SRUs, which may be tasked through the appropriate CCG regional operations centre (ROC),

.3 the primary SRUs of neighbouring SRRs, which may be available and are requested through the appropriate joint rescue coordination centre (JRCC)/maritime rescue sub-centre (MRSC),

.4 secondary SRUs of other federal government departments, and

.5 other facilities, which may be tasked under the *Canada Shipping Act, 2001* by the SMC, acting for the SRR Commander.

NOTE: JRCCs/MRSCs may charter required facilities in accordance with *section 1.04, paragraphs 1.04.7 to 1.04.11 – Hiring of Civilian Personnel and Services*. Any MRSC arranged charter which will be costed against the JRCC's accounting base must be approved by the Officer in Charge of the JRCC.

1.01.4 SMCs have the authority to task SRUs on aeronautical and maritime SAR incidents only.

Chapter 1 THE SAR SYSTEM

1.01 Search and Rescue Units

1.01.5 Other Than Aeronautical or Maritime SAR – Requests made to the SMC for the use of primary SRUs in functions not related to an aeronautical or a maritime SAR incident shall be referred to the appropriate authority within the CAF or the CCG.

1.01.6 Requests for CCG SRUs assistance on other than SAR incidents, i.e. police escort, salvage, etc., shall be transferred to the appropriate CCG ROC.

NOTE: Requests for CCG SRUs assistance on humanitarian incidents shall be in accordance with *section 3.04 – Humanitarian Incidents*.

On-scene Coordination

1.01.7 On-scene Coordinator – Whenever there is more than one SRU (primary or secondary) engaged in an operation, one SRU should be designated to coordinate the operation at the scene, whether the participating SRUs are aeronautical, maritime or a combination of both. Since the crews of primary SRUs will be experienced and trained in SAR operations, one of these will normally be designated as on-scene coordinator (OSC). If primary SRUs, either aeronautical or maritime, are not available and only secondary maritime SRUs are engaged, then one of these should assume the duty of OSC.

1.01.8 Aircraft Coordinator – Whenever more than one aircraft is engaged in a search where a vessel is OSC, then one of these aircraft should be designated as aircraft coordinator (ACO) to coordinate the aeronautical portion of the search as directed by the SMC.

NOTE: Refer to *CAMSAR III, section 3.01 – On-scene Coordinator* for the duties and responsibilities of the OSC and ACO.

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1.02 CAF SAR Technicians

1.02.1 The role of Canadian Armed Forces Search and Rescue Technicians (SAR Techs) in SAR and other Domestic/Expeditionary operations is to save lives and reduce human suffering. This is accomplished by:

.1 Searching for and accessing the incident site to determine the nature of distress;

.2 Penetrating the incident site;

.3 Initiating and maintaining medical treatment;

.4 Sustaining and protecting the survivors by the provision of site security, food, water and shelter; and

.5 Evacuating the survivors.

NOTE: SAR Techs shall NOT normally dive for salvage or body recovery operations.

1.02.2 The method of penetrating and accessing the distress site rests with the aircraft commander and the SAR Tech team leader. It may be achieved by one of the following:

.1 Parachute, day or night,

.2 Helicopter Hoist,

.3 Helicopter Descent device[1],

.4 Helicopter Free entry[2],

.5 Mountain/Rope Rescue,

.6 Rescue Diving, open water or confined space; and

.7 Technical rescue, over land or over water.

1.02.3 The operational deployment of the SAR Tech team for SAR or other incidents should normally be preceded by authorization from the SAR Mission Coordinator to ensure that it is the most effective method of resolving the situation.

[1] Helicopter Descent device is a device authorized within the 1 Cdn Air Div FOM or aircraft SMM used in the absence of a helicopter hoist.
[2] Helicopter Free entry is any approved method used without the aid of a hoist/descent device to depart the helicopter normally into open water.

Chapter 1 THE SAR SYSTEM

1.02 CAF SAR Technicians

1.02.4 With regard to safety, the SAR Tech team shall not be deployed without the complete concurrence of the SAR Tech Team Leader and of the Aircraft Commander.

1.02.5 Procedures pertaining to operational deployment of SAR Techs are detailed in the RCAF *flight operations manual*, *CAF Diving Manual, Vol 2, B-GG-308-000/FP-002*, *CC-130H SMM, CC-115 SMM, CH-149 SMM, CH-146 SMM and the CFACM 60-ST-00101 SAR Tech checklist.*

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1.03 CCG Rescue Specialists

General

Background

As a signatory to the International Convention on Maritime Search and Rescue (SAR) 1979*, the Canadian government is responsible for "the provision of medical advice, initial medical assistance, or medical evacuation".*

The Rescue Specialist (RS) Program was created in 1992 to address this requirement and recommendations contained in the Royal Commission Inquiry on the Ocean Ranger Disaster (1984).

Recommendations included the need for Coast Guard rescue personnel to be trained and equipped in an advanced level of first aid – including hypothermia and Cardio-Pulmonary Resuscitation (CPR) – and trained in offshore survival and rescue techniques.

Policy

Rescue Specialists are regular ships' crew members who, in addition to performing the duties required by the work description for their position on board the vessel, volunteer to undergo the RS training to provide this service.

In order to provide pre-hospital care, it is the policy of the CCG to carry RS capabilities on board all CCG ships […].

Excerpts from the *Fleet Order (FO) 535.00 – Rescue Specialists on board Canadian Coast Guard Vessels*

1.03.1 The role of the Canadian Coast Guard (CCG) rescue specialists is to save lives. They are the front line of the CCG when it comes to providing medical assistance on coastal waters or the high seas. They may be deployed to rescue or assist survivors aboard distressed vessels, in remote locations along shorelines, or in water rescue situations. In addition to responding to SAR incidents, the rescue specialists also serve as the first aid attendants for the officers and crews of their vessels.

1.03.2 The approved CCG minimum crewing level is one to two rescue specialists per vessel, depending on the type of vessel, as stated in the CCG *FO 535.00, Annex A*.

Responsibilities

1.03.3 The roles and responsibilities pertaining to CCG rescue specialists are described in the CCG *FO 535.00*.

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1.03 CCG Rescue Specialists

1.03.4 Rescue specialists provide a level of pre-hospital medical care with basic life support and advanced first aid skills for the injured or sick. In addition to assessing injuries/illnesses and performing field treatment, the rescue specialists:

.1 provide monitoring and support to survivors;

.2 communicate with other professionals involved in the rescue to make sure they have full understanding of the extent of the victim’s injuries;

.3 conduct triage and disaster scene management at the site of major maritime disasters;

.4 conduct treatment given under telemedical advisory service from medical practitioners, until patients can be transferred to a higher level of medical care; and

.5 maintain the SAR readiness equipment (rescue and first aid) at CCG stations and on board CCG vessels.

Requirements

1.03.5 In order to become rescue specialists, CCG personnel must meet specific advanced training and recertification requirements, as stated in the CCG *FO 535.00, Annex B*.

1.03.6 Other training may be taken, such as:

- Marine Emergencies Duties (MED);
- Rigid Hull Inflatable Operational Training (RHIOT);
- Confined Space Rescue; and
- Ice Rescue.

Deployment

1.03.7 Operational deployment of the Rescue Specialist is under the authority of the Commanding Officer. Procedures are detailed in the CCG *Fleet Safety and Manual*.

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1.04 Civilian Agencies and Volunteers

Use of Civilian Associations

1.04.1 When tasking a civilian association unit, the joint rescue coordination centre (JRCC)/maritime rescue sub-centre must ensure that the crew members clearly understand that the tasking is in fact a request and that they are not obligated to comply with this request.

1.04.2 **CASARA –** Civil Air Search and Rescue Association (CASARA) members may be tasked for distress beacon homing missions, as spotters on military flights, or to provide fully manned civilian search aircraft as considered appropriate by the search and rescue (SAR) mission coordinator (SMC) or searchmaster (SM).

NOTE:	CASARA invoices shall be certified and paid by the SMC or SM staff at SAR headquarters prior to CASARA members leaving the search. Other invoices shall be certified by the JRCC and submitted to the section of the base associated with the JRCC for payment. Where possible, invoices shall be reimbursed with minimum delay owing to the personal expenses incurred by CASARA members.

1.04.3 **CCGA –** Tasking of Canadian Coast Guard Auxiliary (CCGA) units is to be considered in the absence of more appropriate SAR facilities or when it is perceived that by utilizing CCGA units, the SAR objectives can be achieved more quickly.

Use of Civilian Volunteers

1.04.4 When civilian aircraft, vessel or vehicle operators volunteer to assist in a search, but their assistance is considered not essential to the search, the SMC/SM may permit them to participate under his direction on the understanding that no reimbursement of expenses will be made. When tasking civilian volunteers, the SMC/SM must ensure that they clearly understand that the tasking is in fact a request and that they are not obligated to comply with this request.

1.04.5 **Spotters –** Trained CASARA or Canadian Armed Forces (CAF) spotters should be used as required. When trained spotters are unavailable, other civilians may be used if they are essential to the conduct of the search. Civilians volunteering their services in this capacity shall be advised that there will be no remuneration for their services. However, the SMC/SM is authorized to provide in-flight lunches for volunteer civilian spotters and to reimburse them for out-of-pocket expenses incurred due to their volunteer services (i.e., lodging and meals necessitated by an overnight stay as the result of an aircraft diversion). Invoices shall be utilized.

Hiring of Civilian Personnel and Services

1.04.6 When the SMC/SM considers that the assistance of civilian services is required, these services may be employed, at pay/charter rates, on the authority of the SAR Region

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1.04 Civilian Agencies and Volunteers

Commander or his delegated representative. These services include the hiring of civilian aircraft, vessels, vehicles and personnel (guides, trackers, etc.) that are essential to the successful completion of a SAR distress operation.

1.04.7 Before recommending the hiring of civilian personnel services, the SMC/SM shall determine that the rates quoted are fair and reasonable and include charges for all services rendered. The SMC/SM is also to mention to the chartered operators that they, and well as those in their employ, are responsible for their own actions.

1.04.8 Invoices charged to the CAF shall be certified by the SMC/SM in accordance with standard procedures, and submitted to the accounting section of the Wing/Base serving the JRCC for certification and payment action.

1.04.9 When necessary, SAR personnel may be carried by chartered civilian facilities. This carriage will normally be limited to the transport of personnel to and from the scene of the incident.

1.04.10 Once hired, the responsibility to adhere to normal safe operating procedures remains with the operator.

Carriage of Civilians

1.04.11 The Commander, 1 Canadian Air Division, through Senior Staff Officer (SSO) SAR, may authorize civilian personnel such as next-of-kin to be carried as additional crew in aircraft engaged in SAR operations, as long as their participation is in the interest/support of the actual SAR operation. Foreign civilians will require ministerial level approval, as there may be diplomatic concerns or considerations.

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1.05 Support to SAR

Position Locating Services

1.05.1 Radar – Numerous radar sites located across Canada are used to record the progress of aircraft and vessel movements. These systems have a capability to assist in locating aircraft or vessels in distress and search planners should make full use of this capability.

1.05.2 Air Defence – Military radar sites of the North American Aerospace Defence Command (NORAD) may provide valuable information, which could help locate distressed aircraft transiting through the area coverage of the defence radar. Search and rescue (SAR) mission coordinators (SMC) can be provided with specific recorded radar information from NORAD sites by contacting appropriate military authorities. Joint rescue coordination centres (JRCCs) shall maintain a current list of contacts within NORAD to ensure timely provision of such information when required.

1.05.3 Air Traffic Control – Recorded radar or voice information from civilian and military air traffic control (ATC) installations may also be used to assist in responding to an aeronautical distress incident. In addition, some ATC radar installations have the capability to direct SAR aircraft to the scene of a suspected aeronautical distress. When it is believed that ATC information can assist in SAR operations, the Wing's Operations Officer of Canadian Armed Forces (CAF) bases, or the Transport Canada Regional Manager of Air Traffic Services, should be contacted as soon as possible.

1.05.4 In addition, ATC should be requested to issue notices to airmen about the search areas in order to provide added safety for search crews.

1.05.5 Marine Communications and Traffic Services – Marine Communications and Traffic Services (MCTS) centres within the SAR region may also be able to provide JRCCs/maritime rescue sub-centres (MRSCs) with real-time radar information concerning incidents and/or traffic within the limits of a traffic zone.

1.05.6 Vessel Traffic Services and Reporting Systems – Organizations that manage vessel traffic services and/or vessel traffic reporting systems are capable of providing, to varying degrees, information about participating vessels (location, construction, cargo, etc.) that may be of use in resolving a SAR incident.

.1 Selected MCTS centres are designated to administer the following Canadian offshore vessel traffic reporting systems:

.a **ECAREG –** The Eastern Canada Traffic System (ECAREG) covers all eastern Canadian waters south of 60°N, including the Gulf of Saint Lawrence but excluding designated vessel traffic services zones.

.b **NORDREG CANADA –** The Arctic Canada Traffic System (NORDREG CANADA) covers all waters north of 60°N, including all of Hudson Bay

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1.05 Support to SAR

and Ungava Bay but excluding those portions of MacKenzie Bay and Kugmallit Bay that are south of 70°N and east of 139°W.

.2 **St Lawrence Seaway –** Operated in Canada by the St. Lawrence Seaway Management Corporation, the St. Lawrence Seaway (commonly called “The Seaway”) Traffic Management System (TMS) covers the area from west of 073°30’W in Montréal Harbour to Port Colborne, Lake Erie. The Seaway TMS centres maintain very high frequency (VHF) – frequency modulation (FM) contact and the reporting procedures are the same as those of other vessel traffic services.

1.05.7 Each joint rescue coordination centre (JRCC)/maritime rescue sub-centre (MRSC) should develop mutually agreed upon procedures with all MCTS and Seaway TMS centres within their area of responsibility. These local procedures are to be included in the JRCC/MRSC standard operating procedures.

NOTE: Refer to *CAMSAR I, section 5.04 – JRCC/MRSC SAR Documentation*.

1.05.8 **Amver –** The Automated Mutual Assistance Vessel Rescue System (Amver) is a voluntary ship reporting system operated by the United States Coast Guard (USCG). Participating vessel information is made available to JRCC/MRSC coordinators via any USCG rescue coordination centre.

NOTE: Refer to *section 3.07 – Maritime Electronic Positioning Information Tools*.

Direction Finding

1.05.9 **VHF DF –** Some MCTS centres have direction finding (DF) capability on selected VHF aeronautical and maritime frequencies. JRCC/MRSC coordinators should familiarize themselves as to which MCTS centres provide which type of DF services. These centres should be contacted if their assistance is likely to contribute to the resolution of the SAR incident.

1.05.10 Under regulation, all primary SAR vessels have a VHF DF capability, which should be used to the maximum extent.

1.05.11 **HF DF –** There are two high frequency (HF) DF nets in Canada, one operated by the Canadian Forces Information Operations Group (CFIOG) and the other by Industry Canada. These may be used by the SAR system to pinpoint the source of an HF transmission from a distressed vessel or aircraft.

1.05.12 One of the primary services of the nets is support to SAR; they should therefore be contacted if their assistance is likely to contribute to the success of the SAR effort.

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1.05 Support to SAR

1.05.13 To facilitate maximum opportunity for HF DF net prosecution, the SAR authority should attempt to have the distressed unit transmit, at maximum power, an easily identified signal such as:

.1 A long count from zero to 10 or longer and reverse followed by the distressed unit's identification, repeated frequently.

.2 A steady carrier or alarm signal.

1.05.14 The following information should be provided when the net stations are contacted:

.1 Urgency of the situation (life-threatening or not)

.2 SAR incident name

.3 Call sign of unit in distress

.4 Distress frequency

.5 Mode of transmission (voice, auto-alarm, tone, etc.)

.6 Nature of emergency

.7 Any positional data known or previously received

.8 Length of watch requested (note that CFIOG will continue to prosecute a SAR event until stood down by the requesting authority)

1.05.15 Canadian Forces Information Operations Group (CFIOG) – The following procedures are to be employed by the JRCCs and CFIOG stations:

.1 On notification that an aircraft with the ability to transmit in the 2 to 32 megahertz range is in distress, the applicable JRCC will include Canadian Forces Stations (CFS) Alert and Leitrim as action addresses in its *Missing Aircraft Notice (MANOT)*. The Senior Staff Officer of Operations (SSO Ops) at the CFIOG Headquarters (HQ) will be included as an information addressee.

NOTE: Refer *to section 2.03, paragraphs 2.03.4 to 2.03.7 – Missing Aircraft Notices*.

.2 CFIOG stations shall respond to all MANOTs using dedicated HF DF facilities, treating requests for CAF assistance to actual or potential distress cases as an emergency.

.3 Negative reports shall be submitted every eight hours or at shift turnover. Positive reports shall be submitted as they occur, in accordance with the format shown on the next page. All reports will be submitted as immediate precedence to the initiating JRCC, info CFIOG HQ/SSO OPS, with follow-up reports numbered in sequence. If the JRCC wishes to extend the surveillance

Chapter 1 THE SAR SYSTEM

1.05 Support to SAR

beyond the initial 48-hour period, it shall address its request to the CFIOG addresses, specifying the period of extended cover requested, e.g., 24 hours, 48 hours. Unless requested to extend surveillance, contributing stations shall submit their final report as “FOLLOW-UP NR AND FINAL”.

.4 Netted HF DF stations may initiate tip-offs to the appropriate net for SAR support as required. When available, netted results will be reported in *paragraph G of the SAR support message* as follows:

Message to be sent IMMEDIATE/ROUTINE

Distribution

FM: Applicable CAF Communication Station

TO: Appropriate JRCC

INFO: CFIOG HQ OTTAWA//SSO OPS//

Required Information

SUBJ: SAR HF DF SUPPORT

A. MANOT Identification.

B. Time of bearing in UTC or negative results.

C. True bearing in three digits with validity indicator.

D. Latitude and longitude of reporting station.

E. Signal type/frequency.

F. Amplifying data.

G. Netted fix report.

Example

SUBJ: SAR HF DF SUPPORT

A. MANOT 58, SAR COMOX FOLLOW-UP NUMBER 10 AND FINAL

B. 1800 UTC

C. 320 TRUE PLUS OR MINUS 10 DEGREES

D. 485704N 0543133W

E. VOICE/5680

F. N/A

G. N/A

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1.05 Support to SAR

1.05.16 JRCCs are authorized to contact the CFIOG by telephone. Contact telephone numbers are:

CFS Leitrim: 613-945-3135 (General Purpose Canadian Switched Network: 627-3135)

1.05.17 The Canadian Forces Station (CFS) Leitrim has promulgated formal and annually reviewed procedures through their chain of command. Any changes in procedures between JRCCs and the CFIOG are to be forwarded to the Senior Staff Officer of Operations, at the CFIOG HQ.

Satellite, Aerial and Infra-Red Photography

1.05.18 If the use of air or infrared photography may aid the conduct of a search, a request for its use is to be forwarded to the Canadian Forces Integrated Command Centre (CFICC).

1.05.19 Space-based and other multi-spectrum detection systems may be capable of assisting in detecting the search object. JRCCs may request this service, as required, through the appropriate Joint Task Force Intelligence or through the CFICC.

NOTE: Also refer to *paragraph 1.05.21 – CAF Weather Service*.

Meteorological Services

1.05.20 In the initial planning of a SAR operation, the SMC shall have available comprehensive information on the past, prevailing, and forecast meteorological conditions in the search area, and the prevailing and forecast conditions search facilities will encounter en route to and from the search area. In the case of winter maritime SAR operations, forecast and prevailing ice conditions also need to be obtained.

1.05.21 **Canadian Forces Weather Service –** The provision of meteorological support to SAR operations is the responsibility of the Canadian Forces Weather Service (CFWS) and procedures to that effect are in place with the JRCCs. Also, most CFWS centres are equipped to receive satellite photos. These pictures are available for the visual and infrared frequencies and may be of assistance to search planners. The deployed SMC or searchmaster will coordinate with the CFWS to arrange for the meteorological services to be provided at the search headquarters.

1.05.22 **Environment Canada –** Available to all, the Environment Canada (EC) Weather Office website: weatheroffice.gc.ca provides detailed online weather information. MRSCs will normally obtain meteorological information directly from their established point of contact

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1.05 Support to SAR

with EC. The Canadian Search and Rescue Planning System (CANSARP) is linked to EC databases and is a particularly useful tool for determining wind forces.

1.05.23 Canadian Ice Service – Ice information is collected and collated by the Canadian Ice Service, EC, on behalf of the Canadian Coast Guard (CCG). This information may be obtained from one of the CCG operated Ice Offices or Ice Centre.

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1.06 Public Relations

1.06.1 Whenever possible, all public information releases to the news media concerning search and rescue (SAR) operations should be made through the Canadian Armed Forces (CAF) Public Affairs or through the Fisheries and Oceans Communications branch.

1.06.2 Unless otherwise directed by the SAR Region Commander, releases will be authorized by the Officer in Charge (OIC) of the joint rescue coordination centre (JRCC) or his/her representative.

1.06.3 The Regional Supervisor, Maritime SAR, (RSMS) of a JRCC may develop press releases for maritime incidents. However, approval of the OIC JRCC must be obtained prior to actual release of the information.

1.06.4 The RSMS of a maritime rescue sub-centre (MRSC) may develop press releases for incidents which are solely controlled by the MRSC; however, approval of the OIC JRCC must be obtained prior to actual release of the information.

1.06.5 Press releases on incidents for which the control has been transferred from an MRSC to a JRCC shall originate through the OIC JRCC, or, if applicable, the SMC. Prior to issuance of a press release in these cases, a copy of the contents shall be forwarded to the MRSC for near-simultaneous transmittal to news media.

1.06.6 All releases from JRCCs shall be in accordance with current CAF directives.

NOTE: Refer to the *IAMSAR Manual, Volume II, section 1.10 – Public Relations*.

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1.06 Public Relations

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2.01 Global Maritime Distress and Safety System

GMDSS

2.01.1 Maritime Mobile Service – The Maritime Mobile Service is defined by the International Telecommunication Union (ITU) as: “A mobile [communications] service between coast stations and ship stations, or between ship stations, or between associated on-board communications stations; survival craft stations and emergency position-indicating radio beacon stations may also participate in this service”.

2.01.2 Maritime Mobile-Satellite Service – The Maritime Mobile-Satellite Service is defined by the ITU as: “A mobile-satellite [communications] service in which mobile earth stations are located on board ships: survival craft stations and emergency position-indicating radio beacon stations may also participate in this service”.

2.01.3 These services interface with carriage requirements and other shore-side services, required under the *International Convention for the Safety of Life at Sea* and the *International Convention on Maritime Search and Rescue, 1979*, to form the overall Global Maritime Distress and Safety System (GMDSS).

2.01.4 In the Canadian search and rescue (SAR) area of responsibility (AOR), Canadian Coast Guard (CCG) Marine Traffic and Communications Services (MCTS) centres provide 24/7 “coast watching” services required for the detection of all distress alerts issued within the maritime mobile service. Further, these centres provide the follow-on broadcast and mobile communications services required during SAR operations.

Distress Beacons

2.01.5 There are two types of distress beacons regulated for use:

.1 COSPAS-SARSAT 406 megahertz (MHz) emergency locator transmitters (ELTs), emergency position-indicating radio beacons (EPIRBs) and personal locator beacons (PLBs)

.2 Very high frequency (VHF) digital selective calling (DSC) EPIRBs

2.01.6 COSPAS-SARSAT 406 MHz Beacons – Alerts from 406 MHz distress beacons—ELTs, EPIRBs and PLBs—are received by the COSPAS-SARSAT constellation of geostationary (GOES) and low-earth orbiting (LEO) satellites and relayed to ground stations called local users terminals. Alerts are then forwarded to the associated mission control centre (MCC) for processing and determination of position. The Canadian Mission Control Centre (CMCC) forwards all ELT and EPIRB alerts to the joint rescue coordination centre (JRCC) responsible for the SAR region (SRR) in which the beacon is detected. The JRCC or maritime rescue sub-centre (MRSC) coordinator then actions the alert to resolve the incident.

NOTE: Refer to *section 3.06 – Alert Response*.

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2.01 Global Maritime Distress and Safety System

2.01.7 The 406 MHz distress beacons are coded, and when properly registered, identify the aircraft or vessel and give contact information, which the JRCC/MRSC coordinator uses in resolving the incident. Some distress beacons also transmit a low-power 121.5 MHz homing signal. JRCC/MRSC coordinators who encounter improperly registered beacons shall advise CMCC.

NOTE: Refer to *section 3.06, paragraph 3.06.8 – Canadian Beacon Registry*.

2.01.8 The bit-code transmitted by the COSPAS-SARSAT beacons contains vital information, including a 15-digit hexadecimal code used to cross-reference against the distress beacon registry for each country. Some beacons may have a global positioning system (GPS) position fixing option, in which case the position is transmitted within the bit-code. Also included is a beacon identification number, which is coded using one of three protocols:

.1 call sign,

.2 maritime mobile service identity (MMSI) number, or

.3 serial number not related to any other registry.

2.01.9 406 MHz Cospas-Sarsat beacon alerts are instantaneously detected by the GOES satellites which, however, cannot ascertain the position of beacons not coded with GPS information because there is no Doppler shift. A position for those beacons can only be calculated when a LEO satellite detects the signal. An unlocated signal is initially passed to the MCC of the country that holds the database for that beacon, until a probable position of the beacon can be ascertained. If it is a Canadian registered beacon, CMCC forwards the alert to the JRCC responsible for the SRR in which the aircraft or vessel normally operates.

2.01.10 **VHF-DSC EPIRBs –** Ships operating exclusively in a GMDSS “A1 sea area” may, in lieu of satellite EPIRBs, use VHF-DSC EPIRBs transmitting on channel 70. These EPIRBs transmit their MMSI number, their GPS position and other vital information. They are registered in the national MMSI database for each country. In Canada, distress alerts from these beacons are detected by CCG MCTS centres and all alert information is forwarded to the appropriate JRCC/MRSC as soon as possible. The JRCC/MRSC coordinator then actions the alert to resolve the incident similarly to VHF-DSC distress alerts.

NOTE: Refer to *section 3.06, paragraph 3.06.9 – DSC Distress Alerts*.

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2.01 Global Maritime Distress and Safety System

Inmarsat

2.01.11 Inmarsat A, B or C distress and urgency alerts transmitted from a vessel are first detected by an Inmarsat land earth station (LES) and forwarded directly to its associated rescue coordination centre (RCC). A vessel in distress in Canada's SAR AOR will have its automatic distress alert sent to the RCC associated with the LES which that vessel has chosen. Vessels may also contact any Canadian JRCC/MRSC directly by telephone, fax, or telex using Inmarsat A, B or C.

2.01.12 Terminal Return ID – The Inmarsat return ID is a "hidden" identification code assigned to a ship earth station (SES) and used by the system for security purposes. Occasionally alerts are received from terminals that have been installed on a ship but have not yet been commissioned on the Inmarsat system. In these cases there will be no terminal ID to identify the vessel. The return ID is programmed into the terminal at the manufacturing stage, as opposed to a terminal ID, which is assigned by Inmarsat when the SES is commissioned. It can be obtained from the Inmarsat Network Operations Centre or the LES operator that received the distress alert. Inmarsat equipment manufacturers have records to match return IDs with serial numbers and should be able to identify the dealer to whom the terminal was sold.

2.01.13 Follow-on Communications – Each Inmarsat system provides different services and can be recognized by the first digit of the Inmarsat Mobile Number:

Type	First Digit	Services
Inmarsat-A	1	telephone, telex, fax, data
Inmarsat-B	3	telephone, telex, fax, data
Inmarsat-C	4	telex, send fax, data
Inmarsat-M	6	telephone, fax, data

2.01.14 To call a vessel on Inmarsat, follow the instructions in the *Inmarsat User Manual* or use the assistance of the LES or Network Operations Centre operator.

2.01.15 Inmarsat-C Shore-to-ship Distress Priority Message – A JRCC/MRSC may initiate an Inmarsat-C distress priority message for follow-on communications. This internet-based service gives the shore-to-ship message the same priority for immediate delivery as a distress message originating from a ship. An Inmarsat-C distress priority message can be sent from the JRCC/MRSC or via an MCTS centre with access to the service. An acknowledgement request can be attached to the message, which means the LES will send a positive delivery notification to the originator when the message is delivered to the vessel, thus ensuring that the message has been delivered on-board the vessel.

2.01.16 Barred Inmarsat Terminals – Inmarsat may bar a ship's terminal from accessing the system due to non-payment of invoices or improper use. The ship will still be

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2.01 Global Maritime Distress and Safety System

able to send a distress alert to an RCC via a LES even when normal access is barred. If a JRCC/MRSC receives a distress alert from a barred terminal, the JRCC/MRSC coordinator can request that the operator at the LES that received the alert activate the terminal for distress communications. Since reception of maritime safety information broadcasts is a requirement in the GMDSS, all barred terminals will still receive all priorities of enhanced group calling broadcasts.

Radiotelephones

2.01.17 Upon receipt of a radio telephone transmitted alert at an MCTS centre, the duty MCTS officer will take action in accordance with the *MCTS Standards Manual*. First, the MCTS officer will obtain relevant vital data from the source. Then, if it is clear that there are persons in distress and more assistance is required, the MCTS officer shall broadcast a "Mayday Relay" on behalf of the master of the distressed vessel. As soon as possible, the MCTS officer shall forward all information and any actions taken related to the alert to the JRCC/MRSC coordinator. This should be done via voice and followed-up with a hardcopy message. Upon notification, the JRCC/MRSC coordinator shall action the alert to resolve the incident.

NOTE: For frequencies, refer to *section 2.02 – SAR Radio Frequencies and Channels*.

Digital Selective Calling

2.01.18 DSC distress and other alerts are detected by CCG MCTS centres equipped with DSC, foreign coast radio stations and vessels within propagation range of the alert broadcast.

2.01.19 Alert Message Composition

.1 Format specifier:

.a Distress,

.b Urgency, or

.c Safety;

.2 Nine-digit MMSI:

.a ship station: MIDXXXXXX, or

.b coast station: 00MIDXXXX,

where "MID" is maritime identification digits or country code, and "X" is any integer from 0 to 9;

Chapter 2 COMMUNICATIONS

2.01 Global Maritime Distress and Safety System

.3 Nature of the distress (default setting is "undesignated");

.4 Distress coordinates (default is "no position information" or 99999 99999);

.5 Coordinated Universal Time (UTC): hhmm (default is "no time information" or 8888); and

.6 Mode of subsequent communication (default is "radiotelephony").

2.01.20 VHF-DSC – If an MCTS officer receives a VHF-DSC distress alert and the distress coordinates are within the MCTS centre's AOR, the MCTS officer will transmit a VHF-DSC distress alert acknowledgement. If no coordinates are transmitted or if the coordinates are outside VHF range and the alert is not being acknowledged, the MCTS Officer will acknowledge. After acknowledgement, radiotelephone communications will be established on VHF channel 16 in order to obtain vital data. If required, a Mayday Relay may be broadcasted. The MCTS Officer will then advise the JRCC or MRSC as soon as possible.

2.01.21 HF-DSC – If an HF-DSC distress alert is received and the distress coordinates are within the Canadian AOR for SAR, the most appropriate MCTS centre will immediately transmit a HF-DSC distress alert acknowledgement on the same frequency. After acknowledgement, communications will be established on radiotelephone or narrow band direct printing using the associated frequency in order to obtain vital information. If required, a Mayday Relay may be broadcasted. The MCTS officer will then advise the JRCC/MRSC. If the distress coordinates are outside the Canadian SAR AOR or no coordinates were included in the transmission, a DSC distress alert acknowledgement will not be sent without consultation with the JRCC/MRSC coordinator.

NOTE: Refer to *section 3.06, paragraph 3.06.8 – DSC Distress Alerts*.

Mobile Phones (Terrestrial and Satellite)

2.01.22 JRCC/MRSCs should make arrangements with the cellular service providers' regional network operation centres to provide SAR assistance such as:

.1 directory assistance,

.2 when last and next call is made from a particular cellular number,

.3 which cell site a particular call was received through, and

.4 locating services, where available.

2.01.23 Satellite Communications Services – Many mobile satellite communications services are not regulated for the provision of aeronautical or maritime distress alerting, nor are they suitable substitutes for approved means of distress communications. JRCC/MRSCs must still be capable of coordinating the response to incidents alerted via these services. There are numerous international services (systems) used aboard aircraft and vessels for the provision of voice, fax, e-mail, and data communications. Quite often these services automatically interface with public communications networks.

2.01.24 Most satellite service providers maintain a network operations centre that is staffed 24/7. JRCC/MRSC should maintain contact information for these centres to assist in establishing follow-on communications and obtaining vital data in the event of an alert being transmitted via one of their services. If an alert is transmitted via one of these services, either directly to a JRCC/MRSC or relayed to a JRCC/MRSC via another source, the JRCC/MRSC coordinator shall then action the alert to resolve the incident.

SARTs

2.01.25 SAR transponders (SARTs) are used for locating survivors by SAR units and their signals are also to be considered as a distress alert. The SART should normally be taken to the survival craft when abandoning a vessel. SARTs transmit in the X-band (3 cm) radio frequency used by common aeronautical and maritime radar. The signals are detected at various distances depending on scanner height, tuning and bandwidth of the radar.

2.01.26 Any JRCC/MRSC coordinator that is advised of the detection of a SART shall action the alert to resolve the incident.

Chapter 2 COMMUNICATIONS

2.02 SAR Radio Frequencies and Channels

2.02.1 Distress, Safety and Calling

Service	Band	Frequency / Channel (CH)	Description	Mode
Maritime	MF	2174.5 kHz	International – distress	NBDP
		2182 kHz	International – distress	RT
		2187.5 kHz	International – distress and calling	DSC
Maritime	HF	4125 kHz	International – distress	RT
		4177.5 kHz	International – distress	NBDP
		4207.5 kHz	International – distress and calling	DSC
Maritime	HF	6215 kHz	International – distress	RT
		6268 kHz	International – distress	NBDP
		6312 kHz	International – distress and calling	DSC
Maritime	HF	8291 kHz	International – distress	RT
		8376.5 kHz	International – distress	NBDP
		8414.5 kHz	International – distress and calling	DSC
Maritime	HF	12 290 kHz	International – distress	RT
		12 520 kHz	International – distress	NBDP
		12 577 kHz	International – distress and calling	DSC
Maritime	HF	16 420 kHz	International – distress	RT
		16 695 kHz	International – distress	NBDP
		16 804.5 kHz	International – distress and calling	DSC
Land	HF	27 066.5 kHz/ CB-CH 09	International – unofficial safety and calling General Radio Service frequency (citizen's band)	RT
Aeronautical	VHF-AM	121.5 MHz	International – distress and distress beacon	RT
Maritime	VHF-FM	156.525 MHz/ CH 70	International – distress and calling	DSC
		156.75 MHz/ CH 15	Canadian – frequency for old emergency position-indicating radio beacons which may still be in existence but are not allowed under regulations	RT
		156.8 MHz/ CH 16	International – distress and calling	RT
Aeronautical/ Maritime	UHF	243 MHz	North Atlantic Treaty Organization (NATO) – combined voice aeronautical distress frequency; International – life boat and life raft; distress beacon	RT
Aeronautical/ Maritime/Land	UHF	406 MHz to 406.1 MHz	International – distress beacon frequency	–

Chapter 2 COMMUNICATIONS

2.02 SAR Radio Frequencies and Channels

2.02.2 Mission Coordination

Service	Band	Frequency / Channel (CH)	Description	Mode
Aeronautical/ Maritime	HF	3023 kHz	International – Search and rescue (SAR) on-scene (to be used between commercial aircraft and vessels if communications are not established on 4125 kHz)	RT
		4125 kHz	International – SAR on-scene (recommended between commercial aircraft and vessels)	
		5680 kHz	International – SAR on-scene	
Aeronautical	HF	5717 kHz	Canadian – SAR air/ground/air	RT
		6694 kHz	Canadian – SAR air/ground/air	
		8992 kHz	Canadian – SAR air/ground/air	
		11 187 kHz	Canadian – SAR air/ground/air	
Aeronautical	VHF-AM	123.1 MHz	International – SAR on-scene and emergency locator transmitter training	RT
Aeronautical/ Maritime/Land	VHF-FM	149.08 MHz	Canadian SAR interagency frequency (SAR-IF)	RT
Maritime	VHF-FM	156.3 MHz/ CH 06	International – SAR on-scene	RT
		156.95 MHz/ CH 19A	Canadian - Coast Guard general operations (East Coast and Great Lakes)	
		157.125 MHz/ CH 82A	Canadian - Coast Guard general operations (West Coast)	
Aeronautical	UHF	246.2 MHz	Canadian – SAR on-scene and Canadian Forces personal locator beacon training	RT
Aeronautical/ Maritime	UHF	252.8 MHz	NATO – combined SAR training	RT
		282.8 MHz	NATO – combined SAR on-scene	

2.02.3 Radio Stations – Working frequencies and frequencies for maritime safety information broadcasts used by Marine Traffic and Communications Services centres are listed in the current volume of *Radio Aids to Marine Navigation, Pacific*, or *Atlantic and Great Lakes* editions. The *Admiralty List of Radio Signals, Volume 5*, lists those for all international radio stations.

2.02.4 On-scene Ground Search Parties - Ground search parties involved in crash guard team duties may use any of the following additional on-scene working frequencies while so employed:

2 216 kHz	3 280 kHz	4 480 kHz	5 832 kHz
9 292 kHz	12 115 kHz	15 733 kHz	18 204 kHz

Chapter 2 COMMUNICATIONS

2.03 Broadcasts

General

2.03.1 After an alert of an actual or potential aeronautical or maritime incident has been detected, a broadcast of search and rescue (SAR) related safety information, which requires and initiates a response by all fixed or mobile stations (aircraft and vessels) in the vicinity, may aid in resolving the incident. The broadcasts are issued via various systems.

2.03.2 In general, a broadcast of SAR related aeronautical or maritime safety information shall consist of

.1 Priority:

.a Distress, transmitted as “MAYDAY RELAY” (repeated three times)

.b Urgency, transmitted as “PAN PAN” (repeated three times)

.c Safety, transmitted as “SÉCURITÉ” (repeated three times)

.d No specific priority (general broadcast)

.2 ALL STATIONS (repeated three times)

.3 THIS IS (name of transmitting station)

.4 Details of the situation

.5 Action required by all stations

.6 Contact instructions for follow-on communications

2.03.3 Broadcasts of SAR related information are normally initiated by the SAR Mission Coordinator (SMC). A distress broadcast (Mayday Relay) may, however, be retransmitted or initiated by a station that learns that a mobile station (aircraft or vessel) or person is in distress and it is apparent that further assistance is required.

Missing Aircraft Notices

2.03.4 Once a distress phase has been declared by a joint rescue coordination centre (JRCC) for an aeronautical incident, an *Initial Missing Aircraft Notice (Initial MANOT)* is to be completed and issued by the JRCC.

2.03.5 A *Final MANOT* is to be issued on successful completion or reduction of a search.

2.03.6 When a search has been reactivated a MANOT is to be issued using the original number and format, and adding the word “REOPENED” after the number.

Chapter 2 COMMUNICATIONS

2.03 Broadcasts

2.03.7 Each JRCC will number the MANOTs consecutively, commencing each calendar year with the number 1 and a suffix of the four digits of the year, i.e., 1/2011 INITIAL, 1/2011 FINAL, and 1/2011 REOPENED.

NOTE: Refer to *Appendix A* for the *MANOT Message* formats.

Maritime Safety Information Broadcasts

2.03.8 Unless it has already been done by a Marine Communications and Traffic Services (MCTS) officer, the SMC shall initiate the broadcast appropriate to the type of SAR incident and degree of emergency. To this end, a completed *Maritime Safety Information (MSI) Broadcast Message* form will be transmitted to the appropriate MCTS centre(s) for broadcast. This action may be done verbally and followed-up with a hard copy.

2.03.9 SMCs and MCTS officers should consult and reach a mutual agreement to ensure that the broadcast is properly prioritized, sent via the most appropriate media and transmitted over the most effective area. This will help ensure the best resolution of the incident while not impacting more stations than necessary.

NOTE: Should a conflict occur that cannot be immediately resolved, the SMC will exercise ultimate authority and accept responsibility for actions taken to resolve the incident.

2.03.10 Finally, the SMC shall always cancel or downgrade the priority of MSI broadcasts as soon as practicable, by transmitting the *MSI Broadcast Cancellation Message* to the MCTS Centre.

NOTE: Refer to *Appendix A* for the *MSI Message* formats, and to *Annex 1 – Excerpts from the MCTS Standards Manual*.

MSI DSC Broadcasts

2.03.11 Dependent upon the priority of a MSI radiotelephone broadcast and the availability of digital selective calling (DSC) equipment, the MCTS officer will normally precede the radiotelephone broadcast with the appropriate distress or urgency priority DSC broadcast, known as a "relay". The radio auto alarm tone may also precede a radiotelephone broadcast. Because DSC relays can be addressed to ships within a rectangular area and due to the negative impact that multiple DSC relays can cause within the Maritime Mobile Service, consultation should occur between the MCTS officer and the SMC when relays are used.

Chapter 2 COMMUNICATIONS

2.03 Broadcasts

2.03.12 VHF-DSC Distress Relay Alert Broadcast – In accordance with the *MCTS Standards Manual*, MCTS officers will broadcast a VHF-DSC Distress Relay Alert for vessels or persons in distress who require further assistance.

2.03.13 HF-DSC Distress Relay Alert Broadcast – In accordance with the *MCTS Standards Manual*, MF/HF-DSC Distress Relay Alert Broadcast shall only be broadcasted after consultation between the MCTS Officer and the SMC. This is required to control the near global impact associated with these broadcasts.

MSI Radiotelephone Broadcasts

2.03.14 In accordance with the *MCTS Standards Manual*, MCTS officers shall make MSI broadcasts of SAR information via VHF/MF/HF radiotelephone in consultation with the SMC.

2.03.15 Continuous Marine Broadcast – In accordance with the *MCTS Standards Manual*, once the priority of an incident has decreased or for other reasons, the MCTS officer may, in consultation with the SMC, place the SAR related MSI broadcast on the centre's continuous marine broadcast.

MSI NAVTEX Broadcasts

2.03.16 In accordance with the *MCTS Standards Manual*, MCTS officers shall make MSI broadcasts of SAR information via NAVTEX in consultation with the SMC.

MSI SafetyNET EGC Broadcasts

2.03.17 SafetyNET is the satellite service for dissemination of MSI using Inmarsat-C. Navigational warnings, Meteorological warnings and SAR messages are broadcast over the Inmarsat-C system using the enhanced group calling (EGC) facility. The Canadian Coast Guard (CCG) is licensed as a "SAR SafetyNET Provider" for the purpose of broadcasting SAR related EGCs using this service. One MCTS centre per CCG Region acts as the sole provider of the SafetyNET service.

2.03.18 In accordance with the *MCTS Standards Manual*, MCTS officers shall make MSI broadcasts of SAR information via SafetyNET in consultation with the SMC in order to ensure that the most effective broadcast parameters are used. Further, to ensure consistency of information received aboard vessels, only one MCTS centre shall issue SafetyNET broadcasts for each SAR incident. SMCs shall monitor SafetyNET broadcasts they have initiated by using an Inmarsat-C terminal.

Chapter 2 COMMUNICATIONS

2.03 Broadcasts

MSI NOTSHIPs and NAVAREA Warnings

2.03.19 In relation to SAR incidents, situations arise where a MSI notice should be transmitted to mariners (e.g., abandoned vessels adrift). If the SMC becomes aware of such situations, he or she shall advise the regional CCG Notices to Shipping (NOTSHIPs) issuing authority and request a safety notice be issued.

2.03.20 If there is a requirement to issue a safety notice on the high seas, this can only be done by the NAVAREA 4 and 12 Coordinator at the National Imagery and Mapping Agency in Washington, District of Columbia:

SARNET

2.03.21 SARNET is an Inmarsat-C EGC broadcast service maintained by Her Majesty's Coastguard, United Kingdom, that provides international wide-area messaging to rescue centres. It is recommended that joint rescue coordination centres and maritime rescue sub-centres make use of this service, where appropriate, in the resolution of international SAR incidents.

Chapter 2 COMMUNICATIONS

2.04 Mission Coordination Communications

General

2.04.1 In the process of coordinating a search and rescue (SAR) mission, the SAR Mission Coordinator (SMC) shall issue messages to mobile facilities (aircraft, vessels and others), as required, such as:

.1 Briefings

.2 Taskings

.3 SAR Actions Plans

.4 Debriefings

2.04.2 Mobile facilities, in return, will issue to the SMC:

.1 Situation reports (SITREPs)

.2 Notices of crash/casualty location

.3 Debriefings

2.04.3 Normally, these verbal or hardcopy messages shall be transmitted via radio telephone service providers such as Marine Traffic and Communications Services (MCTS) centres, Air Traffic Control units or Canadian Forces (CF) Radio Stations, so that all relevant parties are informed and kept up-to-date as to the status of the mission. If not necessary, secure communications should be avoided.

NOTE: For frequencies, refer to *section 2.02 – SAR Radio Frequencies and Channels*.

2.04.4 The SMC or mobile facility may, however, choose to communicate directly using point-to-point communications. This may be required to ensure privacy, pass large messages automatically or because the facility is not within radio telephone range. If these communications are used for coordination, the SMC shall attempt to keep necessary parties advised of the mission status.

Briefings/Taskings

2.04.5 SMCs must provide a complete and detailed briefing when tasking responding facilities. Where tasking is directed by telephone or other verbal means, efforts should be made to confirm by message or other written form. Although a hard-copy is not required at all times, the SMC must note the details of each tasking in the case file and be prepared to provide the hard-copy when it is deemed appropriate or requested.

NOTE: *SAR tasking and briefing forms* may be obtained from the SAR Mission Management System (SMMS) and are also available in *CAMSAR III, Appendices*.

Chapter 2 COMMUNICATIONS

2.04 Mission Coordination Communications

NOTE: SRUs shall only accept the proposed mission if, in the commander/ master/operator's judgement, the SRU's equipment and crew capability will permit completion of the task with safety.

2.04.6 When possible, the briefing shall commence with a comprehensive description of the weather situation and forecast given by a meteorologist or qualified meteorological technician. If such personnel are not available, then the SMC shall provide as detailed a weather picture as is possible.

2.04.7 **SRU SITREPs –** SAR units (SRUs) are obligated to maintain regular communications with the SMC and this should be emphasized to secondary SRUs. During the briefing, the SMC shall specify the reporting times of individual SRUs. These SITREPs should be made at least once per hour for aircraft and once every four hours or less for vessels.

2.04.8 SRUs should also be instructed to contact the SMC

.1 before departure,

.2 when arriving on-scene,

.3 any time there is a change in the situation,

.4 prior to departing the scene, and

.5 upon return.

2.04.9 SMCs shall employ all means to verify the status of the SRU if an expected communications check-in is missed. This could include the dispatch of another SRU if consecutive communications check-ins are missed. The SMC should also not hesitate to task a fixed wing primary SRU to provide top cover for a helicopter secondary SRU if the SMC feels this SRU may require assistance (e.g., communications).

2.04.10 **Aeronautical SRUs –** The initial briefing to the first aircrews participating in a search operation shall normally be given by the joint rescue coordination centre (JRCC) via telephone/fax/e-mail. The briefing shall cover all the items detailed in the appropriate *SAR Briefing Form for Aircraft*, and any additional information items considered pertinent to the case.

2.04.11 When search headquarters (HQ) have been set up and an SMC has been deployed or a searchmaster (SM) appointed, it is the responsibility of the deployed SMC/SM to ensure that all search crews are adequately briefed prior to each sortie. The appropriate *SAR Briefing Form for Aircraft* shall be filled out by the deployed SMC/SM and made available to each aeronautical SRU commander prior to each mission.

2.04.12 Secondary aeronautical SRUs will be tasked through normal tasking procedures; however, in emergency situations where this procedure would not be practicable, the request for assistance may be made directly to the SRU commander. In these cases, the SRU commander or the requesting SAR official shall, as soon as possible, take steps to report through regular channels the action being taken and the circumstances which made a direct approach necessary.

2.04.13 To ensure secondary aeronautical SRU commanders fully understand the scope of the mission, SMCs shall provide each commander with a detailed briefing covering all the items of the *SAR Briefing/Debriefing Form for Aircraft – Secondary SRUs*.

2.04.14 Maritime SRUs – SAR taskings of Canadian Coast Guard (CCG) SRUs are routinely done via a verbal message and deemed to be sufficient. Provision of a formal tasking message is suggested for non-federal resources. If the master of a vessel requires a formal copy, then such copy will be provided as soon as practicable, owing to the circumstances of the case.

2.04.15 More complex taskings of maritime SRUs should be done following the *SAR Briefing Form for Vessels*. These taskings can be sent electronically, via fax, MCTS, or satellite communication.

Notification of Next-of-Kin

2.04.16 An SMC must ensure that the immediate next-of-kin (NOK) of persons involved in a SAR incident have been notified prior to the release of names to the media. Notification of NOK shall be accomplished as follows:

.1 For CF personnel, the JRCC shall notify the Commanding Officer of the casualties' parent unit.

.2 For CCG personnel, contact the Superintendent, Regional Operations Centre.

.3 For casualties resulting from a SAR incident involving a commercial aircraft or maritime craft, the JRCC/maritime rescue sub-centre (MRSC) shall request that the operating company notify the NOK.

.4 For casualties resulting from a SAR incident involving a privately owned aircraft or maritime craft, the JRCC/MRSC shall request that the federal, provincial, or municipal police, as applicable, notify the NOK.

.5 In instances where the SMC has established regular contact with the NOK to keep them informed of search development, notification of the NOK concerning casualties may be made by the SMC if he/she considers it the most appropriate method of conveying the news.

.6 In instances where foreign nationals are involved, the JRCC shall inform the CFICC to advise the appropriate embassy if required.

Chapter 2 COMMUNICATIONS

2.04 Mission Coordination Communications

Communicating with the Media

NOTE: Refer to *section 1.06 – Public Relations*.

Transferring control of an incident

2.04.17 Assuming or transferring control of an incident is a formal event and shall be done officially, with timed and detailed log entries made to record the event. Transfer is not complete until the responsible SMC, centre or agency has acknowledged and accepted the transfer.

2.04.18 SAR to SAR – All parties involved must be made aware of the change, the time of the change and that all further reports are to be passed to the new responsible SMC with an information copy to the former one if necessary.

2.04.19 SAR to CCG Other Than SAR – Transfer of incidents to or from a CCG responsibility centre other than SAR, i.e. Regional Operations Centres (ROCs), Environmental Response, Ice Centres, etc., must adhere to the *Handover Procedures for Canadian Coast Guard Operations*:

Handover Message

When the responsibility for an incident or tasking is transferred from one vessel, program, centre or region to another, the ROC or Rescue Centre will transmit a handover message to the vessel receiving the tasking and copy all other Rescue Centres, ROCs, ICE Centres, MCTS Centres and resources as appropriate. The handover message must contain all relevant case history information.

Acknowledgement Message

When a vessel receives a handover message transferring a tasking or an incident from another vessel, program, centre or region, the vessel shall transmit an acknowledgement of receipt of the handover to the ROC or Rescue Centre and copy all other Rescue Centres, ROC, ICE Centres, MCTS Centres, Regions and resources as appropriate.

Excerpts from the *Handover Procedures for Canadian Coast Guard Operations*, November 2010

Chapter 2 COMMUNICATIONS

2.05 Informing Authorities

JRCC Daily SITREPs

2.05.1 In prolonged distress incidents and in all incidents where the search object is not located, situation reports (SITREPs) shall be issued by the joint rescue coordination centres (JRCCs). SITREPs from maritime rescue sub-centres (MRSCs) shall be forwarded to the Officer in Charge of the parent JRCC, for approval and onward transmission. SITREPs shall be sent with priority precedence in the following sequence:

.1 SITREP ONE AND INITIAL

.2 SITREP TWO, etc.

.3 SITREP (number) AND FINAL

NOTE: SITREP formats to be used have been grouped at the end of this volume, in *Appendix B – Reports and Returns*.

2.05.2 A SITREP shall contain all information and action taken. Wherever possible, plain language shall be used in lieu of terse format phrases. Enough information must be relayed to enable headquarters staff officers to process queries and requests for future reduction.

2.05.3 When the search and rescue (SAR) operation is successfully completed or search reduction has been authorized, the JRCC shall send a final SITREP. The final SITREP shall state whether a *SAR Operation Report* will be prepared on the case.

2.05.4 In cases where only one SITREP is required (*SITREP ONE AND FINAL)*, a combined initial and final SITREP format shall be used, replacing the *SITREP ONE AND INITIAL paragraphs J. and K.* by the *SITREP (number) AND FINAL paragraphs B. to E.*, renamed *paragraphs J. to M.*

Daily SARSUMs

2.05.5 Daily SAR Summaries (SARSUMs) shall be prepared each day by each JRCC. SARSUMs shall provide a logical story of the events that occurred for each of the incidents mentioned.

NOTE: The SARSUM format is provided at *Appendix B.05 – Daily SAR Summary*.

2.05.6 MRSCs shall only provide the required daily SARSUM data to their parent JRCC.

CCG National Incident Notification Procedure

NOTE: Refer to *Annex 2 – Excerpts from the CCG National Incident Notification Procedure*.

Chapter 2 COMMUNICATIONS

2.05 Informing Authorities

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Chapter 3 AWARENESS AND INITIAL ACTION

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Chapter 3 AWARENESS AND INITIAL ACTION

3.01 SAR Incident Progression

Assigning the Degree of Emergency

3.01.1 In emergency situations requiring immediate assistance, positive action must be taken quickly. The ability to take appropriate action is a function of the information available to the search and rescue (SAR) mission coordinator (SMC), and of his/her judgment and experience. Initially, the SMC should not hesitate to classify an incident at the highest degree of emergency that the available information supports. Later, the degree of emergency can be lowered if the situation warrants it.

NOTE: This paragraph confers the authority to declare distress on behalf of a vessel whether or not the vessel has declared a distress. Whenever a distress is declared under these circumstances, the rationale is to be recorded in the case file log.

3.01.2 If apprehension as to the safety of the search object and its occupants continues to exist, or if new evidence implies the persons on board are in grave and imminent danger, the current emergency phase should be increased to a higher degree of emergency phase, as appropriate, given the circumstances and information available. The decision to declare this change of phase should be taken without delay and based on past experience with similar situations.

NOTE: Nothing in this manual is meant to prevent the SMC from assigning the highest degree of emergency.

Distress Beacons

NOTE: In the absence of other information, a signal from a 406 megahertz distress beacon, on its own, is to be considered as a sign of distress and shall be investigated immediately.

Major SAR Operations

3.01.3 Major SAR Operations are those that meet any of the following criteria:

.1 Aeronautical and maritime SAR incidents where primary SAR units, aeronautical and/or maritime, are tasked on an incident for more than four calendar days.

.2 Incidents which the SAR Region (SRR) Commander assesses as being potentially sensitive.

.3 Special cases, as directed by Canadian Joint Operations Command or Canadian Coast Guard Headquarters.

Chapter 3 AWARENESS AND INITIAL ACTION

3.01 SAR Incident Progression

Appointing an SMC

3.01.4 For day to day SAR operations, the joint rescue coordination centre (JRCC)/maritime rescue sub-centre (MRSC) as a whole acts as SMC. If a SAR case has the potential to become a major SAR operation, then the appointment of a specific SMC or a searchmaster (SM) is to be considered.

3.01.5 Appointment of an SMC/SM facilitates:

- search plan continuity;
- the provision of a single point of contact for the SRR Commander, the next of kin and all participants; and
- the completion of the *SAR Operation Report* in a timely and accurate fashion.

3.01.6 Examples of situations where the appointment of an SMC/SM could be warranted are:

- A SAR case continuing through a second and into a third JRCC/MRSC shift.
- A search object has not been located during the first 24 hours of search operations.
- A case where SAR activity is escalating or involving numerous resources.

Chapter 3 AWARENESS AND INITIAL ACTION

3.02 Aeronautical Incidents

Degrees of Emergency

3.02.1 There are three phases in the conduct of search and rescue (SAR) aeronautical emergencies: UNCERTAINTY, ALERT and DISTRESS.

NOTE: These phases are also defined in the *IAMSAR Manual, Volume II, section 3.3 – Emergency Phases*.

3.02.2 Aeronautical Degrees of Emergency Defined:

.1 **Uncertainty Phase –** An aeronautical emergency UNCERTAINTY phase exists in any one of the following circumstances:

.a no communication has been received from an aircraft within a period of 30 minutes after the time communications should have been received, or from the time an unsuccessful attempt to establish communication with such aircraft was first made

.b A flight plan has been filed and no arrival report has been received by the area control centre (ACC) within 60 minutes of when the arrival time was last estimated by the aircraft or by an ACC, whichever is later.

.c A flight itinerary has been filed and no arrival report has been received by the ACC within 24 hours of the arrival time that the pilot indicated on the flight itinerary.

.d A situation exists wherein there is uncertainty as to the safety of an aircraft and its occupants, e.g. a responsible person has declared an aircraft overdue which was not on a flight plan but whose tardiness is of sufficient concern;

.e A signal from an analog emergency locator transmitter (ELT) has been reported by an aircraft or a ground station but there is no reason to suspect that an actual distress situation exists.

.2 **Alert Phase –** An aeronautical emergency ALERT phase exists when:

.a the analog ELT signal reported in the uncertainty phase is still being reported and cannot be isolated or otherwise accounted for.

.b following the uncertainty phase, the communication search procedure has failed to reveal any new information on the aircraft

.c 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;

Chapter 3 AWARENESS AND INITIAL ACTION

3.02 Aeronautical Incidents

.d information has been received which indicates that the operating efficiency of the aircraft has been impaired, but not to the extent that a forced landing is likely; or

.3 **Distress Phase –** An aeronautical emergency DISTRESS phase exists when:

.a A 406 megahertz (MHz) ELT has been reported by the Cospas-Sarsat system (elemental or composite position);

.b the fuel on board is considered to be exhausted or to be insufficient to enable the aircraft to reach safety;

.c information is received which indicates that the operating efficiency of the aircraft has been impaired to the extent that a forced landing is likely;

.d information is received that the aircraft is about to make or has made a forced landing or requires immediate assistance;

.e a downed aircraft is located; and

.f The analog ELT transmission referred to in the uncertainty or alert phase

- has been linked to an overdue aircraft.

Initial Actions

NOTE: For more information on the initial actions to be taken during an emergency, consult the *IAMSAR Manual, Volume II, section 3.5 – Initial Action Stage*.

3.02.3 Uncertainty Phase – During the UNCERTAINTY phase of an aeronautical emergency, the SAR Mission Coordinator (SMC) shall, when applicable:

.1 Obtain the data contained on the flight plan or notification.

.2 Confirm that all airports or possible alighting areas along the route of flight and within the possible flight range of the aircraft concerned are checked.

.3 Notify position fixing agencies to attempt establishment of the aircraft's position, informing them of all known frequencies.

NOTE: Refer to *section 1.05 – Support to SAR*.

.4 Notify Region Operational Control Centre at the North American Air Defence (NORAD) Headquarters, North Bay, and request air surveillance.

.5 Notify the Royal Canadian Mounted Police, the provincial police, and/or the Civil Air Search and Rescue Association (CASARA) along the route of flight, as they may be requested to verify alighting areas, or obtain information on the aircraft and its occupants.

.6 If the flight is over water, request Marine Traffic and Communications Services centres to alert the vessels in the area.

.7 If the flight originated in, or intended entering, a country other than Canada, notify the SAR authorities in that country.

.8 Notify the appropriate ACCs for air surveillance (radar/transponder) and request all ground stations in the area to monitor the primary frequency of the missing aircraft as well as distress frequencies.

.9 In the case of an analog ELT signal, request all ground stations, including private strips, flight service stations, towers, ACCs, vessels, etc., to monitor the appropriate frequency (121.5 or 243.0 MHz) in an attempt to verify and isolate the ELT.

.10 Advise the Canadian Mission Control Centre (CMCC) of the details of the possible emergency and request a query of the Cospas-Sarsat system.

.11 Select a name for the incident, such as the aircraft registration.

NOTE: Normally, the investigation and communication search should not be pursued for more than one hour in the uncertainty phase without upgrading to the alert phase.

3.02.4 Alert Phase – During the ALERT phase of an aeronautical emergency, the SMC shall, when applicable:

.1 Expand the communication search area as the case warrants.

.2 Alert the rescue squadron to prepare aircraft equipment and personnel, especially in circumstances that may require more than the standard configuration.

.3 Alert secondary and other facilities, including ships at sea, which may be required to assist, in order to establish availability.

.4 Alert CASARA to prepare aircraft and personnel.

.5 Ensure that the appropriate ACCs have alerted air traffic flying through the area involved so that a watch will be maintained.

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.6 Obtain additional details on aircraft, equipment on board, the pilot and the passengers.

.7 Obtain weather along the aircraft's route and assess its effect on the tasking of SAR units (SRUs).

.8 Plan initial briefing of search crews.

.9 Action all incoming reports and consolidate them into the initial briefing plan.

.10 In the case of an analog ELT signal, task individuals, airport managers, Industry Canada or CASARA ground personnel to isolate the source of the signal, if its general location has been determined and indicates that a distress is unlikely.

.11 Advise CMCC of the details of the emergency and request a query of the Cospas-Sarsat system.

NOTE: Tasking of aeronautical SRUs from other SAR regions (SRRs) should be considered when

- significant improvement in on-scene time would be realized, and
- there would be no adverse effect on the responding SRR(s).

NOTE: Normally, the investigation and communication search should not be pursued for more than one hour in the alert phase without upgrading to the distress phase.

3.02.5 Distress Phase – During the DISTRESS phase of an aeronautical emergency, the SMC shall, when applicable:

.1 Initiate action with the appropriate SRUs and services: this action will normally be to task the standby crew to immediately take off on an initial search.

.2 Notify appropriate ACC and other agencies concerned, such as the Canadian Forces Integrated Command Centre when deemed appropriate; issue a *missing aircraft notice (MANOT)* and a *situation report (SITREP)*.

NOTE: Refer to *Appendices A.01 – Initial MANOT*, and *B.01 – Initial JRCC SAR SITREP*.

.3 Develop a search plan by ascertaining the position of the aircraft; estimating the degree of uncertainty of this position; and, on the basis of this information, the circumstances and the historical weather, determine the extent of the search area.

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3.02 Aeronautical Incidents

.4 Task additional search units as deemed suitable to meet the requirements of the search plan, and appoint an on-scene coordinator as required.

.5 In conjunction with the SAR squadron, arrange for the appointment of a searchmaster and assess and determine the most suitable location for the search headquarters.

.6 Assess and coordinate the requirements for telecommunication facilities, weather services and equipment and ensure that appropriate telecommunication personnel are available and briefed.

.7 Notify the operating agency and keep it informed on SAR developments. The operating agency shall be requested to

.a provide all known information regarding the aircraft, its occupants, the experience of the flight crew, and any special equipment carried; and

.b inform and update the NOK of all occupants. Failing this option, JRCC will deal directly with the NOK.

NOTE: The operating agency shall be afforded the opportunity to appoint liaison personnel and participate in the search, subject to *section 1.04, paragraphs 1.04.7 to 1.04.11 – Hiring of Civilian Personnel and Services*.

.8 Advise CMCC of the details of the emergency and request a query of the Cospas-Sarsat system.

.9 In the case of a 406 MHz ELT, investigate the cause of the signal by contacting owners and emergency contacts in the various registries and databases.

.10 When an aircraft accident has been confirmed, notify the Transport Safety Board with the pertinent details.

.11 When the incident involves an aircraft of foreign registry, the JRCC shall inform the Canadian Forces Integrated Command Centre to advise the appropriate embassy if required.

.12 Develop a rescue plan in the event casualties require assistance. The plan should have provisions for the notification of medical facilities and police/coroner, and should establish the most expeditious means and method of rescue.

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Chapter 3 AWARENESS AND INITIAL ACTION

3.03 Maritime Incidents

Degrees of Emergency

3.03.1 There are three phases in the conduct of search and rescue (SAR) maritime emergencies: UNCERTAINTY, ALERT and DISTRESS.

NOTE: These phases are defined in the *IAMSAR Manual, Volume II, section 3.3 – Emergency Phases*.

Initial Actions

NOTE: For more information on the initial actions to be taken during an emergency, consult the *IAMSAR Manual, Volume II, section 3.5 – Initial Action Stage*.

3.03.2 **Uncertainty Phase –** During the UNCERTAINTY phase of a maritime emergency, the SAR Mission Coordinator (SMC) shall, when applicable:

.1 If the voyage originated in, intended entering, or may have entered other than Canadian waters, notify the SAR authorities in that country.

.2 Select a name for the operation, this will normally be the name of the vessel and will be used throughout the operation when reference to such is made.

.3 Verify the information received and if it is suspected that the vessel is in danger, its master should be asked: "ARE YOU IN IMMEDIATE DANGER?" If the reply is negative and the joint rescue coordination centre (JRCC)/maritime rescue sub-centre (MRSC) judges it appropriate, request that the Marine Communications and Traffic Services (MCTS) centre issue a maritime assistance request broadcast, allowing up to 15 minutes for vessels in the area to respond (the SMC should use the replies to prioritize the SAR response).

NOTE: Refer to *section 6.02 – Assistance to Vessels*.

.4 Attempt to obtain information on the route and points and times of departure and arrival of the vessel.

.5 Start a plot of the situation based on the information obtained.

.6 Conduct a communication search, utilizing appropriate resources.

.7 Issue an "All stations" broadcast for information on the vessel's whereabouts.

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3.03.3 Alert Phase – During the ALERT phase of a maritime emergency, the SMC should, where possible:

.1 Issue an “All stations” broadcast under the urgency PAN PAN prefix for information on the vessel or, if the vessel is disabled, to locate vessels able to render assistance.

.2 Alert personnel and SAR facilities, and plan initial briefing of SAR crews.

.3 Verify the information received.

.4 Endeavour to obtain information concerning the vessel from sources not previously contacted.

.5 Thoroughly evaluate information on the vessel’s intended route, weather, possible communications delays, last known position (LKP) and last radio communication.

.6 Consider the possibility of fuel exhaustion and the estimated performance of the vessel under adverse conditions.

.7 Maintain close liaison with associated MCTS centres so that information from ships at sea can be evaluated.

.8 Plot relevant details obtained through the actions described above to determine the probable position of the vessel and its maximum range of action from its LKP, and determine the extent of search area. Also plot the positions of any vessel known to be operating in the vicinity.

.9 If so indicated by the situation appraisal, initiate appropriate search action and notify the associated MCTS centres of any action taken.

.10 Whenever possible, communicate to the owner or agent all information received and action taken.

NOTE: Tasking of SAR units (SRUs) from other SAR regions (SRRs) should be considered when

- significant improvement in on-scene time would be realized, and
- there would be no adverse effect on the responding SRR(s).

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3.03 Maritime Incidents

3.03.4 Distress Phase – During the DISTRESS phase of a maritime emergency, the SMC shall, when applicable:

.1 Initiate action in accordance with the detailed plans or instructions for the conduct of SAR operations in his/her area of responsibility.

.2 Issue an "All stations" broadcast for vessels to render immediate assistance.

NOTE: This action may already have been taken by an MCTS centre in the form of a MAYDAY or a MAYDAY RELAY, as appropriate.

.3 Develop a search plan.

.4 Advise appropriate authorities.

.5 Notify the owner or agent, if possible, and keep them informed of developments.

.6 Notify adjacent JRCCs or MRSCs, which may be able to render assistance or which may be involved in the operation.

.7 If possible, inform the vessel in distress of SAR actions taken.

.8 When the incident involves a vessel of foreign registry, notify the consular authorities concerned.

NOTE:
- Formal requests for information received from a consulate are to be acknowledged by the Regional Supervisor, Maritime SAR, and forwarded, through the regional Director, Operational Support, (or designate), to the Manager SAR, Canadian Coast Guard Headquarters, for action as soon as possible.
- Correspondence with any consular authority shall be through the Officer in Charge of the JRCC.

NOTE: If any report is produced about an incident involving a foreign vessel, refer to *Appendix B.07 – SAR Operation Report*.

.9 Assess and determine the most suitable SRU for assuming the duties of on-scene coordinator.

.10 Assess and determine the most suitable location for the search headquarters and arrange for the deployment of an SMC if required.

.11 Develop a rescue plan in the event casualties require assistance; consider using the provincial emergency measures organization for their contacts with local hospitals, police, etc.

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Chapter 3 AWARENESS AND INITIAL ACTION

3.04 Humanitarian Incidents

General

3.04.1 Any joint rescue coordination centre (JRCC)/maritime rescue sub-centre (MRSC) search and rescue (SAR) coordinator who is notified of the existence of a life-threatening emergency and is not aware of the involvement of any other competent authority, shall initiate suitable action. If the emergency is not related to an aeronautical or maritime SAR incident, the appropriate responsible authority shall be advised as soon as possible.

3.04.2 All such cases are to be classified as humanitarian incidents.

NOTE: Refer to *section 8.03 – Classification of SAR Incidents*.

Tasking of SRUs

3.04.3 Canadian Armed Forces (CAF), Canadian Coast Guard (CCG), Civil Air Search and Rescue Association (CASARA) and Canadian Coast Guard Auxiliary (CCGA) SAR units (SRUs) may be tasked for humanitarian incidents to preserve human live or relieve suffering. SRUs may be tasked

.1 when properly requested and approved by the Officer in Charge (OIC) of the JRCC, or designate, for aeronautical SRUs; or by the Regional Supervisor, Maritime SAR (RSMS), or designate, for maritime SRUs;

.2 when these SRUs are not employed in an aeronautical or maritime SAR incident; and

.3 if SAR coverage will not be unduly compromised.

NOTE: Refer to *section 1.01, paragraph 1.01.5 – [Tasking of SRUs on] Other Than Aeronautical or Maritime SAR*.

3.04.4 **Use of CAF SRUs –** On behalf of the SAR Region Commander, the OIC of a JRCC shall consider requests from non-defence agencies for humanitarian assistance, and determine if CAF SAR facilities are appropriate for the mission and whether such tasking falls within the guidelines of the National SAR Program. The appropriate Joint Task Force Headquarters shall be informed when SAR facilities are tasked for such missions. The OIC JRCC is responsible for the coordination of CAF and/or civilian aeronautical facilities employed for such missions. Cost recovery actions for CAF aeronautical SAR facilities are the responsibility of the Commander, Canadian Joint Operations Command, in accordance with the *CAF Provision of Services Manual*.

3.04.5 **Use of CCG SRUs –** CCG SRUs may be tasked for humanitarian incidents. JRCC/MRSC maritime SAR coordinators receiving requests for such assistance from federal,

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3.04 Humanitarian Incidents

provincial or territorial health or emergency planning authorities shall, as soon as practicable, forward the request to the RSMS (or designate).

3.04.6 If satisfied that certain specific conditions have been met, the RSMS (or designate) shall advise the appropriate CCG regional authority of the request. These conditions are:

.1 Other appropriate facilities are not readily available.

.2 The CCG units are suitable and available for the mission at hand.

.3 The request is from and approved by a recognized federal or provincial authority.

3.04.7 If the RSMS (or designate) is of the opinion that the tasking of the required units would hamper the maritime response capability in the Region, the use of the CCG primary SRUs may be denied or deferred. Any such denial or deferral shall be immediately forwarded to the appropriate regional authority/manager (or delegate) in order that other arrangements may be made.

3.04.8 The *National Incident Notification Procedure*.(NINP) shall be followed for any Humanitarian Incident.

Ground SAR Assistance

3.04.9 Ground SAR is an integral part of the National SAR Program. Hence, Canadian Armed Forces primary SRUs and Canadian Coast Guard primary SRUs may be tasked, when available, for ground SAR missions such as searches for missing persons.

Diving Accidents

3.04.10 Diving accidents are the responsibility of local authorities. It may be necessary, however, for a SAR coordinator from a JRCC/MRSC to ensure that appropriate action is taken until the responsible authority can take charge of the incident.

3.04.11 In all serious diving accidents, and when in doubt, specialized medical assistance must be arranged without delay. Therapeutic recompression can best be conducted in a compression chamber capable of holding two or more people and fitted with an inner and outer compartment. A one-person chamber can be used for emergency treatment of decompression sickness but, on such occasions, this chamber must be conveyed to the site of a multi-person chamber by the quickest means after therapeutic treatment has started.

3.04.12 Preferably, a diving casualty should be accompanied by a person adequately trained in the medical aspects of diving accidents. In all cases, detailed written information concerning patient and accident must travel with the casualty.

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3.04 Humanitarian Incidents

3.04.13 Diving accidents occurring in coastal waters and remote areas usually require medical assistance on short notice. Therefore, rescue of the casualty by helicopter or transportation of medical assistance will be asked for in most cases. Assistance by a vessel equipped for therapeutic recompression or with medical facilities is also possible. Where suitable helicopters or vessels are not available, the requirement may be to transport casualty ashore by boat and then by road to medical assistance or recompression facilities.

3.04.14 The choice between helicopter and vessel depends on various factors, such as:

.1 Helicopter capability

.2 Weather conditions and sea state

.3 Distance to be covered

.4 Condition of the casualty

3.04.15 A helicopter landing will only be attempted on a platform equipped for this purpose; therefore, in most cases, a helicopter rescue hoist has to be used.

3.04.16 Evacuation by helicopter of a patient being treated in a recompression chamber should only be attempted if the helicopter is capable of accommodating the recompression chamber.

3.04.17 During the flight, the recompression chamber is to be attended constantly and sufficient breathing gas must be available for adequate ventilation of the chamber.

3.04.18 Helicopters evacuating a diving casualty not being treated in a recompression chamber should preferably fly as low as possible.

Missing Swimmers

3.04.19 The JRCC/MRSC will advise provincial and/or local authorities of a swimming incident, and will arrange assistance when requested. If, for any reason, the proper civil authorities cannot be advised, the JRCC/MRSC is to take appropriate action until civil control is assumed.

Medical Evacuations

NOTE: Refer to *section 3.05 – Medical Evacuations*.

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3.04 Humanitarian Incidents

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3.05 Medical Evacuations

General

3.05.1 There are three types of medical evacuations (MEDEVACs):

.1 **Rescue MEDEVAC –** The critical evacuation of injured or stranded persons from isolated areas, or the recovery of sick or critically injured persons from vessels at sea.

.2 **Critical MEDEVAC –** The transfer of persons under medical care where the situation is deemed to be life threatening in terms of either the patient's serious condition or isolated location.

.3 **Routine MEDEVAC –** The transfer of a patient from one medical facility to another medical facility where delay would not unduly compromise the patient's condition.

Maritime Incidents

3.05.2 Rescue MEDEVACs from vessels at sea are actioned and classified as maritime search and rescue (SAR) incidents.

Humanitarian Incidents

3.05.3 Rescue MEDEVACs from isolated areas and critical MEDEVACs are considered humanitarian assistance.

Routine Medevacs

3.05.4 Routine MEDEVACs or hospital to hospital transfers are beyond the mandate of a humanitarian incident; they are not considered to be SAR incidents and should be dealt with by provincial or territorial authorities.

Level of Care

3.05.5 In Canada there are liability and moral issues associated with the level of care for a patient receiving medical attention. It is not normally permitted to electively hand-off a patient to a lower level of medical care, therefore caution must be taken by the Duty JRCC Flight Surgeon and the JRCC Air SAR Mission Coordinator to ensure the patient is always provided a suitable level of professional medical care. For instance, SAR Techs must not be the only medical personnel during the air transfer of a patient who requires ongoing nursing or physician services which are beyond SAR Tech medical capabilities. The Duty JRCC Flight Surgeon must ensure that the patient will be accompanied by the civilian medical personnel that are required to provide continuity of care in-flight. The civilian medical team must subsequently hand over the patient to the receiving physician at the definitive care hospital.

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3.05 Medical Evacuations

Medical Equipment (

3.05.6 Air transport of a critically-ill patient often requires the use of specialized medical equipment in the cabin of the aircraft. The possibility exists that certain types of medical equipment may cause interference with aircraft systems (or vice-versa). The 1 Cdn Air Div Surgeon is the OPI for all medical equipment procured for patient air transport, and for use by SAR Techs. This medical equipment has been tested, proven compatible with a number of CAF aircraft and should, wherever possible, be the equipment that is used. If civilian or uncertified medical equipment is required during the patient transport, the Duty JRCC Flight Surgeon and aircraft commander shall discuss the requirement for the equipment and risk involved in its use. Medical equipment installation and use must be accomplished according to an approved patient transport configuration for that aircraft type. In MOST CASES, CAF (certified) medical equipment should be the only equipment permitted in CAF aircraft.

Required Documentation

3.05.7 Upon completion of a patient transport mission, the particulars must be properly documented. Each mission tasked through a JRCC or the CAOC requires a SAR Mission Report completed by the aircraft commander, with a copy forwarded to the applicable JRCC. Further, each patient transported requires a SAR Tech Patient Care Report. SAR Techs and civilian medical staff will complete this report, have it reviewed by the local SAR and Wing Flight Surgeons, and then forward it to the 1 Cdn Air Div Surgeon to retain as the official record of the patient care provided on the mission.

Reference: RCAF Flight Operations Manual Chap 2 Sec 4.6 Para 2.4.6.16

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3.06 Alert Response

Reception of Alerts

3.06.1 The joint rescue coordination centre (JRCC)/maritime rescue sub-centre (MRSC) may be alerted of aeronautical or maritime distress, or other incidents requiring a coordinated response from the Search and Rescue (SAR) System, by numerous means, such as:

- Radiotelephone, monitored by Air Traffic Control (ATC), Marine Communication and Traffic Services (MCTS) or others
- Radio digital selective calling (DSC), monitored by MCTS
- Distress beacons, monitored by Cospas-Sarsat
- Very high frequency (VHF)-DSC beacons, monitored by MCTS
- Inmarsat
- SAR transponders
- Reports of official visual or audible distress signals or of other indications of distress
- Reports of overdue or missing aircraft
- Reports of overdue or missing vessels and persons at sea;
- Reports of overdue or missing aircraft or vessels participating in an ATC, vessel traffic services or offshore reporting system
- Requests for assistance via mobile phone aboard an aircraft or vessel or on behalf of an aircraft or vessel

NOTE: Refer to *section 2.01 – Global Maritime Distress and Safety System* for details on means of communication that may be used to alert SAR authorities.

3.06.2 Regardless of the means and method, whether regulated by aeronautical or maritime regulations or not, by which a JRCC/MRSC SAR mission coordinator has been alerted of an actual or potential aeronautical or maritime incident, the coordinator shall take affirmative action to prosecute all calls received and resolve the incident.

Vital Incident Data

3.06.3 As a minimum, the JRCC/MRSC SAR mission coordinator shall obtain data vital to coordinating the effective resolution of the incident. At no time shall the coordinator delay the response to a life-threatening incident, if all vital data is not readily available.

NOTE: Checklists may be found in the *IAMSAR Manual, Volume II, Appendix D – Uncertainty Phase Data*, and *Appendix E – Alert Phase Data*.

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3.06 Alert Response

Establishing Communications

3.06.4 If the MCTS centre or other station that received the alert is unable to communicate with the vessel that sent the alert, the JRCC/MRSC shall establish communications directly with the vessel or shore-side contact for the vessel by

.1 identifying the distressed vessel and obtaining registry information from a maritime mobile service identity (MMSI) registry, and attempting to establish communications using all available means such as Inmarsat, and/or

.2 identifying other vessels in the area of the distressed vessel using maritime safety information broadcasts and electronic positioning information tools, and request they attempt to contact the distressed vessel, and/or

NOTE: Refer to *section 3.07 – Maritime Electronic Positioning Information Tools*.

.3 contacting other rescue centres and requesting any further information they may have on the distressed vessel, and/or

.4 contacting the 24/7 "SAR data provider" for the national MMSI or distress beacon registries.

3.06.5 **Canadian MMSI Registry –** The Canadian Maritime Mobile Service Identity (MMSI) registry is maintained by Industry Canada and is available via the Internet. The International Telecommunication Union also maintains an international MMSI registry available via the Internet. JRCC Halifax is designated as the 24/7 emergency "SAR Data Provider" for the Canadian MMSI registry.

Distress Beacons Alerts

3.06.6 Through the COSPAS-SARSAT system, the Canadian Mission Control Centre (CMCC) receives 406 MHz distress alerts from Emergency Locator Transmitters (ELTs), Emergency Position-Indicating Radio Beacons (EPIRBs) and Personal Locator Beacons (PLBs).

a. The combined mandate of DND and CCG includes the coordination of the SAR response to distress alerts within the aeronautical and federal marine domains.

b. The mandate of provincial and territorial (P/T) authorities, and in some instances Parks Canada, includes the coordination of SAR response to distress alerts within the land and inland water domains.

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3.06 Alert Response

3.06.7 When CMCC receives a PLB distress alert from the COSPAS-SARSAT system:

a. If the PLB is registered, CMCC will take measures to identify the responsible federal or P/T SAR authority to which CMCC will transfer the case and registration information for response; and will also send an advisory to the corresponding JRCC.

b. If the PLB is unregistered, CMCC will transfer the case to the appropriate P/T SAR authority (Annex B) for the area where the beacon is located; and will also send an advisory to the corresponding JRCC.

3.06.8 **Canadian Beacon Registry –** The Canadian Beacon Registry is co-located with the CMCC and is accessible 24/7. Its coordinates are:

Telephone: 1-877-406-SOS1 (7671) Fax: 1-877-406-FAX8 (3298) Email: cbr@sarnet.dnd.ca Online: www.CBR.RCB.ca

DSC Alerts

3.06.9 Upon notification of a DSC urgency or distress alert at the JRCC/MRSC, the JRCC/MRSC SAR mission coordinator shall:

.1 Obtain the distressed vessel's MMSI and other vital data.

.2 If not received directly by an MCTS centre, obtain the receiving station's name, frequency alert received on and time of receipt, MMSI, position, and details of any actions taken.

.3 If the position is within the JRCC's SAR region (SRR) or MRSC's SAR sub-region (SRS), assume SAR Mission Coordinator functions and continue to resolve the incident.

.4 If the position is outside the JRCC's SRR or the MRSC's SRS, attempt to pass responsibility to the appropriate rescue coordination centre (RCC).

NOTE: The format provided in the *IAMSAR Manual, Volume II, Appendix B – Message Formats – DSC Format*, shall be used for the forwarding of DSC distress alerts between rescue centres.

.5 If passing responsibility to the appropriate RCC is not possible, or no position is transmitted, the JRCC/MRSC SAR mission coordinator shall continue to action the incident in accordance with the policy of "First RCC". Further, the Flag State for that particular vessel should be advised.

NOTE: The policy of "First RCC" is detailed in the *IAMSAR Manual, Volume II, section 3.6 – Designation of the RCC or RSC Responsible for Initiating SAR Action*.

Inmarsat Alerts

3.06.10 Upon reception or notification of an Inmarsat alert at a JRCC/MRSC, the JRCC/MRSC SAR mission coordinator shall:

.1 If the distress position is within the JRCC's SRR or the MRSC's SRS, acknowledge reception of the alert by establishing contact with the vessel by the same means to which alert was transmitted and resolve the incident. If contact cannot be established in this method, JRCCs/MRSCs are to utilize any other means possible.

.2 If the position is outside the JRCC's SRR or within an MRSC's SRS, acknowledge reception of the alert and attempt to pass responsibility to the appropriate rescue coordination centre (RCC)/MRSC.

NOTE: The formats provided in the *IAMSAR Manual, Volume II, Appendix B – Message Formats*, shall be used for the forwarding of Inmarsat distress alerts between rescue centres.

.3 If passing responsibility to the appropriate RCC/MRSC is not possible, the JRCC/MRSC SAR mission coordinator shall continue to action the incident in accordance with the policy of "First RCC".

NOTE: Refer to the *IAMSAR Manual, Volume II, section 3.6 – Designation of the RCC or RSC Responsible for Initiating SAR Action*.

.4 Use the services of the Inmarsat Land Earth Station or Network Operations Centre operator to help establish direct follow-on communications, if required.

Mobile Phone (Terrestrial or Satellite) Alerts

3.06.11 Although a cellular phone is not an approved or suitable substitute for radiotelephone distress communications, JRCC/MRSC SAR mission coordinators must be capable of coordinating the response to incidents alerted via this method.

3.06.12 In Canada, cellular users can

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3.06 Alert Response

- dial *16, to be connected directly to an MCTS centre;
- dial 911, to be connected directly with a 911 emergency centre; or
- call the JRCC/MRSC directly.

3.06.13 In addition to the vital data, the following information should also be initially obtained:

.1 The caller's complete cellular telephone number

.2 The cellular service provider

.3 The roam number if needed to recall caller

.4 An alternative point of contact

.5 The remaining battery power

3.06.14 The caller should be advised to keep the cellular phone on and ensure any call forwarding or messaging is disabled. If the cellular telephone has insufficient battery charge to be left on, then an appropriate communication schedule should be arranged. Further, if possible, the caller should attempt to make a distress alert on standard distress radiotelephone frequencies.

NOTE:	For frequencies, refer to *section 2.02 – SAR Radio Frequencies and Channels*.

Flare Sightings

3.06.15 Red flares are recognized internationally as a distress signal. Coordinating the response to a flare sighting is especially challenging due to the lack of useable information and the high rate of false alarms. However, it is important that JRCC/MRSC SAR mission coordinators do not become complacent in their response to flare sightings and that actions are taken as per the appropriate emergency phase.

NOTE:	Refer to the *IAMSAR Manual, Volume II, section 3.8 – Flares*.

3.06.16 Some special considerations for resolving flare-sighting incidents are:

.1 Colour of flare and burn time

.2 Location of flare (over water/land/island)

.3 Weather and possibility of meteor shower in progress?

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3.06 Alert Response

.4 Aircraft operating or military operations being conducted in the vicinity?

.5 If more than one flare, did they appear at once from the same location or spread out (fireworks)?

.6 Deck illumination lights, aids to navigation, or ascending or descending aircraft.

3.06.17 If the JRCC/MRSC SAR mission coordinator escalates the incident to the distress phase and tasks a facility to locate the source of the flare, the initial objective should be to prompt the victim to set off another flare.

Sail Plans

3.06.18 Many vessels are required by regulation to participate in either coastal or offshore vessel traffic systems. Reports of participating vessels overdue within these systems shall be actioned according to the emergency phase.

3.06.19 For vessels not required to participate in these systems, it is the policy of the CCG that mariners are expected, and are encouraged, to file sail plans with a responsible person. In circumstances where this is not possible, sail plans may be filed with any CCG MCTS Centre. MCTS Officers will collect voyage data and process sail plans in accordance with the *MCTS Standards Manual*. The JRCC/MRSC shall be notified when vessels become overdue on these sail plans.

Underwater SAR

NOTE: Refer to *section 6.03 – Underwater SAR*.

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3.07 Maritime Electronic Positioning Information Tools

General

3.07.1 Although not all are designed for the purpose of being search and rescue (SAR) information providers, a variety of maritime information management systems, accessible through the SAR Mission Management System (SMMS) or the Internet, can be utilized to gain information during the incident prosecution.

3.07.2 Incidents involving overdue vessels or distress beacon elementals are examples of situations where electronic sources can provide useful data. Joint rescue coordination centre (JRCCs) and maritime rescue sub-centre (MRSCs) SAR coordinators will be able to locate potential sources of distress of known or unknown vessels, as well as locate secondary and non SAR resources closest to the position or area of interest.

Amver

3.07.3 Managed through the United States Coast Guard (USCG) Operational Support Command in Martinsburg, Virginia, the Automated Mutual Assistance Vessel Rescue (Amver) system is a voluntary ship reporting system which provides information to aid in the resolution and coordination of SAR efforts in the ocean areas of the world.

3.07.4 Information concerning the predicted locations and characteristics of the ships known to be near the scene of an emergency is made available to recognized SAR agencies of any country or to vessels and persons in distress for use during the emergency.

3.07.5 **SURPIC –** Information provided by Amver is in the form of a surface picture (SURPIC). A SURPIC is a listing or graphical image of vessels, their SAR capabilities and dead reckoning positions within a specified geographical area at a specific time. It will also indicate the time and distance to the distress, and the new course each vessel must come to in order to make the intercept.

3.07.6 There are three types of SURPIC:

.1 **Radius SURPIC**

.a The requesting agency determines the geographic area by providing

- a datum (latitude and longitude), with the date and time of the information desired, which can be either real-time or projected; and
- a radius, defined as a distance around the datum.

.b The listing of vessels is given in the order of increasing distance from the datum.

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3.07 Maritime Electronic Positioning Information Tools

.2 **Hi/Lo SURPIC**

.a Two limiting parallels of latitude and two limiting meridians of longitude are provided by the requesting agency.

.b The listing is in random order unless listing by latitude or longitude is specified by the requesting agency.

.3 **Trackline SURPIC**

.a The listing is arranged along a track line (which may be obliquely oriented) from the origin to the destination (the first and second positions provided by the requesting agency).

.b The SURPIC can be obtained for a great circle track if requested.

3.07.7 Each SURPIC can be further modified according to specific needs, for example by making one of the following requests for listing:

- All ships, or just those with a doctor, nurse or paramedic aboard (as reported in the sail plans)
- All ships, or just those heading east or just those heading west
- The medical personnel and direction specifications in combination

3.07.8 Participating vessel information is supplied to the JRCC/MRSC SAR coordinators via any USCG rescue coordination centre or through the Amver.com web site. It is not available on SMMS.

AIS

3.07.9 The Automatic Identification System (AIS) is a short range coastal tracking system used on ships and by Vessel Traffic Services (VTS) for identifying and locating vessels by electronically exchanging data with other nearby ships and VTS stations.

INNAV

3.07.10 INNAV ("Information sur la navigation maritime") is a waterway management information tool developed by the Canadian Coast Guard (CCG) Marine Traffic and Communications Services (MCTS).

3.07.11 The AIS and INNAV systems, not available on SMMS in all regions, may be accessed by JRCC/MRSC SAR coordinators via MCTS or CCG regional operations centres.

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LRIT

3.07.12 The Long-Range Identification and Tracking (LRIT) system provides for the global identification and tracking of ships. Contracting Governments may request, receive and use, LRIT information for safety and marine environment protection purposes.

3.07.13 The obligations of ships to transmit LRIT information and the rights and obligations of SOLAS Contracting Governments and of Search and rescue services to receive LRIT information are established in *regulation V/19-1 of* the *International Convention for the Safety of Life at Sea, 1974*. The LRIT regulation applies to the following ship types engaged on international voyages:

.1 passenger ships, including high-speed passenger craft;

.2 cargo ships, including high speed craft, of 300 gross tonnage and upwards; and

.3 mobile offshore drilling units.

3.07.14 The ship's terminal automatically transmits the following long-range identification and tracking information:

.1 the identity of the ship;

.2 the position of the ship (latitude and longitude); and

.3 the date and time of the position.

3.07.15 A request for the provision of LRIT information for the search and rescue of persons in distress at sea will result in a SAR SURPIC message, which is a picture of ships within the geographical area specified by the SAR service requesting the information. From that information the SAR service can identify which ships are more favourably positioned to respond to the situation and can poll those ships directly to determine their current locations.

NOTE: Refer to *Annex 3* – Excerpts from the *Maritime Safety Committee Circular MSC.1/Circ.1308* for the procedure to make a request for the provision of LRIT information.

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3.07 Maritime Electronic Positioning Information Tools

VMS

3.07.16 Vessel Monitoring Systems (VMS) are used in commercial fishing to allow environmental and fisheries regulatory organizations to monitor selected fisheries activity by recording the position, time at a position, and course and speed of participating fishing vessels.

3.07.17 VMS is displayed on SMMS electronic charts and searchable in the Resource Data Management (RDM). The system will display fishing vessels' name, last known position and time, if they are participating in the Fisheries and Oceans monitoring process and are fitted with transponders (satellite monitoring system). JRCC/MRSC SAR coordinators may access the information by selecting a geographical area of interest and polling the information displayed on the chart or in the RDM search window.

VTOSS

3.07.18 Participating Commercial ships and Government vessels and aircraft of the Pacific Coast can be located with the Vessel Traffic Operations and Support Systems (VTOSS) by checking a geographical area of interest in SMMS.

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Chapter 4 SEARCH PLANNING AND EVALUATION CONCEPTS

4.01 Search Planning

NOTE: This chapter covers the practical application of the basic search theory concepts described in the *IAMSAR Manual, Volume II (Chapter 4)*. In addition, specific Canadian search procedures are included.

General

4.01.1 Search planning is necessary when

.1 the location of the distress is not known, or

.2 a significant period of time has passed since the search object's position was last known.

4.01.2 The degree of search planning can range from the simple tasking of a search and rescue (SAR) unit on an electronic search, to the complicated coordination of a weeklong search, using many aeronautical and/or maritime SAR facilities. The planning can be carried out manually or by one of the computer programs available.

4.01.3 **Record Keeping –** Search planning may be carried out completely by the SAR mission coordinator (SMC) at the joint rescue coordination centre (JRCC)/maritime rescue sub-centre (MRSC) or may be initiated by the SMC at the JRCC/MRSC and continued by a remotely deployed SMC/searchmaster (SM). Since more than one person may be involved in the planning process, a record shall be kept of all assumptions and factors which affected the development of the plan. This record of assumptions and factors is especially critical on extended searches where new information may cause the SMC/SM to re-evaluate the assumptions made during the initial planning phase. The record is also critical for legal purposes where the conduct of a search may be called into question.

4.01.4 It is important that throughout the process all participating agencies are included in the communications net and kept advised of the search action plan. On-scene coordinators also have search planning responsibilities.

Search Planning Methods

4.01.5 The method used to determine the search plan will depend on the location of the incident, its complexity, and the SAR facilities available for its prosecution. Complex incidents, involving more than one uncertainty or a number of SAR facilities, may require the use of automated planning tools. Less complex incidents may be resolved by the application of manual planning methods. The search planner may have to deal with more than one method, regardless of whether the search is happening in the inland or maritime environment.

Chapter 4 SEARCH PLANNING AND EVALUATION CONCEPTS

4.01 Search Planning

4.01.6 Inland Searches – Canada has developed two predefined methods of determining and plotting inland searches, the Canadian Search Area Definition (CSAD) and the Mountain Visual Flight Rules (VFR) methods:

.1 **CSAD Method –** This method is based on empirical data collected on Canadian inland SAR incidents from 1981 to 1986, excluding the data used for the Mountain VFR study. The CSAD method applies in point-to-point cases.

.2 **Mountain VFR Method–** For utilization in mountainous regions in which visual flight routes are accepted, published and flown, the Mountain VFR method is based on empirical data collected on Canadian inland incidents involving VFR flights in mountainous regions. The Mountain VFR method applies in cases where the intended route of the missing aircraft involves navigation by following such things as valley floors, rivers and roads (in mountainous terrain) as opposed to point-to-point navigation.

4.01.7 These methods were developed for cases where there is little information to go on besides a last known position and a destination. If the SMC/SM has evidence to suggest that these methods are not applicable, then they should be modified, subject to the concurrence of the SAR Region Commander, through the officer in charge of the JRCC. Details of the modification to the search area and SMC/SM reasoning for the modification are to be included in the situation report (SITREP).

NOTE: The CSAD and Mountain VFR methods are explained in *section 4.02 – Inland Search Planning Methods*.

4.01.8 Maritime Searches – In contrast to the inland search environment, the search object in the maritime environment is rarely static; it drifts due to the effect of the various water currents and surface winds. All maritime search planning methods use the same types of information and are based on the assumed drift errors of these individual drift forces. As these drift errors increase proportionally with the passage of time, it is recommended that search planning be commenced early in the incident, to minimize the search area, and therefore, the effort required to resolve the incident.

4.01.9 In Canada, worksheets for several of the maritime search planning steps have been devised to aid in the planning process, to avoid overlooking pertinent data, and to establish a logical sequence for the planning computations when it must be done without computer-based search planning aids.

NOTE: Refer to *Appendix C – Search Planning Worksheets (Minimax)*.

Chapter 4 SEARCH PLANNING AND EVALUATION CONCEPTS

4.01 Search Planning

Computer-Based Search Planning Aids

4.01.10 CANSARP – The Canadian Search and Rescue Planning Program (CANSARP) is an automated search-planning tool for calculating drift plots and conducting search planning and effort allocation. In all maritime searches, CANSARP should be used as the primary means for search planning.

4.01.11 The advantages of CANSARP are that the program

.1 accepts more available incident data than is possible in the manual solution: The search planner can evaluate many possible scenarios with a range of incident times, positions, search objects, situations, and environmental factors, while the manual method averages data to estimate the search object location;

.2 uses computer simulation to graphically depict the range of possible search object locations, and areas most likely to contain the search object. When more than one search is necessary, CANSARP can use previous search results in estimating the probable search object location for the next search;

.3 calculates the probability of detection (POD) for individual searches, a measure of search effectiveness. CANSARP maintains a record of the POD for each SAR facility, allowing the search planner to more effectively evaluate the search effort, especially in large incidents when a number of searches or SAR facilities are required;

.4 divides the divergence angle of the assigned targets by a factor of ten, and drifts each individual set of vectors over the desired time interval. This results in eleven drift tracks per search object, with resulting drift error. In a uniform wind and current field, this results in a series of overlapping probability circles, or “arc of probability”. The arc of probability defines the area where the search object is most likely to be found, and the search planner can concentrate the search effort in this area. In a less uniform current field, such as a tidal zone, the arc of probability may be less regular in shape. However, it still defines the best areas to search. The amount of calculations required to make similar predictions manually is prohibitive; and

.5 also calculates the minimax probability area derived by the manual method. If adequate SAR facilities are available to the search planner, this area may still be covered.

4.01.12 SMMS – Search and Rescue Mission Management Software (SMMS). (To be developed)

Chapter 4 SEARCH PLANNING AND EVALUATION CONCEPTS

4.01 Search Planning

4.01.13 Other Search Planning Models – Other search planning models are available for determining the search area. However, as with all planning tools, the user should be aware of their limitations and proper application. Two of these models are:

.1 **SARIS –** "Search and Rescue Information System", used in the United Kingdom.

.2 **SAROPS –** "Search and Rescue Optimal Planning System", used by the United States Coast Guard (USCG). SAROPS uses simulation methods and is most efficient in cases where information concerning the incident position is vague.

NOTE: Canadian users may access SAROPS by having the JRCC contact a USCG maritime rescue coordination centre, either at Norfolk or at Seattle.

Chapter 4 SEARCH PLANNING AND EVALUATION CONCEPTS

4.02 Inland Search Planning Methods

Canadian Search Area Definition Method

4.02.1 Based on historical data, two definitive probability areas have been established. These zones are categorized according to the priority with which they should be searched. The Canadian Search Area Definition (CSAD) method takes into account the variations in known crash positions along track and across track. Those variations are combined, giving rectangular areas within which the crash position is likely to be found.

4.02.2 Other factors may influence the search area based on known habits of the pilot, aircraft equipment, available navigation aids, weather, equipment, local procedures and other considerations. In 2010 DRDC CORA re-examined the validity of the existing Canadian Search Area Definition (CSAD) methodology using crash data from the 2003-2010 period. For crashes in non-mountainous terrain, the data showed that crash locations tend to be closer to track than previous studies on which current CSAD areas are based. CSAD Area Two, offers minimal additional likelihood of covering crash sites.

4.02.3 Notwithstanding, the Search Master will consider all known factors to define a search area best suited for the unique circumstances of a particular search effort and may modify from CSAD in consultation with the Officer in Charge (OIC) of the Joint Rescue Coordination Center (JRCC) and the Search and Rescue Region (SRR) Commander.

4.02.4 The use of the CSAD requires the following information:

.1 The last known position (LKP)

.2 The intended route

.3 The intended destination

4.02.5 **CSAD Search Areas –** The CSAD method applies to all intended track lengths. The two areas are:

.1 **AREA ONE –** A rectangle, 10 nautical miles (NM) each side of track, beginning 10 NM before LKP and extending 10 NM beyond destination.

.2 **AREA TWO –** A rectangle, 15 NM each side of track, beginning at the LKP and extending 15 NM beyond destination. AREA TWO includes that portion of AREA ONE where overlapping occurs.

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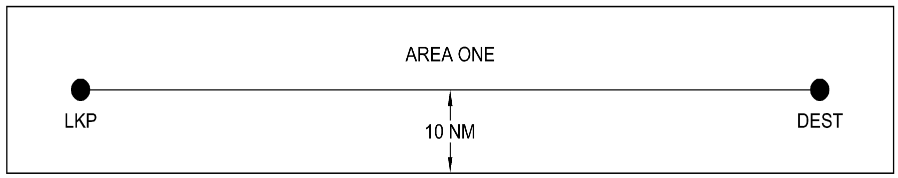
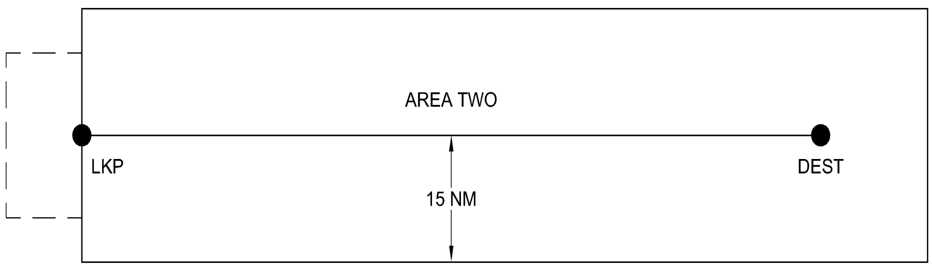
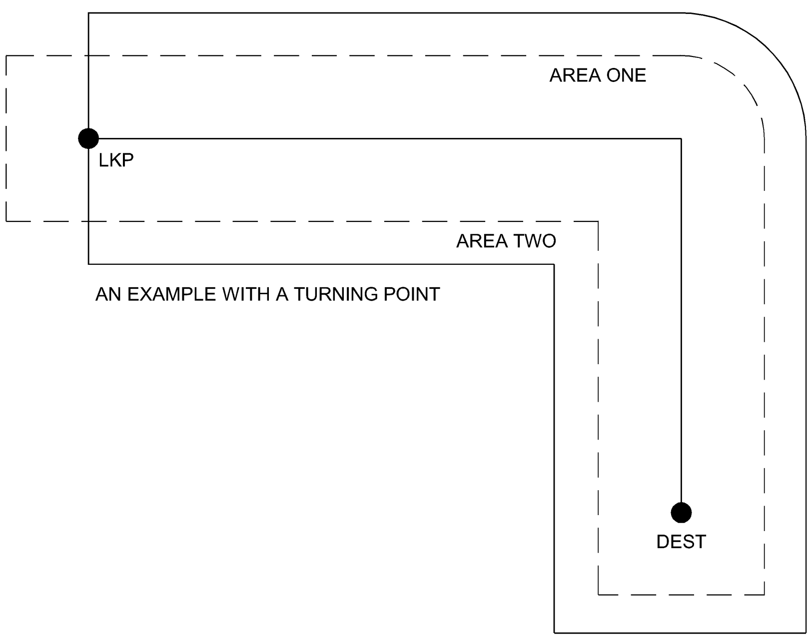
4.02 Inland Search Planning Methods





4.02.6 CSAD Turning Point – Where an en route turning point includes a track direction change of greater than 20°, the outside boundary of each area shall be an arc using the turning point as centre and a radius equal to 10 NM for AREA ONE and 15 NM for AREA TWO.



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4.02 Inland Search Planning Methods

4.02.7 Normally, there is no requirement to adjust the search areas in an inland search. Such adjustment would have to be considered, however, if any of the three basic factors listed in *paragraph 4.02.4* should change during the search.

4.02.8 Probability of Containment – The probability of containment (POC), or density of crash positions based on the data, varies in the along-track and off-track directions. Generally, incidents tend to cluster close to the intended track, with the density dropping off sharply as offset increases. There are concentrations of incidents in the first tenth and last tenth of track but very few incidents in the underfly and overfly areas. There also tends to be more incidents in the second half of track than in the first half.

NOTE: *Appendix D.01* **–** *CSAD Square Mileage Graph* provides a ready reference for determining the square mileage of search areas.

4.02.9 CSAD Search Strategy and Sequence – There is no single sequence of search types or patterns which will be suitable for all searches. For searches where the CSAD method is used, the following search sequence is suggested, unless circumstances dictate otherwise:

.1 **Phase I**

.a Carry out track crawls along the missing aircraft's intended track and thoroughly check in the vicinity of the LKP and destination.

.b Carry out electronic searches to detect any distress beacon signals.

.c Carry out a search for visual detection aids over the high probability areas, covering 15 NM either side of the missing aircraft's intended track.

.2 **Phase II –** Thoroughly search AREA ONE in the following sequence, for all track lengths:

.a The last quarter of the intended track, from the track outwards, with equal priority along the track.

.b The third quarter of the intended track, from the track outwards, with equal priority along the track.

.c The first quarter of the intended track, from the track outwards, commencing at the LKP.

.d The second quarter of the intended track, from the track outwards, with equal priority along the track.

.e The overfly area, expanding from the intended destination.

Chapter 4 SEARCH PLANNING AND EVALUATION CONCEPTS

4.02 Inland Search Planning Methods

.f The underfly area, expanding from the LKP.

.g Upon satisfactory completion of CSAD Area One the SM should re-assess all relevant information prior to proceeding to phaseIII. Circumstances may preclude the employment of Phase III.

.3 **Phase III –** Expand the search to AREA TWO and use the same sequence as in Phase II.

Chapter 4 SEARCH PLANNING AND EVALUATION CONCEPTS

4.02 Inland Search Planning Methods

Mountain Visual Flight Rules Method

4.02.10 Canadian search and rescue data involving Visual Flight Rules (VFR) flight plans has revealed distinct differences in the POC between the mountainous regions and other regions of the country. In particular:

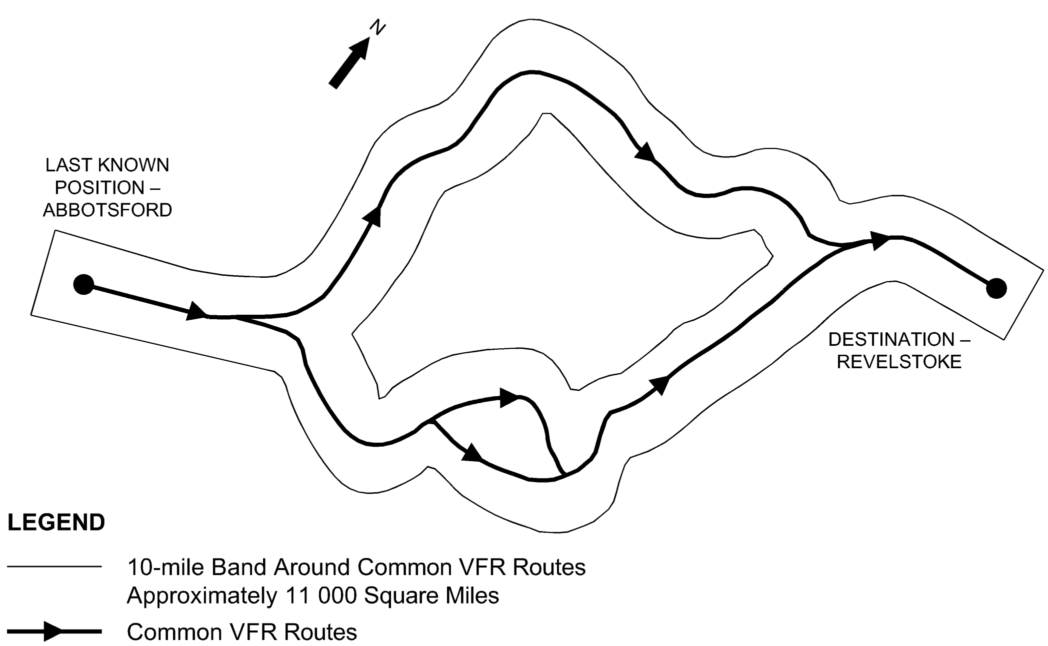
.1 Although there tend to be more crash sites between one-half and three-quarters of the way along the intended track, a substantial portion occurs along the other areas of the track.

.2 Very few crash sites are found before the LKP or beyond the intended destination.

.3 Crash sites tend to cluster close to the intended track with the POC decaying sharply as you move away from the track.

.4 The minimum search area for a given POC always stretches along the entire length of the track.

4.02.11 Mountain VFR Search Areas – Two probability areas are defined for incidents involving VFR flight plans in mountainous regions:



.1 **AREA A –** Area stretching along the entire intended track of the missing aircraft, from the LKP to the destination, and extends 5 NM either side of the track. Based on previous data and assuming the intended track is known, this area should include a large portion of crash sites. In order to include incidents where the crash occurs shortly after takeoff or on approach for landing, this area is extended 5 NM before the LKP and 5 NM beyond the destination.

.2 **AREA B –** Area stretching along the entire intended track of the missing aircraft, from the LKP to the destination. It extends 10 NM either side of the track, and is also extended 10 NM before the LKP and 10 NM beyond the destination.

NOTE: AREA B also includes all of AREA A.

NOTE: If the missing aircraft's intended route is not known with any certainty, all likely routes must be covered or another search planning method used.

4.02.12 Mountain VFR Search Strategy and Sequence – Given that an aircraft is missing on a VFR flight in the mountainous regions of Canada and all the preliminary checks have been completed without success, the following procedure is recommended:

.1 **Phase I**

.a Carry out track crawls along the missing aircraft's intended VFR route and thoroughly check LKP and destination for near take-off/landing incidents.

.b Carry out electronic searches to detect any distress beacon signals.

.c Carry out a search for visual detection aids over the high probability areas, covering 10 NM either side of the missing aircraft's intended VFR route. This should include all likely routes if the intended route is unknown.

.2 **Phase II –** Thoroughly search AREA A in the following sequence, for all track lengths. Once again, if the missing aircraft's intended route is not known with any certainty, all likely routes must be covered:

.a The third quarter of the route, from the track outwards.

.b The fourth quarter of the route, from the track outwards.

.c The second quarter of the route, from the track outwards.

.d The first quarter of the route, from the track outwards.

.e The overfly area, expanding from the intended destination.

.f The underfly area, expanding from the LKP.

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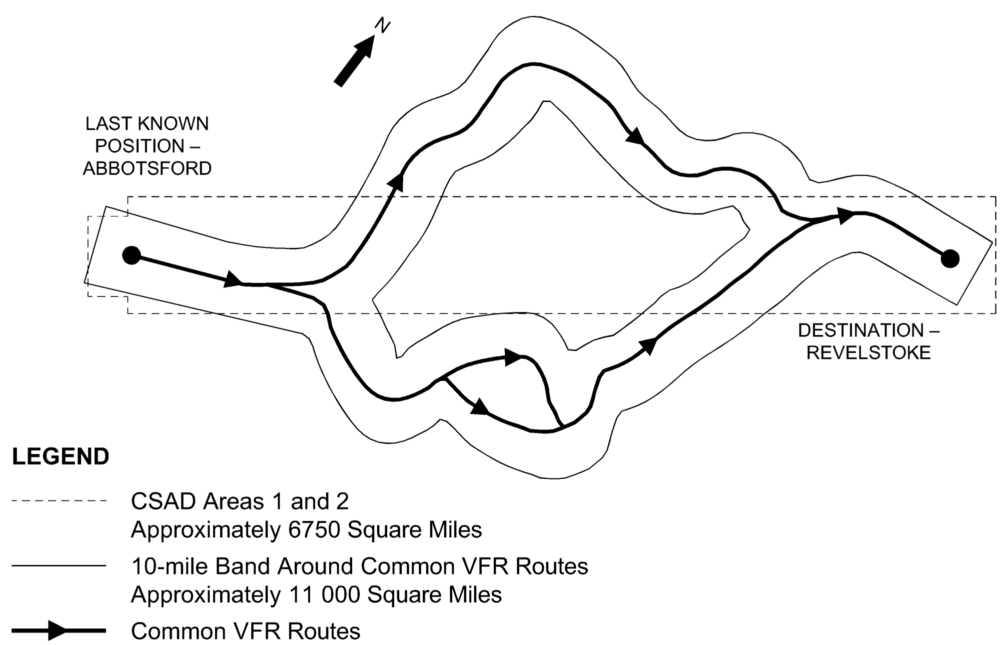
4.02 Inland Search Planning Methods

.3 **Phase III –** Expand the search to AREA B, and use the same sequence as in Phase II. Any valleys, dead-end canyons, passes, etc., that may have been taken accidentally by the missing aircraft should also be covered.

Comparisons of CSAD and Mountain VFR Search Areas

4.02.13 The following figure shows a comparison between the CSAD and the Mountain VFR methods, for an incident involving a flight from Abbotsford to Revelstoke, where more than one common VFR route is possible. The practicality of the Mountain VFR method is demonstrated by the fact that the CSAD method covers only about one-third of the possible VFR routes.



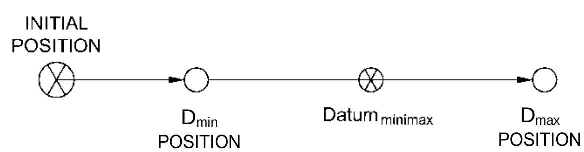
Chapter 4 SEARCH PLANNING AND EVALUATION CONCEPTS

4.03 Maritime Search Planning Methods

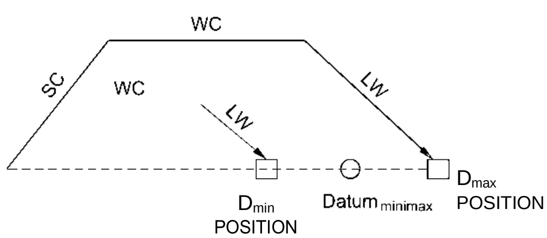
Oceanic Environment

4.03.1 Non-Minimax – If the drift is less than four (4) hours, compute the search radius without considering drift error. If the drift is more than four (4) hours, consider using the minimax method.

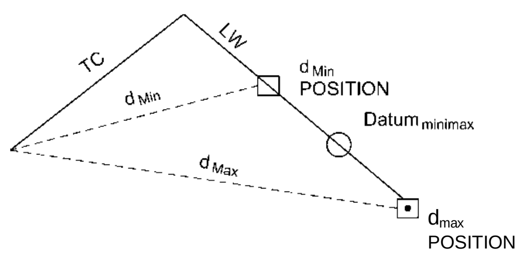
4.03.2 Minimax – Often the information available about a maritime incident is so uncertain that the planner must make several assumptions to determine a datum. This is accomplished by deciding on the least and greatest practical values of all unknown or uncertain factors. These factors include the earliest and latest times the incident may have occurred, the various positions where the incident may have occurred and the many drift forces that may affect the object. Then, the least practical values are added vectorially to provide the minimum distance an object should be from the last known position (LKP), just as the greatest practical values are added to provide the maximum distance. The datum point is established midway. This procedure is called minimax (minimum/maximum) plotting, and some examples are shown below. The minimum drift distance is labelled d_{min}, the maximum drift distance, d_{max}, and the datum point, $Datum_{minimax}$.



BASIC PLOT



TIME UNCERTAINTY



DROGUE/NO DROGUE UNCERTAINTY

4.03.3 It will be apparent that when minimum and maximum values of all uncertainties, such as time, position and drift, are incorporated into one minimax computation, the result will be an extremely complex computation, and so only one uncertainty is normally considered. Thus, if a time uncertainty is imposed, a single position will be used and leeway (LW) will be considered as downwind. If drift rate (and therefore, LW) uncertainty is imposed, time and position uncertainty will not be included in the computation.

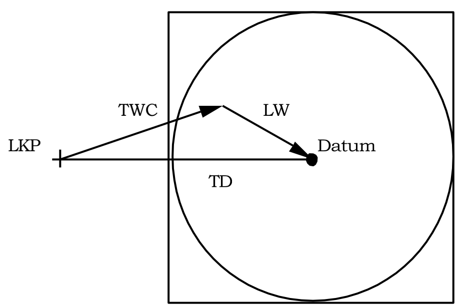
Chapter 4 SEARCH PLANNING AND EVALUATION CONCEPTS

4.03 Maritime Search Planning Methods

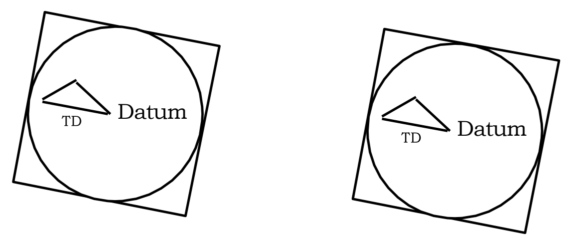
Coastal Waters

4.03.4 Coastal search planning differs from oceanic planning in that sea current and wind current are not usually included in the total water current. In the initial search, radius is set at six (6) nautical miles and, normally, only the downwind LW is taken into consideration.

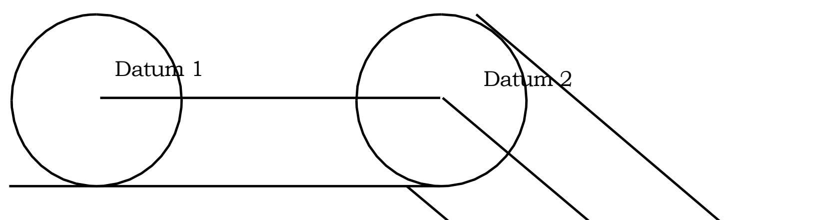
4.03.5 The intent of coastal search planning is to furnish simplified procedures that can be acted upon in the early stages of an incident.



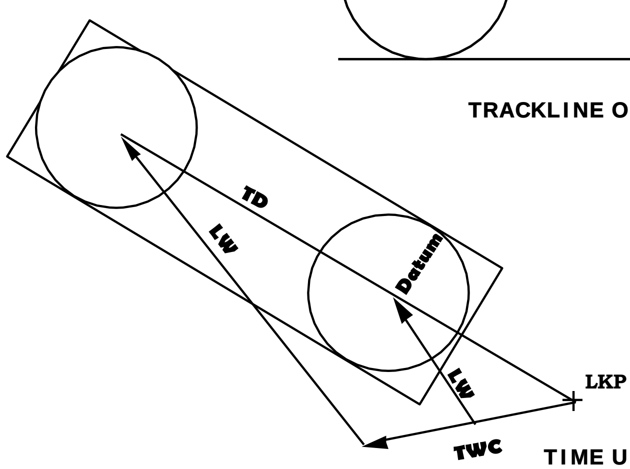
VESSEL ADRIFT



POSITION UNCERTAINTY



TRACKLINE OVERDUE



TIME UNCERTAINTY

NOTE: If the distressed craft reports a position that is in shallow water, it may anchor. Therefore, particular attention should be paid to the LKP when it is located outside the determined search area. If this is the case, the search facility should proceed to check the LKP first.

Chapter 4 SEARCH PLANNING AND EVALUATION CONCEPTS

4.04 SAR Incident Location

General

4.04.1 At the initiation of search planning, the search planner may know a reported position, the proposed track or only the general area of the search object. This knowledge is used to determine the object's most probable position, which is then corrected for drift if necessary. When searching for an aircraft on land, the result is a datum which will remain stationary throughout the search. For an object in the water, the result is a moving datum from which continually moving search areas may be derived. In both cases, the object is to determine an area which has the greatest chance of including the most probable position of the search object.

4.04.2 In the computation of the search and rescue (SAR) incident location, the planner must collect, weigh and review information from all practical sources. These might include

.1 Airfields where an aircraft might have attempted to land

.2 Possible vessel docking areas

.3 Military or civil radar services, such as the Terminal Radar and Control System (TRACS) or the Joint Enroute/Terminal System (JETS)

.4 Aviation or maritime authorities along the route

.5 Marine Communications and Traffic Services

.6 Canadian Forces high frequency (HF)– and Canadian Coast Guard very high frequency (VHF)– direction finding nets

.7 Owner/operator/next-of-kin, to

  .a obtain information on the crew and the aircraft/vessel operating characteristics, relating these to the enroute weather and terrain, and

  .b assess the ability of the crew to survive and the type of assistance likely from survivors

.8 Environment Canada Meteorological Service, for weather information which may have influenced the intended voyage

Possible Area

4.04.3 This area is the region bounded by the object's limit of endurance in all possible directions from the last known position (LKP) of the search object. It approximates a circle centred on the LKP with the radius being expressed in terms of distance. The basic methodology may be applied to both aeronautical and maritime cases. Normally, it will be impractical to search this wide area, but it should be determined so that the planner will be aware of all possibilities.

Chapter 4 SEARCH PLANNING AND EVALUATION CONCEPTS

4.04 SAR Incident Location

Probability Area

4.04.4 Aeronautical – In the absence of information to the contrary, it may be assumed that the most probable area within which a missing aircraft will be found is that along the intended track from the LKP to the intended destination and within a reasonable distance either side of track. The study of Canadian data, which led to the Canadian Search Area Definition and Mountain Visual Flight Rules methods, confirmed this assumption for aircraft cases. It also determined that definitive area sizes could be established in relation to probability of whereabouts values of an incident location for various track length groupings.

NOTE: Refer to *section 4.02 – Inland Search Planning Methods*.

4.04.5 Maritime – In maritime cases, the probability area consists of an increasing area about a periodically repositioned datum. The area is determined using the oceanic or coastal search planning methods.

NOTE: Refer to *section 4.03 – Maritime Search Planning Methods*.

4.04.6 Adjustment of the probability area may be necessary for a variety of reasons, including:

.1 The initial search of a determined probability area has proven unsuccessful.

.2 Information becomes available which suggests a deviation from the intended route may have occurred. This might include:

.a Adverse weather differing from that expected by the crew

.b Unserviceable or unreliable navigation aids en route

.c Advice on preferred routes from qualified witnesses

.d Reliable sighting reports

.3 The effect of drift in the case of maritime incidents.

NOTE: Refer to *section 4.08 – Search Areas*.

NOTE: To aid in the computation of the area and time involved in sequential coverage of various search areas, a series of nomographs and tables have been developed. Refer to *Appendices D.02 to D.04 – Search Nomographs*.

Chapter 4 SEARCH PLANNING AND EVALUATION CONCEPTS

4.04 SAR Incident Location

Distress Beacon Detection

4.04.7 Often, distress beacon reports are received from pilots of other than SAR aircraft. In Canada, anyone hearing a distress beacon signal is required to advise the nearest air traffic control unit, flight service station or joint rescue coordination centre, stating the position where the signal was first and last heard and the strength of the signal.

4.04.8 With this information, and the theoretical reception range for VHF and ultra high frequencies (UHF) signals, the search planner can arrive at a rough estimate of the most appropriate search area, keeping in mind that while in theory distress beacon signals should extend to line of sight range, they may be affected by a number of factors such as terrain shielding, transmitter strength and receiver sensitivity.

NOTE: Refer to *Appendices D.05 – VHF/UHF Theoretical Reception Range Table*, and *D.06 – ELT Detection Distance Graphs*.

4.04.9 Because of the limited operating life of most distress beacon batteries, it is essential that search planning be premised on saturating the high probability areas as soon as possible. An electronic search should be conducted during the first 24 hours after a search object is missing. For the remainder of the search, a listening watch on the appropriate frequencies shall be maintained.

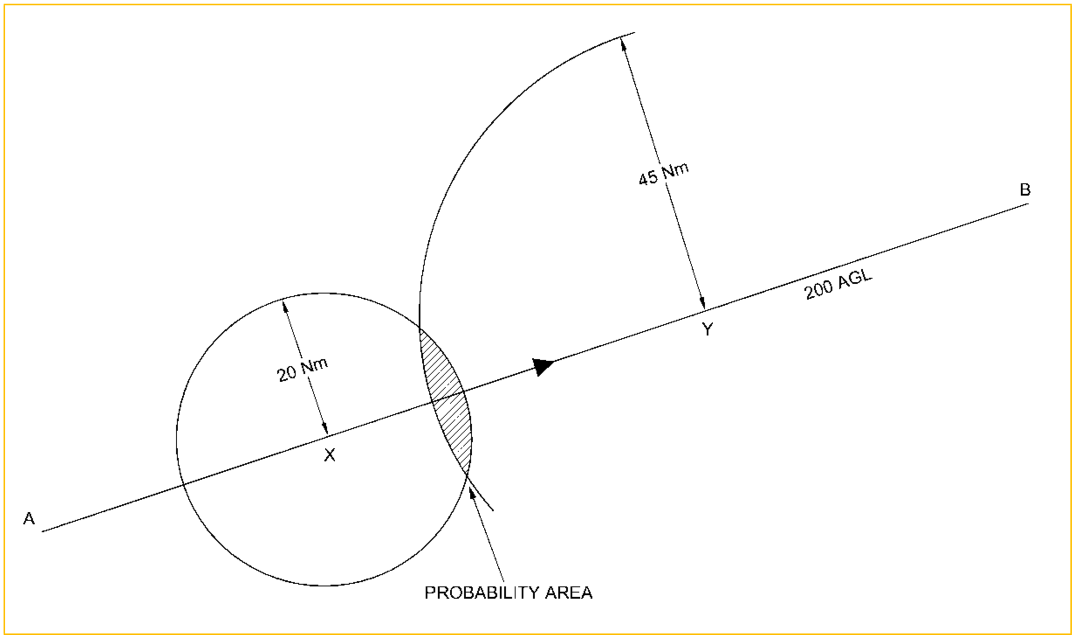
4.04.10 **ELT Searching Examples –** There are several methods of working out the most appropriate search area. The following examples show how ELT tone information received from overflying aircraft can be used to locate the source of the signal.

Chapter 4 SEARCH PLANNING AND EVALUATION CONCEPTS

4.04 SAR Incident Location

Example A

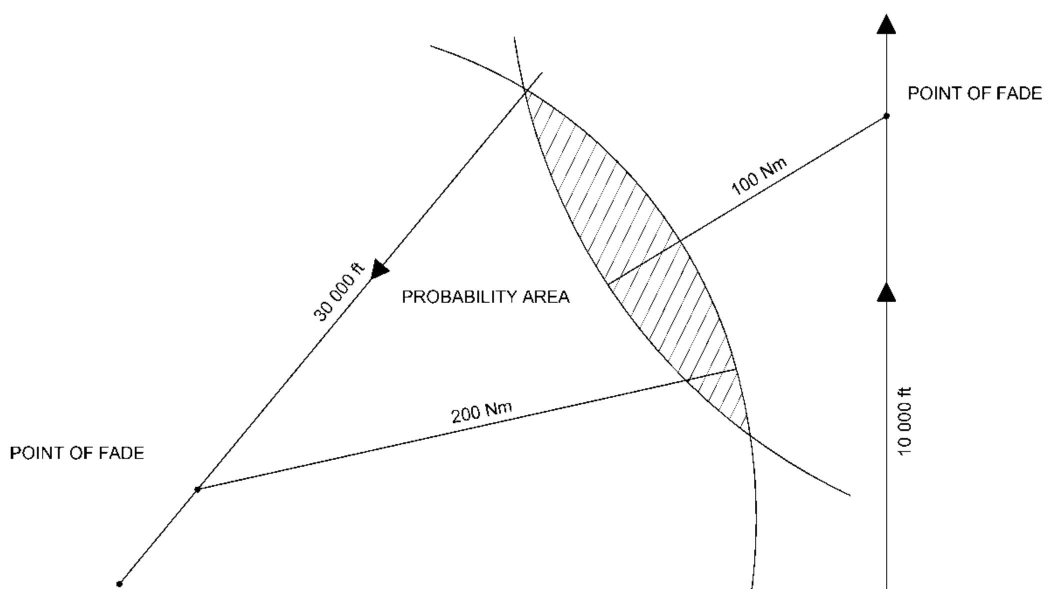
Situation – The pilot of a Beaver is flying from point A to point B. Over point X, at 600 metres (2,000 feet) above ground level (AGL), he receives a loud and clear steady ELT signal. He notes the time and his location but because of fuel considerations does not attempt an aural homing. He continues his flight and keeps monitoring 121.5 megahertz. Thirty minutes later at point Y, after covering approximately 60 NM, the signal fades out.



Solution – It is most likely, judging from the way that the signal was first received (“loud and clear”) that the downed pilot did not turn the ELT on until he saw or heard the Beaver. At that time, the Beaver was probably within 20 NM of his position. Since the Beaver pilot continued to hear the beacon until it faded at point Y, we can use the VHF/UHF theoretical reception range for 600 metres (2,000 feet) of 45 NM and draw an arc cutting the 20 NM circle drawn around point X. The probability area would then be the relatively small shaded area.

Example B

Situation – Two different aircraft on two different routes, one flying at an altitude of 3000 metres (10,000 feet) AGL and the other at 9 000 metres (30,000 feet) AGL, each receiving ELT signals.

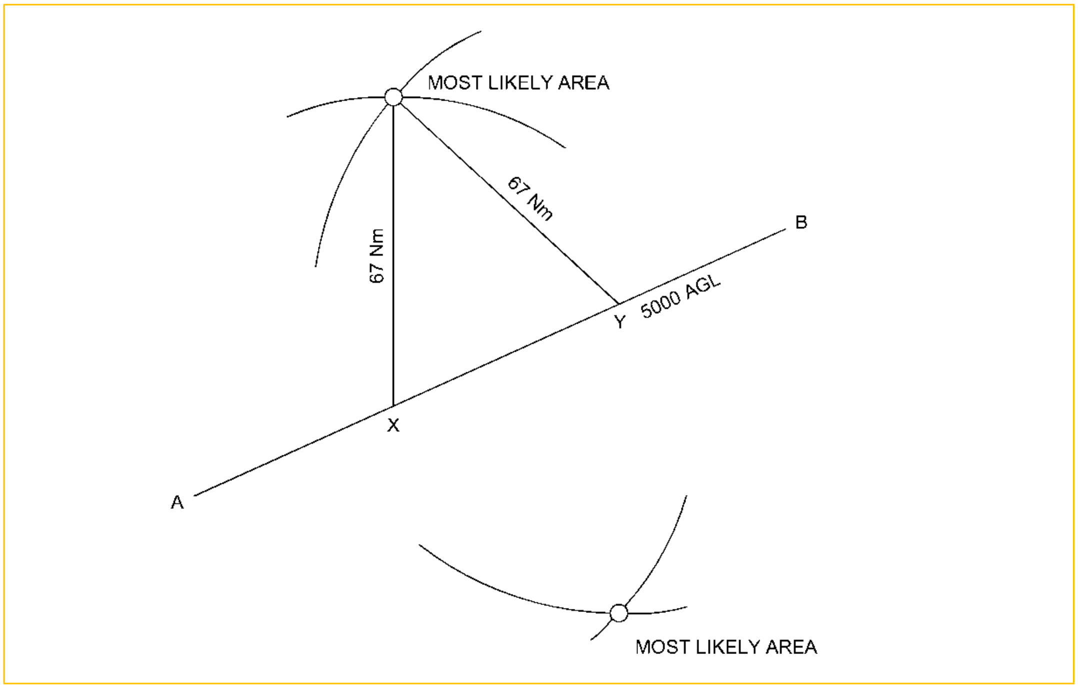


PROBABILITY AREA – EXAMPLE B

Solution – By using the theoretical reception range of 100 NM for aircraft flying at an altitude of 3000 metres (10,000 feet), and of 200 NM for aircraft flying at an altitude of 9000 metres (30,000 feet), we can draw two arcs and arrive at a relatively small probability area.

Example C

Situation – One aircraft, flying at 1500 metres (5,000 feet) AGL, picks up a weak signal at point X and tracks it until it fades at point Y.



Solution – By using the theoretical reception range of 67 NM for 1500 metres (5,000 feet), we can draw two arcs from each of the X and Y points and arrive at two most likely areas, one on either side of the track.

Chapter 4 SEARCH PLANNING AND EVALUATION CONCEPTS

4.05 Datum

Inland Environment

4.05.1 When planning a search in the inland environment, determining a starting reference point or datum is simply establishing the last known position (LKP), that is, the last position for which there is indisputable evidence of the search object's location.

Maritime Environment

4.05.2 In the maritime environment, datum is defined as the most probable position of the search object, corrected for drift, at any specific time.

4.05.3 In the maritime environment, many forces act on a search object, such as wind, sea and tidal current, etc. Unless the search object is immobilized, such as a vessel aground, the actual position of the search object may be substantially different from the initial position or LKP. The search planner should therefore include all the appropriate forces, considering the location, when calculating a particular datum.

4.05.4 As the search object continues to be acted upon by these forces during the search, datum should be periodically recalculated. Datums are usually labelled sequentially (e.g., Datum 1, Datum 2, Datum 3), with the calculation time.

4.05.5 To compute a datum, the search planner must first consider the time and location of the search object's last reliable position, or LKP. Four datum types may be derived from the four possible situations that usually exist:

.1 Single Datum, where a <u>single position is known</u>;

.2 Multiple Datums, where there is an <u>uncertainty in the position</u>;

.3 Datum Line, where the <u>intended track is known</u>; and

.4 Datum Area, where the LKP is actually a <u>vicinity</u> rather than a position.

4.05.6 **Single Datum** – If the incident has been reported by the distressed craft itself or witnessed by another craft or observer, or the position may be established from a previously reliable position, the search planner applies the drift to the search object's position for the appropriate time interval and computes a unique, or single, datum.

4.05.7 **Multiple Datums –** A variation of the single datum is the "position uncertainty" situation. In this case, the reported position may be vague, or described in such a manner that the planner must drift two or more possible locations (this should not be confused with the trackline).

4.05.8 **Datum Line –** If the craft's intended track is known, but not its position along the track, or a single line of position, such as a direction finder bearing, is obtained, a datum line can be computed by correcting the track for the drift.

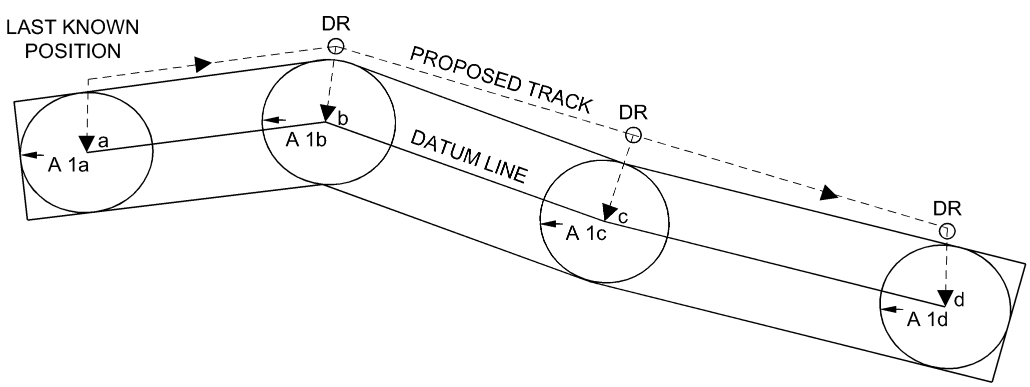
Chapter 4 SEARCH PLANNING AND EVALUATION CONCEPTS

4.05 Datum

4.05.9 To do so, dead reckoning (DR) positions should be established at the beginning and end of the track, and along the track as required. Each DR is used to develop a datum point for a common time. These are analyzed for possible error factors and the resultant search radii are tangentially joined to construct a search area along the intended track:

.1 The intended track is first plotted. A series of DR positions are then computed at frequent and regular intervals for estimated progress along the track, including the DR position at the end of the track and the turning points along the track.

.2 Each DR position is considered as a known position and drift is computed for each position up to a common single time. Thus, a series of datum points is developed. All datum points are then sequentially connected by straight lines to form a datum line.



NOTES

1. Drift is exaggerated.
2. Points a, b, c and d are datum points for DR positions corrected for drift.

4.05.10 Datum Area – If neither the position nor the intended track is known, but the general area the search object was probably in, such as a lake, a military exercise area, or an offshore fishing ground, is known, it will be necessary to determine a datum area.

4.05.11 First, using the information available on the endurance and normal cruising speed of the missing craft, and on the drift forces, an area of possibility will be determined. This area will normally be much too large to search effectively; the search planner will therefore be required to do extensive detective work to determine a reasonable search area.

4.05.12 Datum area calculations depend on many factors, such as fuel endurance, natural boundaries, and known or suspected areas of occupancy. These calculations may range from reasonably exact to a best guess.

Chapter 4 SEARCH PLANNING AND EVALUATION CONCEPTS

4.06 Drift Forces

General

4.06.1 In all searches where the search object is believed to be in the water, it will be necessary to re-compute datum periodically to account for drift or new information by determining the various forces that cause the search object to move in and with the water. The periods at which the datum must be re-computed will vary according to this expected drift. The forces that must be considered may include:

- Sea current (SC)
- Tidal current (TC)
- Lake current
- River current
- Bottom current
- Long shore current
- Wind current (WC)
- Leeway (LW)

4.06.2 While the list may seem overwhelming, some are rarely used. Typically, one drift force might be used for aircraft incidents over land, three for surface water incidents, and none for ground incidents.

NOTE: *Appendix C – Search Planning Worksheets (Minimax)* contains forms that may be used as guides for these calculations.

4.06.3 There is a *Maritime Environment Search Planning Decision Matrix* which illustrates four possible paths that a planner may use to determine a datum and, ultimately, a search area in the maritime environment. Other factors may occur that will warrant the planner determining the datum via some other method, and the decision matrix should be used as a guideline only.

NOTE: Refer to *Appendix D.07 – Maritime Environment Search Planning Decision Matrix*.

Water Currents

4.06.4 **Sea Current –** SC is the permanent, large-scale flow of ocean waters, not caused by local winds or tides. SC is normally only significant in the oceanic environment, and is generally not calculated in depths of less than 90 meters (300 feet), unless local knowledge suggests differently. While several sources for obtaining SC information are available, the most recent and preferred sources are the Canadian Hydrographic Service publications. The instructions for deriving SC from these and other publications are included in the publications. It must be remembered that SC publications are based on recorded climate data and should be verified whenever possible with more recent on-scene information.

4.06.5 Tidal Current – The effect of tide on current in any given area may be determined by consulting tide tables or current charts which will include the effects of coastal geography. Whenever possible, local knowledge should be sought to verify TC computations. While the ebb and flow of tides may tend to nullify the cumulative effect, tide must be considered since

.1 when tides reverse, the current effect in one direction may be greater than in the other,

.2 the tidal flow will cause changes in the probable position of the search object for different search times, and

.3 the cumulative effect may be such as to thrust the search object into areas where sea current may take effect.

4.06.6 Lake Current – Any large lake will likely have a water current, which can vary due to changes in season, weather, etc. Information on current may be found in regional Canadian Hydrographic publications. If charts do not exist, potential sources of local knowledge are boat or marina operators who are familiar with the lake.

4.06.7 River Current – Some large rivers, such as the St. Lawrence, have data published on their current. It should be remembered that, where large rivers empty into the sea, their current might have an effect some distance from the river mouth. This should be considered when computing the offshore or long-shore current, and the only reliable source of information will usually be local knowledge.

4.06.8 Bottom Current – Although Canadian search and rescue (SAR) facilities are seldom involved in underwater incidents, it may be necessary for the SAR planner to obtain information on bottom current. This data can be obtained from the Canadian Hydrographic regional facility.

4.06.9 Long-shore Current – Caused by incoming swells striking the shoreline at an angle, the long-shore current is only considered within one mile of the shoreline and must be obtained from direct observation or local knowledge.

4.06.10 In general, when planning any kind of inshore search, it is advisable to seek outside and/or local knowledge. Each joint rescue coordination centre (JRCC)/maritime rescue sub-centre (MRSC) should establish reliable contacts that can provide such data. These might include:

- Oceanographic institutes

- Coast Guard or naval experts
- Professional fishers or tug operators
- Marina operators
- Ferry operators
- Local area marine pilots

4.06.11 Wind Current – Also called wind driven current or wind drift current, the WC is the result of wind acting on the surface of the water for a long period. WCs are virtually ignored in coastal, lake, river and harbour areas due to the many variable effects of the water/land interface. A rule of thumb is to calculate WC when water depths are greater than 30 metres (100 feet) and at distances of 20 NM or more from shore.

4.06.12 The United States Coast Guard Oceanographic Unit developed a procedure to calculate the wind current by determining the wind effect for six-hour time periods and vectorially adding these effects. To do this, the most accurate wind speed possible should be obtained for the 48-hour period prior to the incident, divided into eight six-hour periods of which the first period is the most recent. Winds are usually available for the normal synoptic hours, 0000 UTC, 0600 UTC, 1200 UTC and 1800 UTC, or from weather maps. Wind speed and direction for each period are considered to be those which were valid at the end of the period. The first period should be selected so that it begins and ends on the synoptic times bracketing the time for which the current is to be calculated. While a 48-hour wind record is preferred, a shorter period could be used with some loss of accuracy.

NOTE: Refer to *Appendix C, Sheet 9 – Wind Current Calculation*.

4.06.13 On-scene Observations – Since almost all information available for computing the various drifts is based on historical record, every effort should be made to verify or update it with recent observed data. Some of the means available are:

.1 Oceanographic vessels operating in the area of the incident, which can provide information on winds or current.

.2 Expendable surface current probes (ESCPs), which are carried by some oceanographic research vessels and should be deployed if available. The same constraints exist with ESCP as with datum marker buoys (DMBs).

.3 Self-locating datum marker buoys (SLDMBs), which are drifting buoys that transmits a signal automatically tracked by JRCC/MRSC via satellite and input into CANSARP. SAR units should not deploy a SLDMB without first consulting with the JRCC/MRSC, to ensure that it is being tracked.

.4 DMBs, which are carried by SAR aircraft and vessels and by some naval aircraft and vessels. A DMB is a drifting buoy that transmits a homing signal and must tracked by a mobile unit on scene. A DMB should be employed at the earliest opportunity in a maritime search. The DMB vector can then be added to the LW vector for a more reliable datum. However, it must be remembered that the DMB will only provide information on the current existing at the time and place it is used.

.5 Other vessels operating in the area of the incident, which can provide information on winds or current.

.6 Visual markers such as smoke floats or dye markers, which can be used but must be continually replaced to ensure continuous marking.

.7 If no other marker is available, the planner might consider the use of a “drifter”, such as a boat, a raft or a large float, to simulate the search object movements. The search planner must realize that the object used may have a different draft and plane area from the search object, and may thus have a different LW speed and direction.

4.06.14 **Total Water Current –** The vectorial sum of all applicable current in a particular drift plot may be referred to as total water current (TWC).

4.06.15 All of the above methods are used to increase search effectiveness by one or more of the following:

.1 Determining actual TWC

.2 Marking a search object’s location

.3 Acting as a reference point for a drifting datum

.4 Emulating the drift of a specific search object

Leeway

4.06.16 LW is the movement of the search object through water, caused by the action of the wind on the exposed surfaces of the object. The shape, size and orientation of the search object cause LW to vary to the point where it is extremely difficult to determine a precise value for LW direction and magnitude for any given object. Also, experiments have shown that objects tend to diverge either side of the downwind direction.

NOTE: Refer to *Appendix D.08 – Leeway Tables and Taxonomy.*

Chapter 4 SEARCH PLANNING AND EVALUATION CONCEPTS

4.07 Datum and Search Unit Errors

General

4.07.1 Once datum has been determined, the planner must consider the effect of possible errors in the computations and later planning. The three basic errors which must be considered are:

.1 Initial position error (X)

.2 Total drift error (D_e)

.3 Search facility error (Y)

Initial Position Error

4.07.2 X is based on the position fixing accuracy of the reporting agency, whether it was the search object, a passing vessel or aircraft, an electronic direction finding (DF) source such as radar or HF-DF, or a Cospas-Sarsat position. The more sophisticated the reporting agency, the smaller the error that may be expected.

4.07.3 When the initial position is reported as a fix, X is the same as the fix error (Fix_e). When the initial position is reported as a dead reckoning (DR) position, X is the sum of Fix_e and the DR error (DR_e):

$$X = Fix_e + DR_e$$

NOTE: *Appendix D.09 – Position Error Tables* lists the position errors which may be assumed for various types of reporting agencies and search facilities.

Total Drift Error

4.07.4 D_e is either the combination of all individual drift errors (d_e) or the minimax drift error ($d_{e\ minimax}$).

NOTE: In the early hours (up to four) of a search, drift error can be disregarded. Again, for practicality, drift error is ignored if it is less than one nautical mile (NM), and needs only to be considered when calculating the surface drift.

4.07.5 The individual drift errors are the errors which develop during computation and are possible when computing any kind of drift. These errors are due to the assumptions and generalizations which must be made to keep the computations practical and simple. For search planning, d_e is established as one-eighth (0.125) of the determined drift, or, if confidence is low, at three-tenths (0.3) of the drift.

4.07.6 The precise definition of D_e is the arithmetic sum of all the accumulated d_e, from the time the search object was first exposed to drift to the time of the latest computed datum. In the calculation of the first datum on a mission, d_e will usually equal D_e but, as the mission progresses and another datum is calculated, D_e will equal $d_{e1} + d_{e2}$ … and so on.

Chapter 4 SEARCH PLANNING AND EVALUATION CONCEPTS

4.07 Datum and Search Unit Errors

4.07.7 **Minimax –** The minimax drift error is determined using the formula:

$$d_{e\ minimax} = \frac{Distance + d_{e\ min} + d_{e\ max}}{2}$$

where Distance is the distance between the minimum drift distance (d_{min}) and maximum drift distance (d_{max}); the minimum total drift error ($d_{e\ min}$) is one-eighth d_{min} (or three-tenths, depending on confidence) and the maximum total drift error ($d_{e\ max}$) is one-eighth d_{max} (or three-tenths, depending on the confidence).

NOTE: If aeronautical drift is incorporated to minimax calculations, then the aeronautical drift error (d_{ea}) is added to the $d_{e\ minimax}$:

$$D_e = d_{ea} + d_{e\ minimax}$$

4.07.8 This method is appropriate for all cases except when minimax plotting is used to account for directional uncertainty. In such cases the addition of drift errors from a series of minimax calculations causes an unwarranted enlargement of the total drift error. When using minimax plotting to account for directional uncertainty, D_e must be determined for the final datum position only.

Search Facility Position Error

4.07.9 Position errors may also be anticipated for search facilities, depending on their individual capabilities to navigate. However, only fix errors need be considered for search facilities since they will normally do little or no dead reckoning, so Y is estimated as:

$$Y = Fix_e$$

NOTE: Refer to *Appendix D.09 – Position Errors Tables.*

Total Probable Error

4.07.10 The total probable error (E) can be estimated using a basic statistical method, which holds that the sum of the squares of all possible errors will equal the square of the total probable error. E may therefore be found using the formula:

$$E = \sqrt{De^2 + X^2 + Y^2}$$

4.07.11 This calculation is of great importance since the size of the search area which will be developed depends directly on E.

4.07.12 Finally, it will be necessary for the search planner to recompute E periodically, for example to account for

.1 drift changes, as datum is redefined,

.2 search facility changes, or

.3 initial position revision.

Chapter 4 SEARCH PLANNING AND EVALUATION CONCEPTS

4.08 Search Areas

General

4.08.1 One of the most important phases of the search planning process is the delineation of the area to be searched. The objective of the search planner in all cases will be to define an area which will ensure a better than 50% chance that the search object is in the area.

Oceanic Search Areas

4.08.2 For maritime searches in the oceanic environment, this area can be described as a circle with the datum point as centre and having a radius (R) equal to the product of the total probable error (E) multiplied by a safety factor, called the optimal search factor (f_s):

$$R = E \times f_s$$

4.08.3 While it would obviously be desirable to increase the radius to achieve the highest possible probability, there are usually limitations, including the number of search facilities available, the time available and the track spacing required.

NOTE: *Appendix D.10 – Search Area Delineation Table* shows the f_s which must be applied to E to determine search radius.

4.08.4 Using the search radius, the planner describes a circle about the datum point, usually squaring it off with tangential lines parallel to the direction of drift. As the datum point moves, the search area is redefined by the same process, using the new R to enlarge the search area. In this way, the search keeps re-covering the water surface area within which the search object is most likely to be.

4.08.5 **Search Area Expansion –** The procedures described above result in repeated expansion of the search area as the search continues. While the table provided expands the search area to a radius 2.5 times the total probable area by the fifth search, the area will continue to grow larger on successive searches by virtue of the fact that E will continue to increase.

Coastal Search Areas

4.08.6 Coastal search planning differs from oceanic planning in that

.1 sea current and wind current are not usually included in the total water current, and

.2 the initial search radius is set at six (6) nautical miles.

NOTE: If the drift is for periods greater than six hours, apply the oceanic methodology.

Chapter 4 SEARCH PLANNING AND EVALUATION CONCEPTS

4.08 Search Areas

4.08.7 Search Area Expansion – After the first search in a coastal case, the search areas will be increased using the same method of computing E and f_s as for searches in the oceanic environment. The datums will be developed by using minimax plotting.

NOTE: Refer to *paragraph 4.08.5* and to *Appendix D.10.*

Inland Search Areas

4.08.8 Currently available data does not allow for more than a subjective estimate of the effectiveness of aerial search in the inland environment. Factors such as the type of terrain, the weather, the available light and the capability of the searchers all affect the efficiency of the search facilities. It will be the responsibility of the search planner to evaluate the coverage of each of the individual sections of the search area to reach a rational search conclusion in unsuccessful searches.

4.08.9 Search Area Expansion – Unlike maritime searches, inland searches do not normally require an expansion of the search area. Rather, repeated coverage of the same areas will usually be required until the conclusion of the search.

Search Area Coverage

4.08.10 Search area coverage involves the systematic search of defined areas to ensure the optimum probability of detection of the search object. The many factors that influence detection capability during a search can be reduced to four mathematical expressions:

.1 Track Spacing (S), which is a measure of search effort;

.2 Probability of Detection (POD), which is a measure of search effect;

.3 Sweep Width (W), which is a measure of detection capability; and

.4 Coverage factor (C), which is a measure of search quality.

4.08.11 Track Spacing – S is the distance between adjacent search tracks, whether these are by simultaneous sweeps of several facilities or successive sweeps of a single facility. It should be apparent that the smaller S is, the higher will be the likelihood of detecting any object which is within the area searched. It must be remembered, however, that decreasing S increases the time for any given search facility to cover the search area, or alternatively requires more facilities to complete the search in the same time. The object of the search planner will be to achieve an optimum value for S, one that will permit expecting search object detection to be within the constraints of time and search facility availability.

Chapter 4 SEARCH PLANNING AND EVALUATION CONCEPTS

4.08 Search Areas

4.08.12 Probability of Detection – Usually expressed as a percentage, the POD refers to the odds of detecting the search object. An observer can be expected, under normal conditions, to sight most of the objects in close range, fewer objects at greater range and no object at all beyond the maximum detection range. A typical curve for search aircraft spotters is depicted at the end of this section. It has been shown in field experiments that the curve is not a straight line, that is, there is not a constant rate of decrease as the range increases. To make optimum use of this concept, sweep widths tables have been developed to achieve particular PODs.

4.08.13 Probability of Detection vs. Coverage Factor – As S and W control C, so C controls POD. The POD is determined using the *Probability of Detection Graph*, the curves providing POD when C is given for a single search of an area, and for up to four repeated searches in the same area. When repeated searches of the same area are completed, POD is determined by entering the average C for all those searches on the appropriate curve. While this is not strictly accurate, it is sufficiently so for manual calculations, given the basic level of accuracy of the graphs.

NOTE: Refer to *Appendix D.11 – Probability of Detection Graph*.

4.08.14 Sweep Width – W is a mathematically expressed measure of detection capability based on search object characteristics, weather and other variables. W is obtained by choosing a value less than the maximum detection range so that scattered objects that may be detected beyond W are equal in number to those, which may be missed within W. This concept is expressed in the graph at Appendix D.11. Thus, W will always be less than the maximum detection range.

4.08.15 The W concept is applicable for any type of search, including electronic or aural searches, and its computation depends on the search methods being used by search facilities:

.1 Visual search

.2 Electronic search

.3 Miscellaneous search methods

NOTE: The tables shown at *Appendix E – Sweep Width Computation* provide W values for various types of searches. Also refer to *section 5.01 – Search Patterns and Sweep Widths*.

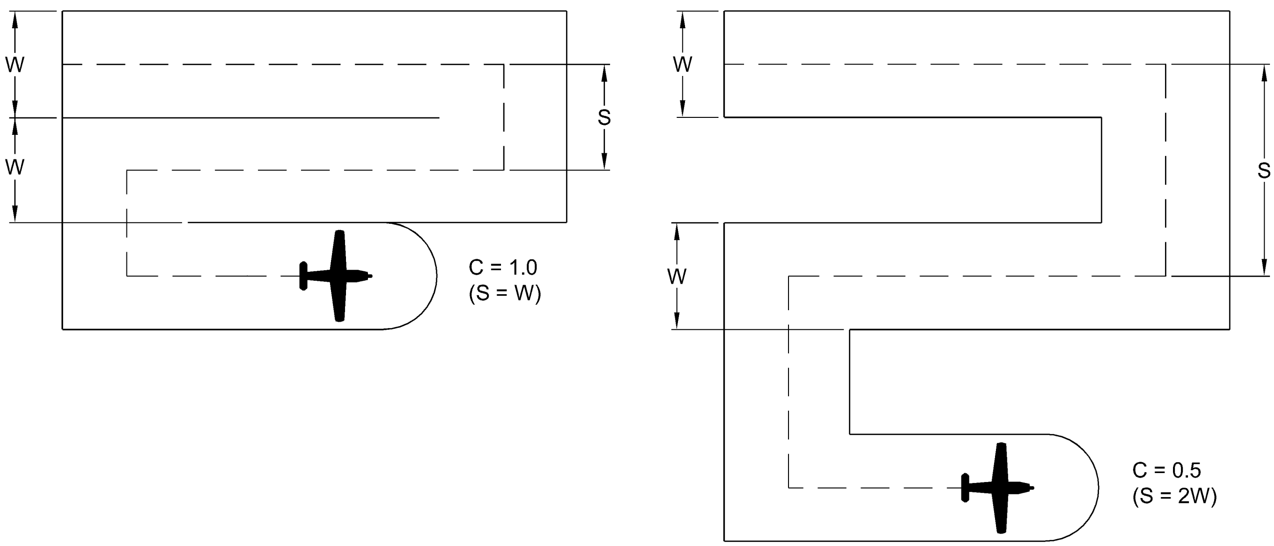
Chapter 4 SEARCH PLANNING AND EVALUATION CONCEPTS

4.08 Search Areas

4.08.16 Coverage Factor – C is a measure of search effectiveness or quality. It depends on the relation between W and S, and is expressed:

$$C = \frac{W}{S}$$

4.08.17 The following figure demonstrates the difference between a C of 1.0 and one of 0.5:



NOTE:	In the case of inland searches, the POD varies according to the changing terrain and vegetation within a given search area. Canadian visual W tables have not been developed for inland searches and therefore C for these searches cannot be determined.

4.08.18 Search Concentration – The likelihood of survivors decreases with time, making it imperative that the search planner completes a maximum search effort at the outset of the search. Usually, a large area will be involved, compounding the problem. Adherence to the following principles has proven successful in the past:

.1 Define an area large enough to encompass the survivors.

.2 Use an S equal to W (C = 1.0).

.3 Select a time frame to complete the search.

.4 Determine the number of aircraft and/or vessel hours needed to complete the search in the allotted time.

.5 Dispatch sufficient search facilities to complete one search of the area within the allotted time.

.6 If unsuccessful, expand and repeat the search.

.7 Avoid re-orienting the search or reassigning search facilities unnecessarily.

4.08.19 In any search, re-orientation of the search area once a particular search has commenced is both difficult and wasteful. Thus, planning should be thorough and then adhered to. The temptation to reassign search facilities for every new lead or sighting report should be resisted. Rather, additional facilities should be dispatched to check out such possibilities.

4.08.20 Inland Search Area Coverage – The number of times an area should be searched depends on the probability of containment (POC) and on the POD. Both of these values are subjective. However the following guidelines are suggested:

.1 Lateral coverage from the airplane is improved to some extent with increasing altitude without degrading the POD appreciably. Therefore, a minimum search altitude of approximately 300 metres (1000 feet) should be considered where terrain and/or vegetation are factors.

.2 Since lateral coverage varies with terrain and vegetation, spotters must adjust their searching accordingly. For example, in densely forested areas, lateral coverage may only be a few hundred feet whereas in open ground, it may be one-half mile.

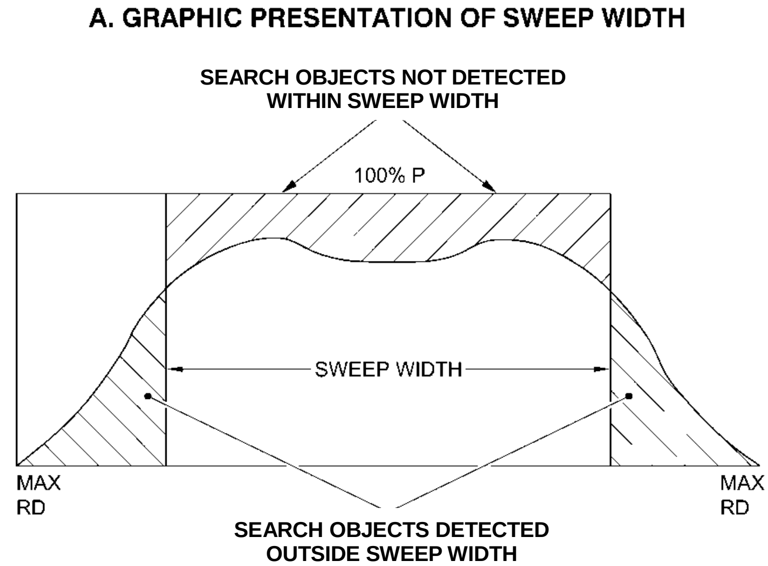
.3 Adequate coverage of a forested, high probability area may require multiple intensive searches with the narrow track spacings. There are also advantages in varying the search direction, if possible.

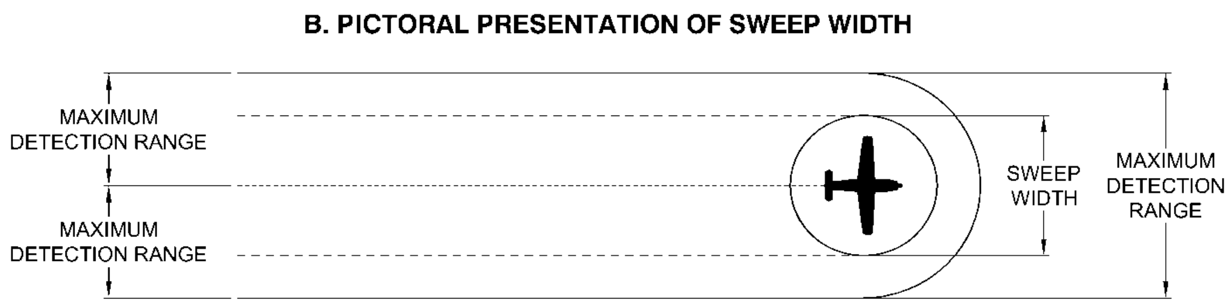
4.08.21 Any pre-defined search areas like those of the Canadian Search Area Definition and Mountain Visual Flight Rules methods are intended as guides when there is little else to go on. Any valid information on the missing aircraft, pilot, route flown, weather, etc., should be used to modify or re-define search areas. This same route may involve a dead-end canyon that could have been taken accidentally by the pilot; this canyon should be searched even if it extends more than 10 miles from the intended track. The key is common sense and flexibility.

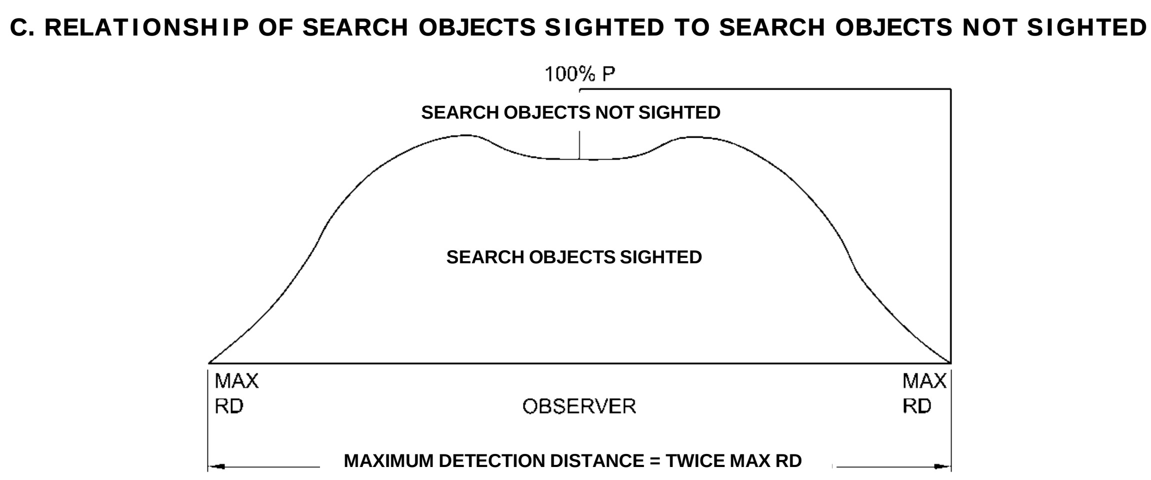
NOTE: For further information, refer to the *IAMSAR Manual, Volume II, section 4.6 – Search Planning and Evaluation Factors*.

Chapter 4 SEARCH PLANNING AND EVALUATION CONCEPTS

4.08 Search Areas







Chapter 5 SEARCH TECHNIQUES AND OPERATIONS

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Chapter 5 SEARCH TECHNIQUES AND OPERATIONS

5.01 Search Patterns and Sweep Widths

General

NOTE: The information pertaining to this chapter is comprehensively covered in the *IAMSAR Manual, Volume II, Chapter 5 – Search Techniques and Operations*. The following is additional information for Canadian implementation.

5.01.1 No single sequence of search types or patterns will be suitable for all searches. Many practical considerations are used in deciding exactly which sub-areas and what coverages to use, such as maintaining safe separations among the search facilities, search facility sensor and navigational capabilities, and choices of search patterns.

5.01.2 In all cases, search planners will be expected to use their judgment and the available units to establish a sensible and attainable search sequence, based on search object or signalling device expected and the environmental conditions encountered.

5.01.3 The following table shows a representative search sequence, in this case where a large area is to be searched and the number of search facilities is limited. Night searches should be considered when terrain is suitable and when there is likelihood that survivors might have night or electronic signalling capability.

Search	Type	Period	Search Object	Preferred Aircraft	Speed (knots)	Spacing	Altitude (metres (feet))
1 and initial	Trackline	Day/ Night	Communication wreckage, electronic beacons	Jet	300/600	50 NM	3 000 to 12 000 (10 000 to 40 000)
2	Electronic	Day/ Night	Electronic beacons	Jet	300/600	50 NM	3 000 to 12 000 (10 000 to 40 000)
3	Visual (Aids)	Night	Fires, flares, torch, etc.	Turbo-prop	150/300	20 NM	450 to 900 (1 500 to 3 000)
4	Visual (Aids)	Day	Mirrors, dye	Prop	130/190	10 NM	450 to 900 (1 500 to 3 000)
5	Visual (Rafts)	Day	Rafts	Prop, helo	100/180	3.1 NM	90 to 450 (300 to 1 500)
6	Visual (Wreckage)	Day	Wreckage	Prop, helo	75/130	0.3 NM	60 to 150 (200 to 500)
* ALL AIRCRAFT TO KEEP RADAR SEARCH *							
NOTE: Initial, electronic and visual (aids) searches could take place simultaneously at night and (aids)/(rafts)/(wreckage) searches could take place during the ensuing daylight hours; six searches being completed by the end of a 24 or 36-hour period.							

Visual Searches

NOTE: The tables necessary for the calculation of sweep widths (W) for visual searches over water are shown at *Appendix E – Sweep Width Computation*. Tables for visual searches over land are available in the *IAMSAR Manual, Volume II, Appendix N, Tables N-9 to N-11*.

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5.01 Search Patterns and Sweep Widths

5.01.4 Searches for Visual Detection Aids – If it is initially known that the survivors have visual signalling equipment, the W information from the example in *paragraph 5.01.3* should be used.

5.01.5 Correction Factors – There are many factors which may modify visual sweep widths. While the effects of some of these factors may be variable or indefinite, the search planner must take them into consideration when developing a search plan. These factors (search object, sea/terrain conditions, search craft speed, position of sun, and lookout effectiveness) tend to affect the corresponding probability of detection.

5.01.6 Correction tables account for the effect of weather (f_w), crew fatigue (f_f) and search aircraft speed (f_v). The values from these tables are applied to W_u as follows:

$$W = W_u \times f_w \times f_f \times f_v$$

NOTE: Refer to *Appendix E.01 – Uncorrected Visual Sweep Width (W_u) Tables*.

.1 **Weather Correction Factor–** It will be noted that in some cases f_w is less than 1 in calm winds; this is due to the detrimental effect glassy water conditions have on sighting small objects. These tables are for daylight use only.

NOTE: Refer to *Appendix E, table E.02.1* **–** *Weather Correction Factor (f_w).*

.2 **Fatigue Correction Factor –** If the crew on the search facility is likely fatigued, reduce W values by 20%. Crew will be fatigued if they have been involved in a search for an extended period, and they may exhibit signs of fatigue which include missed communications, problems with memory, irritability, and increased time to complete tasks or make decisions.

NOTE: Refer to *Appendix E, table E.02.2* **–** *Fatigue Correction Factor (f_f).*

.3 **Search Aircraft Speed Correction Factor –** High speed can reduce effectiveness in aircraft, particularly at low altitude, or in any type of search vehicle if turbulence is being encountered.

NOTE: Refer to *Appendix E, table E.02.3* **–** *Search Aircraft Speed (Velocity) Correction Factor (f_v).*

5.01.7 Horizon Range – A table has been drawn to help the search planner determine the horizon range from different heights of eye.

NOTE: Refer to *Appendix E.03 – Horizon Range vs. Height of Eye Table*.

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5.01 Search Patterns and Sweep Widths

Night Searches

NOTE: *Appendix E.04 – Uncorrected NVG Sweep Width Tables* shows the available sweep width information for night vision goggles (NVG) searches.

NOTE: For more information on searches involving NVG and infrared devices, refer to the *IAMSAR Manual, Volume II, section 5.7 – Night Search Patterns.*

Electronic Searches

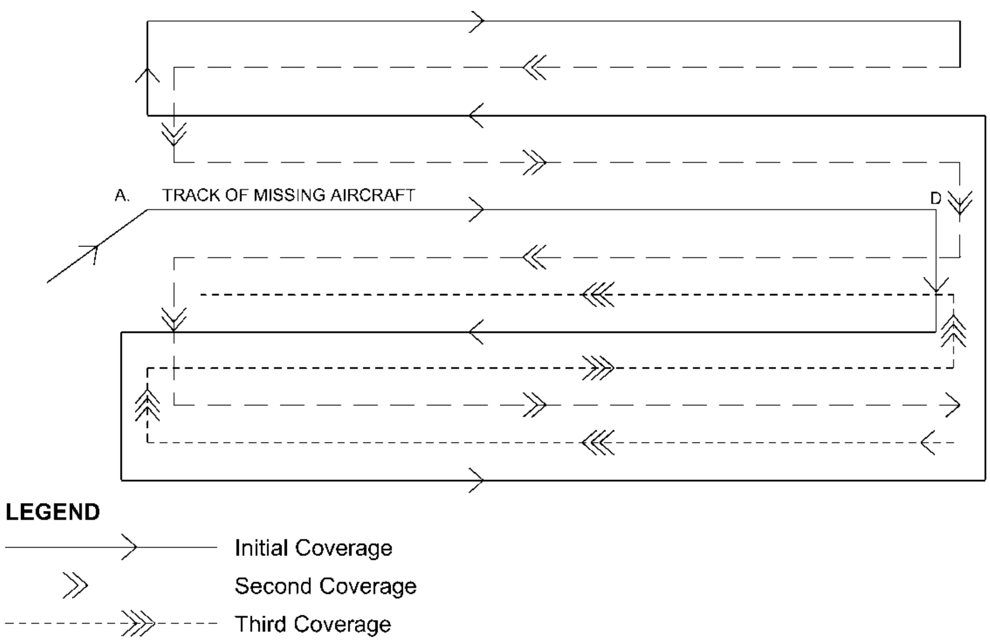
5.01.8 Distress Beacon Searches – The standard visual search patterns are applicable to electronic searches for distress beacons with the following modifications:

.1 Effective electronic search can be carried out under all weather conditions at normal cruise speed.

.2 Track spacing (S) should be 60 nautical miles (NM) at 6000 metres (20,000 feet) and 30 NM at 3000 metres (10,000 feet), with the S reduced by one half over mountainous terrain.

.3 The beacon's location and orientation on the ground can cause erroneous "on top" indications; caution should be used on all homing with a second procedure carried out if doubt exists.

5.01.9



Normally, a parallel sweep or creeping line should be employed for distress beacon searches. Maximum S should be used for the initial rapid sweep of the area, followed

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5.01 Search Patterns and Sweep Widths

by a further sweep of the area at right angles to the first, followed by a further sweep stepped over one-half the S, as shown in the figure above. In mountainous areas, the search should be arranged to cut the ridge lines at right angles if at all possible.

NOTE: For more information, refer to the *IAMSAR Manual, Volume II, section 5.6 – Electronic Search Patterns*.

5.01.10 The detection range of distress beacons varies and the search planner should attempt to determine the specific range of the equipment in question. The same may be true of the search unit capability. Dedicated search units will normally have published standard operating procedures regarding electronic track spacing and detection ranges to which the search planner may refer.

NOTE: Examples of these are shown in *section 4.04, paragraph 4.4.9 – VHF/UHF Theoretical Reception Ranges*.

5.01.11 **SART Searches –** Sweep width tables for search and rescue transponder (SART) detection have not been developed. Search planners should however be aware of the following data:

.1 The International Maritime Organization Specification for SART is detection at 5 NM with SART mount 1 metre above sea level. United States Coast Guard trials, when searching with large ships in various sea states were able to detect SARTs mounted at 1 metre above sea level at 6 to 7 NM. The same SART was detected by 360° airborne search radar mounted on a King Air at 18 NM.

.2 Canadian trials have recorded good detection at between 10 and 16 NM with the SART mounted on the bottom of the raft (the 10 NM result was achieved with the Labrador and Hercules, with the better results from the Aurora and Sea King).

.3 The detection range data available to the search planner may be reported as minimum, average or maximum detection ranges. The classification would be based on a series of ranges at which targets have been first detected. When such data is available, the following guidelines are recommended, in order of preference:

.a When minimum detection range is known,
W = 1.7 x the minimum detection range.

.b When average detection range is known,
W = 1.5 x the average detection range.

.c When maximum detection range is known,
W = the maximum detection range.

.d When no detection range is known,
W = 0.5 x the horizon range.

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5.02 Describing Search Areas

General

5.02.1 When the search area has been determined it will be necessary to define it to search facilities and others who may require the information. The total area will need to be divided in sub-areas for allocation to search facilities. The accurate definition of these areas is of the utmost importance to the search planner; the information will have to be recorded and may be referred to over a long period of time.

NOTE: Refer to the *IAMSAR Manual, Volume II, section 5.11 – Designation and description of search sub-areas*.

GEOREF Grid

5.02.2 The GEOREF latitude and longitude system of squares is the preferred reference method used on inland searches for missing aircraft in Canada, both for tasking and for reporting, and should be used during the intensive search phase. It is especially suitable for large-scale searches where a wide area can be covered without complication.

5.02.3 The GEOREF system is used with the National Topographical Series, Aeronautical Edition, scale 1:500 000. These maps are printed with each GEOREF grid square (1° of latitude by 1° of longitude) labelled with a two-letter code. Thirty-minute grid lines are also provided, subdividing each 1° x 1° area into four sub-areas. These are identified numerically from 1 to 4, with 1 being the Northwest corner, 2 the Northeast corner, 3 the Southwest corner and 4 the Southeast corner. These 30 minute by 30 minute squares are referred to as "primary squares" and can be further divided into "secondary squares". These secondary squares are labelled alphabetically from A to D in the same fashion as the primary squares. An example of an assigned sub-area might read as Map 42 NW, square CG4A.

NOTE: Refer to the figure on the next page.

5.02.4 An added advantage of this system is that the GEOREF overlay is printed not only on the 1:500 000 maps but on the 1:1 000 000 as well. Also, the legend on the 1:250 000 maps indicates a GEOREF grid that can be easily extrapolated onto the map.

Other Methods

5.02.5 The use of other methods may be more practical during the initial visual detection aids searches, when it is important to follow a priority sequence along the track. It should always be remembered that the method used should be simple, effective and easy to work with, not only for the search and rescue (SAR) mission coordinator, but for the other agencies involved with the operation.

5.02.6 Maritime SAR units will simply use latitude and longitude expressed by the convention degrees and decimal degrees.

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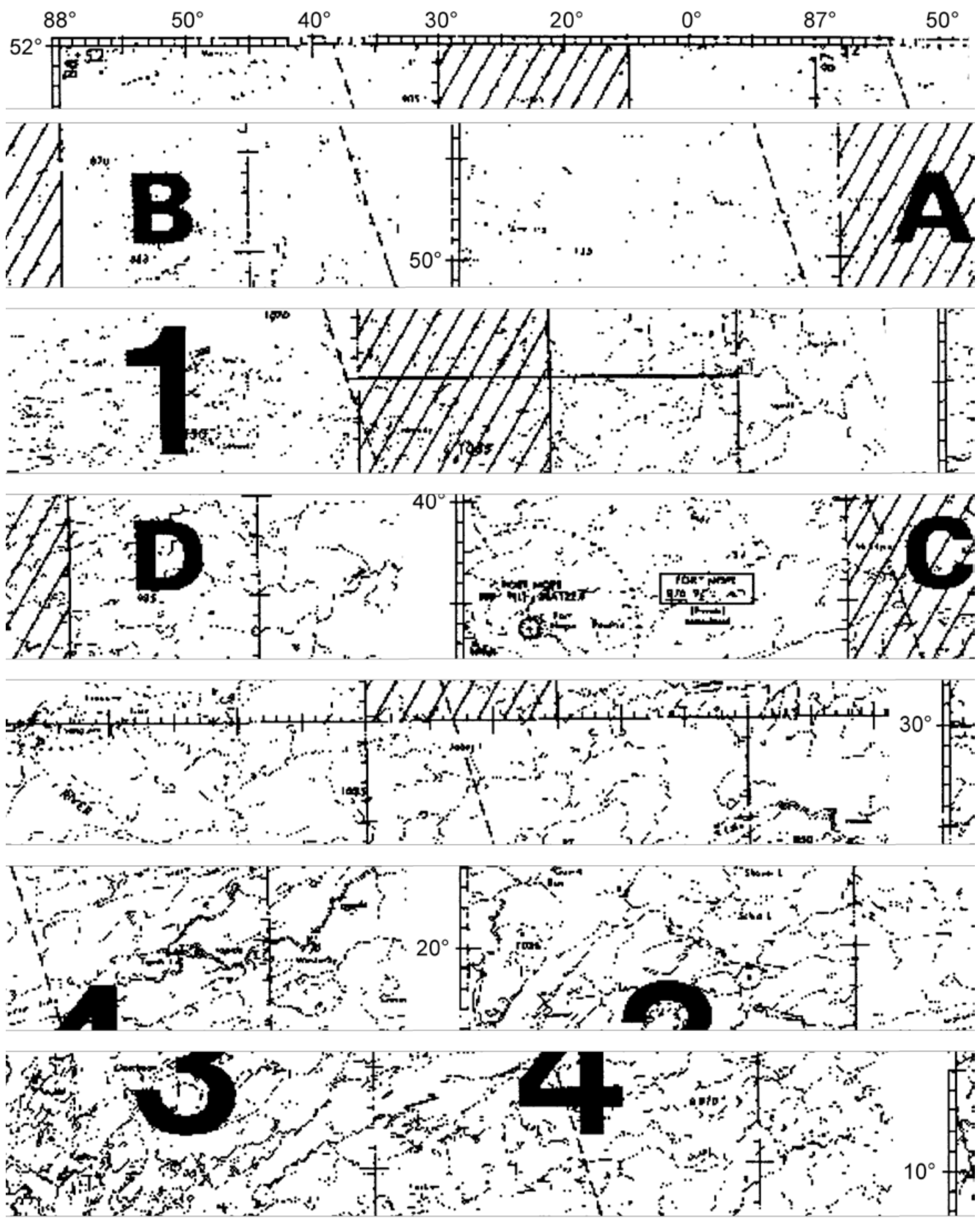
5.02 Describing Search Areas

GEOREF GRID



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6.01 Assistance to Aircraft

Intercept and Escort of Distressed Aircraft

NOTE: Refer to *section 7.01 – Intercept and Escort Services*.

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6.01 Assistance to Aircraft

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6.02 Assistance to Vessels

Assistance to Disabled Vessels

NOTE: Refer to *Annex 4 – Excerpts from the Canadian Coast Guard (CCG) Operational Procedures on Assistance to Disabled Vessels*.

Also of interest:

- *CAMSAR I, Annex 4 – Excerpts from the CCG Policy on Assistance to Disabled Vessels;* and
- *CAMSAR III, Annex 1 – Excerpts from the CCG Operational Procedures on Assistance to Disabled Vessels*.

6.02.1 The joint rescue coordination centre (JRCC)/maritime rescue sub-centre (MRSC) shall facilitate the provision of assistance to disabled vessels and if necessary, the participation of search and rescue (SAR) units (SRUs) of the Federal Government or its agents. An appropriate case classification shall be assigned to this activity. Available SRUs may, however, not be capable for such operations, so the JRCC/MRSC must consider their capabilities, the risks involved and the type of disabled vessel, with the tasking.

NOTE: No waiting period should delay the tasking of any mobile facility to any situation where there is an uncertainty as to the safety of persons at sea.

6.02.2 In response to disabled vessels in non-distress or non-potential distress situations, tasking for the provision of technical assistance by CCG SRUs remains a high priority for safety reasons, but may be considered a secondary priority to other CCG taskings (i.e., fisheries enforcement, pollution clean up, etc.). In consultation with the Commanding Officer and appropriate CCG regional operations centre (ROC), departure for the tasking may be reasonably delayed until such time that the SRU has completed the critical mission, or another SRU may be tasked as dictated by the circumstances of the incident. This same principle applies to other SRUs of the Federal Government or its agents.

6.02.3 SRUs of the Federal Government or its agents will not assist disabled vessels merely on request and will not compete with commercial or private interests to provide assistance. If a disabled vessel requesting assistance refuses commercial or private assistance when available, this shall be considered a cancellation of the initial request for assistance and the master of the disabled vessel is to be notified accordingly.

6.02.4 SRUs of the Federal Government or its agents will not be tasked nor provide a tow to disabled vessels for the sole purpose of getting from one place of refuge to another.

6.02.5 If a disabled vessel refuses to evacuate when the Commanding Officer of the mobile facility responding requires the personnel to evacuate, this shall be considered a cancellation of the initial request for assistance and the master of the disabled vessel is to be notified accordingly.

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6.02 Assistance to Vessels

6.02.6 To prevent more serious safety risks from developing, SRUs of the Federal Government or its agents may be tasked to provide assistance to vessels aground with people onboard only when such operations incur no further endangerment to lives or property and commercial assistance is not available or cannot be on scene in sufficient time.

6.02.7 **Salvage –** JRCC/MRSC SMCs shall not task SRUs of the Federal Government or its agents to engage in salvage operations for vessels with no persons on board. Requests for this type of assistance shall be forwarded to the appropriate CCG ROC.

NOTE: Refer to *section 7.04 – Protection of Property*;

Assistance to Disoriented Vessels

6.02.8 When the JRCC/MRSC maritime SAR coordinator is advised of a disoriented vessel, he/she shall evaluate the degree of emergency and take such action, as deemed appropriate under the circumstances, such as:

.1 Attempt to locate the disorientated vessel by using any available communication network or information source, such as Marine Communications and Traffic Services centres.

.2 Task available SRUs to locate the disoriented vessel and either escort the vessel to safety or provide guidance so that it can proceed safely.

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6.03 Underwater SAR

NOTE: Refer to the *IAMSAR Manual, Volume II, section 6.14 – Underwater Search and Rescue*.

General

6.03.1 Suspension or continuation of a search may depend on underwater detection and recovery measures to locate a missing aircraft or vessel, to establish the fate of its occupants. However, if identification of floating wreckage or an accumulation of evidence, clearly establishing the fate of the aircraft or vessel and its occupants, is possible without recourse to underwater search, then there is no responsibility for the search and rescue (SAR) system to coordinate or participate in underwater detection or recovery action.

6.03.2 Assistance may be rendered when requested by a competent provincial or federal authority; however, nothing in this manual should be construed as committing the SAR system to undertake or to continue underwater search when such action is considered by the SAR Region (SRR) Commander to be impractical.

Diving Operations

6.03.3 When required, the SAR Mission Coordinator (SMC)/Searchmaster (SM) may coordinate diving operations using units of the Canadian Armed Forces, Canadian Coast Guard (CCG), Royal Canadian Mounted Police, or of any provincial or federal agency that is prepared to assist and can provide suitable equipment and qualified personnel.

6.03.4 The CAF and the CCG have specific diving procedures:

.1 The CAF SAR Technician diving procedures are contained in the B-GG-380 *Canadian Forces Diving Manual, Guidelines for Survivor Extraction from Overturned Vessels,* B-GA-002-146/FP-001 Standard Manoeuvre Manual (SMM) CH146, the SMM 60-149 *and in 1 Canadian Air Division Orders FOM.*

.2 CCG diving procedures are contained in the *Fleet Safety and Security Manual*.

6.03.5 Should the use of CAF units and capability be required, direct communications should be effected with the Joint Task Force (Atlantic) (JTF[A]) or the Joint Task Force (Pacific) (JTF[P]) Headquarters, as appropriate. Commercial facilities may be engaged on authority of the SRR Commander if suitable government facilities are not available and underwater investigation is deemed necessary to the expeditious conduct of the search.

6.03.6 The decision to continue an underwater search will be as a result of consultation between the SMC/SM, the joint rescue coordination centre (JRCC)/maritime rescue sub-centre (MRSC) and the appropriate diving advisor/supervisor.

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6.03 Underwater SAR

6.03.7 Despite the above considerations, it is provincial authorities that have jurisdiction in the matter of drowned persons. Therefore, any participation in recovery must be with the cognizance and consent of the provincial authorities concerned.

Submarine SAR (SUBSAR)

6.03.8 Military Submarines – The overall responsibility for SAR in the event of a lost Canadian submarine remains with the SRR Commander. The formulation of plans for a missing or sunk military submarine (SUBMISS/SUBSUNK) is the function of the Commander (Comd), JTF(A), or JTF(P). The control of SAR operations in a missing or sunk military submarine (SUBMISS/SUBSUNK) operation is the function of the Maritime Component Commander. In the event of a lost United States (US) Navy submarine, the responsibility for overall coordination of SAR activities rests with the US Navy submarine operating authority.

6.03.9 Detailed instructions covering submarine disaster SAR operations are contained in the North Atlantic Treaty Organization publication *ATP-10(D)*, and operational orders issued by the Comd JTF(A) and Comd JTF(P).

6.03.10 Civilian Submersibles – A rescue operation where the vehicle in distress is a submersible will require specialized equipment and personnel who are familiar with the lay out and operation of submersibles and rescue equipment. The role of the SAR organization will be to assist the rescue efforts to save the lives of persons involved. The JRCC/MRSC shall coordinate such action.

6.03.11 Each JRCC/MRSC shall maintain a contact list, which will enable appropriate response to be carried out immediately upon receiving information of a submersible in distress.

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6.04 Rescue / Crash Sites

Restricting Airspace Access

6.04.1 In the event that press or private aircraft are interfering with rescue operations or jeopardizing flight safety, the rescue airspace can be immediately restricted to search and rescue (SAR) operations by advising the Transport Canada (TC) Civil Aviation Contingency Operations Division at the following 24/7 emergency number:

1-877-992-6853 (toll free)

Securing a Crash Site

6.04.2 When the subject of an aeronautical search has been found, the SAR Mission Coordinator (SMC) shall inform the appropriate Transport Safety Board (TSB) regional office and confirm the requirements for preserving the wreckage pending the arrival of the accident investigation team.

6.04.3 The SMC shall ensure that, when necessary, the integrity of the crash site is maintained until civil authorities arrive. This is done to preserve the wreckage or any marks made by the aircraft in landing. The aircraft wreckage should not be disturbed except to assist in the recovery of survivors.

Transporting the Bodies / Coroner / TSB Representatives

6.04.4 During a SAR operation, authority to transport the coroner, the coroner's representatives, or local authorities to a crash site is vested in the SMC.

NOTE: Hoisting of the coroner, the coroner's representatives, local authorities, or representatives of the TSB is NOT authorized.

6.04.5 Bodies can be removed once approved by the coroner.

Marking the Wreckage

6.04.6 The Canadian Armed Forces will be responsible for the marking of the wreckage of military aircraft that have not been removed from a crash site.

6.04.7 TC will be responsible for marking the wreckage of civilian aircraft.

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6.04 Rescue/Crash Sites

6.04.8 Military aircraft wreckage will be marked by metal plaques manufactured locally by the SAR squadrons. The plaques are to be screwed or bolted firmly to the wreckage or a nearby tree, and will bear the words:

THIS CRASH HAS BEEN REPORTED CET ÉCRASEMENT A ÉTÉ SIGNALÉ

6.04.9 If the wreckage was not marked during either the SAR operations or the investigation phase, the plaques may be placed during ground party or SAR Technicians jump-training exercises. Priority should be given to marking wreckage likely to be encountered by hunters or prospectors.

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Chapter 7 EMERGENCY ASSISTANCE OTHER THAN SAR

7.01 Intercept and Escort Services

NOTE: Intercept and escort procedures for both aircraft and vessels are explained in the *IAMSAR Manual, Volume II, section 7.2 – Intercept and Escort Services* and *Appendix J – Intercepts*.

Intercept and Escort of Distressed Aircraft

7.01.1 Intercept and escort services will be provided for aircraft in distress, as required, in areas of Canadian search and rescue (SAR) responsibility. If primary SAR aircraft are unable to provide this service owing to unavailability or limitations in operational capability—lack of necessary range or speed—the SAR Region Commander is empowered to direct any Canadian Armed Forces aircraft operating within his area to perform the task, providing it possesses the necessary capability.

7.01.2 When an aircraft is required to provide intercept and escort service, the captain will be provided with as much of the following information as possible:

.1 the distressed aircraft's identification;

.2 its last known position (LKP), with amplification as to the type of navigation aids used, i.e. GPS, VOR,TACAN, Celestial, Inertial, or estimated;

.3 the time of the LKP;

.4 the aircraft's altitude and whether or not it is descending or climbing;

.5 its true course;

.6 its ground speed;

.7 its true air speed; and

.8 a brief description of the emergency.

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7.01 Intercept and Escort Services

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7.02 Nuclear Emergencies

7.02.1 Joint rescue coordination centres will action nuclear emergency responses in accordance with the instructions contained in *the Federal Nuclear Emergency Response Plan.*

7.02.2 Nuclear emergencies may range from incidents involving military nuclear weapons or civilian reactors to incidents involving civilian aircraft or vessels carrying industrial or medical isotopes.

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7.02 Nuclear Emergencies

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7.03 Piracy

Aircraft

7.03.1 When a joint rescue coordination centre (JRCC) is advised by any source of an actual or suspected hijacking, they shall immediately notify Canadian Joint Operations Command and the 1 Canadian Air Division Combined Air Operations Centre (CAOC), Air Traffic Control, the other JRCCs, and the Royal Canadian Mounted Police, as appropriate. The JRCC within whose boundaries the incident exists shall declare an alert phase. The JRCC shall maintain communications with the alerting agency and AOC and provide the latter with expert advice and recommendations pertaining to the search and rescue (SAR) response.

Vessels

7.03.2 When a JRCC/maritime rescue sub-centre (MRSC) is notified by any source of an actual or suspected act of piracy; they shall immediately notify the Regional Supervisor, Maritime SAR; the Director of CCG Programs (or designate) and the Maritime Security Operations Centre. The JRCC/MRSC within whose boundaries the incident exists shall declare an alert phase.

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Chapter 7 EMERGENCY ASSISTANCE OTHER THAN SAR

7.04 Protection of Property

Salvage

7.04.1 Salvage assistance is the provision of aid for the protection or saving of property such as dewatering, provision of critical supplies, refloating of vessels and the recovery of aircraft, to name a few examples.

NOTE: For the assistance to vessels other than salvage, refer to *section 6.02 – Assistance to Vessels*.

7.04.2 Canadian Armed Forces (CAF) and Canadian Coast Guard (CCG) search and rescue (SAR) units (SRUs) shall not undertake salvage unless it is instrumental to the saving of life or it will avoid undue physical hardship, or it will alleviate an imminent risk of pollution.

7.04.3 However, in support of the national SAR objective, CAF and CCG SRUs may, in exceptional circumstances, be tasked to provide salvage assistance to civilian aircraft or vessels, providing no commercial means are available and appropriate approval has been obtained by the requesting persons or agencies.

NOTE: Salvage operations will NOT be performed if they jeopardize operations, disrupt training, or unduly hazard SAR personnel or equipment.

NOTE: Refer to *Annex 4 – Excerpts from the CCG Operational Procedures on Assistance to Disabled Vessels*; and to *section 1.01, paragraphs 1.01.3 to 1.01.5 – Tasking of SRUs*.

Use of Aeronautical SRUs

7.04.4 When a request is made to use aeronautical SRUs for the salvage of civilian aircraft, full details of the commitment shall be obtained and its feasibility assessed by the 1 Canadian Air Division, in conjunction with the applicable joint rescue coordination centre (JRCC).

Use of Maritime SRUs

7.04.5 When a request is made to use maritime SRUs for the salvage of maritime property, full details of the commitment shall be obtained and its feasibility assessed by the applicable CCG Regional Operations Centre. The Regional Supervisor, Maritime SAR, of the appropriate JRCC or maritime rescue sub-centre must approve any such tasking of primary maritime SRUs.

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8.01 Reduction of Search Operations

Search for Survivors

8.01.1 The Canadian search and rescue (SAR) System is responsible to search for survivors of SAR incidents. Not locating a survivor at the scene when an aircraft or vessel is found does not alter this obligation. A search will continue until the SAR Mission Coordinator (SMC) determines that there is no longer a reasonable expectation of survivability, that every reasonable effort has been expended and that all leads have been exhausted.

Successful Searches

8.01.2 When search efforts indicate that danger no longer exists, e.g., the communication search was successful and no problem exists, or the object and/or the survivors have been located and rescued, and all SAR facilities are accounted for, the joint rescue coordination centre (JRCC)/maritime rescue sub-centre shall close the incident and immediately inform the operating agency and any centre, service or facility that has been alerted or activated.

Unsuccessful Searches

8.01.3 When it has been determined that further search would be to no avail because the area has been adequately searched and all probability areas investigated, or because there is no longer any probability of survival, or for other pertinent reasons, a search reduction should be recommended. Next-of-kin (NOK) should be made aware that search reduction is being sought.

NOTE:	In the case of maritime incidents, such recommendation shall be made under the advice of the Regional Supervisor, Maritime SAR.

8.01.4 **Major SAR Operations –** The authority to reduce a major SAR operation is the SAR Region (SRR) Commander *(Canada Command Letter 3385-1 [J3SAR] 23 Mar 2009)*.

NOTE:	Requests for a major maritime search reduction shall be evaluated in consultation with Canadian Coast Guard (CCG) Headquarters (HQ) SAR staff.

8.01.5 Approval for the reduction of a major SAR operation should be obtained by submitting a *Request for Search Reduction* message at least one working day prior to the proposed reduction, to ensure adequate time for the SRR Commander to action the request. The message must summarize search activities, outline the reasons for recommending search reduction, and resolve any apparent anomalies. The SRR Commander must also be advised of any factor which might provoke controversy. The reduction request should be based on the completion of a specified search plan as detailed in the message.

Chapter 8 CONCLUSION OF SAR OPERATIONS

8.01 Reduction of Search Operations

NOTE: Refer to *Appendix B.06 – Request for Search Reduction* for the format, priority and classification of the message.

8.01.6 SMCs shall ensure that situation reports are completed in sufficient detail to substantiate the reduction request. A delay in reduction after all reasonable steps have been taken would likely result in a needless waste of SAR resources. It is therefore important that the SRR Commander and CCG HQ staff officers have full and accurate supporting data when presented with the search reduction request.

8.01.7 Authorization for reduction shall not prevent the SMC from prolonging the search, should a change in circumstances so demand. In this case, the SRR Commander shall be advised as soon as it is practicable. For cases involving maritime units, the Director Operational Support, CCG HQ, shall also be advised if the National Incident Notification Procedure (NINP) has not been initiated.

8.01.8 **Minor SAR Operations –** Minor SAR operations are those that do not meet the major SAR operations criteria. Minor searches may be reduced by the Officer in Charge of the JRCC on the authority of the SRR Commander.

Transferring Responsibility to Civilian Authorities

8.01.9 In order to conclude a search reduction, responsibility of the case must be accepted by the appropriate civilian authorities. Details of the transfer must be properly documented in accordance with established procedures.

NOTE: Refer to *section 2.04, paragraph 2.04.17 – Transferring control of an incident*.

Notification of NOK

8.01.10 When approval of a search reduction has been obtained, the NOK, if known, shall be advised immediately and the circumstances explained fully. This shall include a frank explanation that the SMC is convinced that there is no longer any hope of finding survivors in the search area, that every reasonable effort has been expended and that all leads have been exhausted.

8.01.11 The NOK shall be informed that although the incident will remain open, further search activity is not planned unless new evidence indicates a strong likelihood of locating survivors. The SMC shall state that aircraft/vessels in the area will be asked to keep a lookout, but that, while it may be possible to hold a SAR exercise in the search area at some future date, there will be no further formal search activity.

8.01.12 In particular, NOK shall not be left with any perception that search activity might resume because of climate changes such as melting snow, changes in foliage or changes in sea-ice conditions.

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8.01 Reduction of Search Operations

Informing the Public

8.01.13 After notification of NOK, the following information may be passed to news media and as required, members of the public:

.1 The full scale search for the (type of aircraft/vessel) missing in (area) since (date) has been reduced.

.2 A total of (number) government and civilian aircraft/vessels have flown/steamed (number) hours and covered (number) square kilometres.

.3 The aircraft/vessel was owned by (name) and was (describe mission) at the time of its loss. Aboard were (names and hometowns of persons on board).

.4 The aircraft/vessel was/was not equipped with an electronic locating device and survival gear (if applicable).

.5 Further search activity is not planned unless new evidence indicates a strong likelihood of locating survivors.

NOTE: Also refer to *section 1.06 – Public Relations*.

Chapter 8 CONCLUSION OF SAR OPERATIONS

8.01 Reduction of Search Operations

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Chapter 8 CONCLUSION OF SAR OPERATIONS

8.02 Reopening of Searches

New Evidence

8.02.1 Searches may be reopened on the authority of the Search and Rescue Region Commander when new evidence indicates a strong likelihood of locating survivors. Changes in climate conditions, which might make wreckage more visible at a later date, would not constitute grounds for reopening a general search since, if there was any hope of discovering survivors, the search would not have been reduced.

Other Situations

8.02.2 Requests for reopening searches which do not meet the criteria of the previous paragraph are to be referred to the Commander, Canadian Joint Operations Command.

SITREPs

8.02.3 When searches are reopened, normal daily situation reports (SITREPs) shall recommence.

Chapter 8 CONCLUSION OF SAR OPERATIONS

8.02 Reopening of Searches

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Chapter 8 CONCLUSION OF SAR OPERATIONS

8.03 Classification of SAR Cases

General

8.03.1 Records of search and rescue (SAR) incidents are an important instrument in the management of the Canadian SAR system. All joint rescue coordination centres and maritime rescue sub-centres shall use the same guidelines for reporting SAR incidents and classifying SAR cases.

NOTE:	Classification of SAR cases is based on a post-case dispassionate assessment of what actually occurred, not on the perceived level of distress during the case.

Definitions

NOTE:	The following definitions are for Canadian use and may differ from those of the *IAMSAR Manual* for their corresponding terms.

8.03.2 **SAR Incident** – A reported situation which has the potential to require a response from the SAR System. There are four types of SAR incidents:

.1 **Aeronautical –** A SAR incident involving an aircraft.

.2 **Maritime –** A SAR incident on the water involving a vessel or person(s) from a vessel, including the medical evacuation (MEDEVAC) of person(s) from a vessel.

.3 **Humanitarian –** A SAR incident not otherwise classified as an aeronautical or maritime incident.

.4 **Unknown –** A SAR incident of unknown origin, its source remaining untraced at the conclusion of the incident.

8.03.3 **SAR Case** – A SAR incident becomes a SAR case when the SAR system responds, would have responded had it been alerted at the time of the incident or when a documentary file is opened whether or not SAR services are dispatched.

8.03.4 **SAR System** – The coordinated SAR system is the combined facilities, equipment and procedures established in each SAR Region to provide the response to SAR incidents.

8.03.5 **SAR Response** - A SAR response is defined as the actions required from the SAR system to resolve a situation. These may include:

.1 Tasking SAR services. SAR services typically result from notification to the SAR system of a potential or actual distress situation.

Chapter 8 CONCLUSION OF SAR OPERATIONS

8.03 Classification of SAR Cases

.2 Issuing an "All Stations" broadcast (e.g., distress, urgency, missing aircraft notice, maritime assistance request, etc.).

.3 Monitoring, when situation dictates, for one half hour of working time.

.4 Investigating, for one half hour working time, to determine if a SAR incident is occurring.

.5 Investigating an official aeronautical or maritime distress alert, as defined under regulations, regardless of the amount of working time.

.6 Performing other actions as defined in this manual.

SAR Case Identification

8.03.6 For the purpose of reporting and statistical data, SAR cases are to be assigned a SAR case number and a name.

8.03.7 The SAR case name should refer to the "what and where", not the "who".

NOTE:	The name of a SAR case should not normally include the personal names of any victim nor enable their improper disclosure; for this reason, the call sign or the name of a craft in distress is not recommended and should in no case be released to the media or the public.

SAR Case Categories

8.03.8 SAR cases are classified in accordance with the categories described next.

NOTE:	Cases involving divers or swimmers are classified as humanitarian, as the case category is not determined by the vehicle or platform from which they entered the water; that information will however be recorded in the case file.

Chapter 8 CONCLUSION OF SAR OPERATIONS

8.03 Classification of SAR Cases

.1	**AERONAUTICAL**
Category	Definition
A1	**Distress –** A person or persons (in relation to an aircraft) are threatened by grave and imminent danger and require immediate assistance.
A1P	**Distress Reported After the Fact –** An A1 case that has been resolved but would have required a response had the SAR system been alerted at the time of the case.
A2	**Potential Distress –** The potential exists for an A1 case if timely action is not taken; i.e., an immediate response is required to stabilize an aeronautical situation in order to prevent distress.
A3	An aeronautical situation other than an A1 or A2 case, where assistance is rendered to prevent case degradation to greater potential danger.
A4	A known aeronautical related false alarm or hoax.
A5	An aeronautical case that is subsequently determined to be outside of the Canadian AOR and successfully transferred to a responsible agency; there has been no involvement by Canadian SAR units (SRUs) and information on the SAR operation may be limited.

.2	**MARITIME**
Category	Definition
M1	**Distress –** A person or persons from a vessel are threatened by grave and imminent danger and require immediate assistance.
M1P	**Distress Reported After the Fact –** An M1 case that has been resolved but would have required a response had the SAR system been alerted at the time of the case.
M2	**Potential Distress –** The potential exists for an M1 case if timely action is not taken; i.e., immediate response is required to stabilize a situation in order to prevent distress.
M3	A maritime situation other than an M1 or M2 case, where assistance is rendered to prevent case degradation to greater potential danger.
M4	A known maritime related false alarm or hoax.
M5	A maritime case that is subsequently determined to be outside of the Canadian AOR and successfully transferred to a responsible agency; there has been no involvement by Canadian SRUs and information on the SAR operation may be limited.
NOTE:	Maritime MEDEVACS should normally be classified in category 1 or 2.

Chapter 8 CONCLUSION OF SAR OPERATIONS

8.03 Classification of SAR Cases

.3	**HUMANITARIAN**
Category	Definition
H1	**Distress –** A person or persons are threatened by grave or imminent danger (not maritime or aeronautical related) and require immediate assistance.
H2	**Potential Distress –** The potential exists for an H1 case if timely action is not taken; i.e., immediate response is required to stabilize a situation in order to prevent distress.
H3	A humanitarian situation other than an H1 or H2 case, where assistance is rendered to prevent case degradation to greater potential danger.
H4	A known humanitarian related false alarm or hoax.
H5	A humanitarian case that is subsequently determined to be outside of the Canadian AOR and successfully transferred to a responsible agency; there has been no involvement by Canadian SRUs and information on the SAR operation may be limited.
NOTE:	Normally, a case number will only by assigned to a humanitarian case when the Federal SAR system is used.

.4	**UNKNOWN**
Category	Definition
U	A case of unknown origin, such as: • A distress beacon false alert, the signal being interrupted before it could be located. • An alert for a visual distress signal whose origin remains unknown after a search or investigation.

Chapter 8 CONCLUSION OF SAR OPERATIONS

8.04 Reports and Returns

General

8.04.1 Accurate reports and returns are essential for the effective control of search and rescue (SAR) aircraft, vessels, and personnel. They are also needed for the compilation of data and statistics required to indicate or support organizational changes and equipment requirements, and to facilitate planning. Analysis of actions conducted during SAR operations provides the basis to change regulations, policy, standards, guidelines and international practices.

NOTE: The joint rescue coordination centre (JRCC)/maritime rescue sub-centre (MRSC) SAR *Reports and Returns* formats have been grouped together at the end of this volume, in *Appendix B*.

SAR Operation Reports

8.04.2 SAR operation reports are compiled for the purpose of improving the SAR System and safety procedures. They are required for Major SAR Operations, or as directed by higher headquarters through the SAR Region (SRR) Commander, in order to make recommendations or comments on the command, control, and/or coordination aspects of the incident.

8.04.3 SAR operation reports shall contain the pertinent details of an incident for the information of participating SAR agencies, other agencies, the owners and/or operating agencies of the aircraft or vessel. It is necessary to detail sufficient information to allow others to infer the rationale for the more important decisions and actions taken during the search. This information should include weather and SAR facilities considerations, the impact of sighting reports, the effectiveness of search facilities and patterns, and any other factors that aided or interfered with the progress of the search. Recommendations that are supported by fact and offer insight into ways of avoiding similar accidents or improving the SAR response to these accidents are useful to SAR and safety officials and should be included.

NOTE: For the format and distribution, refer to *Appendix B.07 – SAR Operation Report*.

8.04.4 The JRCC/MRSC or SAR Mission Coordinator (SMC) shall produce the *SAR Operation Report* as soon as possible after completion of the incident (normally within 30 days). For maritime incidents, the Officer in Charge (OIC) of the JRCC and the Regional Supervisor, Maritime SAR, shall co-sign the report. SAR operation reports from MRSCs or deployed SMCs shall be forwarded to the OIC of the parent JRCC for approval and onward transmission.

8.04.5 The SRR Commander, or a delegated senior officer, shall review the report and indicate on the report those items which will be actioned by the SRR Commander and those on which other comment or action is desired.

Chapter 8 CONCLUSION OF SAR OPERATIONS

8.04 Reports and Returns

Unnecessary SAR Alerts / Hoaxes Reports

8.04.6 Unnecessary SAR alerts (UNSAR) and hoaxes are serious drains on SAR resources. UNSAR's can be intentional or unintentional; the circumstances will be recorded and as appropriate, reported to the appropriate authorities for follow-up action. Maintaining a record of these alerts will aid in proposed changes to regulations and SAR responses in the future. Those found to be malicious will also be referred to local authorities.

8.04.7 **UNSAR Message –** An *UNSAR message* is to be sent by the OIC JRCC when the SAR system is unnecessarily activated in a maritime or aeronautical case. Only UNSAR's where the type and identity of the search object is known require an UNSAR message. Examples would be unauthorized diversions from or failing to file or close flight/float plans, or the inadvertent or illegal use of distress beacons.

NOTE: The UNSAR message format is shown at *Appendix B.04 – UNSAR Message*.

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Appendix A Broadcast Messages

NOTE: *SAR tasking and briefing forms* may be obtained from the SAR Mission Management System (SMMS) and are also available in *CAMSAR III, Appendices*.

A.01 INITIAL MISSING AIRCRAFT NOTICE (MANOT)

Distribution List

TO: CMCC; All FSSs and ACCs as appropriate.

INFO: CJOC// CFICC/J3 SAR; 1 Cdn Air Div//SSO SAR; All JRCCs and MRSCs as appropriate; CFIOG HQ *(if aircraft as HF)*; TC Aviation//AAB/AANDO; TSB Ottawa//DIA; any other, as appropriate.

Required Information

NAME OF SAR OPERATION

A. MANOT NUMBER__________– SAR OPERATION________________________– INITIAL –
(aircraft registration)
JRCC _______________________

B. Registration – Type of aircraft – Colour ____

C. Number of crew and passengers ____

D. Route ____

E. Departure (local time) ____

F. Last known position and date (local time) ____

G. Fuel exhaust time ____

H. Type and frequency of emergency locator transmitter ______________________________

I. REQUEST FSS AT ___
AND ATC AT _______
REVIEW VOICE AND RADAR TAPES IN ____
____AREA
FOR PERIOD____________________________UTC TO____________________________UTC.

Appendix A Broadcast Messages

A.02	FINAL MANOT

Distribution List

TO: CMCC; All FSSs and ACCs as appropriate.

INFO: CJOC// CFICC/J3 SAR; 1 Cdn Air Div//SSO SAR; All JRCCs and MRSCs as appropriate; CFIOG HQ *(if aircraft as HF)*; TC Aviation//AAB/AANDO; TSB Ottawa//DIA; any other, as appropriate.

Required Information

NAME OF SAR OPERATION

A. MANOT NUMBER__________– SAR OPERATION________________________– FINAL –
(aircraft registration)
JRCC ______________________

B. SEARCH SUSPENDED AS OF___________________(local time)
(date/time)

C. Success of mission ____

____

____

D. Remarks ____

____

____

____

____

If located, indicate method and by whom and give other pertinent info that may be of general interest.

If not located, recommend continued watch by overflights, and include route and description of missing aircraft.

Appendix A Broadcast Messages

A.03	MARITIME SAFETY INFORMATION (MSI) BROADCAST

Distribution List

TO: All MCTS centres, as appropriate ____________________

____

____

Required Information

Date/Time____________________UTC

SAR ____________________
(name and case number)

Message: ____________
(number)

The following SAR message is to be issued upon receipt and repeated, in accordance with MCTS standard procedures, until cancelled.

INSTRUCTIONS: *(consult MCTS Officer to ensure most effective broadcast)*

Mode(s): *(circle)*

VHF-DSC	HF-DSC	MF-DSC	NAVTEX
VHF-RT	HF-RT	MF-RT	SafetyNET
VHF-CMB			

Priority and Prefix: *(circle)*

Distress “Mayday Relay”

Urgency “PanPan”

Safety “Sécurité”

Routine

(continued on next page)

Appendix A Broadcast Messages

MSI BROADCAST (continued from previous page)

DSC Parameters (if required): *(circle)*

No Geographical Area Defined

Rectangle Geographical Area ______________________________

____

NW Corner Point *(lat/long)* ______________________________

Side Length__________________degrees

Top Length__________________degrees

SafetyNET Parameters (if required): *(circle)*

The broadcast shall be sent via all Inmarsat satellites appropriate for the area.

Circular Geographical Area _____

Centre *(lat/long)* ______________________________

Radius__________________nautical miles

Rectangular Geographical Area ______________________________

____

SW Corner Point *(lat/long)* ______________________________

Side Length__________________degrees

Top Length__________________degrees

TEXT ______________________________

____

____

____

____

____

____

Contact the nearest MCTS Centre or JRCC/MRSC _

____

at *(coordinates)* ______________________________

____

Appendix A Broadcast Messages

A.04	MSI BROADCAST CANCELLATION

Distribution List

TO: All MCTS centres, as appropriate ______________________________

____

Required Information

Date/Time______________________UTC

SAR ______________________________
(name and case number)

Message: ____________
(number)

The MSI broadcast message issued at date/time________________UTC
is to be cancelled.

REASON FOR CANCELLATION:

____

____

____

____

____

____

____

____

Appendix A Broadcast Messages

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Appendix B Reports and Returns

B.01 INITIAL JRCC SAR SITREP

Distribution List

TO: Canadian Joint Operations Command/CFICC; 1 Cdn Air Div; CCG HQ; CMCC; TC Operations Centre; TSB Ottawa.

INFO: All JRCCs and MRSCs; appropriate CAF Regional JTF; CAF Public Affairs; CCG ROC of applicable Region; NSS; others, as appropriate.

Required Information

NAME OF SAR OPERATION

A. Number and type of SITREP

B. Alerting agency or individual and date/time group in UTC (local time group in brackets) when the JRCC was alerted

C. Type of distress and reason for declaring distress

D. Flight Plan or Float Plan of craft in distress. Include following information:
- Call sign and type of aircraft or vessel
- Number of POB
- Owner
- Colour
- Electronic equipment carried
- Distress beacon on board? If yes, indicate type

E. LKP of craft

F. Weather along route including LKP

G. Weather at destination or possible alternates

H. Name of SMC/SM and location of search HQ

J. Remarks to include action since receiving alert (to include tasking times and SRU departure times)

K. Future plans

NOTE: If the requested information is not available at time of origin of the initial SITREP, it is to be forwarded at the earliest possible date and indicated as an addendum to the initial SITREP.

Appendix B Reports and Returns

B.02	DAILY JRCC SAR SITREP (SITREP TWO, ETC.)

Distribution List

TO: Canadian Joint Operations Command/CFICC; 1 Cdn Air Div; CCG HQ; CMCC; TC Operations Centre; TSB Ottawa.

INFO: All JRCCs and MRSCs; appropriate CAF Regional JTF; CAF Public Affairs; CCG ROC of applicable Region; NSS; others, as appropriate.

Required Information

NAME OF SAR OPERATION

A. Progress SITREP numbered consecutively starting with TWO

B. Period covered

C. Record for this period of: Squadrons and SRU employed on search, with times for each SRU broken down into search, transit, and total hours

D. Complete search, transit, and total times this period and totals to date

E. Total square miles this period; total square miles to date

F. Search areas covered this period; type of search, effectiveness

G. Weather conditions at search areas and bases

H. Details of search not indicated above to include major instances and possible leads

J. Proposed operations for the next 24 hours

Appendix B Reports and Returns

B.03	FINAL JRCC SAR SITREP

Distribution List

TO: Canadian Joint Operations Command/CFICC; 1 Cdn Air Div; CCG HQ; CMCC; TC Operations Centre; TSB Ottawa.

INFO: All JRCCs and MRSCs; appropriate CAF Regional JTF; CAF Public Affairs; CCG ROC of applicable Region; NSS; others, as appropriate.

Required Information

NAME OF SAR OPERATION

A. SITREP____________AND FINAL
(number)

B. Authority for termination/reduction (may be the SRR commander or NDHQ message with date/time group)

C. General areas covered during entire search indicating specific altitude and visibility distances

D. Record for the entire search of Squadrons and SRUs employed on search, with times for each SRU broken down into search, transit, and total hours

E. REMARKS: Including type of SAR Operation Report to be filed, crash/wreck location, and briefly covering the “who, what, when, where and how”

Appendix B Reports and Returns

B.04 UNSAR MESSAGE

Distribution List

TO: *(for aeronautical cases only)* Transport Canada//AAB/AANDO//

TO: *(for maritime cases only)* Transport Canada Ottawa//AARBI/AARQ// and the appropriate Regional Director Marine Safety as follows:

- Atlantic Region – Dartmouth *(or)*
- Quebec Region – Quebec *(or)*
- Ontario Region – Sarnia *(or)*
- Prairies and Northern Region – Ottawa *(or)*
- Pacific Region – Vancouver

INFO: Canadian Joint Operations Command/CFICC; CCG HQ *(for maritime cases and aeronautical cases using maritime facilities only)*; CMCC; NSS.

Required Information

UNNECESSARY SAR ALERT NUMBER _____

A. Date/time of incident

B. Type and identity of search object

C. Owner and/or operator.

D. Flight/float plan or location.

E. Communications equipment on board or at destination

F. SAR action required; number of hours flown or steamed

G. Reason for alert (for distress beacon cases, include: type, model, switch position, time since last sortie, and reason for activation)

Appendix B Reports and Returns

B.05	DAILY SAR SUMMARY

Distribution List

TO: AIG 2645

Required Information

DAILY SAR SUMMARY FOR________________________________SRR

FOR PERIOD__________________00:00:00 UTC TO___________________23:59:59 UTC.
(date) *(date)*

A. INCIDENT SUMMARY	DAY	MONTH	YEAR
1. CATEGORY 1	______	______	______
2. CATEGORY 2	______	______	______
3. CATEGORY 3	______	______	______
4. CATEGORY 4	______	______	______
5. CATEGORY 5	______	______	______
6. TOTAL INCIDENTS	______	______	______
7. PREVIOUSLY UNREPORTED	______	______	______

B. INCIDENT TYPE	DAY	MONTH	YEAR
1. AERONAUTICAL	______	______	______
2. MARITIME	______	______	______
3. HUMANITARIAN	______	______	______
4. UNKNOWN	______	______	______
5. OUTSIDE CANADIAN AOR	______	______	______

C. SRU UTILIZATION *[refer to NOTES]*	DAY	MONTH	YEAR
1. CAF	______	______	______
2. CCG	______	______	______
3. OTHER FEDERAL	______	______	______
4. CASARA	______	______	______
5. CCGA	______	______	______
6. CHARTER	______	______	______
7. OTHER	______	______	______

(continued on next page)

Appendix B Reports and Returns

DAILY SAR SUMMARY (continued from previous page)

D. DISTRESS BEACON RELATED INCIDENTS	DAY	MONTH	YEAR
1. CATEGORY 1	______	______	______
2. CATEGORIES 2/3/4	______	______	______
3. UNRESOLVED	______	______	______

E. State cases in progress, providing a brief description of the case, actions taken and SRUs employed.

F. For category 1 and 2 cases: give a short narrative containing the SAR case number, classification, date–time group when the JRCC/MRSC was alerted, and a brief description of actions taken, SRUs employed and case conclusion. Include the location, POBs, survivor condition, which SRU resolved the case, the position of the rescue if different from the case location and on-scene weather. Also include any other incident where CAF SRUs were employed.

G. REMARKS: include late departure reasons, oil rig positions, aircraft that remain off base overnight, and any other terms of interest not associated with a specific case.

NOTES:

1. SRU utilization means the number of times a specific SRU was used for a specific case, i.e.:

- ◇ Three sorties of same SRU on same case counts as one use.
- ◇ Three cases completed during one sortie by one SRU counts as three uses.
- ◇ Three SRUs on one case counts as three uses.
- ◇ CAF SRUs detached with a Search HQ in your Region are to be included.
- ◇ CASARA spotters on one CAF aircraft count as one CASARA use.

2. This is a daily summary of SRUs used. If the sortie of an SRU starts before 2400 UTC and ends thereafter, then the SRU will be included in messages for both days, however, the SRUs times will only be included in the cumulative total of the second day.

Appendix B Reports and Returns

B.06	REQUEST FOR SEARCH REDUCTION

Distribution List

TO: SRR Commander

INFO: Canadian Joint Operations Command/CFICC; 1 Cdn Air Div; CCG HQ *(when appropriate)*.

NOTE: Message to be sent PRIORITY and UNCLASS.
Contents of draft message should be discussed with 1 Cdn Air Div A3 SAR prior to release. The message can be classified depending upon the situation.

Appendix B Reports and Returns

Required Information

SAR____________________________________– REDUCTION REQUEST
(name)

A. SEARCH OBJECT (aircraft or vessel – brief description)

B. PERSONS ON BOARD (names of POBs and names and addresses of NOK)

C. DISTRESS BEACON (yes/no and type)

D. ROUTE (intended route or flight/float plan/notification)

E. LAST KNOWN POSITION (as reported)

F. DATE/TIME (of last known position)

G. SEARCH COMMENCED (time JRCC notified)

H. SEARCH HEADQUARTERS (location)

I. SAR MISSION COORDINATOR/SEARCHMASTER (identification)

J. TOTAL MILITARY FLYING HOURS (at time of search reduction request)

K. TOTAL CIVILIAN FLYING HOURS (at time of search reduction request)

L. TOTAL VESSEL STEAMING HOURS (at time of search reduction request)

M. TOTAL SEARCH HOURS (at time of search reduction request)

N. AREA COVERED_____________SQUARE MILES (total coverage)
(e.g., a 30 NM by 60 NM area covered three times is 5400 NM^2)

O. Narrative summating search activities, explaining reasons for recommending reduction, resolving any apparent anomalies, and advising of any factors that might provoke controversy.

Appendix B Reports and Returns

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Appendix B Reports and Returns

B.07	SAR OPERATION REPORT

TITLE ***SAR operation name and case number***

PART I ***SEARCH OBJECT DETAILS*** *(as captured in SMMS)*

PART II ***DETAILS OF SAR OPERATION***

1. JRCC ACTION

   a) Brief narrative of initial actions from log

   b) SAR facilities tasked, response times

   c) SMC/SM appointment, name, location of SAR HQ

   d) Basic assumption regarding search object

2. SEARCH OPERATIONS

   a) Rationale for arriving at particular search plan

   b) Explanation of any departures from a)

   c) Brief outline of each day's search activities including areas covered, SAR facilities used and general weather

   d) If object is found, a complete explanation of how, to include type of SAR facilities, altitude and/or distance, from what position in SAR facility, what was visual reference, was spotter trained, phase of flight, time of day, search conditions, distress beacon details, etc.

   e) If object not found, why (in general terms)

   f) Problem areas, if any

3. RESCUE OPERATIONS

   a) Condition of survivors

   b) SAR facilities used (Rescue Specialists, SAR Techs, etc.)

   c) Evacuation details

   d) Problem areas, if any

NOTE: A copy of the *SAR Mission Report* may suffice here.

(continued on next page)

Appendix B Reports and Returns

SAR OPERATION REPORT (continued from previous page)

PART III CESSATION

1. OBJECT LOCATED
   a) Date/time group ____________________
   b) Location ____________________N____________________W
   c) Number on board ____________________*(from Part I)*
   d) Survivors ____________________
   e) Fatalities ____________________
   f) Missing ____________________
2. SEARCH REDUCED
   a) Authority ____________________*(message date/time group)*
   b) Number on board ____________________*(from Part I)*
   c) Survivors ____________________
   d) Fatalities ____________________
   e) Missing ____________________

PART IV CONCLUSIONS/RECOMMENDATIONS

1. SMC/SM CONCLUSIONS
2. SMC/SM RECOMMENDATIONS (may include recommendations to TC and TSB to help prevent future accidents of this kind)
3. JRCC OIC and RSMS REMARKS
4. AC CCG REMARKS (for maritime cases and aeronautical cases using maritime facilities)
5. SRR COMMANDER REMARKS

ATTACHMENTS

1. Weather reports
2. Sighting reports
3. SAR HQ maps
4. SRU utilization (flying/steaming hours)
5. List of objects recovered
6. Photographs (if applicable)

(continued on next page)

Appendix B Reports and Returns

SAR OPERATION REPORT (continued from previous page)

Distribution List

❖ For *all cases*, copies of the SAR operation report shall be forwarded to:

- ✓ Canadian Joint Operations Command/, J3 SAR, Ottawa
- ✓ 1 Cdn Air Div, SSO SAR, Winnipeg
- ✓ All JRCCs
- ✓ All participating SRUs
- ✓ Transport Canada:

Transport Canada Transport Canada Building Place de Ville Ottawa (Ontario) K1A 0N8 Attention: AAB

- ✓ NSS:

National Search and Rescue Secretariat 275 Slater Street, 4th Floor Ottawa (Ontario) K1A 0K2

- ✓ CCGC:

Canadian Coast Guard College Search and Rescue Training Section P.O. Box 4500 Sydney (Nova Scotia) B1P 6L1

(continued on next page)

Appendix B Reports and Returns

SAR OPERATION REPORT (continued from previous page)

- ❖ For *aeronautical cases*, copies of the SAR operation report shall be forwarded to:
  - ✓ TSB:

    Canadian Transportation Accident Investigation and Safety Board
    Director of Air Investigations
    Place du Centre
    200 Promenade du Portage, 4th Floor
    Gatineau (Québec)
    K1A 1K8

  - ✓ Regional Aviation Safety Officer
- ❖ For *maritime cases and aeronautical cases using maritime facilities*, copies of the SAR operation report shall be forwarded to:
  - ✓ CCG HQ:

    Director Operational Support
    Canadian Coast Guard
    Centennial Towers
    200 Kent Street, 6N144
    Ottawa (Ontario)
    K1A 0E6

  - ✓ MRSC Quebec
  - ✓ Regional Marine Investigation Officer
- ❖ If a report is produced about *an incident involving a foreign vessel*, a copy should be forwarded to the Department of Foreign Affairs and International Trade, Legal Advisory Division, for information purposes.
- ❖ Further distribution shall be made to other agencies cooperating in the search effort or investigation at the discretion of the appropriate SRR Commander.

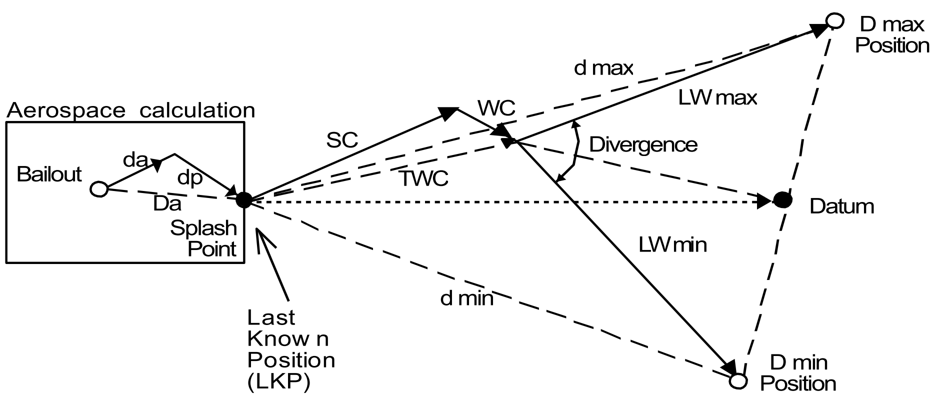
Appendix C Search Planning Worksheets (Minimax)

Case Name: ______________________ **Sheet 1**

SMC: ______________________

Search number: ______________________

DATUM



~~A. Aeronautical drift (D_a)~~

		Minimum		Maximum	
	Bailout position				
1	Time	______	UTC	______	UTC
2	Latitude	______	N	______	N
3	Longitude	______	W	______	W
4	Total aerospace vector	______	°T	______	°T
		______	NM	______	NM

B. Position where surface drift will start

Choose one of:

- ☐ Last known position (LKP) or estimated incident position (EIP);
- ☐ d_{min} and d_{max} positions; or
- ☐ Previous datum (non-minimax).

		Minimum		Maximum	
1	Latitude	______	N	______	N
2	Longitude	______	W	______	W
3	Time	______	UTC	______	UTC

C. Datum time

1	Commence search time or mid search time	______	UTC	______	UTC
2	Drift interval *(C1 – B3)*	______	h	______	h

Appendix C Search Planning Worksheets (Minimax)

***Complete either* "D", *or* "E and F", *not both*.** **Sheet 2**

D. Observed Total Water Current (TWC) *(to be used instead of SC and WC, e.g. data from DMB)*

			Minimum	*Maximum*
1	Source: ______			
2	Set		______°T	______°T
3	Rate		______kt	______kt
4	Total water current direction	*(D2)*	______°T	______°T
5	Total water current distance	*(D3 x C2)*	______NM	______NM

E. Sea Current (SC), Tidal Current (TC)

1	Publication: ______			
2	Set		______°T	______°T
3	Rate		______kt	______kt
4	Current direction	*(E2)*	______°T	______°T
5	Current distance	*(E3 x C2)*	______NM	______NM

F. Wind Current (WC)

1	Wind current vector *(resultant from Sheet 9)*	______°T	______°T
		______NM	______NM

G. Leeway (LW)

1	Search object(s): ______		
2	Leeway vector *(from Sheets 11 and 12)*	______°T	______°T
		______NM	______NM

H. Total Surface Drift (TD) Plotting sheet ☐ Calculator ☐

1	Direction	______°T	______°T
2	Distance	d_{min} ______	d_{max} ______NM
3	Distance between D_{min} and D_{max}		______NM

I. Datum Minimax ☐ Other ☐

1	Time	______UTC	______UTC	______UTC
2	Latitude	Datum ______	D_{min} ______	D_{max} ______N
3	Longitude	Datum ______	D_{min} ______	D_{max} ______W

Appendix C Search Planning Worksheets (Minimax)

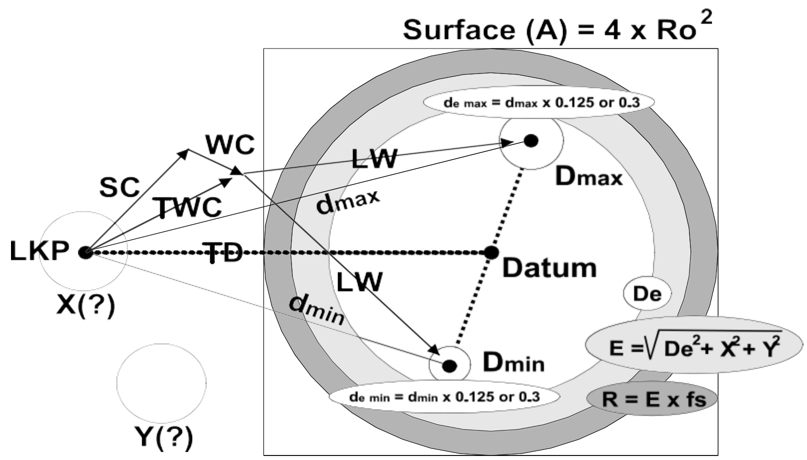
Sheet 3

Case Name: ______________________

SMC: ______________________

Search number: ______________________

SEARCH AREA



J. Aeronautical Drift Error (D_{ea})

1 ~~Aeronautical drift distance~~ D_a ____________ NM

2 ~~Drift error confidence factor~~ CF ____________

3 ~~Aerospace drift error~~ $D_{ea} = D_a \times CF$ ____________ NM

K. Surface Drift Error Minimax ($de_{minimax}$)

1 Sum of previous drift errors *($d_{e\ min}$ and $d_{e\ max}$)* sum ____________ NM

2 Surface drift distance *(from H2 on Sheet 2)* d_{min} ____________ NM d_{max} ____________ NM

3 Drift error confidence factor *(choose and circle one)* **0.125** **0.3**

4 Drift error min-max $d_{e\ min}$ ______ NM (d_{min} x CF) $d_{e\ max}$ __ NM (d_{max} x CF)

5 Distance between latest D_{min} and D_{max} positions *(from plot or H on Sheet 2)* distance ____________ NM

6 Surface drift error minimax $d_{e\ minimax}$ ____________ NM

$$d_{e\ minimax} = \frac{d_{e\ min} + d_{e\ max} + \text{distance} + \text{sum}}{2}$$

Appendix C Search Planning Worksheets (Minimax)

Sheet 4

K. Surface Drift Error (Non-Minimax)

7	Surface drift distance	d ________	NM
8	Drift error confidence factor	CF ________	
9	Individual drift error	(d_e = d x CF) ________	NM

L. Total Drift Error

1	Minimax *(from J3 + K6)*	$D_e = d_{ea} + d_{e\ minimax}$ ________	NM
2	Non minimax *(from K9)*	$D_e = d_{e1} + d_{e2} + d_{e3}$ + etc. ________	NM

M. Initial Position Error (X)

1	Navigational fix error	Based on ________	Fix_e ________	NM
2	Navigational DR error		DR_e ________	NM
3	Initial position error		$X = Fix_e + DR_e$ ________	NM

N. SRU Position Error (Y)

1	Navigational fix error	Based on ________	Fix_e ________	NM
2	Navigational DR error		DR_e ________	NM
3	Initial position error		$Y = Fix_e + DR_e$ ________	NM

O. Total Probable Error (E) $E = \sqrt{De^2 + X^2 + Y^2}$ ________ NM

P. Optimal Search Factor (f_s) *(choose and circle one)* **1.1** **1.6** **2.0** **2.3** **2.5**

Q. Desired Search Radius (R)

	Search radius minimax	$R = E \times F_s$ ________	NM
☐	Search radius *(round up to next whole number)*	R_o ________	NM
☐	Search radius for coastal search *(6 NM)*	R_o ________	NM

R. Optimum Search Area (A)

☐	Oceanic search area (square)	$A = 4R_o^2$ ________	NM^2
☐	Coastal search area (square)	$A = 4 \times 6^2$ ________	NM^2
☐	Rectangle search area	A = length x width ________	NM^2

Appendix C Search Planning Worksheets (Minimax)

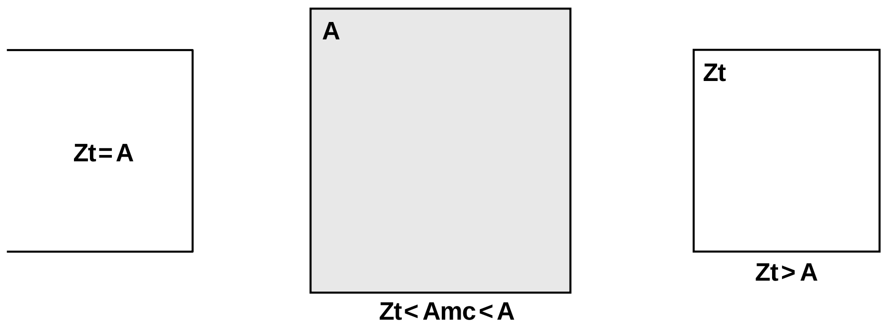
Case Name: ____________________

Sheet 5

SMC: ____________________

Search number: ____________________

EFFORT ALLOCATION



	S.	Effort Allocation	
	1	Search sub-area designation	
	2	Search facility assigned	
V	3	Search facility speed	
	4	On-scene endurance	
	5	Daylight hours remaining	
T	6	Search endurance	
			(Lesser value of S4 or S5, use 0.85 of result for aircraft)
VxT	7	Trackline distance (in NM)	
	8	Search altitude	
$\mathbf{W_u}$	9	Uncorrected sweep width	
$\mathbf{f_w}$	10	Weather factor	
$\mathbf{f_f}$	11	Fatigue correction factor	
$\mathbf{f_v}$	12	Search facility speed correction factor	
W	13	Corrected sweep width	$W = W_u \times f_w \times f_f \times f_v$
$\mathbf{Z_n}$	14	Individual effort	$Z_n = V \times T \times W$
$\mathbf{Z_t}$	15	Total effort	$Z_t = Z_{n1} + Z_{n2} + Z_{n3} + Z_{n4}$
A	16	Optimum search area	$A = 4 \times R_0^2$
		If Z_t >A then go to section T1, otherwise continue with line S17.	
$\mathbf{A_{mc}}$	17	Midpoint compromise search area	$A_{mc} = \frac{A + Z_t}{2}$
$\mathbf{C_{mc}}$	18	Midpoint compromise coverage factor	$C_{mc} = \frac{Z_t}{A_{mc}}$

Appendix C Search Planning Worksheets (Minimax)

Sheet 6

	1	Search sub-area designation	____	____	____	____
	2	Search facility assigned	____	____	____	____
$\mathbf{S_{mc}}$	19	Midpoint compromise track spacing $S_{mc} = \dfrac{W}{C_{mc}}$	____	____	____	____
$\mathbf{S_a}$	20	Track spacing assignable *(within usable limits of SRU navigational capability – rounded down if C < 1)*	____	____	____	____
C	21	Search sub-area coverage factor $C = \dfrac{W}{S_a}$	____	____	____	____
	22	Individual search area POD	____	____	____	____
$\mathbf{A_n}$	23	Individual adjusted search area $A_n = V \times T \times S_a$	____	____	____	____
T	24	Search endurance (*for excess search facilities only*) **(– 15% for aircraft)** $T = \dfrac{A_n}{V \times S_a}$	____	____	____	____
$\mathbf{A_t}$	25	Total search area $A_t = A_{n1} + A_{n2} + A_{n3} + A_{n4}$	____		$\sqrt{A_t}$ ____	
	26	Search area coverage factor $C = \dfrac{Z_t}{A_t}$	____			
	27	Search POD	____%			
l’	28	Estimated area length	____	____	____	____
w’	29	Estimated area width $w' = \dfrac{A_n}{l'}$	____	____	____	____
n’	30	Number of tracks required $n' = \dfrac{w'}{S_a}$	____	____	____	____
n	31	Round off to whole number	____	____	____	____
w	32	Area actual width $w = n \times S_a$	____	____	____	____
l	33	Area actual length $l = \dfrac{A_n}{w}$	____	____	____	____

Complete Drift Compensation Sheet 7 for each assigned SRU.

T. Excess Search Facilities Planning

C	1	Search sub-area coverage factor *(C = 1.0 recommended, except in areas of suspected high probability)*	____	____	____	____
S	2	Track spacing $S = \dfrac{W}{C}$	____	____	____	____
	3	*Go back to section S20 and complete the rest of the worksheet.*				

Appendix C Search Planning Worksheets (Minimax)

Sheet 7

Case Name: ____________________________

SMC: ____________________________

Search number: ____________________________

DRIFT COMPENSATED SEARCH PATTERNS

SRU ____________________________________

U. Search Planning Summary

1 Search object drift (direction and distance) _________________°T _________________NM

2 Search object drift (rate per hour) **v**__________________kt

3 Search area (length and width) **l** _________________ **w**__________________NM

4 SRU search speed **V**__________________kt

5 SRU track spacing **S**__________________NM

6 Time required to complete the area **T**__________________hours

Use the lesser T in lines S4 or S5, or in line S24 from sheet 5; x *0.85 for aircraft)*

V. Compensation Methods

1 *To determine whether drift compensation is recommended, complete the following formula:*

(vl) + (VS) (______) x (______) + (______) x (______) = (______) ÷ (______) = ______

a. If the value is < 0.1, then drift compensation is not recommended.

STOP HERE. *No further computation is necessary*.

b. If the value is > 0.1, then drift compensation is recommended.

<u>Orient the search area so that the major axis is parallel to the search object drift direction.</u>

2 *Complete the following formula to see if further drift compensation is recommended.*

(vw) + (VS) (______) x (______) + (______) x (______) = (______) ÷ (______) = ______

a. If the value is < 0.1, then further drift compensation is not recommended.

STOP HERE. *No further computation is necessary.*

b. If the value is > 0.1, then further drift compensation is recommended.

Select one option as indicated in next section W.

Appendix C Search Planning Worksheets (Minimax)

Sheet 8

W. Options for further direct compensation (in descending order of preference)

1 Create a parallelogram along the major axis as follows:

a. Select a CSP for a PS search pattern.

b. Advance the down creep side of the search area by the following:

Distance = T x v = (_________) x (_________) =________________NM

c. Connect advanced sides to unadvanced sides.

Determine new latitudes and longitudes of corners.

2 Keep the major axis oriented parallel to the drift direction, and:

a. Conduct a CS search pattern with drift compensated headings as follows:

1 v ÷ V = (_________) ÷ (_________) = _______________

2 Heading correction = ARCTAN (above value)________________°

3 Round off correction to the nearest whole degree________________°

b. Apply the heading correction in the direction of the search object drift.

c. Extend the search area in the direction of the search object drift by the following distance:

T x v = (_________) x (_________) =________________NM

3 If the major axis cannot be oriented parallel to the drift direction, orient the search area so that the minor axis is parallel to the drift direction, and conduct one of the following:

a. A PS search pattern with the SRU creeping in the *same* direction as the search object drift, using drift compensated headings.

b. A PS search pattern with the SRU creeping in the direction *opposite* to the search object drift, using drift compensated headings.

c. A CS search pattern, and construct a parallelogram.

4 If none of the above situations is feasible, conduct an XSB search.

Appendix C Search Planning Worksheets (Minimax)

Case Name: ____________________

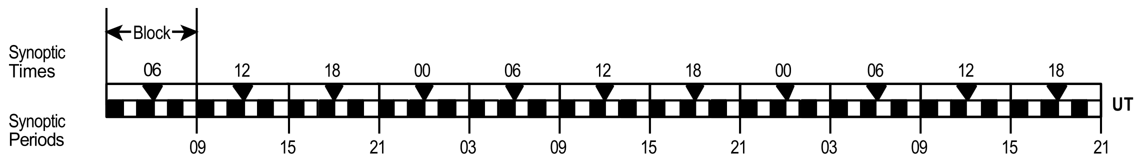
SMC: ____________________

Search number: ____________________

Sheet 9

SYNOPTIC BLOCKS

(repeat as necessary)



Block # [ ]

Synoptic Times	**Synoptic Winds** Direction (A)	Speed (B)	**Coefficients** Direction (C)	Speed (D)	**Effect** (A + C)	(B x D)
1 ________UTC	______ °T	______ kt	______ °T	______ kt	______°T	______ kt
2 ________UTC	______°T	______ kt	______ °T	______ kt	______°T	______ kt
3 ________UTC	______°T	______ kt	______ °T	______ kt	______°T	______ kt
4 ________UTC	______°T	______ kt	______ °T	______ kt	______°T	______ kt
5 ________UTC	______°T	______ kt	______ °T	______ kt	______°T	______ kt
6 ________UTC	______°T	______ kt	______ °T	______ kt	______°T	______ kt
7 ________UTC	______°T	______ kt	______ °T	______ kt	______°T	______ kt
8 ________UTC	______°T	______ kt	______ °T	______ kt	______°T	______ kt

Vectorial addition of effect of above eight vectors x Influence duration = Block resultant vector

______ °T ______kt x ______ hours = ______°T______NM

Block # [ ]

Synoptic Times	**Synoptic Winds** Direction (A)	Speed (B)	**Coefficients** Direction (C)	Speed (D)	**Effect** (A + C)	(B x D)
1 ________UTC	______°T	______ kt	______ °T	______ kt	______°T	______ kt
2 ________UTC	______°T	______ kt	______ °T	______ kt	______°T	______ kt
3 ________UTC	______°T	______ kt	______ °T	______ kt	______°T	______ kt
4 ________UTC	______°T	______ kt	______ °T	______ kt	______°T	______ kt
5 ________UTC	______°T	______ kt	______ °T	______ kt	______°T	______ kt
6 ________UTC	______°T	______ kt	______ °T	______ kt	______°T	______ kt
7 ________UTC	______°T	______ kt	______ °T	______ kt	______°T	______ kt
8 ________UTC	______°T	______ kt	______ °T	______ kt	______°T	______ kt

Vectorial addition of effect of above eight vectors x Influence duration = Block resultant vector

______ °T ______kt x ______ hours = ______°T______NM

Wind current (WC) is the vectorial addition of all block resultants: ______°T______NM

(Transfer to block E1 on Sheet 2)

Appendix C Search Planning Worksheets (Minimax)

Sheet 10

WIND CURRENT COEFFICIENT TABLE

(North latitudes only)

PERIOD	LATITUDE												
	5°N	10°N	15°N	20°N	25°N	30°N	35°N	40°N	45°N	50°N	55°N	60°N	65°N
1	185° 0.029	190° 0.028	196° 0.028	200° 0.027	205° 0.027	210° 0.026	214° 0.025	217° 0.024	221° 0.023	224° 0.022	226° 0.021	228° 0.020	230° 0.020
2	203° 0.012	226° 0.012	249° 0.012	271° 0.011	292° 0.011	312° 0.011	332° 0.011	350° 0.010	007° 0.010	022° 0.09	036° 0.009	049° 0.009	059° 0.008
3	219° 0.009	258° 0.009	296° 0.009	333° 0.009	009° 0.008	043° 0.008	076° 0.008	107° 0.008	136° 0.007	162° 0.007	186° 0.007	207° 0.007	224° 0.006
4	235° 0.008	289° 0.008	342° 0.008	035° 0.007	085° 0.007	134° 0.007	180° 0.007	223° 0.006	264° 0.006	301° 0.006	334° 0.006	003° 0.006	028° 0.005
5	250° 0.007	320° 0.007	029° 0.007	096° 0.006	162° 0.006	224° 0.006	283° 0.006	339° 0.006	031° 0.005	079° 0.005	121° 0.005	159° 0.005	192° 0.004
6	266° 0.006	352° 0.006	076° 0.006	158° 0.006	238° 0.006	314° 0.005	027° 0.005	095° 0.005	159° 0.004	217° 0.004	269° 0.004	315° 0.004	355° 0.004
7	282° 0.006	023° 0.006	123° 0.006	220° 0.005	314° 0.005	044° 0.005	130° 0.005	211° 0.004	286° 0.004	355° 0.004	056° 0.004	111° 0.003	158° 0.003
8	298° 0.005	054° 0.005	169° 0.005	281° 0.005	030° 0.005	134° 0.004	233° 0.004	327° 0.004	053° 0.004	132° 0.003	204° 0.003	267° 0.003	321° 0.003

Appendix C Search Planning Worksheets (Minimax)

Case Name: ____________________

SMC: ____________________

Search number: ____________________

Sheet 11

AVERAGE SURFACE WINDS AND LEEWAY

Incident Summary

1 LKP or EIP Latitude *(Use Block B1 Sheet 1)* ____________N

Longitude *(Use Block B2 Sheet 1)* ____________W

Time of incident *(Use Block B3 Sheet 1)* ____________UTC

Commence search time *(Use Block C1 Sheet 1)* ____________UTC

2 Drift interval *(Use Block C2 Sheet 1)* ____________hours

3 Search object (description): ________________________________

4 Average surface winds (ASW)

Synoptic Date/Time	Wind Period	Number of hours	x	Wind Speed	=	Vectorial Value	Wind Direction
0000 UTC	0300 – 2100	________	x	________	=	________	________°T
1800 UTC	2100 – 1500	________	x	________	=	________	________°T
1200 UTC	1500 – 0900	________	x	________	=	________	________°T
0600 UTC	0900 – 0300	________	x	________	=	________	________°T
0000 UTC	0300 – 2100	________	x	________	=	________	________°T
1800 UTC	2100 – 1500	________	x	________	=	________	________°T
1200 UTC	1500 – 0900	________	x	________	=	________	________°T
0600 UTC	0900 – 0300	________	x	________	=	________	________°T
0000 UTC	0300 – 2100	________	x	________	=	________	________°T
1800 UTC	2100 – 1500	________	x	________	=	________	________°T
1200 UTC	1500 – 0900	________	x	________	=	________	________°T
0600 UTC	0900 – 0300	________	x	________	=	________	________°T
0000 UTC	0300 – 2100	________	x	________	=	________	________°T

5 Total wind vector resultant ________NM________°T

6 Average surface wind (ASW) Speed = $\frac{\text{line 5}}{\text{line 2}}$ ________kt ________°T

Appendix C Search Planning Worksheets (Minimax)

Sheet 12

Leeway – Non Minimax Solution (downwind leeway)

a.	Average surface wind	*(block 6 from Sheet 11)*	____________ kt	____________ °T
b.	Set (reciprocal of ASW)	*(wind direction – 180°)*		____________ °T
c.	Leeway rate	*(as per formula)*		____________ kt
d.	Drift interval	*(block C2 from Sheet 1)*	____________ h	____________ h
e.	Leeway vector(s)	*(block 1b.)*	____________ °T	____________ °T
		(block 1c. x block 1d.)	____________ NM	____________ NM
			(Transfer to block G2 on Sheet 2)	

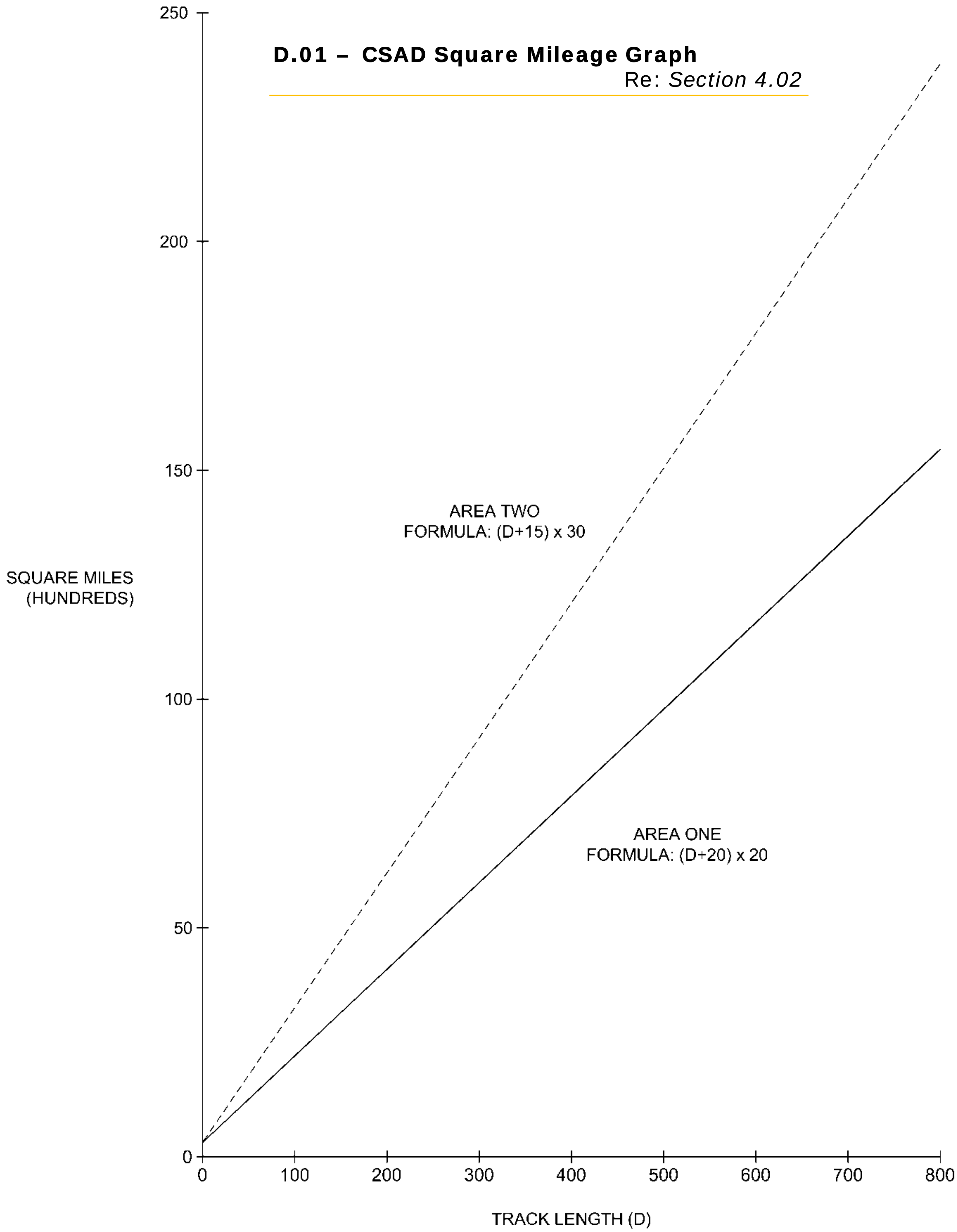
Leeway – Minimax Solution (select a scenario)

1	☐ **Drift Rate Uncertainty (downwind leeway)** Leeway with minimum drift rate, e.g. drogue/no drogue, search object uncertainty.			
a.	Average surface wind	*(block 6 from Sheet 11)*	____________ kt	____________ °T
b.	Set (reciprocal of ASW)	*(wind direction – 180°)*		____________ °T
c.	Leeway rate	*(as per formula)*		____________ kt
d.	Drift interval	*(block C2 from Sheet 1)*		____________ h
e.	Leeway vector(s)	*(block 1b.)*	____________ °T	____________ °T
		(block 1c. x block 1d.)	____________ NM	____________ NM
			(Transfer to Block G2 on Sheet 2)	
2	☐ **Time Uncertainty (downwind leeway)**			
a.	Average surface wind	*(block 6 from Sheet 11)*	____________ kt	____________ °T
b.	Set (reciprocal of ASW)	*(wind direction – 180°)*		____________ °T
c.	Leeway rate	*(as per formula)*		____________ kt
d.	Drift interval	*(block C2 from Sheet 1)*	____________ h	____________ h
e.	Leeway vector(s)	*(block 2b.)*	____________ °T	____________ °T
		(block 2c. x block 2d.)	____________ NM	____________ NM
			(Transfer to Block G2 on Sheet 2)	
3	☐ **Direction Uncertainty (divergence – no other uncertainty)**			
a.	Average surface wind	*(block 6 from Sheet 11)*	____________ kt	____________ °T
b.	Set (reciprocal of ASW)	*(wind direction – 180°)*		____________ °T
c.	Maximum expected divergence			± ____________ °
d.	Leeway rate	*(as per formula)*		____________ kt
e.	Drift interval	*(block C2 from Sheet 1)*		____________ h
f.	Leeway vector(s)	*(block 3b. ± block 3c.)*	____________ °T	____________ °T
		(block 3d. x block 3e.)	____________ NM	____________ NM
			(Transfer to Block G2 on Sheet 2)	

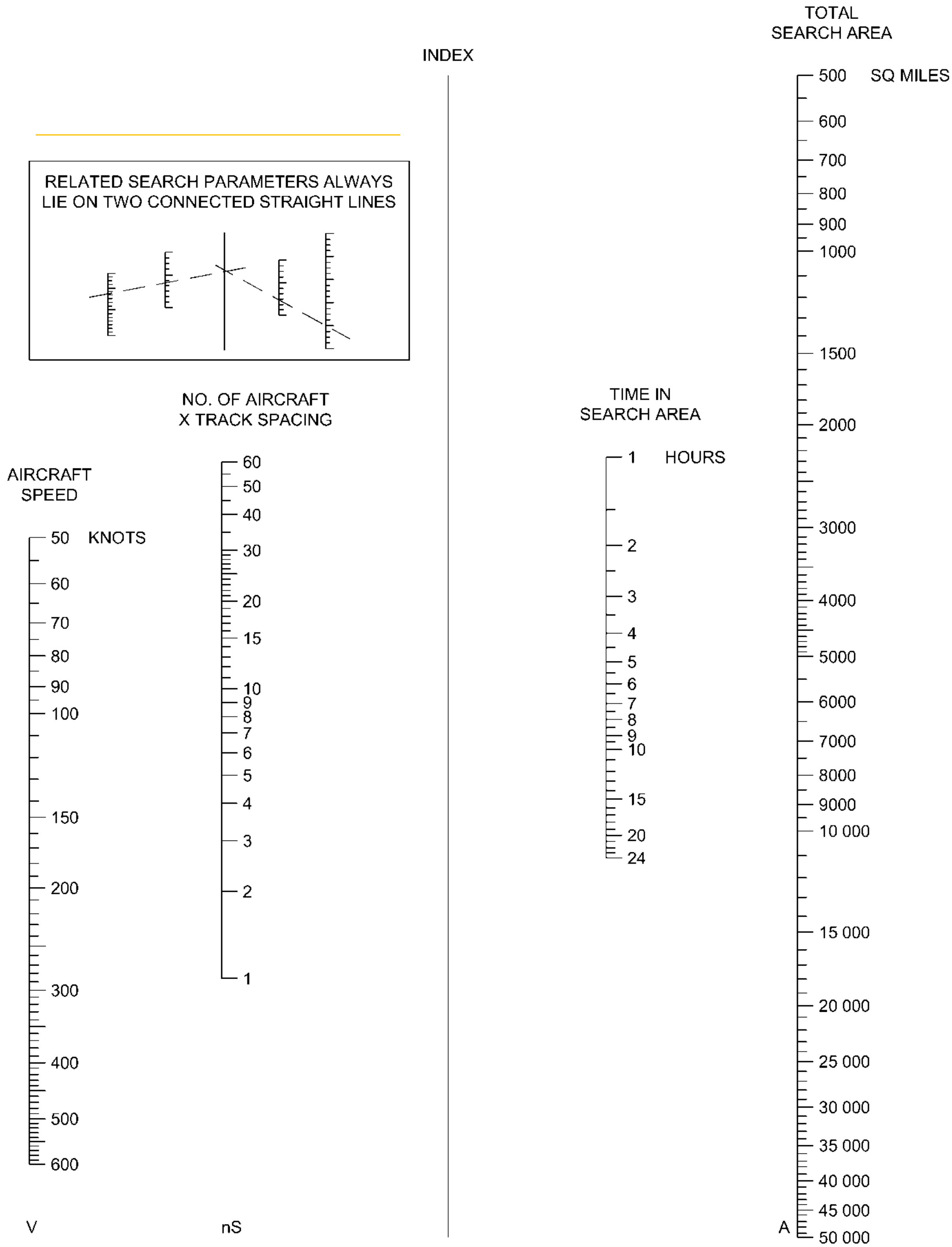
Appendix D Search Planning Tables and Graphs

D.01 – CSAD Square Mileage Graph

Re: *Section 4.02*

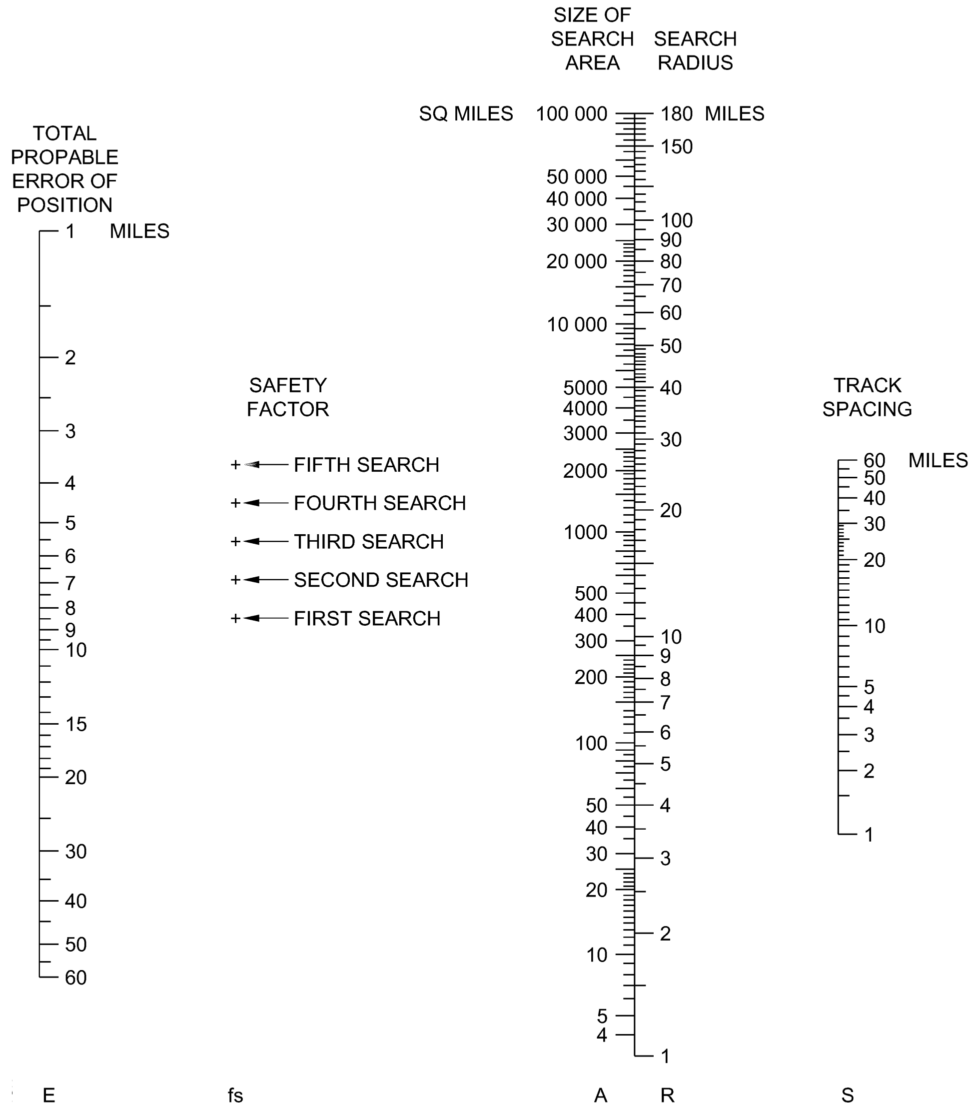


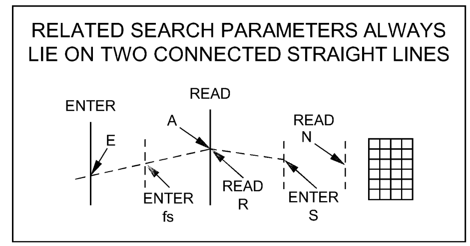
Appendix D Search Planning Tables and Graphs



Appendix D Search Planning Tables and Graphs

D.03 – Sector Search Area Nomograph Re: *Section 4.04*



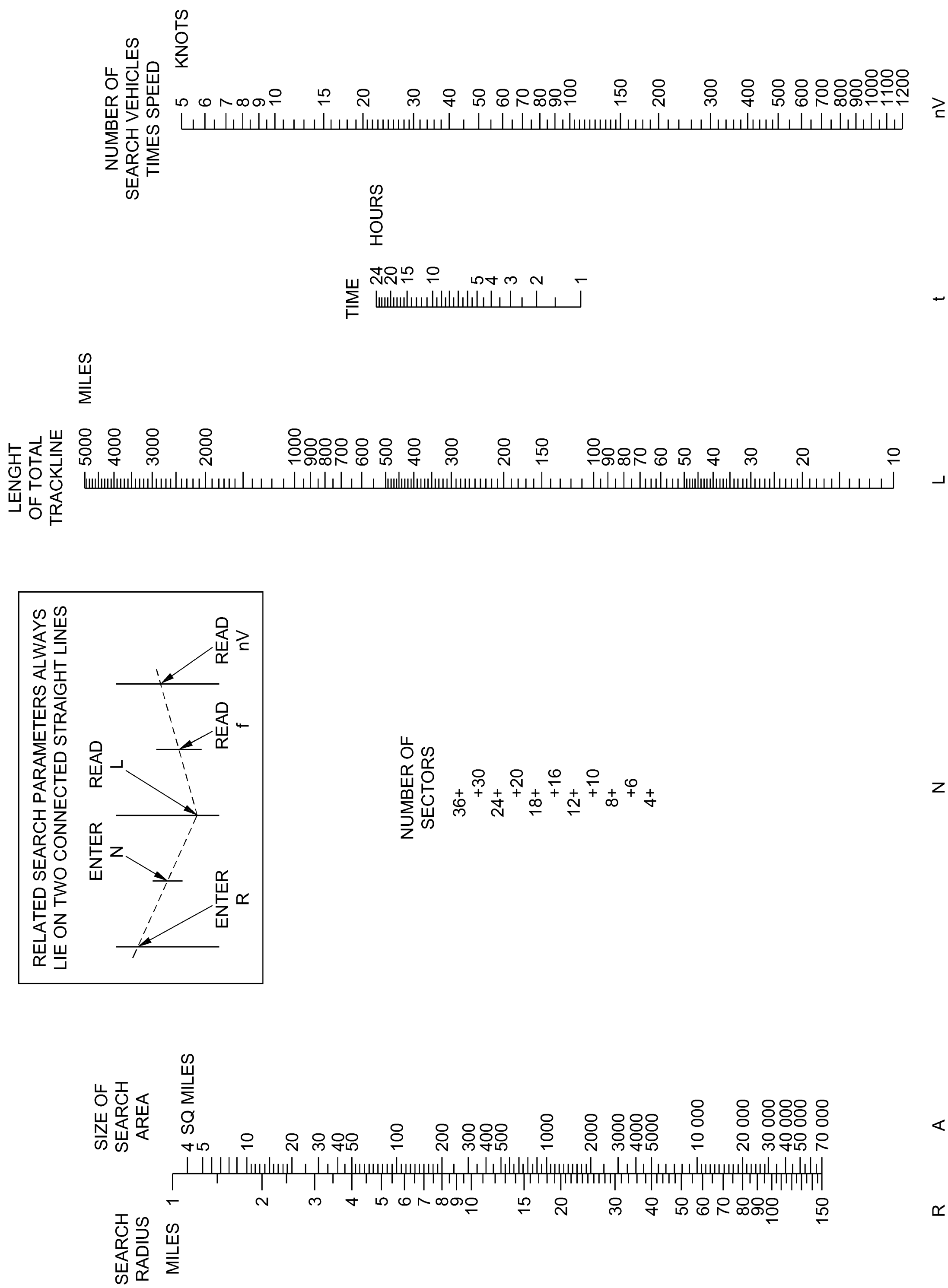


NO. OF SECTORS N	NO. OF LEGS	NO. OF CROSS LEGS	CENTRAL ANGLE	COURSE CHANGE ANGLE
4°	2	1	90°	135°
6	3	2	60°	120°
8°	4	3	45°	112 1/2°
10°	5	4	36°	108°
12	6	5	30°	105°
16°	8	7	22 1/2°	101°
18	9	8	20°	100°
20°	10	9	18°	99°
24	12	11	15°	97 1/2°
30	15	14	12°	96°
36	18	17	10°	95°
AVOID WHEN USING SEARCH CRAFT				

Appendix D Search Planning Tables and Graphs

D.04 – Sector Search Time Nomograph

Re: *Section 4.04*



Appendix D Search Planning Tables and Graphs

D.05 – VHF/UHF Theoretical Reception Range Table

Re: *Section 4.04*

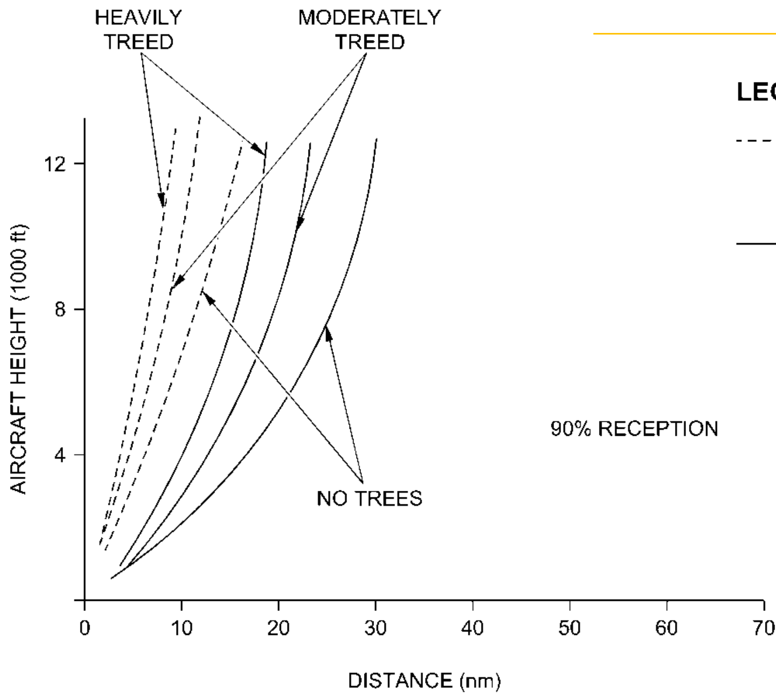
VHF/UHF THEORETICAL RECEPTION RANGES[1]	
Altitude Above Ground Level	**Range**
300 metres (1,000 feet)	30 nautical miles (NM)
600 metres (2,000 feet)	45 NM
900 metres (3,000 feet)	55 NM
1200 metres (4,000 feet)	67 NM
1500 metres (5,000 feet)	85 NM
3000 metres (10,000 feet)	100 NM
4500 metres (15,000 feet)	127 NM
6000 metres (20,000 feet)	150 NM
9000 metres (30,000 feet)	200 NM

[1] The ranges are for an ELT operating at full power. Actual reception range will depend on terrain, signal strength and other factors.

Appendix D Search Planning Tables and Graphs

D.06 – ELT Detection Distance Graphs

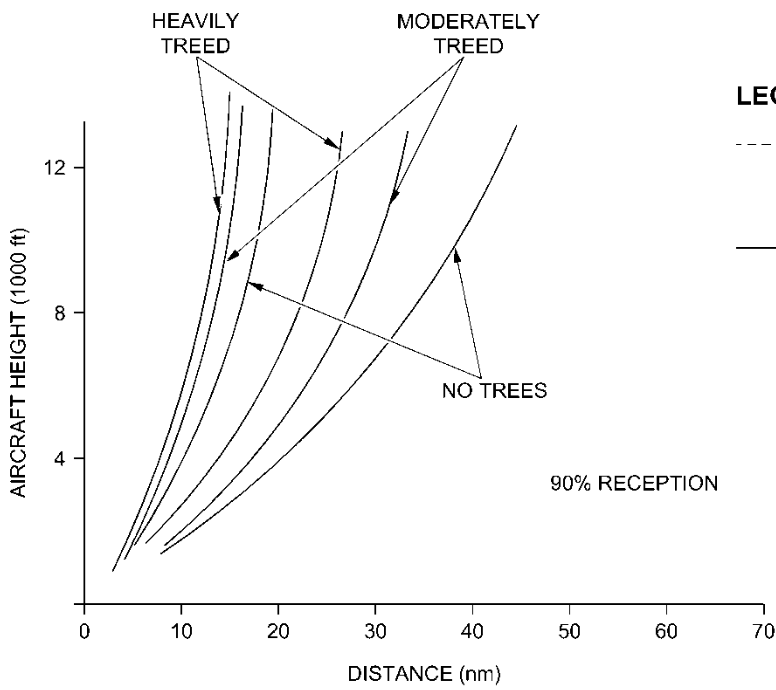
Re: *Section 4.04*



LEGEND

- - - - - - - - Frequency: 243 MHz
Height of base: 10 feet
Terrain: Mountain

——— Frequency: 243 MHz
Height of base: 10 feet
Terrain: Plains



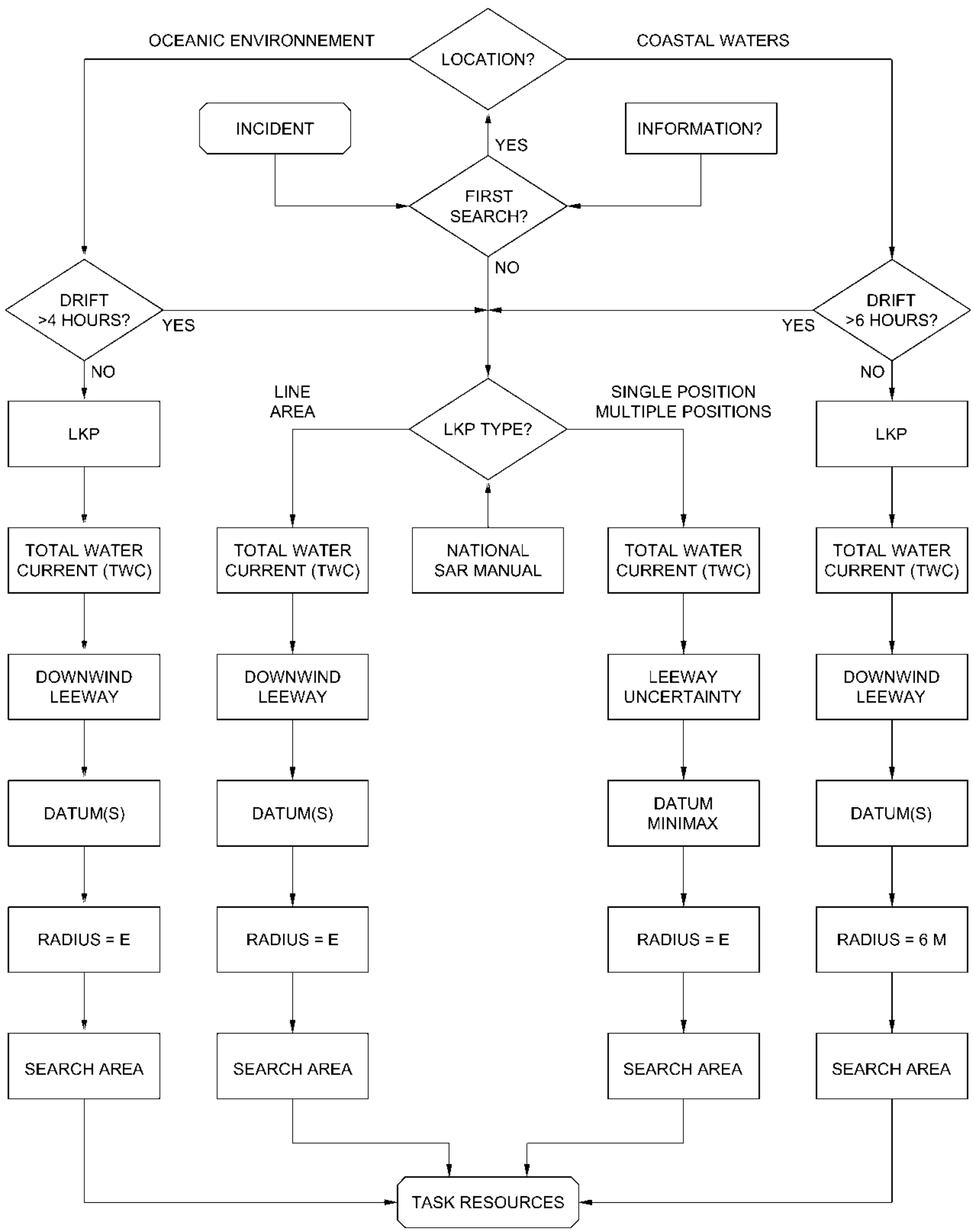
LEGEND

- - - - - - - - Frequency: 121.5 MHz
Height of base: 10 feet
Terrain: Mountain

——— Frequency: 121.5 MHz
Height of base: 10 feet
Terrain: Plains

Appendix D Search Planning Tables and Graphs

D.07 – Maritime Environment Search Planning Decision Matrix Re: *Section 4.06*



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Appendix D Search Planning Tables and Graphs

D.7 – Maritime Environment Search Planning Decision Matrix *(continued from previous page)*

The following steps describe the use of the matrix:

1. **First Search or Subsequent Searches?** If planning a first search, the planner must consider the location of the incident; for subsequent searches, determine the last known position (LKP) type.

2. **Determine Location –** Establish whether the search object is in coastal waters or in the oceanic environment.

3. **Determine Total Drift Time –** Estimate how long the search object has been adrift. This is normally the time interval between the actual occurrence of the incident and the time chosen by the planner for datum calculation.

4. **Determine LKP Type –** Establish the LKP type, considering one of the following: single position, multiple position, area or trackline.

5. **Compute Total Water Current –** Consider all the water current acting on the search object (SC, TC, WC, etc.).

6. **Compute LW –** Leeway is applied downwind in coastal waters and in cases in the oceanic environment where the LKP is determined to be an area or trackline, or if the total drift time is four (4) hours or less. LW uncertainly is applied in situations where the LKP is a single position or multiple positions and the total drift time is greater than four (4) hours.

7. **Establish Datum(s) or Datum$_{minimax}$ –** If the planner uses the downwind LW, then he will determine a datum per LKP. If he uses the LW uncertainty, he will determine Datum$_{minimax}$.

8. **Establish the Search Radius**

   a. In coastal waters, if the drift period is equal to or less than six (6) hours, use a 6 nautical miles (NM) radius. If the drift period is more than six (6) hours, use oceanic methodology.

   b. In oceanic environment, if the drift period is less than four (4) hours, compute the search radius without considering the total drift error (D_e). If the drift period is more than four (4) hours, compute the search radius using the total probable error (E).

9. **Define the Search Area(s)**

   a. For coastal waters, a 6 NM radius around datum(s) will normally create the desired search area(s). If these radii are drawn about a series of positions, as trackline datums, then the circles are grouped together in a simple geometric shape to form the search area.

   b. For the oceanic environment, the search area is determined by the search radius when using the minimax solution. In other cases, the search area will be determined by drawing search radii about the datum positions as in the coastal solution.

Appendix D Search Planning Tables and Graphs

D.08 – Leeway Tables and Taxonomy

Re: *Section 4.06*

NOTE: SMCs should evaluate the calculated results obtained from using the tables with actual known conditions, and adjust leeway values as appropriate.

D.08.1 LEEWAY SPEED AND DIRECTION VALUES FOR DRIFT OBJECTS[1]

Leeway Search Object Class				Leeway Speed		Divergence Angle (degrees)
Category	Sub Category	Primary Leeway Descriptor	Secondary Leeway Descriptor	Multiplier	Modifier (knots)	
Person In Water				0.011	0.07	30°
		vertical		0.005	0.07	18°
		sitting		0.012	0.00	18°
		horizontal	survival suit	0.014	0.10	30°
			scuba suit	0.007	0.08	30°
			deceased	0.015	0.08	30°
Survival Craft	Maritime Life Raft	no ballast system		0.042	0.03	28°
			no canopy, no drogue	0.057	0.21	24°
			no canopy, w/ drogue	0.044	-0.20	28°
			canopy, no drogue	0.037	0.11	24°
			canopy, w/ drogue	0.030	0.00	28°
		shallow ballast system & canopy		0.029	0.00	22°
			no drogue	0.032	-0.02	22°
			w/ drogue	0.025	0.01	22°
			capsized	0.017	-0.10	8°
		deep ballast system & canopy	*(see table D.08.2 for next levels)*	0.030	0.02	13°
	Other Type of Maritime Survival Craft	life capsule, powered		0.038	-0.08	22°
		USCG sea rescue kit		0.025	-0.04	7°
		fibreglass rigid hull life capsule, light loading, no drogue		0.03907	0.04180	40°
			4 person, no drogue	0.03833	0.01282	30°
			7 person no drogue	0.03818	0.07948	40°
		fibreglass rigid hull life capsule, full loading, w/ drogue		0.01018	0.06533	25°
			4 person w/ drogue	0.01085	0.04920	25°
			7 person w/ drogue	0.00969	0.07627	25°
	Aviation Life Raft	no ballast, w/canopy	4-6 person, no drogue	0.037	0.11	24°
		evacuation slide	4-6 person	0.028	-0.01	15°
Person Powered Craft	Sea Kayak	w/ person on aft deck		0.011	0.24	15°
	Surf board	w/ person		0.020	0.00	15°
	Windsurfer	w/ person & mast	& sail in water	0.023	0.10	12°

(continued on next page)

[1] The leeway tables are adapted from *Allen and Plourde 1999 Review of Leeway: Field Experiments and Implementation. USCG Research and Development Centre Report No CG-D-08-99*; and updated from *Oceans, March 2006, Investigation of Leeway and Drift for Ovatek Life Rafts*.

Appendix D Search Planning Tables and Graphs

D.08 – Leeway Tables and Taxonomy *(continued from previous page)*

D.08.1 – Leeway Speed and Direction Values for Drift Objects *(continued)*

Leeway Search Object Class				Leeway Speed		Divergence Angle (degrees)
Category	Sub Categories	primary leeway descriptors	secondary leeway descriptors	Multiplier	Modifier (knots)	
Sailing Vessel	Mono-hull	full keel	deep draft	0.030	0.00	48°
		fin keel	shoal draft	0.040	0.00	48°
Power Vessel	Skiff	flat bottom	Boston whaler	0.034	0.04	22°
		V-hull	standard configuration	0.030	0.08	15°
			swamped	0.017	0.00	15°
	Sport Boat	cuddy cabin	modified V	0.069	-0.08	19°
	Sport Fisher	center console	open cockpit	0.060	-0.09	22°
	Commercial Fishing Vessel			0.037	0.02	48°
		sampan		0.040	0.00	48°
		side-stern trawler		0.042	0.00	48°
		longliner		0.037	0.00	48°
		junk		0.027	0.10	48°
		gill-netter	w/ rear reel	0.040	0.01	33°
	Coastal Freighter			0.028	0.00	48°
Boating Debris	F/V debris			0.020	0.00	10°
	Bait/wharf box holds a cubic meter of ice			0.013	0.27	31°
		lightly loaded		0.026	0.18	15°
		fully loaded		0.016	0.16	33°

D.08.2	SUB-TABLE FOR MARITIME LIFE RAFTS w/ Deep Ballast Systems & Canopies					
Leeway Search Object Class				Leeway Speed		Divergence Angle (degrees)
Leeway Descriptors	Capacity Modifier	Drogue Modifier	Loading Modifier	Multiplier	Modifier (knots)	
Maritime life raft w/ deep ballast system & canopy	4-6 person			0.029	0.04	15°
		no drogue		0.038	-0.04	15°
			light loading	0.038	-0.04	15°
			heavy loading	0.036	-0.03	15°
		w/ drogue		0.018	0.03	12°
			light loading	0.016	0.05	24°
			heavy loading	0.021	0.00	20°
	15-25 person			0.036	-0.09	10°
		no drogue	light loading	0.039	-0.06	9°
		w/ drogue	heavy loading	0.031	-0.07	9°
	capsized			0.009	0.00	12°
	swamped			0.010	-0.04	8°

(continued on next page)

Appendix D Search Planning Tables and Graphs

D.08 – Leeway Tables and Taxonomy *(continued from previous page)*

NOTE: The experimental data used to produce these tables used wind speeds measured at the 10 metres wave height (U_{10}). Search planners should be aware that winds measured at a higher height might be significantly greater than the U_{10} winds.

NOTE: The tables provide values at wind speeds of 5 to 40 knots. They should be used with caution for winds of more than 40 knots, keeping in mind that high waves may reduce the wind speed effect on the search object; *for wind speeds of less than 5 knots, do not apply the correction factor*.

D.08.3 Taxonomy Class Definition / Descriptions.[2]

The following provides information about each of the leeway drift objects in the *above tables*. For each description, the search object characteristics are summarized and pictures are provided where available. These search object descriptions are in no way meant to be all-inclusive; they are intended to assist a search planner in search object identification. Proper identification will make the application of more specific leeway values possible. Some categories do not require further explanation and therefore descriptions/pictures are not included. The search planner should also be reminded that any classification system will have overlap between some categories. *In these cases, a decision must be made about the most probable situation.*

(a) **Person in Water –** Persons in the water (PIW) include persons without any floatation, and those with a throw able cushion, with a personal flotation device (PFD), in an anti exposure suit and in survival/immersion suits.

(1) **Vertical –** Generally requires a conscious and active PIW to maintain this position. *PIWs wearing a sport/work vest, an anti-exposure suit, or a float coat, or having no flotation, must actively maintain a vertical position in the water or become victims in the horizontal position.*

(2) **Sitting –** This is the classic fetal position with legs drawn up and arms huddled across the PFD. This is the preferred position a conscious or unconscious person assumes, especially in cold water, when wearing an offshore lifejacket, a horse collar lifejacket, or an inflatable vest. A conscious PIW hanging onto a throw able device will also assume the sitting position until he become unconscious at which time he become a victim.

(3) **Horizontal –** Three separate configurations place the PIW in a horizontal position:

a. A conscious or unconscious PIW wearing a survival suit will float flat on his back.

b. A PIW in scuba gear, with an inflated buoyancy vest, will float in a semi reclined position.

c. The classic floating position of a victim is floating face down in the water.

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[2] Adapted from the *U.S. Coast Guard Addendum to the United States National Search and Rescue Supplement (NSS) To The International Aeronautical and Maritime Search and Rescue Manual (IAMSAR), Appendix H*; and from the *Australian National Search and Rescue Manual, Appendix I – Tables and Graphs*.

Appendix D Search Planning Tables and Graphs

D.08 – Leeway Tables and Taxonomy *(continued from previous page)*

(b) **Maritime Survival Craft –** Maritime survival craft include life rafts, lifeboats, and life capsules. They do not include dinghies or inflatable boats that may be carried for the same purpose. *figure D.08.4*

(1) **Maritime Life Raft –** If there is any question about what type of life raft a vessel may carry, a phone call to life raft repair and repackaging facilities close to the homeport of the distressed vessel may provide ballast, canopy, size, and drogue information.

a. **Shallow Ballast System –** Consists of a series of fabric pockets generally 10 cm (4 inches) in diameter and less than 15 cm (6 inches) in depth.

b. **Deep Ballast System –** Consist of large fabric bags, from 3 to 7 on the raft, that are at least 30 x 60 x 60 cm (1 x 2 x 2 feet).

(2) **Other Type of Maritime Survival Craft**

a. **Life Capsule –** Fully enclosed craft commonly used on large merchant and military vessels.

b. **Fibreglass Rigid Hull Life Capsule –** This type of life raft has become a popular alternative to the inflatable life raft on board fishing vessels in Atlantic Canada and the west coast of North America.

(3) **Aviation Life Raft –** Aviation life rafts fall basically into two groups, life rafts and slide rafts. They are similar to marine life rafts, but are usually made from lighter materials.

- **Evacuation / Slide –** Slide rafts are specifically designed devices intended to ease evacuation from an aircraft. They mount to doorframes or near wing emergency exits and are cut loose from the airframe once fully loaded.

(c) **Person-Powered Craft –** Person-powered craft include all forms of rowed or paddled boats, including rowboats, inflatable boats without motors, canoes, kayaks, surfboards and windsurfers. *Figure D.08.5*

(d) **Sailing Vessel**

- **Mono-hull –** It is assumed that all search objects in this category are adrift; therefore sails are down or missing and the crew is unable to manoeuvre the vessel at all. A class of small to medium sized sailing vessels generally less than 6 metres (20 feet) and never more than 9 metres (30 feet) in length, they are typically designed for a single purpose such as racing or day sailing. Although this type of boat can have an outboard engine when day sailing, they will almost never have inboard engines.

a. **Full Keel –** Full keel mono-hull sailing vessels are small to medium sized sailboats whose keel runs the full length or nearly the full length of the hull. While the forward portion of the keel is modified or eliminated on some full keel sailboats, the keel on all full keel sailboats extends aft to the rudder. This is an old hull design and is not commonly used in new hull construction due to the relatively slow sailing speeds of this hull design. *Figure D.08.6*

b. **Fin Keel –** Small to medium sized sailboats with permanent keel skegs that do not extend aft to the rudder. *Figure D.08.7*

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Appendix D Search Planning Tables and Graphs

D.08 – Leeway Tables and Taxonomy *(continued from previous page)*

(e) **Power Vessel**

(1) **Skiff –** Skiffs are open boats less than 6 metres (20 feet) long that use an outboard motor as the primary source of propulsion. Some have characteristics identical to rowed boats with the exception that an outboard motor has been attached to the stern. This group includes, but is not limited to, tenders for larger vessels, bass boats, hunting boats, Jon boats, and a large category of utility boats. Skiffs are usually found on lakes and rivers, but are also common in the calm waters of many bays and rivers that provide access to the open ocean. *Figure D.08.8*

(2) **Personal Water Craft –** Personal water craft (PWC) include a number of different designs for one or more persons. Generally there are stand up models and ride on models. Some craft marketed as PWC closely resemble small sport boats. Most PWC have water jet propulsion. No leeway drift experiments have yet been performed on PWC and they do not appear within the above tables. Leeway category choice should be based on number of passengers/loading of PWC and on its size (draft, length, freeboard). These factors may be comparable (not exactly) to several other leeway search objects. *Figure D.08.9*

(3) **Sport Boat –** Sport boats include pleasure craft from 4,5 to 8,5 metres (15 to 28 feet) long with beam widths from roughly 2 to 3 metres (6 to 9 feet). They include metal, fibreglass, and wood vessels, with a V, modified V, or deep-V hull form. They can be outfitted with inboard, outboard, or I/O propulsion. This category includes side console (closed bow and bow riders) and cuddy cabin boats. *Figure D.08.10*

(4) **Sport Fisher –** Sport fishers include pleasure and commercial craft from 5 metres (17 feet) to approximately 30 metres (100 feet) long with beam widths up to 7,3 metres (24 feet). The majority are between 9 to 15 metres (30 to 50 feet), with beam widths between 3 to 4,5 metres (10 to 15 feet). This class includes both semi displacement and planning hull forms that can be outfitted with inboard, outboard, or I/O propulsion. This category includes boats with simple centre console or walk round cabin. Convertibles are sport fishers with a walk around cabin and flying bridge. Convertibles designed for offshore fishing may also have a spotting tower. Many convertibles provide extended cruising capabilities similar to sport cruisers, but their after deck design provides a larger open area to work fishing gear. Some of these vessels can also be found in the cruiser or motor yacht categories. *Figure D.08.11*

(5) **Commercial Fishing Vessel –** Commercial fishing vessels include vessels from 14 to 30 metres (45 to 100 feet) long designed for fishing or shell fishing in coastal and ocean waters. They include side and stern trawling rigs, long liners, bottom dragging rigs, and purse seiners. Pole fishers are simply modified use of a sport fisher or sport cruiser and should be treated as such. Commercial fishers can be working alone, as paired vessels, or can be the mother ship to a group of smaller fishing skiffs. These vessels have different design features based on their purpose, but all have some form of deckhouse and an open area from which nets can lines are worked. A deck winch and boom system is commonly used to handle nets or lines. *Figure D.08.12*

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Appendix D Search Planning Tables and Graphs

D.08 – Leeway Tables and Taxonomy *(continued from previous page)*

(6) **Coastal Freighter –** Coastal freighters include a wide range of commercial shipping platforms up to 30 metres (100 feet) in length. These vessels transfer cargo from one port to another, and shipping agents can provide estimated voyage schedules. Coastal freighters include vessels with a deckhouse on the forecastle, amidships deckhouse (common to cargo vessels), and an aft deckhouse (common to tankers and container ships). Leeway of these vessels will not only vary with respect to deckhouse location; it will also be greatly affected by loading, amount, and type of cargo. *Figure D.08.13*

(f) **Boating Debris –** Boating debris include any debris that can be expected from a boat that is sinking and/or breaking up. It may include paper or plastic containers, bedding or clothing, and a variety of fragmented boat sections.

(1) **Fishing debris –** Fishing debris are debris typical to a fishing vessel such as lifejacket, life ring, fishing float balls, a fishing box lid, or wooden boards.

(2) **Bait/wharf box –** This is a commercially available 1.1 x 1.5 meter plastic box used by commercial fisherman for holding ice and/or fish. Although not its intended use, it could also serve as a floatation/life raft by persons in distress.

a. **Lightly loaded –** Approximately 90 kg (200 lbs) (simulation of one person)

b. **Fully loaded –** Approximately 360 kg (800 lbs) (simulation of four persons)

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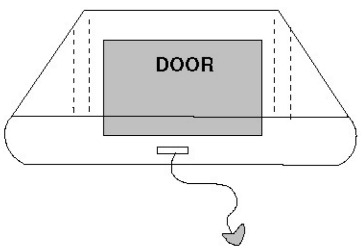
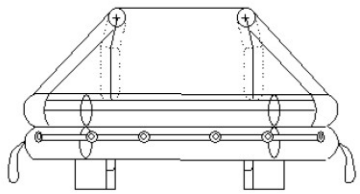
Appendix D Search Planning Tables and Graphs

D.8 – Leeway Tables and Taxonomy *(continued from previous page)*

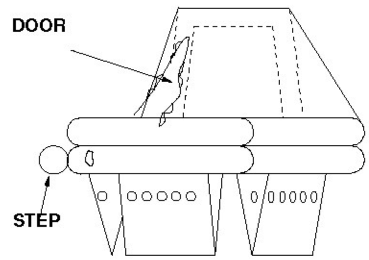
D.8.4 MARITIME SURVIVAL CRAFT



No Ballast Life Raft



Shallow Pocket Ballast



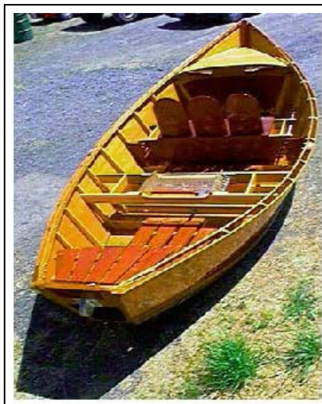
Deep Pocket Ballast

Fibreglass rigid hull life capsule w/ drogue

Life Capsule

Fibreglass rigid hull life capsule

D.8.5 PERSON POWERED CRAFT



Row Boat

Sea Kayak

Canoe

Surf Board

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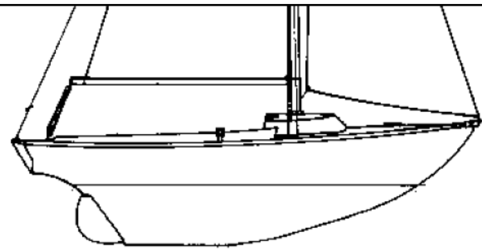
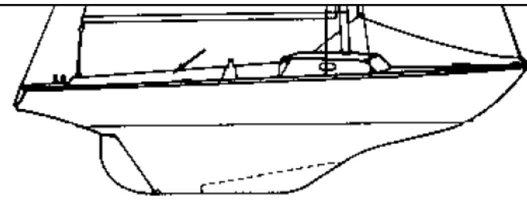
Appendix D Search Planning Tables and Graphs

D.8 – Leeway Tables and Taxonomy *(continued from previous page)*

D.8.6 FULL KEEL ONE-DESIGN SAILBOATS

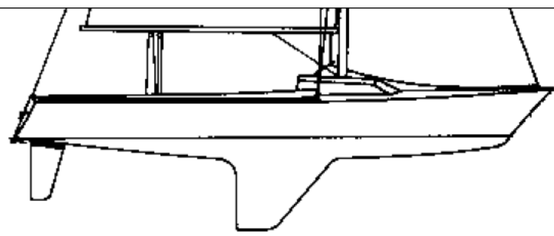


Open Cockpit

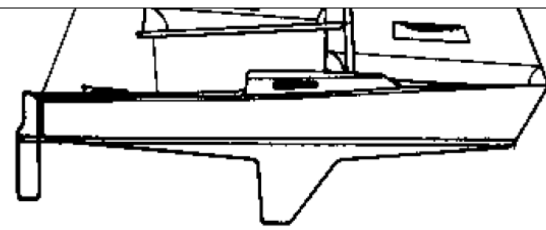


Cabin

D.8.7 FIN KEEL ONE-DESIGN SAILBOATS



Open Cockpit



Cabin

D.8.8 SKIFFS

Flat Bottom Skiff

V-Hull Skiff

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Appendix D Search Planning Tables and Graphs

D.8 – Leeway Tables and Taxonomy *(continued from previous page)*

D.8.9 PERSONAL WATER CRAFT

D.8.10 SPORTS BOATS

Bow Rider

Closed Bow

Cuddy Cabin

High Performance

D.8.11 SPORT FISHERS

Center Console

Walk Around Cuddy

Convertible

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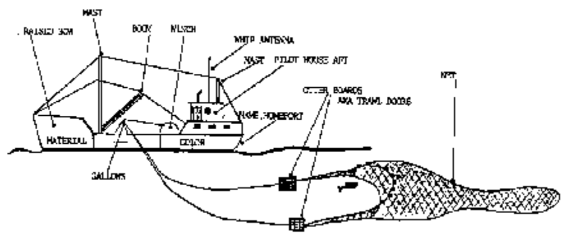
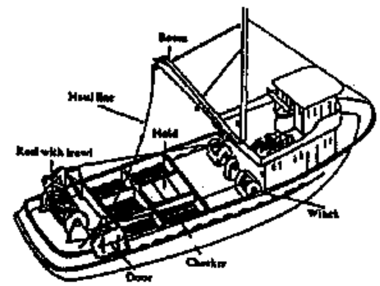
Appendix D Search Planning Tables and Graphs

D.8 – Leeway Tables and Taxonomy *(continued from previous page)*

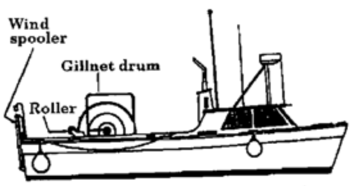
D.8.12 COMMERCIAL FISHERS



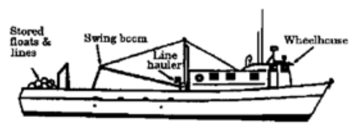
Side Trawler



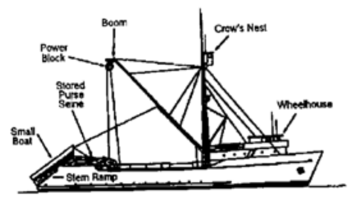
Stern Trawler



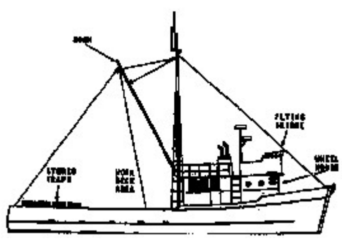
Gillnetter



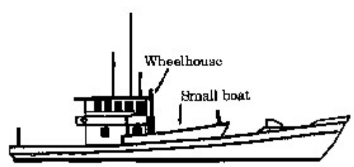
Longliner



Purse Seiner



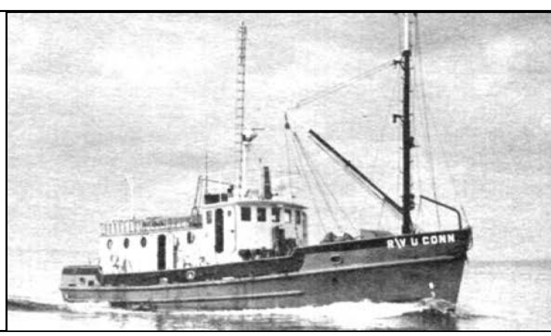
Trap Boat



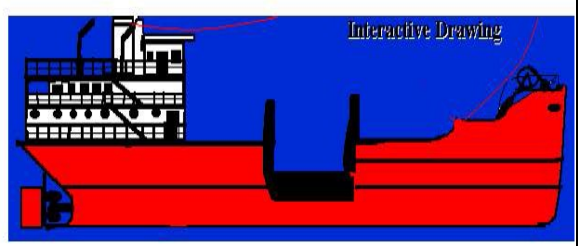
Sampan

Lobster Boat

D.8.13 COASTAL FREIGHTERS



Coastal Freighter with Mid Deckhouse



Coastal Freighter with Aft Deckhouse

Appendix D Search Planning Tables and Graphs

D.9 – Position Error Tables

Re: *Section 4.07*

NOTE: The search planner should keep in mind that these values are guidelines only, and should alter them should he have information indicating that the accuracy is substantially different from that suggested.

D.09.1	**POSITION ERRORS WITH NAVIGATION SYSTEMS**
Means of Navigation	Fix Error (Fix_e)
Global Positioning System (GPS)[1]; Differential GPS (DGPS)[1]	0.1 nautical mile (NM)
Satellite navigation (NAVSAT)	0.5 NM
Visual Fix (3 lines)[2]; Loran C ; Radar	1 NM
Celestial Fix (3 lines)[2]	2 NM
Marine Radio Beacon (3 beac on-fix)	4 NM
Inertial Navigation System (INS)	0.5 NM per flight hour without position update
VHF Omni-directional Range (VOR); Tactical Air Navigation (TACAN)	±3° arc and 3 % of distance, or 0.5 NM radius, whichever is greater

[1] Published accuracy of the system is much greater.
[2] Should be evaluated upward according to circumstances.

D.09.2	**POSITION ERRORS IF THE MEANS OF NAVIGATION IS UNKNOWN**
Type of Aircraft or Vessel	Fix Error (Fix_e)
Ship; Military submarine; Aircraft with more than 2 engines	5 NM
Twin-engine aircraft	10 NM
Boat < 20 metres (65 feet); Submersible; Single engine aircraft	15 NM

D.09.3	**DEAD RECKONING ERRORS**
Type of Aircraft or Vessel	DR Error (DR_e)
Ship; Military submarine; Aircraft with more than 2 engines	5% of the DR distance
Twin-engine aircraft	10% of the DR distance
Boat < 20 metres (65 feet); Submersible; Single engine aircraft	15% of the DR distance

Appendix D Search Planning Tables and Graphs

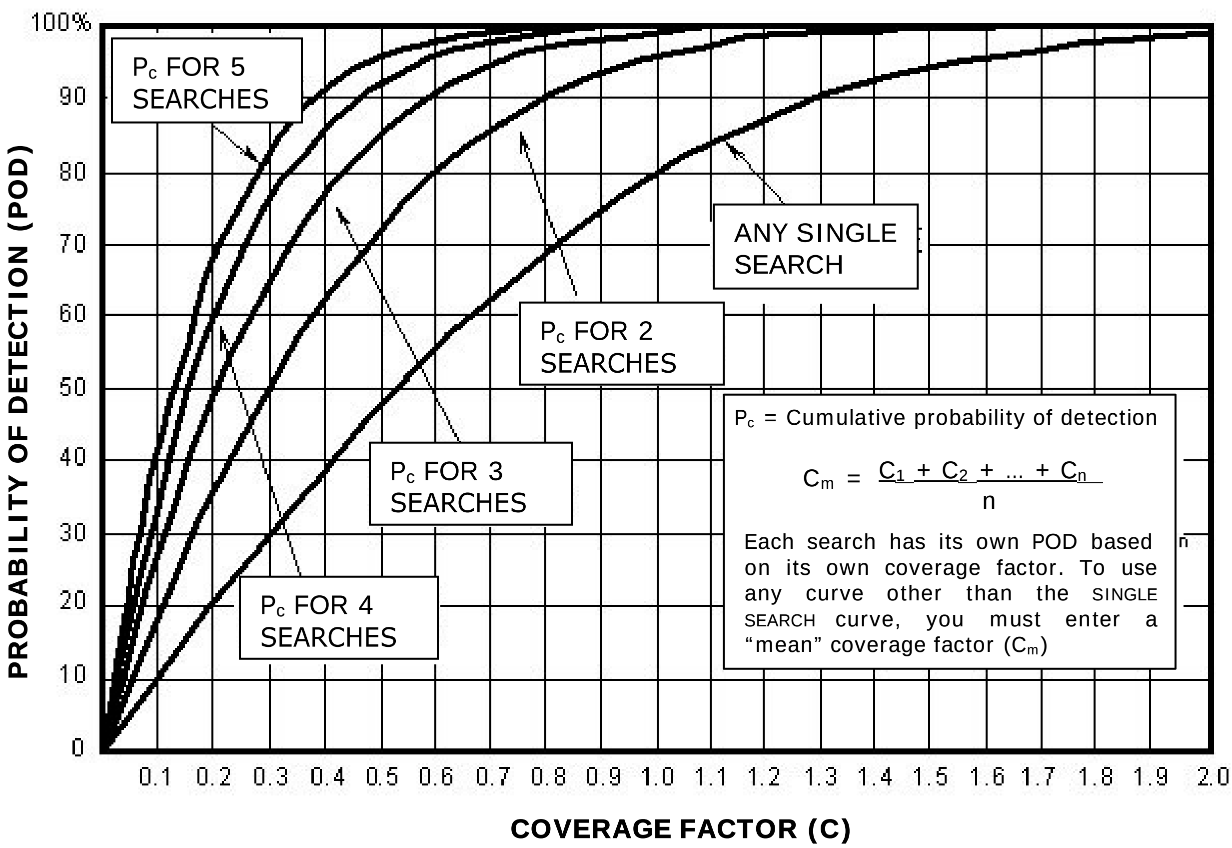
D.10 – Search Area Delineation Table

Re: *Section 4.08*

OPTIMAL SEARCH FACTORS AND SEARCH RADII		
Search	f_s	R
1st	1.1	1.1 E
2nd	1.6	1.6 E
3rd	2.0	2.0 E
4th	2.3	2.3 E
5th	2.5	2.5 E

D.11 – Probability of Detection Graph

Re: *Section 4.08*



Appendix E Sweep Width Computation

E.1 – Uncorrected Visual Sweep Width (W_u) Tables

Re: *Sections 4.08* and *5.01*

NOTES:

1. The following tables give values for ***visual searches over water***. Some of these values are too small to be flown or sailed but provide the search planner with an indication of search effectiveness and a guide for deciding how long to continue the search effort.
2. Interpolation is to be used within these tables as needed.
3. When vessel length is larger than the largest "power boat" or "sail boat", interpolate between the largest "power boat" or "sail boat" line and the smallest "ship" line.
4. When searching for small objects, high search altitudes for aircraft search units yield little to no improvement in sweep width while actually making it more difficult for aircraft scanners to visually identify the search object. For normal search operations, giving consideration to on scene weather and aircraft separation needs, search altitudes should be restricted to no higher than 300 metres (1000 feet) for small objects. For the purposes of using the following tables, entries for small objects are shaded in the tables for higher search altitudes for combinations of search object and altitude that should be avoided. Small objects include:
   a. persons in the water (PIW)
   b. rafts ≤ 6 person
   c. power boats < 4,5 metres (< 15 feet)
   d. sailboats < 4,5 metres (< 15 feet)
5. For search altitudes up to 150 metres (500 feet) only, the values given for sweep width for a person in water may be increased by a factor of four (4) if it is known that the person is wearing a personal floatation device.
6. Visual searches are seldom conducted from altitudes above 900 metres (3000 feet); however, for altitudes up to 1500 metres (5000 feet) where visibility exceeds 3 nautical miles (NM) and the size of the search object exceeds 7,5 metres (25 feet), the sweep widths given for 900 metres (3000 feet) remain applicable.
7. A sailboat is only a sailboat if the sails are up. If the sails are down, the craft should be classed as a powerboat.

NOTE: The sweep widths tables for ***visual searches over land*** are available in the *IAMSAR Manual, Volume II, Appendix N, Tables N-9 to N-11.*

(continued on next page)

Appendix E Sweep Width Computation

E.01 – Visual W_u Tables *(continued from previous page)*

E.01.1	FIXED-WING AIRCRAFT – Altitude 100 metres (300 feet)						
SEARCH OBJECT in metres (feet)	VISIBILITY in NM						
	1	3	5	10	15	20	30
Person in water [1]	0.1	0.1	0.1	0.1	0.1	0.1	0.1
PIW with PDF/surfboard	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Raft 1 person	0.3	0.7	0.9	1.2	1.3	1.3	1.3
Raft 4 persons	0.4	0.9	1.3	1.7	2.0	2.2	2.2
Raft 6 persons	0.4	1.1	1.5	2.1	2.5	2.7	2.7
Raft 8 persons	0.4	1.2	1.6	2.3	2.6	2.9	2.9
Raft 10 persons	0.4	1.2	1.7	2.4	2.9	3.2	3.2
Raft 15 persons	0.5	1.3	1.9	2.7	3.2	3.5	4.0
Raft 20 persons	0.5	1.4	2.1	3.1	3.7	4.2	4.8
Raft 25 persons	0.5	1.5	2.2	3.4	4.1	4.6	5.2
Power boat < 4,5 (< 15)	0.4	0.8	1.1	1.4	1.6	1.7	1.7
Power boat 4,5 to 7,5 (15 to 25)	0.5	1.6	2.4	3.5	4.3	4.8	4.8
Power boat 7,5 to 12 (25 to 40)	0.6	2.1	3.3	5.3	6.6	7.6	9.1
Power boat 12 to 20 (40 to 65)	0.6	2.6	4.5	8.1	10.9	13.1	16.4
Power boat 20 to 28 (65 to 90)	0.6	2.8	5.0	9.7	13.5	16.6	21.6
Sailboat 4,5 (15)	0.5	1.5	2.2	3.2	3.8	4.3	4.3
Sailboat 6,0 (20)	0.6	1.8	2.6	4.0	4.9	5.6	5.6
Sailboat 7,5 (25)	0.6	2.0	3.1	4.8	6.0	6.9	6.9
Sailboat 9,0 (30)	0.6	2.3	3.6	5.9	7.5	8.8	10.6
Sailboat 12,0 (40)	0.6	2.6	4.3	7.5	10.0	11.9	14.8
Sailboat 15,0 (50)	0.6	2.7	4.6	8.4	11.3	13.6	17.3
Sailboat 19,5 to 23,0 (65 to 75) [2]	0.6	2.8	4.9	9.3	12.7	15.5	20.0
Sailboat 23,0 to 28,0 (75 to 90) [2]	0.6	2.8	5.1	9.9	13.7	16.9	22.1
Ship 28,0 to 45,0 (90 to 150)	0.6	2.9	5.4	11.1	15.9	20.0	26.9
Ship 45,0 to 90,0 (150 to 300)	0.6	3.0	5.7	12.5	18.8	24.7	34.8
Ship > 90,0 (> 300)	0.7	3.0	5.8	13.2	20.6	27.9	41.4

[1] For search altitudes up to 150 metres (500 feet) only, the values given for sweep width for a person in water may be increased by a factor of four (4) if it is known that the person is wearing a personal floatation device.

(continued on next page)

Appendix E Sweep Width Computation

E.01 – Visual W_u Tables *(continued from previous page)*

E.01.2	FIXED-WING AIRCRAFT – Altitude 150 metres (500 feet)						
SEARCH OBJECT in metres (feet)	VISIBILITY in NM						
	1	3	5	10	15	20	30
Person in water [1]	0.0	0.1	0.1	0.1	0.1	0.1	0.1
PIW with PDF/surfboard	0.0	0.4	0.4	0.4	0.4	0.4	0.4
Raft 1 person	0.3	0.7	0.9	1.2	1.4	1.4	1.4
Raft 4 persons	0.4	1.0	1.3	1.8	2.0	2.2	2.2
Raft 6 persons	0.4	1.1	1.5	2.2	2.5	2.8	2.8
Raft 8 persons	0.4	1.2	1.6	2.3	2.7	2.9	2.9
Raft 10 persons	0.4	1.2	1.7	2.5	2.9	3.2	3.2
Raft 15 persons	0.5	1.3	1.9	2.7	3.3	3.6	4.0
Raft 20 persons	0.5	1.5	2.1	3.2	3.8	4.2	4.8
Raft 25 persons	0.5	1.6	2.3	3.4	4.1	4.6	5.3
Power boat < 4,5 (< 15)	0.4	0.9	1.2	1.5	1.7	1.8	1.8
Power boat 4,5 to 7,5 (15 to 25)	0.5	1.7	2.4	3.6	4.3	4.8	4.8
Power boat 7,5 to 12 (25 to 40)	0.6	2.1	3.3	5.3	6.7	7.7	9.1
Power boat 12 to 20 (40 to 65)	0.6	2.7	4.5	8.1	10.9	13.1	16.5
Power boat 20 to 28 (65 to 90)	0.6	2.8	5.0	9.8	13.5	16.7	21.7
Sailboat 4,5 (15)	0.5	1.6	2.2	3.2	3.9	4.3	4.3
Sailboat 6,0 (20)	0.6	1.8	2.7	4.1	5.0	5.6	5.6
Sailboat 7,5 (25)	0.6	2.0	3.1	4.9	6.1	7.0	7.0
Sailboat 9,0 (30)	0.6	2.3	3.6	5.9	7.6	8.8	10.6
Sailboat 12,0 (40)	0.6	2.6	4.3	7.6	10.0	11.9	14.8
Sailboat 15,0 (50)	0.6	2.7	4.6	8.4	11.3	13.7	17.3
Sailboat 19,5 to 23,0 (65 to 75) [2]	0.6	2.8	4.9	9.3	12.7	15.5	20.0
Sailboat 23,0 to 28,0 (75 to 90) [2]	0.6	2.8	5.1	9.9	13.7	17.0	22.1
Ship 28,0 to 45,0 (90 to 150)	0.6	2.9	5.4	11.1	15.9	20.1	26.9
Ship 45,0 to 90,0 (150 to 300)	0.6	3.0	5.7	12.5	18.9	24.7	34.8
Ship > 90,0 (> 300)	0.7	3.0	5.8	13.2	20.6	27.9	41.4

[1] For search altitudes up to 150 metres (500 feet) only, the values given for sweep width for a person in water may be increased by a factor of four (4) if it is known that the person is wearing a personal floatation device.

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Appendix E Sweep Width Computation

E.01 – Visual W_u Tables *(continued from previous page)*

E.01.3	FIXED-WING AIRCRAFT – Altitude 230 metres (750 feet)						
SEARCH OBJECT in metres (feet)	VISIBILITY in NM						
	1	3	5	10	15	20	30
Person in water	0.0	0.1	0.1	0.1	0.1	0.1	0.1
PIW with PDF/surfboard	0.0	0.1	0.1	0.1	0.1	0.1	0.1
Raft 1 person	0.3	0.7	0.9	1.2	1.4	1.4	1.4
Raft 4 persons	0.4	1.0	1.3	1.8	2.1	2.2	2.2
Raft 6 persons	0.4	1.1	1.6	2.2	2.6	2.8	2.8
Raft 8 persons	0.4	1.2	1.7	2.3	2.7	3.0	3.0
Raft 10 persons	0.4	1.3	1.8	2.5	3.0	3.3	3.3
Raft 15 persons	0.4	1.4	1.9	2.8	3.3	3.7	4.1
Raft 20 persons	0.5	1.5	2.2	3.2	3.8	4.3	4.9
Raft 25 persons	0.5	1.6	2.3	3.5	4.2	4.7	5.4
Power boat < 4,5 (< 15)	0.4	0.9	1.2	1.6	1.8	1.9	1.9
Power boat 4,5 to 7,5 (15 to 25)	0.5	1.7	2.4	3.6	4.4	4.9	4.9
Power boat 7,5 to 12 (25 to 40)	0.6	2.1	3.3	5.3	6.7	7.7	9.2
Power boat 12 to 20 (40 to 65)	0.6	2.7	4.5	8.2	10.9	13.1	16.5
Power boat 20 to 28 (65 to 90)	0.6	2.8	5.0	9.8	13.5	16.7	21.7
Sailboat 4,5 (15)	0.5	1.6	2.3	3.3	3.9	4.4	4.4
Sailboat 6,0 (20)	0.5	1.8	2.7	4.1	5.0	5.7	5.7
Sailboat 7,5 (25)	0.6	2.1	3.1	5.0	6.2	7.0	7.0
Sailboat 9,0 (30)	0.6	2.3	3.6	6.0	7.6	8.9	10.7
Sailboat 12,0 (40)	0.6	2.6	4.3	7.6	10.0	11.9	14.9
Sailboat 15,0 (50)	0.6	2.7	4.6	8.5	11.4	13.7	17.4
Sailboat 19,5 to 23,0 (65 to 75)[2]	0.6	2.8	4.9	9.3	12.7	15.6	20.0
Sailboat 23,0 to 28,0 (75 to 90)[2]	0.6	2.8	5.1	9.9	13.8	17.0	22.2
Ship 28,0 to 45,0 (90 to 150)	0.6	2.9	5.4	11.1	15.9	20.1	27.0
Ship 45,0 to 90,0 (150 to 300)	0.6	3.0	5.7	12.5	18.9	24.7	34.9
Ship > 90,0 (> 300)	0.7	3.0	5.8	13.2	20.6	27.9	41.4

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Appendix E Sweep Width Computation

E.01 – Visual W_u Tables *(continued from previous page)*

E.01.4	FIXED-WING AIRCRAFT – Altitude 300 metres (1000 feet)						
SEARCH OBJECT in metres (feet)	VISIBILITY in NM						
	1	3	5	10	15	20	30
Person in water	0.0	0.1	0.1	0.1	0.1	0.1	0.1
PIW with PDF/surfboard	0.0	0.1	0.1	0.1	0.1	0.1	0.1
Raft 1 person	0.3	0.7	0.9	1.2	1.4	1.4	1.4
Raft 4 persons	0.3	1.0	1.3	1.8	2.1	2.3	2.3
Raft 6 persons	0.4	1.1	1.6	2.2	2.6	2.8	2.8
Raft 8 persons	0.4	1.2	1.7	2.4	2.8	3.0	3.0
Raft 10 persons	0.4	1.3	1.8	2.6	3.0	3.3	3.3
Raft 15 persons	0.4	1.4	2.0	2.8	3.4	3.7	4.2
Raft 20 persons	0.4	1.5	2.2	3.2	3.9	4.3	4.9
Raft 25 persons	0.4	1.6	2.3	3.5	4.2	4.7	5.4
Power boat < 4,5 (< 15)	0.4	1.0	1.3	1.7	1.8	2.0	2.0
Power boat 4,5 to 7,5 (15 to 25)	0.5	1.7	2.5	3.7	4.4	5.0	5.0
Power boat 7,5 to 12 (25 to 40)	0.5	2.2	3.4	5.4	6.8	7.8	9.3
Power boat 12 to 20 (40 to 65)	0.6	2.7	4.5	8.2	10.9	13.1	16.6
Power boat 20 to 28 (65 to 90)	0.6	2.8	5.1	9.8	13.6	16.7	21.7
Sailboat 4,5 (15)	0.5	1.6	2.3	3.3	4.0	4.4	4.4
Sailboat 6,0 (20)	0.5	1.8	2.7	4.2	5.1	5.7	5.7
Sailboat 7,5 (25)	0.5	2.1	3.2	5.0	6.2	7.1	7.1
Sailboat 9,0 (30)	0.6	2.3	3.6	6.0	7.6	8.9	10.7
Sailboat 12,0 (40)	0.6	2.6	4.3	7.6	10.9	12.0	14.9
Sailboat 15,0 (50)	0.6	2.7	4.6	8.5	11.4	13.7	17.4
Sailboat 19,5 to 23,0 (65 to 75)[2]	0.6	2.8	4.9	9.3	12.8	15.6	20.1
Sailboat 23,0 to 28,0 (75 to 90)[2]	0.6	2.8	5.1	9.9	13.8	17.0	22.2
Ship 28,0 to 45,0 (90 to 150)	0.6	2.9	5.4	11.1	15.9	20.1	27.0
Ship 45,0 to 90,0 (150 to 300)	0.6	3.0	5.7	12.5	18.9	24.7	34.9
Ship > 90,0 (> 300)	0.6	3.0	5.8	13.2	20.6	27.9	41.4

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Appendix E Sweep Width Computation

E.01 – Visual W_u Tables *(continued from previous page)*

E.01.5	FIXED-WING AIRCRAFT – Altitude 450 metres (1500 feet) [1]						
SEARCH OBJECT in metres (feet)	VISIBILITY in NM						
	1	3	5	10	15	20	30
Person in water	0.0	0.0	0.0	0.0	0.0	0.1	0.1
PIW with PDF/surfboard	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Raft 1 person	0.2	0.7	0.9	1.3	1.4	1.4	1.4
Raft 4 persons	0.3	1.0	1.3	1.9	2.1	2.3	2.3
Raft 6 persons	0.3	1.1	1.6	2.3	2.6	2.9	2.9
Raft 8 persons	0.3	1.2	1.7	2.4	2.8	3.1	3.1
Raft 10 persons	0.3	1.3	1.8	2.6	3.1	3.4	3.4
Raft 15 persons	0.3	1.4	2.0	2.9	3.4	3.8	4.3
Raft 20 persons	0.4	1.5	2.2	3.3	4.0	4.4	5.1
Raft 25 persons	0.4	1.6	2.4	3.6	4.3	4.8	5.6
Power boat < 4,5 (< 15)	0.3	1.0	1.3	1.7	2.0	2.1	2.1
Power boat 4,5 to 7,5 (15 to 25)	0.4	1.7	2.5	3.7	4.5	5.1	5.1
Power boat 7,5 to 12 (25 to 40)	0.5	2.2	3.4	5.5	6.8	7.9	9.4
Power boat 12 to 20 (40 to 65)	0.5	2.6	4.5	8.2	11.0	13.2	16.6
Power boat 20 to 28 (65 to 90)	0.5	2.8	5.1	9.8	13.6	16.7	21.8
Sailboat 4,5 (15)	0.4	1.6	2.3	3.4	4.1	4.5	4.5
Sailboat 6,0 (20)	0.4	1.8	2.8	4.2	5.2	5.8	5.8
Sailboat 7,5 (25)	0.5	2.1	3.2	5.1	6.3	7.2	7.2
Sailboat 9,0 (30)	0.5	2.3	3.7	6.1	7.7	9.0	10.8
Sailboat 12,0 (40)	0.5	2.6	4.3	7.6	10.1	12.0	14.9
Sailboat 15,0 (50)	0.5	2.7	4.6	8.5	11.4	13.8	17.5
Sailboat 19,5 to 23,0 (65 to 75)[2]	0.5	2.8	4.9	9.4	12.8	15.7	20.2
Sailboat 23,0 to 28,0 (75 to 90)[2]	0.5	2.8	5.1	10.0	13.8	17.1	22.3
Ship 28,0 to 45,0 (90 to 150)	0.5	2.9	5.4	11.1	16.0	20.1	27.0
Ship 45,0 to 90,0 (150 to 300)	0.5	3.0	5.7	12.5	18.9	24.7	34.9
Ship > 90,0 (> 300)	0.6	3.0	5.8	13.2	20.7	27.9	41.4

[1] Shaded entries indicate combinations of search object and altitude that should be avoided.

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Appendix E Sweep Width Computation

E.01 – Visual W_u Tables *(continued from previous page)*

E.01.6	FIXED-WING AIRCRAFT – Altitude 600 metres (2000 feet) [1]						
SEARCH OBJECT in metres (feet)	VISIBILITY in NM						
	1	3	5	10	15	20	30
Person in water	0.0	0.0	0.0	0.0	0.0	0.0	0.1
PIW with PDF/surfboard	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Raft 1 person	0.1	0.6	0.9	1.2	1.4	1.4	1.4
Raft 4 persons	0.2	0.9	1.3	1.9	2.2	2.3	2.3
Raft 6 persons	0.2	1.1	1.6	2.3	2.7	2.9	2.9
Raft 8 persons	0.2	1.2	1.7	2.5	2.9	3.2	3.2
Raft 10 persons	0.2	12	1.8	2.7	3.1	3.5	3.5
Raft 15 persons	0.2	1.4	2.0	3.0	3.5	3.9	4.4
Raft 20 persons	0.3	1.5	2.2	3.4	4.0	4.5	5.1
Raft 25 persons	0.3	1.6	2.4	3.6	4.4	4.9	5.7
Power boat < 4,5 (< 15)	0.2	1.0	1.3	1.8	2.0	2.2	2.2
Power boat 4,5 to 7,5 (15 to 25)	0.3	1.7	2.5	3.8	4.6	5.1	5.1
Power boat 7,5 to 12 (25 to 40)	0.3	2.2	3.4	5.5	6.9	8.0	9.5
Power boat 12 to 20 (40 to 65)	0.4	2.6	4.5	8.3	11.0	13.3	16.7
Power boat 20 to 28 (65 to 90)	0.4	2.8	5.0	9.8	13.6	16.8	21.8
Sailboat 4,5 (15)	0.3	1.6	2.3	3.5	4.1	4.6	4.6
Sailboat 6,0 (20)	0.3	1.8	2.8	4.3	5.2	5.9	5.9
Sailboat 7,5 (25)	0.3	2.1	3.3	5.2	6.4	7.3	7.3
Sailboat 9,0 (30)	0.3	2.3	3.7	6.1	7.8	9.1	10.9
Sailboat 12,0 (40)	0.4	2.5	4.3	7.7	10.1	12.1	15.0
Sailboat 15,0 (50)	0.4	2.7	4.6	8.6	11.5	13.9	17.5
Sailboat 19,5 to 23,0 (65 to 75)[2]	0.4	2.7	4.9	9.4	12.9	15.7	20.2
Sailboat 23,0 to 28,0 (75 to 90)[2]	0.4	2.8	5.1	10.0	13.9	17.1	22.3
Ship 28,0 to 45,0 (90 to 150)	0.4	2.9	5.4	11.1	16.0	20.1	27.1
Ship 45,0 to 90,0 (150 to 300)	0.4	2.9	5.7	12.5	18.9	24.7	34.9
Ship > 90,0 (> 300)	0.5	3.0	5.8	13.2	20.7	27.9	41.5

[1] Shaded entries indicate combinations of search object and altitude that should be avoided.

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Appendix E Sweep Width Computation

E.01 – Visual W_u Tables *(continued from previous page)*

E.01.7	FIXED-WING AIRCRAFT – Altitude 750 metres (2500 feet)[1]						
SEARCH OBJECT in metres (feet)	VISIBILITY in NM						
	1	3	5	10	15	20	30
Person in water	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PIW with PDF/surfboard	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Raft 1 person	0.1	0.5	0.8	1.2	1.4	1.4	1.4
Raft 4 persons	0.1	0.8	1.3	1.8	2.2	2.4	2.4
Raft 6 persons	0.1	1.0	1.5	2.3	2.7	2.9	2.9
Raft 8 persons	0.1	1.1	1.7	2.5	2.9	3.2	3.2
Raft 10 persons	0.2	1.2	1.8	2.7	3.2	3.5	3.5
Raft 15 persons	0.2	1.3	2.0	3.0	3.6	4.0	4.5
Raft 20 persons	0.2	1.4	2.2	3.4	4.1	4.6	5.2
Raft 25 persons	0.2	1.5	2.4	3.7	4.5	5.0	5.7
Power boat < 4,5 (< 15)	0.1	0.9	1.3	1.8	2.1	2.2	2.2
Power boat 4,5 to 7,5 (15 to 25)	0.2	1.6	2.5	3.8	4.6	5.2	5.2
Power boat 7,5 to 12 (25 to 40)	0.2	2.1	3.4	5.6	7.0	8.1	9.6
Power boat 12 to 20 (40 to 65)	0.3	2.6	4.5	8.3	11.3	13.3	16.7
Power boat 20 to 28 (65 to 90)	0.3	2.7	5.0	9.8	13.6	16.8	21.9
Sailboat 4,5 (15)	0.2	1.5	2.3	3.5	4.2	4.7	4.7
Sailboat 6,0 (20)	0.2	1.8	2.8	4.3	5.3	6.0	6.0
Sailboat 7,5 (25)	0.2	2.1	3.3	5.2	6.5	7.5	7.5
Sailboat 9,0 (30)	0.2	2.2	3.7	6.1	7.8	9.1	11.0
Sailboat 12,0 (40)	0.3	2.5	4.3	7.7	10.2	12.1	15.1
Sailboat 15,0 (50)	0.3	2.6	4.6	8.6	11.5	13.9	17.6
Sailboat 19,5 to 23,0 (65 to 75)[2]	0.3	2.7	4.9	9.4	12.9	15.8	20.3
Sailboat 23,0 to 28,0 (75 to 90)[2]	0.3	2.8	5.1	10.0	13.9	17.2	22.4
Ship 28,0 to 45,0 (90 to 150)	0.3	2.8	5.4	11.1	16.0	20.2	27.1
Ship 45,0 to 90,0 (150 to 300)	0.3	2.9	5.6	12.5	18.9	24.8	35.0
Ship > 90,0 (> 300)	0.3	2.9	5.7	13.2	20.7	27.9	41.5

[1] Shaded entries indicate combinations of search object and altitude that should be avoided.

(continued on next page)

Appendix E Sweep Width Computation

E.01 – Visual W_u Tables *(continued from previous page)*

E.01.8	FIXED-WING AIRCRAFT – Altitude 900 metres (3000 feet) [1]						
SEARCH OBJECT in metres (feet)	VISIBILITY in NM						
	1	3	5	10	15	20	30
Person in water	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PIW with PDF/surfboard	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Raft 1 person	0.1	0.5	0.8	1.1	1.3	1.3	1.3
Raft 4 persons	0.1	0.7	1.2	1.8	2.1	2.3	2.3
Raft 6 persons	0.1	0.9	1.5	2.2	2.7	2.9	2.9
Raft 8 persons	0.1	1.0	1.6	2.5	2.9	3.2	3.2
Raft 10 persons	0.1	1.1	1.8	2.7	3.2	3.5	3.5
Raft 15 persons	0.1	1.2	2.0	3.0	3.6	4.0	4.5
Raft 20 persons	0.1	1.4	2.2	3.4	4.1	4.6	5.3
Raft 25 persons	0.1	1.5	2.4	3.7	4.5	5.1	5.8
Power boat < 4,5 (< 15)	0.1	0.8	1.3	1.8	2.1	2.3	2.3
Power boat 4,5 to 7,5 (15 to 25)	0.1	1.6	2.5	3.9	4.7	5.3	5.3
Power boat 7,5 to 12 (25 to 40)	0.2	2.1	3.4	5.6	7.1	8.1	9.7
Power boat 12 to 20 (40 to 65)	0.2	2.5	4.5	8.3	11.1	13.4	16.8
Power boat 20 to 28 (65 to 90)	0.2	2.7	5.0	9.9	13.7	16.8	21.9
Sailboat 4,5 (15)	0.1	1.5	2.3	3.5	4.3	4.7	4.7
Sailboat 6,0 (20)	0.1	1.7	2.8	4.4	5.3	6.0	6.0
Sailboat 7,5 (25)	0.2	2.0	3.3	5.3	6.6	7.5	7.5
Sailboat 9,0 (30)	0.2	2.2	3.7	6.2	7.9	9.2	11.1
Sailboat 12,0 (40)	0.2	2.4	4.3	7.7	10.2	12.1	15.1
Sailboat 15,0 (50)	0.2	2.6	4.6	8.6	11.6	14.0	17.7
Sailboat 19,5 to 23,0 (65 to 75)[2]	0.2	2.6	4.9	9.4	13.0	15.8	20.3
Sailboat 23,0 to 28,0 (75 to 90)[2]	0.2	2.7	5.1	10.0	14.0	17.2	22.5
Ship 28,0 to 45,0 (90 to 150)	0.2	2.8	5.3	11.1	16.0	20.2	27.1
Ship 45,0 to 90,0 (150 to 300)	0.2	2.8	5.6	12.5	18.9	24.8	35.0
Ship > 90,0 (> 300)	0.2	2.9	5.7	13.2	20.7	27.9	41.5

[1] Shaded entries indicate combinations of search object and altitude that should be avoided.

NOTE: Where visibility exceeds 3 NM and the size of the search object exceeds 7,5 metres (25 feet), these sweep widths remain applicable for altitudes up to 1500 metres (5000 feet).

(continued on next page)

Appendix E Sweep Width Computation

E.01 – Visual W_u Tables *(continued from previous page)*

E.01.9	HELICOPTERS – Altitude 100 metres (300 feet)						
SEARCH OBJECT in metres (feet)	VISIBILITY in NM						
	1	3	5	10	15	20	30
Person in water [1]	0.1	0.1	0.1	0.1	0.1	0.1	0.1
PIW with PDF/surfboard	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Raft 1 person	0.4	0.9	1.2	1.5	1.7	1.7	1.7
Raft 4 persons	0.5	1.2	1.6	2.2	2.5	2.7	2.7
Raft 6 persons	0.5	1.4	1.9	2.7	3.1	3.4	3.4
Raft 8 persons	0.6	1.4	2.0	2.8	3.3	3.6	3.6
Raft 10 persons	0.6	1.5	2.1	3.0	3.6	3.9	3.9
Raft 15 persons	0.6	1.6	2.3	3.3	3.9	4.3	4.9
Raft 20 persons	0.6	1.8	2.6	3.8	4.5	5.1	5.8
Raft 25 persons	0.6	1.9	2.7	4.1	4.9	5.5	6.3
Power boat < 4,5 (< 15)	0.5	1.1	1.4	1.9	2.1	2.2	2.2
Power boat 4,5 to 7,5 (15 to 25)	0.7	2.0	2.9	4.3	5.2	5.8	5.8
Power boat 7,5 to 12 (25 to 40)	0.8	2.5	3.8	6.1	7.7	8.9	10.6
Power boat 12 to 20 (40 to 65)	0.8	3.1	5.1	9.2	12.2	14.7	18.5
Power boat 20 to 28 (65 to 90)	0.8	3.3	5.7	10.8	15.0	18.4	23.9
Sailboat 4,5 (15)	0.7	1.9	2.7	3.9	4.6	5.2	5.2
Sailboat 6,0 (20)	0.7	2.2	3.2	4.8	5.9	6.6	6.6
Sailboat 7,5 (25)	0.8	2.4	3.6	5.7	7.1	8.1	8.1
Sailboat 9,0 (30)	0.8	2.7	4.2	6.8	8.7	10.1	12.2
Sailboat 12,0 (40)	0.8	3.0	4.9	8.6	11.3	13.4	16.7
Sailboat 15,0 (50)	0.8	3.1	5.2	9.5	12.7	15.3	19.3
Sailboat 19,5 to 23,0 (65 to 75) [2]	0.8	3.2	5.5	10.3	14.1	17.2	22.1
Sailboat 23,0 to 28,0 (75 to 90) [2]	0.8	3.3	5.7	11.0	15.2	18.7	24.3
Ship 28,0 to 45,0 (90 to 150)	0.8	3.4	6.0	12.2	17.4	21.9	29.3
Ship 45,0 to 90,0 (150 to 300)	0.8	3.4	6.3	13.6	20.4	26.6	37.3
Ship > 90,0 (> 300)	0.8	3.5	6.4	14.3	22.1	29.8	43.8

[1] For search altitudes up to 150 metres (500 feet) only, the values given for sweep width for a person in water may be increased by a factor of four (4) if it is known that the person is wearing a personal floatation device.

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Appendix E Sweep Width Computation

E.01 – Visual W_u Tables *(continued from previous page)*

E.01.10	**HELICOPTERS – Altitude 150 metres (500 feet)**						
SEARCH OBJECT in metres (feet)	VISIBILITY in NM						
	1	3	5	10	15	20	30
Person in water [1]	0.0	0.1	0.1	0.1	0.1	0.1	0.1
PIW with PDF/surfboard	0.0	0.4	0.4	0.4	0.4	0.4	0.4
Raft 1 person	0.4	0.9	1.2	1.6	1.8	1.8	1.8
Raft 4 persons	0.5	1.2	1.6	2.2	2.6	2.8	2.8
Raft 6 persons	0.5	1.4	1.9	2.7	3.2	3.5	3.5
Raft 8 persons	0.6	1.5	2.0	2.8	3.3	3.7	3.7
Raft 10 persons	0.6	1.6	2.2	3.1	3.6	4.0	4.0
Raft 15 persons	0.6	1.7	2.3	3.3	4.0	4.4	5.0
Raft 20 persons	0.6	1.8	2.6	3.8	4.6	5.1	5.9
Raft 25 persons	0.6	1.9	2.7	4.1	5.0	5.6	6.4
Power boat < 4,5 (< 15)	0.5	1.2	1.5	1.9	2.2	2.3	2.3
Power boat 4,5 to 7,5 (15 to 25)	0.7	2.0	2.9	4.3	5.2	5.8	5.8
Power boat 7,5 to 12 (25 to 40)	0.8	2.5	3.9	6.2	7.8	9.0	10.7
Power boat 12 to 20 (40 to 65)	0.8	3.1	5.1	9.2	12.3	14.7	18.5
Power boat 20 to 28 (65 to 90)	0.8	3.3	5.7	10.8	15.0	18.4	23.9
Sailboat 4,5 (15)	0.7	1.9	2.7	3.9	4.7	5.2	5.2
Sailboat 6,0 (20)	0.7	2.2	3.2	4.8	5.9	6.7	6.7
Sailboat 7,5 (25)	0.8	2.4	3.7	5.7	7.1	8.2	8.2
Sailboat 9,0 (30)	0.8	2.7	4.2	6.9	8.7	10.2	12.3
Sailboat 12,0 (40)	0.8	3.0	4.9	8.6	11.3	13.5	16.8
Sailboat 15,0 (50)	0.8	3.1	5.2	9.5	12.7	15.3	19.4
Sailboat 19,5 to 23,0 (65 to 75) [2]	0.8	3.2	5.5	10.4	14.1	17.3	22.2
Sailboat 23,0 to 28,0 (75 to 90) [2]	0.8	3.3	5.7	11.0	15.2	18.7	24.4
Ship 28,0 to 45,0 (90 to 150)	0.8	3.4	6.0	12.2	17.4	21.9	29.3
Ship 45,0 to 90,0 (150 to 300)	0.8	3.4	6.3	13.6	20.4	26.6	37.3
Ship > 90,0 (> 300)	0.8	3.5	6.4	14.3	22.1	29.8	43.8

[1] For search altitudes up to 150 metres (500 feet) only, the values given for sweep width for a person in water may be increased by a factor of four (4) if it is known that the person is wearing a personal floatation device.

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Appendix E Sweep Width Computation

E.01 – Visual W_u Tables *(continued from previous page)*

E.01.11	HELICOPTERS – Altitude 230 metres (750 feet)						
SEARCH OBJECT in metres (feet)	VISIBILITY in NM						
	1	3	5	10	15	20	30
Person in water	0.0	0.1	0.1	0.1	0.1	0.1	0.1
PIW with PDF/surfboard	0.0	0.1	0.1	0.1	0.1	0.1	0.1
Raft 1 person	0.4	0.9	1.2	1.6	1.8	1.8	1.8
Raft 4 persons	0.5	1.2	1.7	2.3	2.6	2.8	2.8
Raft 6 persons	0.5	1.4	2.0	2.7	3.2	3.5	3.5
Raft 8 persons	0.5	1.5	2.1	2.9	3.4	3.7	3.7
Raft 10 persons	0.6	1.6	2.2	3.1	3.7	4.0	4.0
Raft 15 persons	0.6	1.7	2.4	3.4	4.0	4.5	5.0
Raft 20 persons	0.6	1.8	2.6	3.9	4.6	5.2	5.9
Raft 25 persons	0.6	1.9	2.8	4.2	5.0	5.6	6.5
Power boat < 4,5 (< 15)	0.5	1.2	1.6	2.0	2.3	2.4	2.4
Power boat 4,5 to 7,5 (15 to 25)	0.7	2.0	2.9	4.4	5.3	5.9	5.9
Power boat 7,5 to 12 (25 to 40)	0.7	2.5	3.9	6.2	7.8	9.0	10.7
Power boat 12 to 20 (40 to 65)	0.8	3.1	5.1	9.2	12.3	14.7	18.5
Power boat 20 to 28 (65 to 90)	0.8	3.3	5.7	10.9	15.0	18.4	23.9
Sailboat 4,5 (15)	0.7	1.9	2.7	4.0	4.8	5.3	5.3
Sailboat 6,0 (20)	0.7	2.2	3.2	4.9	6.0	6.7	6.7
Sailboat 7,5 (25)	0.7	2.5	3.7	5.8	7.2	8.3	8.3
Sailboat 9,0 (30)	0.8	2.7	4.2	6.9	8.8	10.2	12.3
Sailboat 12,0 (40)	0.8	3.0	4.9	8.6	11.3	13.5	16.8
Sailboat 15,0 (50)	0.8	3.1	5.3	9.5	12.7	15.4	19.4
Sailboat 19,5 to 23,0 (65 to 75)[2]	0.8	3.2	5.5	10.4	14.2	17.3	22.2
Sailboat 23,0 to 28,0 (75 to 90)[2]	0.8	3.3	5.7	11.0	15.2	18.8	24.4
Ship 28,0 to 45,0 (90 to 150)	0.8	3.4	6.0	12.2	17.4	21.9	29.3
Ship 45,0 to 90,0 (150 to 300)	0.8	3.4	6.3	13.6	20.4	26.6	37.3
Ship > 90,0 (> 300)	0.8	3.5	6.4	14.3	22.2	29.8	43.8

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Appendix E Sweep Width Computation

E.01 – Visual W_u Tables *(continued from previous page)*

E.01.12	HELICOPTERS – Altitude 300 metres (1000 feet)						
SEARCH OBJECT in metres (feet)	VISIBILITY in NM						
	1	3	5	10	15	20	30
Person in water	0.0	0.1	0.1	0.1	0.1	0.1	0.1
PIW with PDF/surfboard	0.0	0.1	0.1	0.1	0.1	0.1	0.1
Raft 1 person	0.4	0.9	1.2	1.6	1.8	1.8	1.8
Raft 4 persons	0.5	1.2	1.7	2.3	2.6	2.9	2.9
Raft 6 persons	0.5	1.4	2.0	2.8	3.2	3.5	3.5
Raft 8 persons	0.5	1.5	2.1	2.9	3.4	3.8	3.8
Raft 10 persons	0.5	1.6	2.2	3.2	3.7	4.1	4.1
Raft 15 persons	0.6	1.7	2.4	3.5	4.1	4.5	5.1
Raft 20 persons	0.6	1.8	2.7	3.9	4.7	5.2	6.0
Raft 25 persons	0.6	1.9	2..8	4.2	5.1	5.7	6.5
Power boat < 4,5 (< 15)	0.5	1.2	1.6	2.1	2.3	2.5	2.5
Power boat 4,5 to 7,5 (15 to 25)	0.7	2.1	3.0	4.4	5.3	5.9	5.9
Power boat 7,5 to 12 (25 to 40)	0.7	2.6	3.9	6.3	7.9	9.1	10.8
Power boat 12 to 20 (40 to 65)	0.7	3.1	5.2	9.2	12.3	14.8	18.6
Power boat 20 to 28 (65 to 90)	0.8	3.3	5.7	10.9	15.0	18.5	23.9
Sailboat 4,5 (15)	0.6	1.9	2.8	4.0	4.8	5.4	5.4
Sailboat 6,0 (20)	0.7	2.2	3.2	4.9	6.0	6.8	6.8
Sailboat 7,5 (25)	0.7	2.5	3.7	5.8	7.3	8.3	8.3
Sailboat 9,0 (30)	0.7	2.7	4.2	6.9	8.8	10.3	12.4
Sailboat 12,0 (40)	0.7	3.0	4.9	8.6	11.4	13.5	16.8
Sailboat 15,0 (50)	0.7	3.1	5.3	9.5	12.8	15.4	19.5
Sailboat 19,5 to 23,0 (65 to 75)[2]	0.8	3.2	5.6	10.4	14.2	17.3	22.2
Sailboat 23,0 to 28,0 (75 to 90)[2]	0.8	3.3	5.7	11.0	15.3	18.8	24.4
Ship 28,0 to 45,0 (90 to 150)	0.8	3.4	6.0	12.2	17.4	21.9	29.3
Ship 45,0 to 90,0 (150 to 300)	0.8	3.4	6.3	13.6	20.4	26.6	37.3
Ship > 90,0 (> 300)	0.8	3.5	6.4	14.3	22.2	29.8	43.9

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Appendix E Sweep Width Computation

E.01 – Visual W_u Tables *(continued from previous page)*

E.01.13	HELICOPTERS – Altitude 450 metres (1500 feet) [1]						
SEARCH OBJECT in metres (feet)	VISIBILITY in NM						
	1	3	5	10	15	20	30
Person in water	0.0	0.0	0.0	0.1	0.1	0.1	0.1
PIW with PDF/surfboard	0.0	0.0	0.0	0.1	0.1	0.1	0.1
Raft 1 person	0.3	0.9	1.2	1.6	1.8	1.8	1.8
Raft 4 persons	0.4	1.2	1.7	2.3	2.7	2.9	2.9
Raft 6 persons	0.4	1.4	2.0	2.8	3.3	3.6	3.6
Raft 8 persons	0.4	1.5	2.1	3.0	3.5	3.9	3.9
Raft 10 persons	0.4	1.6	2.2	3.2	3.8	4.2	4.2
Raft 15 persons	0.5	1.7	2.4	3.5	4.2	4.6	5.2
Raft 20 persons	0.5	1.9	2.7	4.0	4.8	5.3	6.1
Raft 25 persons	0.5	2.0	2.9	4.3	5.2	5.8	6.7
Power boat < 4,5 (< 15)	0.4	1.3	1.7	2.2	2.5	2.6	2.6
Power boat 4,5 to 7,5 (15 to 25)	0.6	2.1	3.0	4.5	5.4	6.1	6.1
Power boat 7,5 to 12 (25 to 40)	0.6	2.6	4.0	6.3	7.9	9.2	10.9
Power boat 12 to 20 (40 to 65)	0.7	3.1	5.2	9.3	12.4	14.8	18.6
Power boat 20 to 28 (65 to 90)	0.7	3.2	5.7	10.9	15.1	18.5	24.0
Sailboat 4,5 (15)	0.6	2.0	2.8	4.1	4.9	5.5	5.5
Sailboat 6,0 (20)	0.6	2.2	3.3	5.0	6.1	6.9	6.9
Sailboat 7,5 (25)	0.6	2.5	3.8	5.9	7.4	8.4	8.4
Sailboat 9,0 (30)	0.6	2.7	4.2	7.0	8.9	10.3	12.5
Sailboat 12,0 (40)	0.6	3.0	4.9	8.7	11.4	13.6	16.9
Sailboat 15,0 (50)	0.7	3.1	5.3	9.6	12.8	15.5	19.5
Sailboat 19,5 to 23,0 (65 to 75)[2]	0.7	3.2	5.6	10.4	14.3	17.4	22.3
Sailboat 23,0 to 28,0 (75 to 90)[2]	0.7	3.3	5.7	11.1	15.3	18.8	24.5
Ship 28,0 to 45,0 (90 to 150)	0.7	3.3	6.0	12.2	17.5	22.0	29.4
Ship 45,0 to 90,0 (150 to 300)	0.7	3.4	6.3	13.6	20.4	26.6	37.3
Ship > 90,0 (> 300)	0.7	3.4	6.4	14.3	22.2	29.8	43.9

[1] Shaded entries indicate combinations of search object and altitude that should be avoided.

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Appendix E Sweep Width Computation

E.01 – Visual W_u Tables *(continued from previous page)*

E.01.14	HELICOPTERS – Altitude 600 metres (2000 feet) [1]						
SEARCH OBJECT in metres (feet)	VISIBILITY in NM						
	1	3	5	10	15	20	30
Person in water	0.0	0.0	0.0	0.0	0.0	0.1	0.1
PIW with PDF/surfboard	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Raft 1 person	0.2	0.8	1.2	1.6	1.8	1.8	0.8
Raft 4 persons	0.3	1.2	1.7	2.3	2.7	3.0	3.0
Raft 6 persons	0.3	1.4	2.0	2.8	3.3	3.6	3.6
Raft 8 persons	0.3	1.5	2.1	3.0	3.6	3.9	3.9
Raft 10 persons	0.3	1.6	2.3	3.3	3.9	4.2	4.2
Raft 15 persons	0.3	1.7	2.5	3.6	4.3	4.7	5.3
Raft 20 persons	0.4	1.8	2.7	4.0	4.9	5.4	6.2
Raft 25 persons	0.4	1.9	2.9	4.3	5.3	5.9	6.8
Power boat < 4,5 (< 15)	0.3	1.3	1.7	2.3	2.6	2.7	2.7
Power boat 4,5 to 7,5 (15 to 25)	0.4	2.1	3.0	4.5	5.5	6.1	6.1
Power boat 7,5 to 12 (25 to 40)	0.5	2.6	4.0	6.4	8.0	9.3	11.0
Power boat 12 to 20 (40 to 65)	0.5	3.0	5.2	9.3	12.4	14.9	18.7
Power boat 20 to 28 (65 to 90)	0.5	3.2	5.7	10.9	15.1	18.5	24.0
Sailboat 4,5 (15)	0.4	1.9	2.8	4.2	5.0	5.6	5.6
Sailboat 6,0 (20)	0.5	2.2	3.3	5.1	6.2	7.0	7.0
Sailboat 7,5 (25)	0.5	2.5	3.8	6.0	7.5	8.6	8.6
Sailboat 9,0 (30)	0.5	2.7	4.3	7.0	9.0	10.4	12.6
Sailboat 12,0 (40)	0.5	3.0	4.9	8.7	11.4	13.6	17.0
Sailboat 15,0 (50)	0.5	3.1	5.3	9.6	12.9	15.5	19.6
Sailboat 19,5 to 23,0 (65 to 75)[2]	0.5	3.2	5.6	10.5	14.3	17.4	22.4
Sailboat 23,0 to 28,0 (75 to 90)[2]	0.5	3.2	5.7	11.1	15.4	18.9	24.6
Ship 28,0 to 45,0 (90 to 150)	0.5	3.3	6.0	12.2	17.5	22.0	29.4
Ship 45,0 to 90,0 (150 to 300)	0.5	3.4	6.3	13.6	20.4	26.6	37.4
Ship > 90,0 (> 300)	0.6	3.4	6.4	14.3	22.2	29.8	43.9

[1] Shaded entries indicate combinations of search object and altitude that should be avoided.

(continued on next page)

Appendix E Sweep Width Computation

E.01 – Visual W_u Tables *(continued from previous page)*

E.01.15	HELICOPTERS – Altitude 750 metres (2500 feet)[1]						
SEARCH OBJECT in metres (feet)	VISIBILITY in NM						
	1	3	5	10	15	20	30
Person in water	0.0	0.0	0.0	0.0	0.0	0.0	0.1
PIW with PDF/surfboard	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Raft 1 person	0.1	0.8	1.1	1.6	1.8	1.8	1.8
Raft 4 persons	0.2	1.1	1.6	2.3	2.7	3.0	3.0
Raft 6 persons	0.2	1.3	1.9	2.8	3.3	3.7	3.7
Raft 8 persons	0.2	1.4	2.1	3.1	3.6	4.0	4.0
Raft 10 persons	0.2	1.5	2.2	3.3	3.9	4.3	4.3
Raft 15 persons	0.2	1.7	2.5	3.6	4.3	4.8	5.4
Raft 20 persons	0.3	1.8	2.7	4.1	4.9	5.5	6.3
Raft 25 persons	0.3	1.9	2.9	4.4	5.3	6.0	6.9
Power boat < 4,5 (< 15)	0.2	1.2	1.7	2.3	2.6	2.8	2.8
Power boat 4,5 to 7,5 (15 to 25)	0.3	2.0	3.0	4.6	5.5	6.2	6.2
Power boat 7,5 to 12 (25 to 40)	0.4	2.5	4.0	6.5	8.1	9.3	11.1
Power boat 12 to 20 (40 to 65)	0.4	3.0	5.2	9.3	12.4	14.9	18.8
Power boat 20 to 28 (65 to 90)	0.4	3.2	5.7	10.9	15.1	18.6	24.1
Sailboat 4,5 (15)	0.3	1.9	2.8	4.2	5.1	5.6	5.6
Sailboat 6,0 (20)	0.3	2.2	3.3	5.1	6.3	7.1	7.1
Sailboat 7,5 (25)	0.4	2.5	3.8	6.1	7.6	8.7	8.7
Sailboat 9,0 (30)	0.4	2.7	4.3	7.1	9.0	10.5	12.6
Sailboat 12,0 (40)	0.4	2.9	4.9	8.7	11.5	13.7	17.0
Sailboat 15,0 (50)	0.4	3.1	5.3	9.6	12.9	15.6	19.7
Sailboat 19,5 to 23,0 (65 to 75)[2]	0.4	3.1	5.6	10.5	14.3	17.5	22.4
Sailboat 23,0 to 28,0 (75 to 90)[2]	0.4	3.2	5.7	11.1	15.4	18.9	24.6
Ship 28,0 to 45,0 (90 to 150)	0.4	3.3	6.0	12.2	17.5	22.0	29.4
Ship 45,0 to 90,0 (150 to 300)	0.4	3.3	6.3	13.6	20.4	26.6	37.4
Ship > 90,0 (> 300)	0.5	3.4	6.4	14.3	22.2	29.8	43.9

[1] Shaded entries indicate combinations of search object and altitude that should be avoided.

(continued on next page)

Appendix E Sweep Width Computation

E.01 – Visual W_u Tables *(continued from previous page)*

E.01.16	HELICOPTERS – Altitude 900 metres (3000 feet) [1]						
SEARCH OBJECT in metres (feet)	VISIBILITY in NM						
	1	3	5	10	15	20	30
Person in water	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PIW with PDF/surfboard	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Raft 1 person	0.1	0.7	1.0	1.5	1.8	1.8	1.8
Raft 4 persons	0.1	1.0	1.6	2.3	2.7	3.0	3.0
Raft 6 persons	0.1	1.2	1.9	2.8	3.3	3.7	3.7
Raft 8 persons	0.1	1.3	2.1	3.1	3.6	4.0	4.0
Raft 10 persons	0.1	1.4	2.2	3.3	3.9	4.3	4.3
Raft 15 persons	0.2	1.6	2.4	3.7	4.4	4.9	5.5
Raft 20 persons	0.2	1.7	2.7	4.1	5.0	5.6	6.3
Raft 25 persons	0.2	1.9	2.9	4.4	5.4	6.0	6.9
Power boat < 4,5 (< 15)	0.1	1.1	1.7	2.3	2.7	2.9	2.9
Power boat 4,5 to 7,5 (15 to 25)	0.2	2.0	3.0	4.6	5.6	6.3	6.3
Power boat 7,5 to 12 (25 to 40)	0.2	2.5	4.0	6.5	8.2	9.4	11.2
Power boat 12 to 20 (40 to 65)	0.3	3.0	5.2	9.3	12.5	15.0	18.8
Power boat 20 to 28 (65 to 90)	0.3	3.1	5.7	10.9	15.1	18.6	24.1
Sailboat 4,5 (15)	0.2	1.9	2.8	4.3	5.1	5.7	5.7
Sailboat 6,0 (20)	0.2	2.1	3.3	5.2	6.3	7.1	7.1
Sailboat 7,5 (25)	0.2	2.4	3.9	6.1	7.7	8.8	8.8
Sailboat 9,0 (30)	0.2	2.6	4.3	7.1	9.1	10.6	12.7
Sailboat 12,0 (40)	0.3	2.9	4.9	8.7	11.5	13.7	17.1
Sailboat 15,0 (50)	0.3	3.0	5.3	9.7	13.0	15.6	19.7
Sailboat 19,5 to 23,0 (65 to 75)[2]	0.3	3.1	5.6	10.5	14.4	17.5	22.5
Sailboat 23,0 to 28,0 (75 to 90)[2]	0.3	3.1	5.7	11.1	15.4	19.0	24.7
Ship 28,0 to 45,0 (90 to 150)	0.3	3.2	6.0	12.2	17.5	22.0	29.5
Ship 45,0 to 90,0 (150 to 300)	0.3	3.3	6.3	13.6	20.4	26.6	37.4
Ship > 90,0 (> 300)	0.3	3.3	6.4	14.3	22.2	29.8	43.9

[1] Shaded entries indicate combinations of search object and altitude that should be avoided.

NOTE: Where visibility exceeds 3 NM and the size of the search object exceeds 7,5 metres (25 feet), these sweep widths remain applicable for altitudes up to 1500 metres (5000 feet).

(continued on next page)

Appendix E Sweep Width Computation

E.01 – Visual W_u Tables *(continued from previous page)*

E.01.17	MERCHANT SHIPS or LARGE PRIMARY SAR VESSELS					
SEARCH OBJECT in metres (feet)	VISIBILITY in NM					
	1	3	5	10	15	20
Person in water	*	0.4	0.5	0.6	0.7	0.7
PIW with PDF/surfboard	*	*	*	*	*	*
Raft 1 person	*	*	*	*	*	*
Raft 4 persons	*	2.3	3.2	4.2	4.9	5.5
Raft 6 persons	*	2.5	3.6	5.0	6.2	6.9
Raft 8 persons	*	*	*	*	*	*
Raft 10 persons	*	*	*	*	*	*
Raft 15 persons	*	2.6	4.0	5.1	6.4	7.3
Raft 20 persons	*	*	*	*	*	*
Raft 25 persons	*	2.7	4.2	6.2	6.5	7.5
Power boat < 4,5 (< 15)	*	1.1	1.4	1.9	2.1	2.3
Power boat 4,5 to 7,5 (15 to 25)	*	2.0	2.9	4.3	5.2	5.8
Power boat 7,5 to 12 (25 to 40)	*	2.8	4.5	7.6	9.4	11.6
Power boat 12 to 20 (40 to 65)	*	*	*	*	*	*
Power boat 20 to 28 (65 to 90)	*	3.2	5.6	10.7	14.7	18.1
Sailboat 4,5 (15)	*	*	*	*	*	*
Sailboat 6,0 (20)	*	*	*	*	*	*
Sailboat 7,5 (25)	*	*	*	*	*	*
Sailboat 9,0 (30)	*	*	*	*	*	*
Sailboat 12,0 (40)	*	*	*	*	*	*
Sailboat 15,0 (50)	*	*	*	*	*	*
Sailboat 19,5 to 23,0 (65 to 75)[2]	*	*	*	*	*	*
Sailboat 23,0 to 28,0 (75 to 90)[2]	*	*	*	*	*	*
Ship 28,0 to 45,0 (90 to 150)	*	*	*	*	*	*
Ship 45,0 to 90,0 (150 to 300)	*	*	*	*	*	*
Ship > 90,0 (> 300)	*	*	*	*	*	*

* Information not available.

(continued on next page)

Appendix E Sweep Width Computation

E.01 – Visual W_u Tables *(continued from previous page)*

E.01.18	BOATS, i.e. type 500 (90' all weather patrol boat)					
SEARCH OBJECT in metres (feet)	VISIBILITY in NM					
	1	3	5	10	15	20
Person in water	0.3	0.4	0.5	0.5	0.5	0.5
PIW with PDF/surfboard	0.3	0.4	0.5	0.5	0.5	0.5
Raft 1 person	0.9	1.8	2.3	3.1	3.4	3.7
Raft 4 persons	1.0	2.2	3.0	4.0	4.6	5.0
Raft 6 persons	1.1	2.5	3.4	4.7	5.5	6.0
Raft 8 persons	1.1	2.5	3.5	4.8	5.7	6.2
Raft 10 persons	1.1	2.6	3.6	5.1	6.1	6.7
Raft 15 persons	1.1	2.8	3.8	5.5	6.5	7.2
Raft 20 persons	1.2	3.0	4.1	6.1	7.3	8.1
Raft 25 persons	1.2	3.1	4.3	6.4	7.8	8.7
Power boat < 4,5 (< 15)	0.5	1.1	1.4	1.9	2.1	2.3
Power boat 4,5 to 7,5 (15 to 25)	1.0	2.0	2.9	4.3	5.2	5.8
Power boat 7,5 to 12 (25 to 40)	1.1	2.5	3.8	6.1	7.7	8.8
Power boat 12 to 20 (40 to 65)	1.2	3.1	5.1	9.1	12.1	14.4
Power boat 20 to 28 (65 to 90)	1.2	3.2	5.6	10.7	14.7	18.1
Sailboat 4,5 (15)	1.0	1.9	2.7	3.9	4.7	5.2
Sailboat 6,0 (20)	1.0	2.2	3.2	4.8	5.9	8.6
Sailboat 7,5 (25)	1.1	2.4	3.6	5.7	7.0	8.1
Sailboat 9,0 (30)	1.1	2.7	4.1	6.8	8.6	10.0
Sailboat 12,0 (40)	1.2	3.0	4.9	8.5	11.2	13.3
Sailboat 15,0 (50)	1.2	3.1	5.2	9.4	12.5	15.0
Sailboat 19,5 to 23,0 (65 to 75)[2]	1.2	3.2	5.5	10.2	13.9	16.9
Sailboat 23,0 to 28,0 (75 to 90)[2]	1.2	3.3	5.7	10.8	15.0	18.4
Ship 28,0 to 45,0 (90 to 150)	1.8	3.3	6.0	12.0	17.1	21.5
Ship 45,0 to 90,0 (150 to 300)	1.8	3.4	6.3	13.4	20.1	26.1
Ship > 90,0 (> 300)	1.8	3.4	6.4	14.1	21.8	29.2

(continued on next page)

Appendix E Sweep Width Computation

E.01 – Visual W_u Tables *(continued from previous page)*

E.01.19	SMALL BOATS, i.e. type 300 (12,5 metres [41'] utility boat)					
SEARCH OBJECT in metres (feet)	VISIBILITY in NM					
	1	3	5	10	15	20
Person in water	0.2	0.2	0.3	0.3	0.3	0.3
PIW with PDF/surfboard	0.2	0.2	0.3	0.3	0.3	0.3
Raft 1 person	0.7	1.3	1.7	2.3	2.6	2.7
Raft 4 persons	0.7	1.7	2.2	3.1	3.5	3.9
Raft 6 persons	0.8	1.9	2.6	3.6	4.3	4.7
Raft 8 persons	0.8	2.0	2.7	3.8	4.4	4.9
Raft 10 persons	0.8	2.0	2.8	4.0	4.8	5.3
Raft 15 persons	0.9	2.2	3.0	4.3	5.1	5.7
Raft 20 persons	0.9	2.3	3.3	4.9	5.8	6.5
Raft 25 persons	0.9	2.4	3.5	5.2	6.3	7.0
Power boat < 4,5 (< 15)	0.4	0.8	1.1	1.5	1.6	1.8
Power boat 4,5 to 7,5 (15 to 25)	0.8	1.5	2.2	3.3	4.0	4.5
Power boat 7,5 to 12 (25 to 40)	0.8	1.9	2.9	4.7	5.9	6.8
Power boat 12 to 20 (40 to 65)	0.9	2.4	3.9	7.0	9.3	11.1
Power boat 20 to 28 (65 to 90)	0.9	2.5	4.3	8.3	11.4	14.0
Sailboat 4,5 (15)	0.8	1.5	2.1	3.0	3.6	4.0
Sailboat 6,0 (20)	0.8	1.7	2.5	3.7	4.6	5.1
Sailboat 7,5 (25)	0.9	1.9	2.8	4.4	5.4	6.3
Sailboat 9,0 (30)	0.9	2.1	3.2	5.3	6.6	7.7
Sailboat 12,0 (40)	0.9	2.3	3.8	6.6	8.6	10.3
Sailboat 15,0 (50)	0.9	2.4	4.0	7.3	9.7	11.6
Sailboat 19,5 to 23,0 (65 to 75)[2]	0.9	2.5	4.2	7.9	10.7	13.1
Sailboat 23,0 to 28,0 (75 to 90)[2]	0.9	2.5	4.4	8.3	11.6	14.2
Ship 28,0 to 45,0 (90 to 150)	1.4	2.5	4.6	9.3	13.2	16.6
Ship 45,0 to 90,0 (150 to 300)	1.4	2.6	4.9	10.3	15.5	20.2
Ship > 90,0 (> 300)	1.4	2.6	4.9	10.9	16.8	22.5

Appendix E Sweep Width Computation

E.2 – Correction Factor Tables

Re: *Section 5.01*

E.02.1	WEATHI R CORRECTION FACTOR (f_W)	
WEATHER	SEARCH OBJECT	
WINDS in km/h (knots) SEAS in metres (feet)	Person in water, raft or boat < 10 metres (33 feet)	Other search objects
WINDS < 28 (< 15) or SEAS 0 to 1 (0 to 3)	1.0	1.0
WINDS 28 to 46 (15 to 25) or SEAS 1 to 1.5 (3 to 5)	0.5	0.9
WINDS > 46 (> 25) or SEAS > 1.5 (> 5)	0.25	0.9

E.02.2	FATIGUE CORRECTION FACTOR (f_f)
Not fatigued	1.0
Fatigued	0.8

E.02.3	SEARCH AIRCRAFT SPEED (VELOCITY) CORRECTION FACTOR (f_v)						
SEARCH OBJECT in metres (feet)	FIXED WING SPEED in knots			HELICOPTER SPEED in knots			
	≤ 150	180	210	≤ 60	90	120	140
Person in water	1.2	1.0	0.9	1.5	1.0	0.8	0.7
Raft 1 to 4 persons	1.1	1.0	0.9	1.3	1.0	0.9	0.8
Raft 6 to 25 persons	1.1	1.0	0.9	1.2	1.0	0.9	0.8
Power boat < 8 (25)	1.1	1.0	0.9	1.2	1.0	0.9	0.8
Power boat 10 (33)	1.1	1.0	0.9	1.1	1.0	0.9	0.9
Power boat 16 (53)	1.1	1.0	1.0	1.1	1.0	0.9	0.9
Power boat 24 (78)	1.1	1.0	1.0	1.1	1.0	1.0	0.9
Sailboat < 8 (25)	1.1	1.0	0.9	1.2	1.0	0.9	0.9
Sailboat 12 (39)	1.1	1.0	1.0	1.1	1.0	0.9	0.9
Sailboat 25 (83)	1.1	1.0	1.0	1.1	1.0	1.0	0.9
Ship > 27 (> 90)	1.0	1.0	1.0	1.1	1.0	1.0	0.9

E.3 – Horizon Range vs. Height of Eye Table

Re: *Section 5.01*

NOTE: The table on the following page is used to help determine the horizon range from different heights of eye. If the search is in a mountainous or heavily wooded area, W should be further reduced by half.

(continued on next page)

Appendix E Sweep Width Computation

Height of eye (in feet)	Horizon Range (nautical miles)	
1	1.1	1.3
2	1.6	1.9
3	2.0	2.3
4	2.3	2.6
5	2.6	2.9
6	2.8	3.2
7	3.0	3.5
8	3.2	3.7
9	3.4	4.0
10	3.6	4.2
11	3.8	4.4
12	4.0	4.6
13	4.1	4.7
14	4.3	4.9
15	4.4	5.1
16	4.6	5.3
17	4.7	5.4
18	4.9	5.6
19	5.0	5.7
20	5.1	5.9
21	5.2	6.0
22	5.4	6.2
23	5.5	6.3
24	5.6	6.5
25	5.7	6.6
26	5.8	6.7
27	5.9	6.8
28	6.1	7.0
29	6.2	7.1
30	6.3	7.2
31	6.4	7.3
32	6.5	7.5
33	6.6	7.6
34	6.7	7.7
35	6.8	7.8
36	6.9	7.9
37	7.0	8.0
38	7.1	8.1
39	7.1	8.2
40	7.2	8.3
41	7.3	8.4
42	7.4	8.5
43	7.5	8.6
44	7.6	8.7
45	7.7	8.8
46	7.8	8.9
47	7.8	9.0
48	7.9	9.1
49	8.0	9.2
50	8.1	9.3
55	8.5	9.8
60	8.9	10.2
65	9.2	10.6
70	9.6	11.0
75	9.9	11.4
80	10.2	11.8
85	10.5	12.1
90	10.9	12.5
95	11.2	12.8
100	11.4	13.2
105	11.7	13.5
110	12.0	13.8
115	12.3	14.1

Height of eye (in feet)	Horizon Range (nautical miles)	Horizon Range (statute miles)
120	12.5	14.4
125	12.8	14.7
130	13.0	15.0
135	13.3	15.3
140	13.5	15.6
145	13.8	15.9
150	14.0	16.1
160	14.5	16.7
170	14.9	17.2
180	15.3	17.7
190	15.8	18.2
200	16.2	18.6
210	16.6	19.1
220	17.0	19.5
230	17.3	20.0
240	17.7	20.4
250	18.1	20.8
260	18.4	21.2
270	18.8	21.6
280	19.1	22.0
290	19.5	22.4
300	19.8	22.8
310	20.1	23.2
320	20.5	23.6
330	20.8	23.9
340	21.1	24.3
350	21.4	24.6
360	21.7	25.0
370	22.0	25.3
380	22.3	25.7
390	22.6	26.0
400	22.9	26.3
410	23.2	26.7
420	23.4	27.0
430	23.7	27.3
440	24.0	27.6
450	24.3	27.9
460	24.5	28.2
470	24.8	28.6
480	25.1	28.9
490	25.3	29.2
500	25.6	29.4
520	26.1	30.0
540	26.6	30.6
560	27.1	31.2
580	27.6	31.7
600	28.0	32.3
620	28.5	32.8
640	28.9	33.3
660	29.4	33.8
680	29.8	34.3
700	30.3	34.8
720	30.7	35.3
740	31.1	35.8
760	31.5	36.3
780	31.9	36.8
800	32.4	37.3
820	32.8	37.7
840	33.2	38.2
860	33.5	38.6
880	33.9	39.1
900	34.3	39.5
920	34.7	39.9

Height of eye (in feet)		Horizon Range (statute miles)
940	35.1	40.4
960	35.4	40.8
980	35.8	41.2
1 000	36.2	41.6
1 100	37.9	43.7
1 200	39.6	45.6
1 300	41.2	47.5
1 400	42.8	49.3
1 500	44.3	51.0
1 600	45.8	52.7
1 700	47.2	54.3
1 800	48.5	55.9
1 900	49.9	57.4
2 000	51.2	58.9
2 100	52.4	60.4
2 200	53.7	61.8
2 300	54.9	63.2
2 400	56.0	64.5
2 500	57.2	65.8
2 600	58.3	67.2
2 700	59.4	68.4
2 800	60.5	69.7
2 900	61.6	70.9
3 000	62.7	72.1
3 100	63.7	73.3
3 200	64.7	74.5
3 300	65.7	75.7
3 400	66.7	76.8
3 500	67.7	77.9
3 600	68.6	79.0
3 700	69.6	80.1
3 800	70.5	81.2
3 900	71.4	82.2
4 000	72.4	83.3
4 100	73.3	84.3
4 200	74.1	85.4
4 300	75.0	86.4
4 400	75.9	87.4
4 500	76.7	88.3
4 600	77.6	89.3
4 700	78.4	90.3
4 800	79.3	91.2
4 900	80.1	92.2
5 000	80.9	93.1
6 000	88.6	102.0
7 000	95.7	110.2
8 000	102.3	117.8
9 000	108.5	124.9
10 000	114.4	131.7
15 000	140.1	161.3
20 000	161.8	186.3
25 000	180.9	208.2
30 000	198.1	228.1
35 000	214.0	246.4
40 000	228.8	263.4
45 000	242.7	279.4
50 000	255.8	294.5
60 000	280.2	322.6
70 000	302.7	348.4
80 000	323.6	372.5
90 000	343.2	395.1
100 000	361.8	416.5
200 000	511.6	589.0

Appendix E Sweep Width Computation

E.4 – Uncorrected NVG Sweep Width Tables

Re: *Section 5.01*

NOTES:

1. The following tables show the available sweep width information for ***night vision goggles (NVG) searches***. These values should be viewed as rough estimates, the accuracy of which has to be assessed by the search planner on a case-by-case basis.
2. These tables are valid for both aeronautical and maritime search facilities.

E.04.1	**NVG SEARCHES FOR UNLIGHTED LIFE RAFTS[1]**
Sea Heights	Sweep Width
1 to 1.5 metres (3 to 5 feet)	1.3 NM
1.5 to 2,2 metres (5 to 7.2 feet)	0.6 NM

[1] These figures were achieved from maritime search and rescue units during trials and should be used with caution until verification data is gathered.

E.04.2	**NVG SEARCHES FOR SURVIVAL CRAFT LIGHTS[2]**
Wind Speed	Sweep Width
> 24 knots	4.0 NM
18 knots	5.0 NM
< 14 knots	5.7 NM

[2] These figures are for NVG searches of lighted life rafts without illumination provided by the search craft (i.e., infrared or illumination flares).

Appendix E Sweep Width Computation

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Annex 1 Excerpts from the *MCTS Standards Manual*

Part A1 – DISTRESS COMMUNICATIONS

1.1 General *(ITU Article RR32)*

a) Distress communications shall consist of all communications relating to the immediate assistance required by the mobile unit or person in distress.

b) Where a distress situation is not formally declared, but the mobile unit or person is in immediate danger, the MCTS Officer shall apply distress procedures.

c) In order to quickly and effectively resolve a SAR incident, there must always be close consultation between the MCTS Officer and the SAR Coordinator for the duration of that incident. Although JRCC/MRSC will provide instructions regarding the SAR action to be taken during a distress, the application of radio procedures regarding distress communications, the use of alarm signals, the ship-shore frequency, the mode and site(s) and handling of the transmissions shall be the responsibility of the MCTS Officer. Should a conflict occur that cannot be resolved immediately, the SAR Coordinator will exercise ultimate authority and accept responsibility for actions taken to resolve the incident.

To initiate SAR coordination, any MCTS Centre that receives information regarding a marine occurrence or aircraft emergency shall forward to a JRCC/MRSC, as soon as possible, all related information and any action taken.

1.17 JRCC/MRSC Request for an “ALL STATIONS” Broadcast

a) In some cases, the JRCC/MRSC may request an "ALL STATIONS" broadcast in response to certain situations. The MCTS Officer, in consultation with JRCC/MRSC, will determine the communication priority of broadcast. The MCTS Officer shall take immediate action upon request.

Part A3 – EMERGENCIES

3.9 Notification of Other Resources

Normally the MCTS Officer shall consult with the JRCC/MRSC prior to informing resources such as IRB units, CCG vessels and staffed lighthouse stations of the details of a marine occurrence. However, it is recognized that alerting rescue units about extremely serious situations, prior to contacting JRCC, may be justifiable. To prevent any confusion with respect to the “tasking” of such resources the MCTS Officer shall ensure that the notification is presented in a manner which clearly identifies that the unit has not yet been tasked by JRCC.

NOTE: The complete text of this manual may be found on the CCG Intranet web site: http://ccg-gcc.ncr.dfo-mpo.gc.ca/mcts-sctm/Publications/Manual5608/standardsmanual_e.htm.

Annex 1 Excerpts from the *MCTS Standards Manual*

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Annex 2 Excerpts from the *CCG National Incident Notification Procedure*

3 PURPOSE

The intention of the National Incident Notification Procedure is to provide CCG and DFO Senior Management, including the Deputy Minister, with an immediate initial alert to inform the organization that an event of significance has or is occurring.

4 INFORMATION GATHERING AND NOTIFICATION

4.1 Initial Notification

It is the responsibility of every CCG program to gather the relevant information and initiate this Procedure for significant events.

The implicated program is expected to gather the information from all relevant sources, where CCG is the lead response agency, as well as information on situations where CCG is not the lead response agency however the significant event may impact upon CCG operations and/or program delivery.

4.2 Information updates

The originating program will issue updates to the incident as significant changes occur, or every 24 hours.

4.3 Termination of event updates

The originating program will send a final message indicating that the incident has been terminated.

5 INCIDENT NOTIFICATION TO HEADQUARTERS

5.1 Regional Program Duty Officer:

Upon determination of a significant incident, the regional duty officer of the implicated program (or others) will make the following notification by telephone:

- **Verbally notify** their respective Assistant Commissioner Office as per regional processes;
- **Verbally notify** the appropriate regional Marine Communications and Traffic Services Centre to action an Incident Notification.

Original: 2010-08-18; revised: 2010-11-04.

Annex 2 Excerpts from the *CCG National Incident Notification Procedure*

CRITERIA FOR REPORTING SIGNIFICANT INCIDENT

- Major damage to a CCG facility, vessel, or aircraft;
- Threats against CCG personnel, facility, vessel or aircraft;
- Serious injury or loss of CCG personnel at work;
- Serious injury or loss of person(s) in a CCG facility, vessel or aircraft;
- Any marine incident where CCG resources have been tasked and where there is a loss of life;
- Any maritime SAR incident where a vessel(s) is (are) abandoned;
- Any SAR incident in which the Pacific Region Rescue Diving Unit is involved;
- Collision, sinking, grounding or any incident involving the release of significant marine pollution;
- Catastrophic loss of CCG operational systems (eg. INNAV, AIS, MCTS Centre, etc);
- Event requiring significant CCG resources (from one or more regions) that will impact on other CCG operations or programs;
- Natural disasters (occurring or anticipated) which may have an impact on the maritime transportation system and/or CCG operations or programs;
- Any incidents, which may cause a major disruption or threat of disruption to commercial shipping, or the maritime transportation system;
- Incidents with cross-border implications which in your opinion need to receive wide distribution within CCG/DFO;
- An increase in MARSEC levels of a port in Canada or of a vessel in Canadian waters;
- Other issues, which in your opinion, need to receive wide distribution within CCG/DFO (if unsure, contact the NCC Duty Officer at (613) 990-0123).

[The following shaded] criteria denote that no verbal notification is required.

- Prolonged unexpected loss of staff in operational centres or vessels resulting in decreased operational capacity;
- Special interest events as defined by Senior Management;
- Any high profile marine incident, directly or indirectly impacting the CCG, and would result in the attention on the House of Commons or the media;
- Any high profile incident resulting in the attention of another level of government, e.g. provincial, municipal, international, etc;
- Significant events received from external sources (eg. GOC, RCMP, DND, TC, CBSA, etc).

Annex 3 Excerpts from the *Maritime Safety Committee Circular MSC.1/Circ.1308*

GUIDANCE TO SEARCH AND RESCUE SERVICES IN RELATION TO REQUESTING AND RECEIVING LRIT INFORMATION

4 Requesting LRIT information

4.5 [...] the SAR service of Contracting Governments shall be entitled to receive LRIT information for the search and rescue of persons in distress at sea.

4.7 Regulation [...] does not draw any distinction between maritime and aeronautical search and rescue incidents and allows SAR services to request LRIT information, as long as it is for the purpose of the search and rescue of persons in distress at sea. [...]

4.8 A request for the provision of LRIT information for the search and rescue of persons in distress at sea is initiated by the LRIT Data Centre serving the SAR service transmitting a SAR SURPIC message via the International LRIT Data Exchange for broadcast to all LRIT Data Centres. This message requests the most recent data from the databases within all LRIT Data Centres in order to provide the SAR services with the ability to obtain a picture of ships within the geographical area specified by the SAR service requesting the information. In order to determine whether ships within the geographical area specified by the SAR service are transiting towards or away from the specific location the SAR service can request up to the last 4 preset transmission LRIT information from of all ships within the geographical area. All LRIT information which would be provided to the SAR service would be located within the geographical area specified by the SAR service. From that information the SAR service can identify which ships are more favourably positioned to respond to the situation and can poll those ships directly to determine their current locations.

5 Information to be provided when requesting LRIT information

5.1 A SAR service, when wishing to receive LRIT information should indicate to the LRIT Data Centre the criteria to be used by the centre when providing the requested information.

5.2 The criteria to be provided are:

.1 the geographical area within which LRIT information is requested; and

.2 the number of LRIT information transmissions requested.

5.3 All LRIT Data Centres are required to provide to SAR services LRIT information irrespective of the location of the geographical area within which the information is requested. Thus, SAR services are able to request LRIT information for geographical areas which are located outside the search and rescue regions which are under their responsibility.

5.3.1 The geographical area may be either circular or rectangular and for these the Technical specifications for communications within the LRIT system use the terms SAR circular area and SAR rectangular area, respectively. SAR services are advised to take into account the information provided in paragraphs 5.4 to 5.4.2 below when defining the geographical areas within which they are requesting the provision of LRIT information. In addition, SAR services, when formulating their initial request

Annex 3 Excerpts from the *Maritime Safety Committee Circular MSC.1/Circ.1308*

for the provisions of LRIT information, are advised to define the geographical area within which they are requesting the provision of LRIT information in a manner that is larger than the search area they have identified for search and rescue purposes, so as to be able to easily identify which ships are transiting towards or away from the specific location.

5.3.2 When requesting LRIT information within a SAR circular area the geographical position of the centre of the area should be indicated in latitude and longitude and the radius in nautical miles. The radius of the SAR circular area should not exceed 999 nautical miles. Any requests which include a radius in excess of 999 nautical miles would be rejected by the LRIT Data Centres which are asked to process them.

5.3.3 When requesting LRIT information within a SAR rectangular area the geographical position of the Southwest corner of the area should be indicated in latitude and longitude and the North and East offsets in degrees and minutes. Each offset should not exceed 2,000 nautical miles. Any requests which include an offset in excess of 2,000 nautical miles would be rejected by the LRIT Data Centres which are asked to process them.

5.3.4 The LRIT system operates using WGS 84 datum and thus all geographical positions should be with reference to the WGS 84 datum.

5.3.5 All geographical positions (latitude and longitude) should be in degrees and minutes, with a single space between the coordinates and no other spaces, without punctuation, with leading zeros for single number minutes, but not for degrees and with the minutes tick following the minutes part, for example 51°42´N 5°07´E.

5.4 The number of LRIT information transmissions requested relates to the LRIT information received within the LRIT system during the 24 hours preceding the time the LRIT Data Centre will lodge the request of the SAR service for LRIT information and for these the Technical specifications for communications within the LRIT system use the term number of position reports. In this respect, it should be noted that, unless there is a demand for the transmission of LRIT information at more frequent intervals, the shipborne equipment are preset to transmit LRIT information at 6-hour intervals.

5.4.1 When a SAR service indicates a value of 2 in relation to the number of positions it is requesting, it will receive the last two LRIT information transmissions from all ships within the defined geographical area during the previous 24 hours.

5.4.2 SAR services are advised to indicate to the LRIT Data Centre the number of positions they are requesting as it will provide them information in relation to the direction the various ships are heading. However, the number of positions to be requested should not exceed 4.

Annex 3 Excerpts from the *Maritime Safety Committee Circular MSC.1/Circ.1308*

7 Requesting additional LRIT information

7.1 A SAR service, after it has assessed the LRIT information it has received following its initial request, is able to request the provision of additional LRIT information on demand (i.e. to request the polling of ships in a geographical area).

10 Obligations of SAR services

10.1 [...] Contracting Governments shall, at all times:

.1 recognize the importance of long-range identification and tracking information;

.2 recognize and respect the commercial confidentiality and sensitivity of any long-range identification and tracking information they may receive;

.3 protect the information they may receive from unauthorized access or disclosure; and

.4 use the information they may receive in a manner consistent with international law. [...]

10.3 [...] Contracting Governments may report to the Organization any case where they consider that provisions of the regulation or of any other related requirements established by the Organization have not been or are not being observed or adhered to.

11 Cost of the LRIT information provided to SAR services

11.1 [...] SAR services shall be entitled to receive, free of any charges, LRIT information in relation to the search and rescue of persons in distress at sea.

11.2 SAR services should note that the provision of LRIT information to them entails expenditures and costs for the LRIT Data Centres and the International LRIT Data Exchange which need to be paid by the other LRIT Data Users as an overhead on the charges they have to pay for the provision of LRIT information to them.

11.3 SAR services are strongly urged, notwithstanding the purpose for which they might be requesting the provision of LRIT information, to exercise the right to request LRIT information with due care and to avoid excessive requests.

12 Performance review and audit of the LRIT system

12.1 SAR services are, subject to the provisions of the national legislation of the Contracting Government in whose territory they are located, expected to provide, when requested by the LRIT Coordinator, information, to enable the holistic review of the performance of the LRIT system and for the investigation of any disputes.

12.2 SAR services are thus expected to maintain the necessary records identifying the cases for which they have requested the provision of LRIT information; what information they have requested and when, what LRIT information they have received and when; and how the information was used.

Annex 3 Excerpts from the *Maritime Safety Committee Circular MSC.1/Circ.1308*

12.2.1 Such records may form part of the operational records maintained by the SAR services.

12.2.2 SAR services should note that all LRIT Data Centres are required to archive LRIT information for at least one year and until such time as the Committee reviews and accepts the annual report of the audit of their performance by the LRIT Coordinator. Thus, SAR services are expected to retain the related records until the Committee reviews and accepts the annual report of the audit of their performance of the LRIT Data Centre providing services to them.

12.3 SAR services are also expected to provide, when requested by the LRIT Coordinator, information on the arrangements they have in place in order to protect the LRIT information they may receive from unauthorized access or disclosure.

International Maritime Organization, 9 June 2009

Annex 4 Excerpts from the CCG *Operational Procedures on Assistance to Disabled Vessels*

NOTE: Different excerpts from the Canadian Coast Guard (CCG) *Policy and Operational Procedures for Assistance to Disabled Vessels* are shown in *CAMSAR I, Annex 4,* and in *CAMSAR III, Annex 1.*

2. Assistance to a Disabled Vessel (i.e. not in Distress)

2.1 IN OPEN WATER

2.1.1 No waiting period should delay the tasking of any mobile facility to any situation where there is an uncertainty as to the safety of the persons at sea.

2.1.2 When the master of a disabled vessel requesting assistance (non-distress or non-potential distress) is in direct communication with a Marine Communications and Traffic Services (MCTS) Centre, Regional Operations Centre, or Ice Office and has advised that persons onboard are in no immediate danger, the centre/office shall ensure that the Maritime SAR Mission Co-ordinator (at the Joint Rescue Co-ordination Centre or Maritime Rescue Sub-centre (JRCC/MRSC)) for the area in which the disabled vessel is located is informed and provided with all pertinent information in order for the Maritime SAR Mission Co-ordinator to take the lead. As the vessel is not in distress, sufficient time will be taken to evaluate the request before deciding on a course of action. CCG will not compete with commercial salvage or towing interests and therefore will not tow disabled vessels unless all efforts to obtain commercial or private assistance have been carried-out and have failed to resolve the situation. In general[1]:

1. The Maritime SAR Mission Co-ordinator, normally through the appropriate MCTS Centre, shall advise the owner/operator to make his or her own arrangements for assistance;

2. If the owner/operator is unable or unwilling to secure arrangements for assistance, the Maritime SAR Mission Co-ordinator shall request that the MCTS Centre issue a Maritime Assistance Request Broadcast (MARB) alerting all private, commercial and vessels of opportunity in the area of the need for assistance and thus giving them the opportunity to provide this assistance;

3. If there is no response to the MARB, in special circumstances, the Maritime SAR Mission Co-ordinator may contact other mobile facilities such as CCG primary SAR units or CCGA to provide an expeditious response;

4. The Maritime SAR Co-ordinator will consult with the Regional Operations Centre if it is determined that assistance will be needed from a CCG vessel not on primary SAR as the tasking may impact other programs. In all cases, when the Maritime SAR Mission Co-ordinator tasks CCG resources they shall provide all pertinent information regarding the vessel requiring assistance and instruct the Commanding Officer to take any reasonable action in order to resolve the situation.

[1] Refer to the *Towing Decision Flow Chart*, shown at the end of this annex.

Annex 4 Excerpts from the CCG *Operational Procedures on Assistance to Disabled Vessels*

5. The Maritime SAR Mission Co-ordinator through their regional alert network must provide Transport Canada Marine Safety and Transportation Safety Board with details of the incident in order to support actions preventing similar incidents from occurring in the future. Special emphasis should be placed on situations when the SAR Mission Co-ordinator and/or the Commanding Officer of the assisting vessel reasonably believe that the disabled vessel had to be assisted because it was un-seaworthy or otherwise in violation of *Canada Shipping Act, 2001*, and/or the regulations made there under.

2.1.3 Although the Maritime SAR Mission Co-ordinator should not routinely engage in obtaining third party assistance for a disabled vessel, in exceptional circumstances and in complete consultation with the owner/operator of the disabled vessel, the Maritime SAR Mission Co-ordinator may aid in co-ordinating commercial or private assistance. The owner/operator shall be informed and agree that he or she will always remain responsible for any and all costs incurred. It must be made clear to the supplier and the end user of the assisting service that the CCG or the Crown has no contractual or other obligation whatsoever in any arrangement.

2.1.4 Regions are to ensure that CCG Environmental Response and partner agencies, such as Transport Canada Marine Safety and the Transportation Safety Board are informed of the details of requests for assistance according to established protocols. Any requests received by Regional Operations Centre for CCG resources to assist disabled vessels on behalf of partner agencies shall be forwarded to the Assistant Commissioner. The Assistant Commissioner’s approval will be required before any CCG resource is tasked to tow disabled vessels of 33 metres or more in length.

2.1.5 For disabled vessels in open water, in order to prevent more serious safety risks from developing, technical assistance may be provided on an as available basis by the CCG only after efforts to obtain commercial or private assistance have been carried out and have failed to resolve the situation.

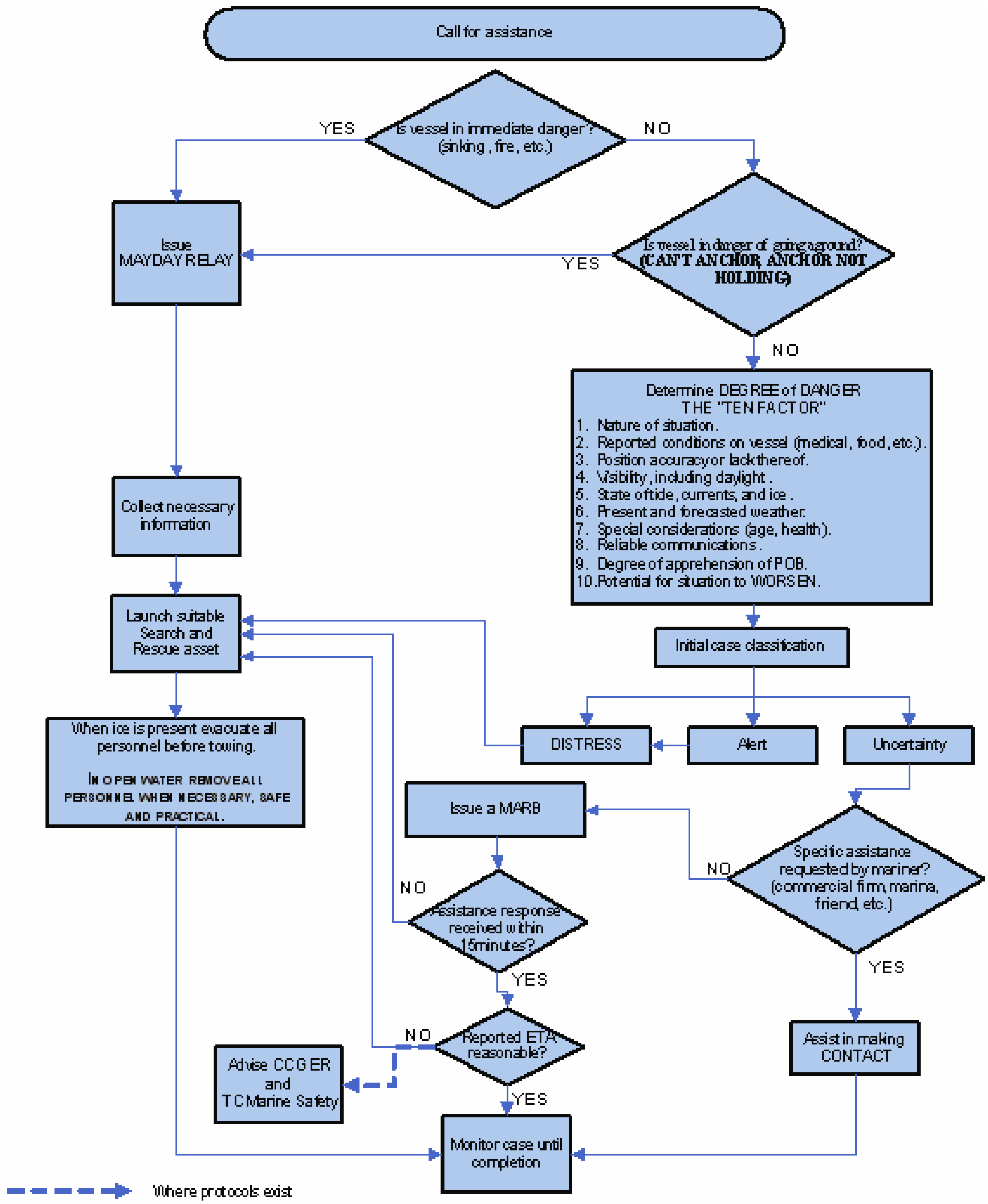
2.1.8 Requests to use a CCG resource to engage in salvage operations of vessels, outside of a SAR operation, with no persons on board shall be carefully assessed prior to authorization by the Assistant Commissioner. Since salvage is normally the responsibility of the vessel owner, the status of the owner must be determined to be unknown, unwilling or unable. Recovery of an abandoned vessel including towing to a place of refuge should be made under the CCG Environmental Response mandate.

21 December 2010

NOTE: The complete text of this document may be found on the CCG Intranet web site: http://ccg-gcc.ncr.dfo-mpo.gc.ca/commissioner-commissaire/policies-eng.html.

Annex 4 Excerpts from the CCG *Operational Procedures on Assistance to Disabled Vessels*

TOWING DECISION FLOW CHART



Annex 4 Excerpts from the CCG *Operational Procedures on Assistance to Disabled Vessels*

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National Defence | Défense nationale | B-GA-209-001/FP-001
Fisheries and Oceans Canada | Pêches et Océans Canada | DFO 5449
Canadian Coast Guard | Garde côtière canadienne

CAMSAR III

CANADIAN AERONAUTICAL AND MARITIME SEARCH AND RESCUE MANUAL

Volume III – Mobile Facilities

(ENGLISH)

Supplement to the IAMSAR Manual, Volume III

Canada

Chapter 1 OVERVIEW

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Chapter 1 OVERVIEW

1.01 Ground Search Parties

Search Techniques

1.01.1 Ground search parties are normally utilized either to conduct a search covering a small area of ground or to aid in the evacuation of personnel and equipment from crashes or during emergency incidents.

1.01.2 Search Patterns **–** Normally, ground search patterns will conform to either the parallel sweep or contour type of search. Variations and modifications of these basic patterns may be required because of local terrain factors. The two most common patterns are:

.1 Parallel Sweep **–** This is the most common type of ground search pattern. It is normally accomplished by forming up a number of people in a straight line evenly spaced apart. The distance between them will vary depending on the terrain and the object of the search. Everyone must be able to see everything between themselves and the persons on each side. The persons on each end of the line are known as flankers and they are responsible for the guidance and control of the search line. In commencing to search an area, the number one flanker usually tries to follow a natural boundary of some type or a predetermined compass course. During the first leg of the search, the party moves on the number one flanker, advancing in the abreast formation. The number two flanker should blaze or mark a trail so that when the party comes to the end of the first leg they can pivot about the number two flanker and proceed in the opposite direction on the second leg. The party will now move on the number two flanker who is searching along his blazed trail. The number one flanker will now be blazing a trail to follow on the third leg. This method is continued until the search area is completely covered.

.2 Contour Search **–** This type of search is a modification of the parallel sweep and is conducted in hilly or mountainous terrain. The search party commences searching at the highest point and a parallel sweep is carried out encircling the hill or terrain.

1.01.3 Search Control **–** The control of a search party is difficult to maintain. The most experienced personnel should be assigned as flankers with other experienced personnel strategically placed along the line of search to assist in party control. To keep control and ensure full coverage of an area, parties should not consist of more than ten people.

1.01.4 The party must proceed slowly and all members must maintain their correct spacing. Each person should maintain their distance from the person on their directing flank and also try to remain in line. Continuous contact is essential. It is a common fault for most to try to proceed too fast and as a result, the control of the search party is lost and full coverage is not ensured.

Chapter 1 OVERVIEW

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1.01.5 Incident Proximity Signs – All members of the search party should be instructed to watch for the object of the search and any sign that may indicate the proximity of the object of the search, such as:

.1 Broken or disturbed trees or underbrush

.2 Presence of smoke

.3 Pieces of clothing or wreckage

.4 Drops of oil or fuel

.5 Odour caused by decomposition

.6 Presence of scavengers

.7 Unusual sounds

.8 Unusually disturbed areas

Ground Search Briefing

1.01.6 The following points shall be included during the briefing of a ground search party before it sets out on a search operation or rescue mission:

.1 Full details of the missing aircraft or persons

.2 The type of terrain the party will encounter if known

.3 Map references of the area and routes to be followed to the search area of the crash site

.4 Aerial support which will be provided

.5 Special equipment that is to be carried

.6 Equipment that will be supply dropped

.7 Action to be taken on locating the missing object or on arrival at the crash site

.8 Communications procedures and use of ground-air signals

On-scene Procedures

1.01.7 Mandatory Equipment **–** The leader of the ground search party shall ensure that each member of the ground party is adequately equipped for the operation and that the following items are carried:

.1 Large scale maps of the area

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.2 Photographs of the surrounding terrain if available

.3 At least one transmitter and receiver with spare batteries capable of operating on VHF FM 149.08 MHz (Canadian SAR interagency frequency [SAR IF]) and HF 5717 kilohertz, or one portable SATCOM device capable of commercial telephone access and at least one of the on-scene working frequencies, including SAR IF

NOTE: The on-scene working frequencies are listed in *CAMSAR II, section 2.02 – SAR Radio Frequencies and Channels*.

.4 A copy of the ground/air visual code

.5 A list giving the number, rank, and name of each member of the party

1.01.8 Each member of the ground search party shall be completely equipped with proper clothing and footgear. Each member shall carry a knife, a whistle, a package of matches, and a compass. They shall carry sleeping bags, rations, signalling panels, flashlight, and signal flares if the party is to remain out overnight.

1.01.9 Proceeding On-scene **–** Unless personnel are themselves familiar with the terrain in which an operation is being conducted, search parties shall include, if available, at least one competent guide who is familiar with the area. The SAR Mission Coordinator (SMC) shall arrange the rate of remuneration with the guide prior to the departure of the party.

1.01.10 Normally, single file is the best method of advancing through bush. If the party must spread out in order to find a trail or crash site, continuous contact shall be maintained between all members of the party. One effective method is to number the members consecutively and then the leader can give command, “NUMBER”, to verify all are present.

1.01.11 The greatest care shall be taken that the party remains together. Should it be necessary to divide the party, each section shall be in the charge of a competent leader. If a member of a party is unable to continue, he shall not be sent back alone. If a party or any member of it becomes lost, the international distress signal of firing three shots should be used. The recognized acknowledgement is one shot. If no firearms are carried, the distress signal should be given by whistle or three loud sounds by any available means.

1.01.12 Search parties shall not travel at night unless the nature of the emergency warrants such action.

1.01.13 Ground search personnel operating watercraft shall observe all water safety regulations. Suitable life preservers shall be worn by all personnel using any type of maritime craft or raft.

1.01.14 Crash Site **–** On locating a crash site, the ground search party shall determine the number of survivors and deceased persons and inform the covering aircraft or search

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centre. If all persons who were aboard the missing aircraft are not immediately accounted for, the search shall continue in the event that someone has left the crash site or parachuted.

1.01.15 The leader of a ground search party shall ensure that no person, whether military or civilian, removes or interferes with an aircraft or wreckage, or disturbs or removes corpses until authorized by the Coroner and the SMC unless this action is required to make the area safe for the extraction of survivors. Where practical, pictures will be taken to preserve evidence with all copies returned to the SMC for distribution to the appropriate authorities.

1.01.16 Identification of deceased personnel is usually made from wallets, identification tags, watches, etc. When possible, two persons should be present when these are being gathered. Valuables and money shall be inventoried and turned over to the SMC or the police, and a receipt obtained.

1.01.17 Rescue Operations **–** When stretcher cases are to be transported any distance overland, a minimum of six persons shall be provided for each stretcher case. When available, an additional six persons shall be provided to spell off the original group and assist in clearing a trail.

Cooperation between Aircraft and Ground Search Parties

1.01.18 In many instances, aircraft can be of great assistance to ground search parties in locating the scene of a crash. Leaders of search parties and aircraft crews shall be briefed on the method of communication and the operation plan to be used. This briefing shall include a planned communication schedule and an alternative schedule in the event of poor weather or aircraft unserviceability.

1.01.19 Ground parties shall ensure that the following information is communicated to the supporting aircraft:

.1 The number of days' food supplies on hand

.2 The progress made

.3 The estimated time of reaching the next objective

.4 The requirement for food or other equipment

Reports

1.01.20 A narrative report covering all aspects and phases of the ground SAR operation, including comments on equipment and recommendations for the approval of techniques, shall be submitted by the ground search party leader to the SMC for inclusion in the search operation final report.

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Chapter 2 RENDERING ASSISTANCE

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Chapter 2 RENDERING ASSISTANCE

2.01 Proceeding to the Area of Distress

Due Vigilance

2.01.1 Search and rescue units (SRUs) proceeding to and from the area of distress should observe due vigilance on their way to and back from the scene, as the search object(s) or clues as to their whereabouts may be encountered outside the SRU's designated search location.

SAR Vessels in VTS Zones

2.01.2 When a Canadian Coast Guard (CCG) or other government vessel has been tasked to a search and rescue (SAR) incident, its commanding officer shall so advise the Marine Traffic and Communications Services (MCTS) centre as soon as practicable, if not already advised.

2.01.3 The MCTS Centre shall make any special provisions necessary to facilitate the arrival, departure or transit of a government vessel engaged on SAR operations.

2.01.4 When CCG or other government vessels are proceeding to the scene of a SAR incident, participating in a SAR mission within a vessel traffic system (VTS) zone or when transporting sick or injured persons the standard reporting and routing procedures may be waived by the MCTS Officer.

2.01.5 Commanding officers shall ensure that, to the greatest extent possible, all reporting procedures to MCTS are maintained during any SAR operations.

2.01.6 CCG vessels, when not tasked to a SAR incident, must comply with the procedures prescribed for other vessels.

Chapter 2 RENDERING ASSISTANCE

2.01 Proceeding to the Area of Distress

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Chapter 2 RENDERING ASSISTANCE

2.02 Sighting and Subsequent Procedures

Sighting the Search Object

2.02.1 When a search object is located, it shall be inspected carefully to verify that it is indeed the object sought, its position carefully plotted, and a *notice of crash/casualty location (NOCL)* message shall be dispatched to the search and rescue (SAR) mission coordinator (SMC) without delay. If positive identification cannot be made, a statement to this effect is to be included in the report.

NOTE:	Refer to *Appendix C – Notice of Crash/Casualty Location*.

Staying Within Sight

2.02.2 When a SAR facility has located the search object, it should attempt, by any means, to indicate to the search object that it has been sighted. If possible, the SAR facility should remain visible to the search object in order to contribute to the survivors' mental well-being.

2.02.3 Crews locating survivors in a life raft shall be particularly careful not to lose sight of the raft. In normal circumstances, search aircraft should remain in the vicinity of the raft until relieved, or until prudent limit of fuel endurance. If possible, the location shall be marked by smoke floats, sea markers, or datum marker buoys.

Photography of the Search Object and Surroundings

2.02.4 If unable to do the rescue, the search crew shall scrutinize the area carefully with a view to assisting those who will be required to effect rescue or conduct investigations. If possible, several photographs of the scene and surrounding area shall be taken. Any open stretches of land on which aircraft could conceivably be landed or SAR Technicians dropped, or any lakes or rivers on which an aircraft could land, should be examined, and any information that may assist in rescue operations shall be reported.

2.02.5 The search object should be photographed from the height and distance at which it was first spotted and at the various heights and distances normally used in search. The SMC shall be notified immediately that photographs have been taken. The photographs shall then be forwarded to the SMC by the most expeditious means.

2.02.6 When possible, visual imaging techniques shall be used at incident sites showing the crash/wreckage location, equipment in use, and any other pertinent details that would assist authorities in conducting an investigation of the incident. These images will normally be taken by SAR personnel. Every piece of wreckage, which would appear worthwhile to the investigators, should be visually reproduced.

NOTE:	Under normal circumstances, visual imaging techniques should not be used when casualties are involved, unless the casualty is covered.

Chapter 2 RENDERING ASSISTANCE

2.02 Sighting and Subsequent Procedures

2.02.7 The location and position at which visual imaging techniques were used should be marked on a grid or chart, record the Lat/Long in degrees, minutes, decimal minutes noting the datum and this information retained.

NOTE: Also refer to *CAMSAR I, section 6.01 – Photographic Libraries*.

Survivors and Supplies

2.02.8 Search crews finding survivors in obvious need of food, water, or first aid equipment, shall, at the captain's discretion, drop or supply the necessary supplies and equipment carried on board for that purpose. If the SAR facility locating the object of the search is not carrying special supply equipment designed for to survivors of a distress incident, then the captain shall immediately notify the SMC of his position and request that a unit carrying the necessary equipment be dispatched or diverted to the scene.

2.02.9 Narcotics shall not be provided to survivors of a distress incident unless accompanied by personnel trained in their administration.

2.02.10 Search crews shall watch for signal messages from survivors. Any such signal noted shall be relayed immediately to the SMC.

Hazardous Material

2.02.11 Many newer generation aircraft include components, which when damaged in an accident may release hazardous material into the environment (carbon fibres, hydrazine, etc.). It is imperative that responding facilities and personnel are adequately protected in these circumstances and that the SMC contact the 1 Canadian Air Division, Director General Health Services, for directions in handling dangerous materials at a crash site.

2.02.12 When dealing with hazardous materials in the maritime environment, the Canadian Transport Emergency Center (CANUTEC) shall be consulted. Part of Transport Canada, CANUTEC provides information and communications assistance in case of transportation emergencies involving dangerous goods. It is accessible 24/7 at the following coordinates:

Telephone: 613-996-6666 (call collect)
Cellular: *666 (Canada only)

Chapter 2 RENDERING ASSISTANCE

2.03 Assisting Disabled Vessels

NOTE: For guidelines on assisting disabled vessels, refer to *Annex 1 – Excerpts from the CCG Operational Procedures on Assistance to Disabled Vessels*.

Also of interest:

- *CAMSAR I, Annex 4 – Excerpts from the CCG Policy on Assistance to Disabled Vessels;* and
- *CAMSAR II:*
  - *Section 6.02 – Assistance to Vessels*;
  - *Section 7.04 – Protection of Property*; and
  - *Annex 4 – Excerpts from the CCG Operational Procedures on Assistance to Disabled Vessels.*

Chapter 2 RENDERING ASSISTANCE

2.03 Assisting Disabled Vessels

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Chapter 2 RENDERING ASSISTANCE

2.04 Communicating with the Media/Public

2.04.1 -During search and rescue (SAR) operations, occasions arise when Canadian Armed Forces and Canadian Coast Guard personnel, as well as other participating parties, are subjected to requests for information from the media/public. This is especially true when a SAR facility or other headquarters is geographically distant from the SAR Mission Coordinator (SMC). It is prudent to respond to these requests rather than give the impression of being unaware or unresponsive.

2.04.2 Where circumstances allow, clearance shall be obtained from the SMC or designated Public Affairs Officer prior to conducting such interviews or making public releases.

2.04.3 The facts given in an interview should be limited to the following:

.1 Number of facilities engaged in the search

.2 Number of crew aboard the search facility

.3 Number of hours the facility has been engaged in the search

.4 The area searched, and search results of the individual search facility

.5 Weather conditions

.6 Search facility's capabilities

.7 Items of general interest, readiness to carry on with the search, etc.

2.04.4 Personal opinions on the conduct of a particular SAR operation or on departmental policy should not be offered. Questions regarding topics other than those stated in the previous paragraph shall be referred to the SMC or designated Public Affairs Officer.

NOTE: Also refer to the *IAMSAR Manual, Volume III, section 2 – Rendering Assistance – Contact with the Media*.

2.04.5 The prerogative to decline an interview that would interfere with the conduct of a SAR operation rests with the SAR facility commander.

Chapter 2 RENDERING ASSISTANCE

2.04 Communicating with the Media / Public

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Chapter 3 ON-SCENE COORDINATION

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Chapter 3 ON-SCENE COORDINATION

3.01 On-scene Coordinator

3.01.1 The resolution of a search and rescue (SAR) case (aeronautical or maritime) depends on the effective coordination of SAR unit (SRU) activity. The SAR mission coordinator (SMC) may designate an on-scene coordinator (OSC) to enhance coordination.

3.01.2 It will be the responsibility of the OSC to:

.1 carry out the plan for the conduct of the operation as directed by SMC;

.2 recommend modifications to the search plan to the SMC as facilities and on-scene conditions dictate; and, if unable to communicate with the SMC, carry out those modifications, notifying the SMC as soon as practical;

.3 monitor weather and sea conditions and report on these at regular intervals to the SMC;

.4 maintain communication/liaison as the primary liaison point of contact between the SMC and the SRUs on scene;

.5 maintain a detailed record of the operation, including on-scene arrival and departure times of SRUs, areas searched, track spacing used, sightings and leads reported, actions taken and results obtained;

.6 issue to the SMC regular situation reports which should include, but not be limited to, weather and sea conditions, the results of search to date, any actions taken, and any future plans or recommendations; and

.7 advise the SMC to release units when their assistance is no longer required.

3.01.3 **Aircraft Coordinator –** When the situation dictates, the SMC may also designate an aircraft coordinator (ACO). The role of the ACO is to coordinate the aeronautical portion of the search as directed by the SMC and maintain communication/liaison as the primary point of contact between the OSC, the SMC and the aircraft on scene. When the OSC is an air resource he/she will normally be tasked as the ACO as well. When this occurs, only the term OSC will be used.

3.01.4 The designated ACO should:

.1 coordinate aircraft hourly check-ins;

.2 give updated search information as it is relayed from the SMC or OSC;

.3 update the SMC on changing weather or search information; and

.4 provide updated navigational data to other aircraft as required.

3.01.5 The ACO will also be responsible for coordinating SMC requests for aircraft support within the search area.

Chapter 3 ON-SCENE COORDINATION

3.01 On-scene Coordinator

NOTE: Refer to *CAMSAR II, section 1.01 – Search and Rescue Units*.

Chapter 3 ON-SCENE COORDINATION

3.02 On-scene Communications

Radiocommunications

3.02.1 The search and rescue (SAR) mission coordinator (SMC), on-scene coordinator (OSC) or aircraft coordinator (ACO) shall designate on-scene aeronautical and maritime frequencies as required. SAR facilities shall maintain a continuous watch on the frequencies allotted by the controlling authority during a SAR mission. Subject to the approval of the SMC, a scheduled watch may be adopted.

NOTE: For frequencies, refer to *CAMSAR II, Section 2.02 – SAR Radio Frequencies and Channels*.

3.02.2 Plain language and non-secure communications shall be used whenever practicable to avoid confusion.

SITREPs

3.02.3 All SAR units (SRUs) engaged on SAR missions shall pass situation reports (SITREPs) through the OSC or ACO is assigned to the SMC, or to the nearest Marine Traffic and Communications Services centre, for onward transmission to the SMC. This will normally consist of an "OPERATIONS NORMAL" for SAR aircraft and an operational SITREP for SAR vessels.

3.02.4 SRUs will report to the OSC, ACO or SMC as per SMC instructions. These reports should be made at least once per hour for aircraft and once every four hours or less for vessels. SRUs should also contact the OSC, ACO or SMC

.1 before departure,

.2 when arriving on-scene,

.3 any time there is a change in the situation,

.4 prior to departing the scene, and

.5 upon return.

Chapter 3 ON-SCENE COORDINATION

3.02 On-scene Communications

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Chapter 3 ON-SCENE COORDINATION

3.03 Fatigue

General

3.03.1 Fatigue has been recognized around the world as a major contributor to many transportation incidents and accidents. Previous misconceptions concerning fatigue have falsely limited the perceived importance of the fatigue factor.

3.03.2 Fatigue is commonly caused by circadian (daily) rhythms, lack of adequate sleep, and intense work activity. Fatigue affects motivation as much as individual and team task performance. There is no physical or chemical test which can tell us that a person is impaired with fatigue.

3.03.3 Although fatigue can be both physical and mental, mental fatigue is most critical in SAR operations.

3.03.4 Search and rescue (SAR) units (SRU's) are governed by their parent organizational orders for crew days and rest periods. SRU's must ensure that the SAR mission coordinator (SMC) is made aware of any limitations to the crew day that may affect the tasking.

Symptoms

3.03.5 Mental fatigue exhibits the following symptoms:

.1 Increased drowsiness – difficulty staying awake

.2 Reduced alertness – less capable of responding to the demands of the job

.3 Reduced ability to concentrate – more difficulty with decision-making and reasoning; shorter attention span

.4 Impaired memory – failure to remember recently completed tasks

.5 Poorer task performance – reduced ability to complete a task as fast and accurately as usual

.6 Increased irritability

Chapter 3 ON-SCENE COORDINATION

3.03 Fatigue

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Chapter 3 ON-SCENE COORDINATION

3.04 SAR Aircraft Debriefing

3.04.1 The debriefing portion of the *SAR Briefing/Debriefing Forms for Aircraft* shall be completed by the search and rescue (SAR) Squadron aircraft commander on the completion of each sortie. All information blanks should be completed and, where possible, a designated crew member should be made responsible for updating the form during the sortie to ensure accurate information is entered in a timely fashion.

3.04.2 On completion of the sortie, the SAR Squadron aircraft commander shall pass the information to the appropriate controlling agency. If under control of a joint rescue coordination centre (JRCC)/maritime rescue sub-centre (MRSC), pass the debriefing information to the JRCC/MRSC by the quickest available means. A hard copy of the form should be subsequently passed to the JRCC/MRSC for record purposes, either by the aircraft captain or the deployed SAR Mission Coordinator (SMC)/Searchmaster, as applicable.

3.04.3 In some cases it may be necessary to complete the debriefing by telephone or radio. In this case the format should be used as a guide, with the completed form to follow by message, if required.

3.04.4 For lengthy searches, the *Abbreviated SAR Briefing/Debriefing* form may be used at SMC's discretion.

NOTE: Refer to *Appendix A – SAR Briefing/Debriefing Forms for Aircraft*.

Chapter 3 ON-SCENE COORDINATION

3.04 SAR Aircraft Debriefing

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Chapter 3 ON-SCENE COORDINATION

3.05 SAR Mission Reports

Aeronautical SRUs

3.05.1 The aircraft commanders shall fill out a *Search and Rescue (SAR) Mission Report* on completion of each SAR mission. The SAR Technician (SAR Tech) team leader (TL) of the operation shall complete the report if SAR Tech equipment was used or to highlight any problems in procedures or equipment encountered during the mission. All SAR Mission Reports shall be reviewed by the SAR Squadron Commanding Officer and SAR Tech Leader.

3.05.2 This report should include a comprehensive narrative of the mission and describe the equipment or techniques used, including deficiencies encountered and corrective actions taken or proposed. Photographs or other available visual aids should be forwarded with the report.

3.05.3 Only one SAR Mission Report is required from each aircraft commander for a given SAR Rescue Squadron SAR case. Where there are multiple sorties associated with one SAR case, as during a prolonged search, several SAR Aircraft Debriefing forms may be required. Care must be taken that the total aircraft times associated with one SAR case reflect the cumulative times from all of the sorties flown by an aircraft commander on the same SRU.

NOTE:	Current criteria dictate that all aeronautical SAR units (SRUs) shall complete a *SAR Mission Report* following a tasking of a mission from the joint rescue coordination centre (JRCC) even if the mission is declined by the aircraft commander. Refer to CAMSAR III-3.04.

Maritime SRUs

3.05.4 Commanding officers and coxswains of vessels involved in SAR operations may provide *SAR mission reports* to the JRCC or maritime rescue sub-centre, as applicable. The use of this report by on-scene coordinators is encouraged for every case involving more than one SRU. The reports should detail any problems involved with the mission (communications, coordination, etc.) and/or any new or innovative practices that aided in the mission, plus any other comment that might aid the prosecution or prevention of similar incidents in the future.

Chapter 3 ON-SCENE COORDINATION

3.05 SAR Mission Reports

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Chapter 4 ON-BOARD EMERGENCIES

Contents

There is no Canadian content specific to this chapter.

Chapter 4 ON-BOARD EMERGENCIES

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Appendix A SAR Briefing / Debriefing Forms for Aircraft

A.01	AERONAUTICAL PRIMARY SRU FORM

BRIEFING

SAR ____________________ Date ____________

Tasked aircraft type and number ____________ Squadron ____________

Commanding Officer ____________________

Details as to nature of distress or emergency ____________________

____

Description of Search Object ____________________

Type of aircraft or vessel ____________________

Number or name of craft ____________________

Length ________ Width (Wing-span) ________ Number on board ________

Full description of craft, including colour and markings ____________________

____

____

Radio frequencies of missing craft ____________________

____

Assigned Search Area

Area ____________________

Type of search ____________ Altitude/Track spacing ____________

Time on task ________

____________ Commence search

at (position) ____________________

____________ and track (N-S)

(E-W) ____________________

Frequencies

Controlling agency ____________ Aircraft ____________

Surface vessels ____________ Others ____________

SITREPs

To be passed to ________ every hours with weather report included every hours.

Special Instructions (on-scene coordinator, aircraft coordinator, etc.)

____

____

____

____

Appendix A SAR Briefing / Debriefing Forms for Aircraft

AERONAUTICAL PRIMARY SRU FORM (continued from previous page)

DEBRIEFING

SAR ______________________ Aircraft no. ______________

Date ______________________

Point of departure ______________ Point of landing ____

Time airborne ____________ On task ____________ Off task ____________

Landed ______________________

Area actually searched ______________________

____

____

Type of search ______________ Altitude/Track spacing ______________

Terrain or sea state ______________ Number of observers ________

Weather conditions in search area (visibility, wind velocity, ceiling, etc.) ______________

____

Object of search (located)

____

at position ______________________

Number and condition of survivors ______________________

____

____

Sightings and/or other reports ______________________

____

____

____

Telecommunications (quality of communications and/or any changes other than briefed)

Remarks: (to include any action taken on search, any problems, criticism, suggestions)

____

____

____

____

Appendix A SAR Briefing / Debriefing Forms for Aircraft

A.02	AERONAUTICAL SECONDARY SRU FORM

BRIEFING

Date/Time Group ______________________ Tasking authority ______________________

SAR (Case no./name) ______________________________ Tasked squadron/Aircraft type ______________________

Nature of distress or emergency (describe) ______________________

____

Search Object

Type (aircraft/vessel/swimmer/hunter/other – specify) ______________

Name/Registration no. ______________________

Number on board _________ Name of pilot/operator/owner ______________________

Description, including colours and marking (hi/low wing, single/multi engine, open boat, cabin cruiser, sailboard, skidoo, etc.) ______________________

____

____

____

Radios on board/Last known frequency _________

Emergency equipment ______________________

Assigned Tasking / Mission (Describe in plain language.)

____

____

____

Assigned Search Area

Area description (corner points, latitude and longitude, etc.) ______________________

____

Commence Search Point ______________________

Direction to track (N-S) (E-W) ______________________

Track spacing ______________________

Search altitude (not below VFR limits) ______________________

Search pattern (ELT, track crawl, etc.) ______________________

Other Search and Rescue Facilities in Same or Adjacent Areas

Aircraft/Altitude/Area ______________________

Vessels/Area ______________________

Ground search teams ______________________

Appendix A SAR Briefing / Debriefing Forms for Aircraft

AERONAUTICAL SECONDARY SRU FORM (continued from previous page)

Frequencies and Callsigns for Communications

JRCC/MRSC/SMC/OSC ____________________

Other search aircraft ____

Other search vessels/Ground teams ____

Search object/Survivors ____________________

____

____

SITREPs should be passed to ____________________

every__________hour(s) (normally every 1 hour).

Advise controlling agency when and why, if SITREPs cannot be maintained.
IF CONSECUTIVE SITREPS ARE MISSED, SEARCH ACTION MAY BE INITIATED.

Action on Sighting Search Object ____________________

____

____

If unable to effect rescue, direct other aircraft and/or vessels to the scene.
Remain on scene until relieved, forced to return or until the rescue has been effected.

Unit Certification (The SMC will read these statements to the unit commander and certify his/her acceptance.)

____

____

Special instructions (on-scene coordinator, aircraft coordinator, etc.) ________________

____

____

____

____

____

____

(continued on next page)

Appendix A SAR Briefing / Debriefing Forms for Aircraft

AERONAUTICAL SECONDARY SRU FORM (continued from previous page)

DEBRIEFING

Immediately upon return to base, advise JRCC of the following details:

Time airborne ___

Time on task ___

Time search object sighted ___

Time off task ___

Time returned to base ___

Area actually searched ___

Remarks/comments on this mission ___

NOTE: The SMC will transmit this form to the SRU commander (if airborne, to the parent unit) prior to the SRU departure.

Appendix A SAR Briefing / Debriefing Forms for Aircraft

A.03 AERONAUTICAL SRU ABBREVIATED FORM

BRIEFING

SAR ______________________________

Date ______________________________

Tasked aircraft type and number ___________

Commanding Officer ______________________________

Take off time _____

Search area ______________________________

____

____

____

Search altitude ______________ Track spacing ______________

Type of search ______

______________ Remarks (on-scene coordinator, aircraft coordinator, etc.) ______________

____

____

____

____

DEBRIEFING

Area actually searched ______________________________

____

____

____

____

Search time ______________ Transit time ______________

Effectiveness of search ____________% Percentage of area covered ____________%

Remarks ______________________________

____

____

____

____

Appendix B SAR Briefing Form for Vessels

B.01 MARITIME SRU FORM

1. SRU tasked ______________________________ AT (date – time group) ___________________
2. SAR (case name) _________________________ (case number) ___________________________
3. SEARCH OBJECT
   A. TYPE (delete as necessary) AIRCRAFT/VESSEL/OTHER ___________________________
   B. NAME ____
   C. REGISTRATION ____
   D. TONNAGE ____
   E. DESCRIPTION (colour, markings, superstructure, characteristics) _________________
   ____
   ____
   F. OWNER/OPERATOR/AGENT ____
   G. PERSONS ON BOARD ____
   H. EMERGENCY EQUIPMENT CARRIED ____
4. NATURE OF DISTRESS OR EMERGENCY (brief description) ____________________________
   ____
5. SEARCH AREA
   A. AREA DESCRIPTION (four corners, latitude and longitude, etc.) __________________
   ____
   ____
   ____
   B. COMMENCE SEARCH POINT ____
   C. DIRECTION OF CREEP ____
   D. REQUESTED SEARCH PATTERN ____
   E. REQUESTED TRACK SPACING ____
   F. REQUESTED SEARCH SPEED ____
   G. REQUESTED COVERAGE FACTOR ____

(continued on next page)

Appendix B SAR Briefing Form for Vessels

MARITIME SRU FORM (continued from previous page)

6. OTHER SRUS TO BE ENGAGED IN ADJACENT AREAS
   A. AIRCRAFT/ALTITUDE ______________________
   B. VESSELS ______________________
   C. GROUND PARTIES ______________________
7. FREQUENCIES AND CALLSIGNS TO BE USED FOR COMMUNICATION WITH
   A. JRCC/MRSC/OSC/SM (delete as necessary) ______________________
   B. SEARCH AIRCRAFT ______________________
   C. OTHER SEARCH VESSELS ______________________
   D. GROUND PARTIES ______________________
   E. VESSEL IN DISTRESS/SURVIVORS ______________________
8. ACTION ON SIGHTING THE SEARCH OBJECT (delete as necessary)
   - REPORT TO ______________________
   - IF UNABLE TO EFFECT RESCUE, DIRECT OTHER VESSELS AND/OR AIRCRAFT TO THE SCENE.
   - REMAIN ON SCENE UNTIL RELIEVED OR FORCED TO RETURN OR RESCUE HAS BEEN EFFECTED.
9. SITREPS TO BE PASSED TO ______________________
   EVERY________HOUR(S) (normally every 4 hours).
10. SPECIAL INSTRUCTIONS (on-scene coordinator, etc.) ______________________

Appendix C Notice of Crash / Casualty Location

C.01 NOCL MESSAGE

The originator should transmit only the words on the left;
the meaning is shown on the right.

SAR MISSION COORDINATOR THIS IS ____________________ (name of SAR facility)

NOVEMBER OSCAR CHARLIE LIMA

ALPHA

- *AFFIRMATIVE* — Positive identification that the object sighted is the search object.
- *NEGATIVE* — Unable to positively determine that the object sighted is the search object.

BRAVO

- An eight or nine digit group denoting position without North or West being used

CHARLIE

- *NEGATIVE* — No survivors or casualties can be seen.
- Number, followed by: (and repeated as necessary) — Indicates number of victims actually seen.
  - *UNDETERMINED* – The status of the survivors or casualties cannot be determined
  - *RED* – Immediate treatment and evacuation (Priority 1)
  - *YELLOW* – Early treatment and evacuation (Priority 2)
  - *GREEN* – Routine treatment and evacuation (Priority 3)
  - *BLUE* – Deferred treatment and evacuation (Priority 4)
  - *WHITE* – Uninjured
  - *GREY* – Missing
  - *BLACK* – Dead

(continued on next page)

Appendix C Notice of Crash / Casualty Location

NOCL MESSAGE (continued from previous page)

DELTA

• *ONE*	On side of hill (indicate north, south, east, or west slope.)
• *TWO*	In valley (indicate north, south, east, or west side of floor.)
• *THREE*	In level country.
• *FOUR*	In heavily wooded area (can be used in conjunction with ONE, TWO or THREE.)
• *FIVE*	In water:
○ *ALPHA*	– Near shore
○ *BRAVO*	– Well off shore

ECHO

• *ONE*	Request authorization to deploy the SAR Tech team.
• *TWO*	A helicopter will be required.
• *THREE*	A ground party could reach the location in good time.
• *FOUR*	A rescue boat will be required.
• *FIVE*	Coroner required.

FOXTROT

• *REMARKS*	Briefly provide any detail, which allows the JRCC/MRSC to initiate appropriate action, bearing in mind that the transmission is not secure.

NOTE: Information on the victims' medical condition should only be transmitted after investigation by CAF SAR Technicians, CCG Rescue Specialists or other medically trained personnel.

Annexes

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Annex 1 Excerpts from the CCG *Operational Procedures on Assistance to Disabled Vessels*

NOTE: Different excerpts from the Canadian Coast Guard (CCG) *Policy and Operational Procedures for Assistance to Disabled Vessels* are shown in *CAMSAR I, Annex 4,* and in *CAMSAR II, Annex 4.*

1. Assistance to a Vessel in Distress or when Status in Doubt

1.1 If time and the circumstances allow, the Commanding Officer should consider providing technical assistance before deciding to tow. From time-to-time, the CCG will have to tow vessels in distress. In the ordinary practice of seamanship, towing involves fewer risks to the towed vessel if the towing vessel is smaller or the same size as the towed vessel. Should towing be necessary, the Commanding Officer shall follow the detailed instructions provided in the Fleet Safety and Security Manual.

1.2 When the situation is stabilized, or if additional information is available to determine that the vessel is no longer in distress, any requirements for further assistance shall follow the directives in Section 2 as appropriate.

2. Assistance to a Disabled Vessel (i.e. not in Distress)

2.1 IN OPEN WATER

2.1.6 In all other situations if time and the circumstances allow, the Commanding Officer should consider providing technical assistance before deciding to tow. Any technical assistance, such as fuel or provisions transferred to the disabled vessel, will be strictly on account of the owner/operator of that vessel. From time-to-time the CCG will have to tow disabled vessels. In the ordinary practice of seamen towing involves fewer risks to the towed vessel if the towing vessel is smaller or the same size as the towed vessel. Should towing be necessary, Commanding Officers shall follow detailed instructions in the Fleet Safety and Security Manual. In general, the Commanding Officer shall provide a copy and formally explain to the master or person in charge of the disabled vessel written towing conditions. The Commanding Officer shall also discuss the risks of towing and CCG expectations during the tow.

2.1.7 When any CCG resource has a disabled vessel under tow and commercial or private assistance arrives on-scene, the Commanding Officer shall hand over the tow to the commercial/private vessel provided it appears capable and the transfer can be conducted safely.

2.1.9 Should a disabled vessel be towed by a CCG resource the towing operation should always be to the nearest place of refuge or to a rendez-vous position where the tow can be safely transferred to commercial or private mobile facilities. In all cases, the Commanding Officer shall record the date and time when the SAR operation ended i.e., when the persons aboard the disabled vessel have been transferred to a safe place and the time when they started the disabled vessel operation under CCG Environmental Response mandate in the log book.

2.1.10 On arrival at the place of refuge, it is not the responsibility of the CCG resource to secure the disabled vessel. However, the Commanding Officer may take such action as is necessary, having due regard for the circumstances of the case, to ensure that the disabled vessel is safely secured or anchored.

Annex 1 Excerpts from the CCG *Operational Procedures on Assistance to Disabled Vessels*

2.1.11 Commanding Officers may have to cast off the tow in order to respond to a distress situation or incident of a more serious nature. In instances when the persons onboard the disabled vessel consider themselves to be in potential danger and wish to abandon, the Commanding Officer of the CCG resource should consider the risks and if prudent to do so, evacuate these persons and continue on with the more serious incident an extended period. The Commanding Officer shall notify the JRCC/MRSC of the action taken.

2.2 WHEN ICE IS PRESENT

2.2.1 The provisions of this paragraph 2.2 apply in addition to the provisions of paragraph 2.1.

2.2.2 In the ordinary practice of seamanship, towing involves fewer risks to the towed vessel if the towing vessel is smaller or the same size as the towed vessel. When ice is present, CCG resources are generally much larger than the disabled vessel, thus due care and attention must be exercised. [...]

2.2.3 Therefore, given the considerations in paragraph 2.2.2 for disabled vessels when ice is present, the CCG will not tow small vessels of less than 33 metres in length with persons onboard. Instead, other options to be considered to render assistance include, but are not limited to the following:

1. provide assistance to find alternate towing arrangements and standby to provide icebreaker escort for the tow if required;
2. standby until ice conditions improve;
3. render onboard technical assistance;
4. assist crew to transfer to a safe place and tow with no persons onboard; or,
5. as a last resort, assist crew to abandon vessel, transfer them to a safe place, leave the unoccupied vessel and depart the area.

3. Towing Instructions and Conditions

In all situations where towing is appropriate, and as far as safely feasible in the circumstances, the Commanding Officer of the responding CCG unit shall instruct the master or person in charge of the assisted vessel on the towing operation that is contemplated, its risks and CCG expectations during the tow. The master or person in charge of the assisted vessel shall confirm his or her understanding of the instructions and risks, and agree to the conditions of the towing operation. If safely feasible, the Commanding Officer of the responding CCG unit shall obtain a signature of the *Towing Conditions and Understanding* shown next.

Annex 1 Excerpts from the CCG *Operational Procedures on Assistance to Disabled Vessels*

TOWING CONDITIONS AND UNDERSTANDING

I, the undersigned___________________________________declare being the owner/operator/master/person in charge of the_______________________________, registered under the official number or registration or license number _________________________ do hereby request that the Canadian Coast Guard Ship _______________________________ (hereinafter: the "Search and Rescue Unit or SAR Unit") provide my disabled vessel with towing assistance.

In doing so, I declare being of sound body and mind and perfectly aware of the dangers and risks of a towing operation, for myself, for all persons on board the vessel, and for the vessel and its equipment.

I confirm that the Search and Rescue Unit has informed me of the details of the intended towing operation and the SAR Unit expectations from my vessel during the operation, including the requirement not to undertake any manoeuver or apply the engine or rudder unless it is ordered by the SAR Unit or the SAR Unit has been informed and agreed to the manoeuver.

I confirm that I am responsible for the safety of the crew and passengers onboard my disabled vessel and that I will take all reasonable steps to ensure their safety during towing operation.

In addition, I have been informed of, and agree to the following:

- The towing operation will be to the nearest place of refuge, or to a rendez-vous position where the tow can be safely transferred;
- If there is a more serious situation elsewhere, the towline will be released or transferred and the towing operation will be ended immediately;
- The SAR Unit may release the towline and end the towing operation if such operation poses risks to its safety or the safety of its crew;

Annex 1 Excerpts from the CCG *Operational Procedures on Assistance to Disabled Vessels*

- If adequate commercial assistance reaches the scene, the SAR Unit may hand over the tow. I will be liable to any charges from that commercial resource;
- Upon arrival at the nearest place of refuge, the SAR Unit will release the towline and depart and it will be my responsibility to secure my own vessel; and,
- the Canadian Coast Guard, the Department of Fisheries and Oceans Canada, the Government of Canada, Her Majesty the Queen in right of Canada and any of their employees or servants are not liable for damages suffered by my vessel, any of its equipment, its owner, master, operator, person in charge, crew or passengers, if the towing operation has to be abandoned, or if damages occurred despite the exercise of due diligence and good seamanship practices of the master and crew of the Search and Rescue Unit.

Print Name: ______________________________

Signature: ______________________________

Date: ______________________________

Witness (if any): ______________________________

Note to the Commanding Officer of the SAR Unit:
If the circumstances do not allow the signature of this document, it should be read to the master or person in charge of the disabled vessel by radio, and their verbal acceptance of this agreement and waiver should be noted in the SAR Unit's logbook. Any electronic recordings of the conversation and agreement shall be retained and safeguarded according to established policy and procedures. In some circumstances it may be preferable to have MCTS communicate with the disabled vessel. Commanding Officers should discuss the circumstances with the MCTS Officer as appropriate.

21 December 2010

NOTE: The complete text of this document is available on the CCG Intranet web site: http://ccg-gcc.ncr.dfo-mpo.gc.ca/commissioner-commissaire/policies-eng.html.

Annexe 1 Extraits des *Procédures d'exploitation de la GCC sur l'aide aux navires désemparés*

NOTA : Différents extraits des *Politique et procédures d'exploitation de la Garde côtière (GCC) sur l'aide aux navires désemparés* sont énoncés à *l'Annexe 4 du CAMSAR I* et à *l'Annexe 4 du CAMSAR II.*

1. Aide à un navire en détresse ou statut de doute

1.1 Si le temps et les circonstances le permettent, le commandant doit envisager d'offrir une aide technique avant de décider de procéder au remorquage. De temps à autre, la GCC devra remorquer des navires en détresse. Dans la pratique ordinaire des marins, le remorquage présente moins de risques pour le navire remorqué si le remorqueur est plus petit ou de la même dimension que le navire remorqué. Si le remorquage est nécessaire, le commandant doit suivre les directives détaillées du Manuel de sécurité et de sûreté de la flotte.

1.2 Lorsque la situation s'est stabilisée ou si des renseignements additionnels sont communiqués pour établir que le navire n'est plus en détresse, tout besoin en matière d'aide additionnelle doit être conforme aux directives de la section 2, s'il y a lieu.

2. Aide à un navire désemparé (c.-à-d. non en détresse)

2.1 **EN EAU LIBRE**

2.1.6 Dans toutes les autres situations, si le temps et les circonstances le permettent, le commandant doit envisager d'offrir une aide technique avant de décider de procéder au remorquage. Toute aide technique, comme la fourniture de carburant ou de provisions au navire désemparé, sera exclusivement aux frais du propriétaire ou de l'exploitant du navire désemparé. De temps à autre, la GCC devra remorquer des navires désemparés. Dans la pratique ordinaire des marins, le remorquage présente moins de risques pour le navire remorqué si le remorqueur est plus petit ou de la même dimension que le navire remorqué. Si le remorquage est nécessaire, les commandants doivent suivre les directives détaillées du Manuel de sécurité et de sûreté de la flotte. En général, le commandant doit donner une copie et formellement expliquer au capitaine ou à la personne responsable du navire désemparé les conditions de remorquage écrites (voir l'Appendice1). Le commandant doit également discuter des risques du remorquage et des attentes de la GCC pendant le remorquage.

2.1.7 Lorsqu'une ressource de la GCC remorque un navire désemparé et qu'une aide commerciale ou privée se présente sur place, le commandant doit confier le remorquage au navire commercial ou privé, pourvu que le navire semble apte à remorquer et que le transfert puisse être fait en toute sécurité.

2.1.9 Lorsqu'un navire désemparé est remorqué par une ressource de la GCC, l'opération de remorquage doit toujours viser le lieu de refuge le plus proche ou une position de rendez-vous où le navire remorqué peut être transféré en toute sécurité vers des ressources mobiles commerciales ou privées. Dans tous les cas, le commandant doit consigner dans le journal de bord la date et l'heure de la fin de l'opération SAR, c.-à-d. le moment où les personnes à bord du navire désemparé ont été transférées vers un lieu sécuritaire et le moment où a débuté l'opération de navire désemparé dans le cadre du mandat d'intervention environnementale de la GCC.

2.1.10 À son arrivée au lieu de refuge, la ressource de la GCC n'est pas chargée de sécuriser le navire désemparé, mais le commandant peut prendre des mesures en ce sens si cela est nécessaire compte tenu des circonstances, afin d'assurer que le navire désemparé soit arrimé ou ancré en toute sécurité.

2.1.11 Il est possible que les commandants doivent larguer la remorque au milieu d'une opération remorquage afin d'intervenir dans une situation de détresse ou à un incident plus grave. Dans les cas où les personnes à bord du navire désemparé se considèrent en danger et souhaitent abandonner le navire, le commandant de la ressource de la GCC doit tenir compte des risques et, s'il est prudent de le faire, évacuer ces personnes et continuer de se charger de l'incident le plus grave en sachant que ces personnes devront peut-être demeurer à bord de la ressource de la GCC pour une durée prolongée. Le commandant doit informer le JRCC/MRSC des mesures prises.

2.2 EN PRÉSENCE DE GLACE

2.2.1 Les dispositions de cette section 2.2 s'appliquent en sus de celles de la section 2.1.

2.2.2 Dans la pratique ordinaire des marins, le remorquage présente moins de risques pour le navire remorqué si le remorqueur est plus petit ou de la même dimension que le navire remorqué. En présence de glace, les ressources de la GCC sont généralement de bien plus grande dimension que le navire désemparé, de sorte qu'il faut faire preuve de diligence raisonnable et d'attention. [...]

2.2.3 Par conséquent, compte tenu des éléments du paragraphe 2.2.2 relatifs aux navires désemparés en présence de glace, la GCC ne remorquera pas de petits navires d'une longueur inférieure à 33 mètres ayant des personnes à bord. Voici plutôt d'autres options à envisager pour offrir de l'aide :

.1 aider à trouver d'autres dispositions de remorquage et rester sur les lieux pour fournir des services d'escorte de brise-glaces pour le remorquage au besoin;

.2 rester sur les lieux jusqu'à ce que l'état des glaces s'améliore;

.3 fournir de l'aide technique à bord des navires;

.4 aider les personnes à bord du navire désemparé à se rendre dans un endroit sécuritaire et remorquer le navire inoccupé;

.5 en dernier recours, aider les personnes à bord du navire désemparé à abandonner le navire et à se rendre dans un endroit sécuritaire, puis délaisser le navire inoccupé et quitter la zone.

Annexe 1 Extraits des *Procédures d'exploitation de la GCC sur l'aide aux navires désemparés*

3. Instructions et conditions de remorquage

Dans toutes les situations où le remorquage est approprié, et pourvu que ce soit possible de façon sécuritaire dans les circonstances, le commandant de l'unité d'intervention de la GCC doit instruire le capitaine ou à la personne responsable du navire aidé à propos des opérations de remorquage qui sont envisagées, ses risques et les attentes de la GCC pendant le remorquage. Le capitaine ou à la personne responsable du navire aidé devra confirmer sa compréhension des instructions et risques, et être d'accord avec les conditions de l'opération de remorquage. Si cela est possible sans danger, le commandant de l'unité d'intervention de la GCC doit obtenir une signature des *Conditions de remorquage et compréhension* montrées en pages suivante.

Daté le 21 décembre 2010.

NOTA : Le texte complet de ce document est disponible sur le site Intranet de la GCC : http://ccg-gcc.ncr.dfo-mpo.gc.ca/commissioner-commissaire/policies-fra.html.

Annexe 1 Extraits des *Procédures d'exploitation de la GCC sur l'aide aux navires désemparés*

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Annexe 1 Extraits des *Procédures d'exploitation de la GCC sur l'aide aux navires désemparés*

CONDITIONS DE REMORQUAGE ET COMPRÉHENSION

Je, soussigné________________________________déclare être le propriétaire/l'exploitant/le capitaine/la personne responsable du______________________________, dont le numéro matricule ou de permis est__________________________et je demande par la présente que le navire de la Garde côtière canadienne _______________________________ (désigné aux présentes comme l'unité de recherche et de sauvetage ou l'unité de SAR) fournisse un service de remorquage à mon navire désemparé.

Je fais la présente demande en étant sain de corps et d'esprit et parfaitement au courant des dangers et des risques qu'une opération de remorquage présente pour moi, pour toutes les personnes à bord du navire, pour le navire et pour son équipement.

Je confirme que l'unité de recherche et de sauvetage m'a informé des détails de l'opération de remorquage prévue et des attentes de l'unité de SAR en ce qui concerne mon navire durant l'opération, y compris l'exigence de ne faire aucune manœuvre, ni d'utiliser aucun moteur ou gouvernail à moins que l'unité de SAR en ait fait la demande ou que l'unité de SAR en ait été informée et qu'elle ait donné son accord.

Je confirme que je suis responsable de la sécurité des membres de mon équipage et des passagers à bord de mon navire désemparé et que je prendrai toutes les mesures raisonnables pour assurer leur sécurité pendant l'opération de remorquage.

De plus, j'ai été informé des éléments suivants, dont je conviens :

- le remorquage se fera vers le lieu de refuge le plus proche ou vers un lieu de rendez-vous où le transfert de la remorque pourra se faire en sécurité;
- si une situation plus grave survient ailleurs, la remorque sera larguée ou transférée et le remorquage prendra fin immédiatement;
- l'unité de SAR peut larguer la remorque et mettre fin au remorquage si l'opération présente un risque pour sa sécurité et la sécurité de son équipage;

Annexe 1 Extraits des *Procédures d'exploitation de la GCC sur l'aide aux navires désemparés*

- si une ressource d'assistance commerciale adéquate se présente sur les lieux, l'unité de SAR peut lui transférer le remorquage. Les frais de l'assistance commerciale, quels qu'ils soient, seront alors à la charge du navire remorqué;
- à l'arrivée au lieu de refuge le plus proche, l'unité de SAR larguera la remorque et reprendra la mer, et j'aurai la responsabilité d'amarrer ou d'ancrer adéquatement mon navire,
- la Garde côtière canadienne, le ministère des Pêches et des Océans du Canada, le gouvernement du Canada, Sa Majesté la Reine du chef du Canada et leurs employés, quels qu'ils soient, ne seront responsables ni des dommages causés à mon navire ou à ses équipements, quels qu'ils soient, ni des blessures, quelles qu'elles soient, subies par son propriétaire, son capitaine, son exploitant, son responsable, son équipage ou ses passagers si l'opération de remorquage devait être abandonnée ou si des dommages et des blessures leurs étaient causés malgré la diligence raisonnable et les bonnes pratiques de manœuvre et de matelotage du capitaine et de l'équipage de l'unité de recherche et de sauvetage.

Nom en caractères d'imprimerie : ______________________________

Signature : ______________________________

Date : ______________________________

Témoin (le cas échéant) : ______________________________

Remarque à l'intention du commandant de l'unité de SAR :
Si les circonstances ne permettent pas la signature du présent document, ce dernier doit être lu au capitaine ou à l'exploitant du navire désemparé par radio, et son acceptation verbale doit être notée dans le journal de bord de l'unité de SAR. Tout enregistrement électronique de la conversation et de l'entente doit être conservé en sécurité, conformément aux politiques et procédures établies. Dans certaines circonstances, il peut être préférable que le Service de communication et de trafic maritimes (SCTM) communique avec le navire désemparé. Les commandants doivent discuter, au besoin, des circonstances avec l'officier du SCTM.