NATSAR Manual Amendment Schedule – Approved at NATSAR 43 for inclusion in 2020 edition

General amendments

Current manual reference	Reason for amendment	Previous Wording	New Wording (For images or tables that cannot fit within this document are to be attached to email to Secretariat)	Council Approval (Y/N)	Responsible	Comments
Introduction	Re-word for clarity	In providing a search and rescue response, nothing in the content of the manual precludes properly qualified officers from using their initiative in providing a SAR response in circumstances not covered by these procedures. In short, the Manual is a body of guidance rather than an operational straitjacket. In so doing, however, officers' actions should conform as closely as possible to the instructions contained in the manual that are most closely pertinent to the circumstances, and keep all other involved parties informed. Officers should be prepared to justify their actions if necessary.	The National Search and Rescue Manual acts as a set of procedures and guidelines in providing a search and rescue response within Australia. It is understood that the knowledge and experience of officers can extend beyond what is covered within this manual and therefore initiative should be used accordingly in search and rescue operations. It is however, necessary to follow the guidelines outlined within this manual as closely related to the circumstances presented and keep all relevant parties well informed throughout the process. Officers should be prepared to justify their actions if necessary.	Pending (submitted by Secretariat)	AMSA, Secretariat	
Appendices: Pages 411, 412 and 417	Incorrect formulas (three worksheets)	(pg 411) Sweep Width Factor W – (Wu x Fs x Ff) (pg 412) Sweep Width Factor W – (Wu x Fs x Ff) (pg 417) Sweep Width Factor W = Wu.Fw.Ff	(pg 411) Sweep Width Factor W = (Wu x Fw x Fs x Ff) (pg 412) Sweep Width Factor W = (Wu x Fv x Ff) (pg 417) Sweep Width Factor W = (Wu x Fw x Ff)	Pending (submitted by Craig Longmuir, ARC)		
Appendices: Figure D-5:12 (page	Image quality	(see image)	Request for image to be replaced by one with a higher pixel/quality	Pending (submitted by Craig Longmuir, ARC)		
Acronyms & Abbreviations	To properly define the term Last Known Position. As a confirmed, 'last known' position, it cannot be a computed or DR position that is estimated or calculated, from the Last Known Position.	Term – Last Known Position Definition - Last witnessed, reported, or computed DR position of a distressed craft.	The Last Known Position is a term used in search planning to indicate the last known location of the person, marine craft or aircraft the subject of a search and /or rescue mission. It is also known by its acronym LKP. The LKP may be a boat ramp where a small craft was launched, a reporting point or navigation aid where an aircraft last reported its position or the location where it can be confirmed a person was last sighted e.g., at the start of a walking track. The Last Known Position differs from the other term used in marine search planning of Splash Point or SP.	Pending (submitted by John Rice, SAR Training Australia)		This or serial 6 (Splash Point) are not IAW with IAMSAR Manual Vol II Glossary LKP description 2011 edition. Will need to check 2019 edition (not yet issued) to see if IAMSAR definition has changed. Council to decide on use of LKP or SP - noting the IAMSAR manual guidance is preferred but not mandatory. (LKP is used within IAMSAR manual vol. 2, 2016)
Acronyms & Abbreviations	To properly define the term Splash Point.	Term - Splash Point Definition – See Last Known Position	A term used in marine search planning to indicate a known point of distress. Also referred to by its acronym SP.	Pending (submitted by John Rice, SAR Training Australia)		Council to decide on use of LKP or SP - noting the IAMSAR manual guidance is preferred but not mandatory. (LKP is used within IAMSAR manual vol. 2, 2016)

Vol. 2 - 3.11.12	Remove the term Point Last Seen (PLS) as it is only used three times in the entire document and is the same as the more commonly used term Last Known Position.	b) Identifying the Last Known Position (LKP), Point Last Scene (PLS) of the MP and any error associated with that location; c) Estimating the MP' post LKP/PLS movements and any associated error of that estimate;	b) Identifying the Last Known Position (LKP) of the MP and any error associated with that location; c) Estimating the MP' post LKP movements and any associated error of that estimate;	Pending (submitted by John Rice, SAR Training Australia)		
Vol 2 – 3.16.9	Remove the term PLS from the text and where appropriate and use the term last known position or LKP	Contain any search area as quickly as possible. This can be done by using FAST and reconnaissance strategies in deploying teams to tracks, PLS, intended destination, lookouts, major camp grounds or known 'trap points' where a person or persons must pass through. These would be the initial high probability areas.	Contain any search area as quickly as possible. This can be done by using FAST and reconnaissance strategies in deploying teams to tracks, last known position (LKP), intended destination, lookouts, major camp grounds or known 'trap points' where a person or persons must pass through. These would be the initial high probability areas.	Pending (submitted by John Rice, SAR Training Australia)		
Vol 2 – 3.2.5	Fix wording and grammar.	The first step in either marine or land search planning is to determine the limits of the area containing all possible survivor locations. This is usually done by determining the maximum distance the survivors could have travelled between the time of their last known position (LKP) and the known or assumed time the distress incident and drawing a circle of that radius around the LKP. Knowing the extreme limits of possible locations allows the search planner to determine where to seek further information related to the missing craft or persons and whether an incoming report might apply to the incident. However, systematic search of such a large area is normally not practical. Therefore, the next step is to develop one or more scenario/s or sets of known facts plus some carefully considered assumptions, describing what may have happened to the survivors since they were last known to be safe. Each scenario must be consistent with the known facts of the case, have a high likelihood of being true and allow the search planner to establish a corresponding geographic reference or datum for the survivors' most probable position (MPP).	The first step in search planning is to determine the limits of the area containing all possible survivor locations. This is usually done by determining the maximum distance survivors could have travelled, or survivors in the water might have drifted, between the time of their last known position (LKP) or splash point (SP), and the known or assumed time that search assets can reach the commence search point, by drawing a circle with a radius equal to that distance around the LKP or SP. Knowing the extreme limits of possible locations allows the search planner to determine where to seek further information related to the missing craft or people and whether any incoming intelligence might apply to the incident. This initially may result in a very large search area that may be too large to search with the available resources. Therefore, the next step is to develop one or more scenario/s or sets of known facts plus some carefully considered assumptions, describing what may have happened to the survivors since they were last known to be safe. Each scenario must be consistent with the known facts of the case, have a high likelihood of being true and allow the search planner to establish a corresponding geographic reference or datum for the survivors' most probable position (MPP).	Pending (submitted by John Rice, SAR Training Australia)		

Vol 2 – 3.5.29	To include the term Splash Point for situations when a distress position is known.	To determine a value for Drift Error (De) it is necessary to complete a Datum Plot. A Datum Plot provides information both to calculate De and to measure the displacement of the Datum from the Last known Position (LKP) for the period under consideration. Drift error is derived by the resolution of the three factors (average sea current, average wind current, leeway), by way of vector addition.	To determine a value for Drift Error (De) it is necessary to complete a Datum Plot. A Datum Plot provides information both to calculate De and to measure the displacement of the Datum from the Last known Position (LKP) or Splash Point (SP) for the period under consideration. Drift error is derived by the resolution of the three factors (average sea current, average wind current, leeway), by way of vector addition.	Pending (submitted by John Rice, SAR Training Australia)		
Vol 2 – 3.5.59	To include the term splash point and to fix wording in relation to individual drift error calculated in relation to leeway left and right vectors.	3.5.59 Drift Error (De) is the radius of a circle of probability around the Datum. The circle is externally tangential to two circles of probability drawn around the end of each leeway vector. Generally, the radius of each circle is equal to 12.5% of the distance from Last Known Position (LKP) to the appropriate leeway vector. The value of De, therefore, is the sum of the radii of the two leeway probability circles and the distance between the ends of the leeway vector [Distance Left-Right (LR)] divided by two, i.e.	Drift Error (De) is the radius of a circle of probability around the Datum. The circle is externally tangential to two circles of drift error probability drawn around the end of each leeway vector. Generally, the radius of each circle is equal to 12.5% of the distance from the Last Known Position (LKP) or Splash Point (SP) to the end of the appropriate leeway vector. The value of De, therefore, is the sum of the radii of the two leeway probability circles and the distance between the ends of the leeway vector [Distance Left-Right (LR)] divided by two, i.e.	Pending (submitted by John Rice, SAR Training Australia)		
Vol 2 - 3.6.3	Proceeding to a last known position of a marine craft or person in the water will not produce any possibility that the target will be located at that location. A marine targets LKP may be many hundreds of miles from its distress location.	In most cases, considering the short response time to coastal SAR incidents, if the search unit proceeds to the last known position (LKP) of the craft in distress it will be found. However, the craft in distress may not be in sight because of inaccuracies in the initial position reported; inherent errors associated with drift factors; and/or errors in navigation of the search unit.	In most cases, considering the short response time to coastal SAR incidents, if the search unit proceeds to the Splash Point (SP) of the craft in distress it will be found. However, the craft in distress may not be in sight because of inaccuracies in the initial position reported; inherent errors associated with drift factors; and/or errors in the navigation of the search unit.	Pending (submitted by John Rice, SAR Training Australia)		In most cases, considering the short response time to coastal SAR incidents, if the search unit proceeds to the LKP or SP of the craft in distress it will be found. However, the craft in distress may not be in sight because of inaccuracies in the initial position reported; inherent errors associated with drift factors; and/or errors in the navigation of the search unit.
Vol 2 – 3.6.4	Change the term LKP to SP	If the time since the craft became distressed is less than four (4) hours and it is not located at the LKP draw a 6 NM radius centred at the LKP. Then draw a square search area with the sides tangential to the circle. This will give a search area of 144 NM² (as shown in Figure 3-16).	If the time since the craft became distressed is less than four (4) hours and it is not located at the SP draw a 6 NM radius centred at the LKP. Then draw a square search area with the sides tangential to the circle. This will give a search area of 144 NM² (as shown in Figure 3-16).	Pending (submitted by John Rice, SAR Training Australia)		If the time since the craft became distressed is less than four (4) hours and it is not located at the LKP or SP draw a 6 NM radius centred at the LKP or SP. Then draw a square search area with the sides tangential to the circle. This will give a search area of 144 NM² (as shown in Figure 3-16).

Vol 2 – 3.6.10	To incorporate the term SP into the description.	If the craft in distress reports a position in shallow water there is always the possibility that the vessel may attempt to anchor. Therefore, particular attention should be paid to the situation when the LKP is outside the established search area. In many cases, it should be possible to search along the drift line from the LKP to the datum during the initial search. However, it may be necessary to search the drift line after the search area has been completed.	If the craft in distress reports a position in shallow water there is always the possibility that the vessel may attempt to anchor. Therefore, particular attention should be paid to the situation when the LKP or SP is outside the established search area. In many cases, it should be possible to search along the drift line from the LKP or SP to the datum during the initial search. However, it may be necessary to search the drift line after the search area has been completed.	Pending (submitted by John Rice, SAR Training Australia)		
Vol 2 – 3.6.19	To incorporate the term SP into the description. Datum1 and Datum2 should be Datum1 and Datum2	The target is drifted from its LKP to datum1 and an E = 6 NM is plotted. The targets drift is recalculated sometime later and its drift is established as eight (8) NM from datum1. Using 1/8th of the targets drift as error, one (1) NM is added to the initial six (6) NM error used for the first datum. Therefore the error used for datum2 is 6 NM + 1 NM = 7 NM. See Figure 3-23 below.	The target is drifted from its LKP or SP to datum1 and an E = 6 NM is plotted. The target's drift is recalculated sometime later and its drift is established as eight (8) NM from datum1. Using 1/8th of the targets drift as error, one (1) NM is added to the initial six (6) NM error used for the first datum. Therefore the error used for datum2 is 6 NM + 1 NM = 7 NM. See Figure 3-23 below.	Pending (submitted by John Rice, SAR Training Australia)		
Vol 2 – 3.11.12	Remove the term Point Last Scene (sic) (PLS)as it is the same as LKP	Search planning involves the following steps: a) Evaluating the situation, including the results of any previous searching; b) Identifying the Last Known Position (LKP), Point Last Scene (PLS) of the MP and any error associated with that location; c) Estimating the MP' post LKP/PLS movements and any associated error of that estimate;	Search planning involves the following steps: a) Evaluating the situation, including the results of any previous searching; b) Identifying the Last Known Position (LKP), of the MP and any error associated with that location; c) Estimating the MP's post LKP movements and any associated error of that estimate;	Pending (submitted by John Rice, SAR Training Australia)		
Vol 2 – 3.16.9	Remove the term PLS as it is the same as LKP.	Contain any search area as quickly as possible. This can be done by using FAST and reconnaissance strategies in deploying teams to tracks, PLS, LKP, intended destination, lookouts, major camp grounds or known 'trap points' where a person or persons must pass through. These would be the initial high probability areas.	Contain any search area as quickly as possible. This can be done by using FAST and reconnaissance strategies in deploying teams to tracks, LKP, intended destination, lookouts, major camp grounds or known 'trap points' where a person or persons must pass through. These would be the initial high probability areas.	Pending (submitted by John Rice, SAR Training Australia)		
4.3.1	Incomplete sentence	Once the search area has been determined, a systematic search for the target should be planned. Factors such as the weather conditions, time available for search, aircraft speed, search altitude, sighting range, size of target, etc., should be taken into account. These factors are related but some may be more important than others. In planning a search operation, the SMC should endeavour to meet the requirements of the more important factors while satisfying the….	Once the search area has been determined, a systematic search for the target should be planned. Factors such as the weather conditions, time available for search, aircraft speed, search altitude, sighting range, size of target, etc., should be taken into account. These factors are related but some may be more important than others. In planning a search operation, the SMC should endeavour to meet the requirements of the more important factors while satisfying the requirements of the others as far as practicable.	Pending (submitted by Craig Longmuir, ARC)		

Abbreviations	Delete as it has been decommissioned	AULUTW Australian Local User Terminal West	(delete)	Pending (submitted by Peter Kelly, ARC)		
1.5.2	Change to management of AUMCC	The Cospas-Sarsat System provides distress alert and location data to RCCs for 406 MHz beacons activated anywhere in the world. In the Australia/New Zealand region, the Australian Mission Control Centre (AUMCC) is located in the JRCC Australia and processes data collected by satellite tracking stations in Australia and New Zealand.	The Cospas-Sarsat System provides distress alert and location data to RCCs for 406 MHz beacons activated anywhere in the world. In the Australia/New Zealand region, the Australian Mission Control Centre (AUMCC) is managed by AMSA and processes data collected by satellite tracking stations in Australia and New Zealand.	Pending (submitted by Peter Kelly, ARC)		

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Amendments – Jim Whitehead manual review

Current manual reference	Reason for amendment	Previous wording	New wording (For images or tables that cannot fit within this document are to be attached to email to Secretariat)	Council Approval (Y/N)	Responsible	Comments
Acronyms	Additional wording		VMS, VTS, IFER, MBZ, CTAF, GNSS, IERCC, LED, MSLD, MSLS, DCS, ACA			
1.1.3 a	Additional wording	Rapid transmission of distress messages from aircraft, ships, and small craft , including for medical assistance;	Rapid transmission of distress messages from aircraft, ships, small craft and persons, including for medical assistance;			
1.2.3	Additional wording	These emergency signals may be made by radio, satellite, RADAR (e.g. transponders), flags, pyrotechnics, flashing lights, smoke, sounds, shapes, ground panels. (Appendix D-1 lists the more common signals and terminology in use.)	These emergency signals may be made by radio, satellite, telephone, texting, internet (email, Facebook etc), RADAR (e.g. transponders), flags, pyrotechnics, flashing lights, smoke, sounds, shapes and ground panels. (Appendix D-1 lists the more common signals and terminology in use.)			
1.4.2	Additional wording	Reflective mirrors, used by survivors to reflect the sun's rays towards a SAR unit, are an effective daylight device. Mirrors have been detected as far away as 45 miles and from as high as 10,000 feet, although the average distance is about 10 miles. Fluorescent material (known as retro-reflective tape) that reflects a large percentage of sunlight is usually sewn on one side of lifesaving craft coverings and has been detected as far away as 5 miles with an average of 3.5 miles.	Reflective mirrors (heliographs), used by survivors to reflect the sun's rays towards a SAR unit, are an effective daylight device. Mirrors have been detected as far away as 80 kilometres (45 miles) and from as high as 10,000 feet, although the average distance is about 18 kilometres (10 miles). Fluorescent material (known as retro-reflective tape) that reflects a large percentage of sunlight is usually sewn on one side of lifesaving craft coverings and has been detected as far away as 9 kilometres (5 miles) with an average of 6 kilometres (3.5 miles).			
1.43	Additional wording	Fluorescent sea dye marker, which stains the water a green or red colour, has been sighted as far away as 10 miles, with an average of three (3) miles. However, sea dye is not visible when searching up-sun because of surface glare.	Fluorescent sea dye marker, which stains the water a green or red colour, has been sighted as far away as 18 Kilometres (10 miles), with an average of 5 kilometres (3 miles). However, sea dye is not visible when searching up-sun because of surface glare.			
1.44	Additional wording	Orange smoke generating signals have been sighted as far away as 12 miles with an average of eight (8 miles. Smoke signals are most effective in calm wind conditions and open terrain. The effectiveness of smoke signals decreases rapidly with an increase of wind speed above 15 knots.	Orange smoke generating signals have been sighted as far away as 20 kilometres (12 miles) with an average of 14 kilometres (8 miles). Smoke signals are most effective in calm wind conditions and open terrain. The effectiveness of smoke signals decreases rapidly with an increase of wind speed above 15 knots (25 kph).			

1.4.6	Additional wording	On land, fires are arguably the most effective night time signal that survivors may use. Fires have been sighted as far as 50 miles away, with the average range varying with the size of the fire and the absence of other light sources on the earth's surface.	On land, fires are arguably the most effective night time signal that survivors may use. Fires have been sighted as far as 90 kilometres (50 miles) away, with the average range varying with the size of the fire, the absence of other light sources on the earth's surface, the terrain and Height of Eye of the search asset.			
1.4.7	Additional wording	Flashing strobe lights are an effective compact night signalling device available for individual survivors. Strobe lights have been sighted as far as 20 miles away with an average of 3.5 miles.	Flashing strobe lights are an effective compact night signalling device available for individual survivors. Strobe lights have been sighted as far as 35 kilometres (20 miles) away with an average of 6 kilometres (3.5 miles).			
1.4.8	Additional wording	Incandescent lights that are used on some individual lifejackets have a much smaller detectable range than strobe lights, generally about 0.5 mile.	Incandescent lights that are used on some individual lifejackets have a much smaller detectable range than strobe lights, generally about 1 kilometre (0.5 mile).			
1.4.9	Additional wording	Flares, star shells and rockets have been detected as far away as 35 miles, with an average of 25 miles.	Flares, star shells and rockets have been detected as far away as 60 kilometres (35 miles), with an average of 45 kilometres (25 miles) from the air.			
1.4.10	Additional wording	With the use of Night Vision Goggles (NVG) objects emitting small amounts of light such as mobile telephone screens are able to be seen from great distances. Larger light sources such as fires, torches, and strobe lights can be viewed from considerably farther.	With the use of Night Vision Goggles (NVG) objects emitting small amounts of light such as mobile telephone screens are able to be seen from great distances. There is no need for a telephone signal, it is the lit screen that is being detected. Larger light sources such as fires, torches, and strobe lights can be viewed from considerably farther. E-Flares and some LED strobe lights have been identified as being invisible on NVG due to the frequencies used. Searchers must be aware of this.			
1.5	change wording	Cospas-Sarsat	COSPAS-SARSAT			
1.5.9	Additional wording		called shadowing			

1.5.10	Additional wording		These satellites send the beacon message back to earth where it is detected by a MEOLUT (MEOSAR Local User Terminal). With sufficient information, the MEOLUT will generate a location for the distress beacon. The beacon activation information is forwarded to a Mission Control Centre (MCC) and then to the relevant Rescue Coordination Centre (RCC) which responds to the beacon activation. The MEOSAR system will detect beacons in almost real-time (i.e within 5 minutes). If the beacon is detected by three or more MEOSAR satellites, then the location of the beacon will be determined as well. When the full constellation of MEOSAR satellites is in operation, this will mean location will be determined within 10 minutes, 95 per cent of the time.			
1.5.14	Additional wording		within its footprint but not at the poles			
1.5.15 a	Additional wording		Emergency Locator Transmitters (ELT) used by aviators (Generally larger devices mounted in the tail of an aircraft);			
1.5.15 b	Additional wording		Emergency Position Indicating Radio Beacons (EPIRB) used by mariners (Water proof and required to float upright); and			
1.5.15 c	Additional wording		Personal Locator Beacons (PLB) used on land (Initially not required to be water proof or floatable but new generation ones are becoming so.).			
1.5.16	Additional wording		also known as a GPS)			
1.5.18	Additional wording		a side frequency of			
1.5.19	change wording	MCC	Change to JRCC			
1.5.20	change wording	Australian MCC	JRCC Australia			
1.7.3	new diagram		New SART image diagram			
1.7.4	Additional wording		Since the RADAR detection range depends primarily upon the height of the RADAR scanner and the height of the beacon, it is probably not realistic to expect a detection range of much more than 30 miles (55km) for an aircraft flying at 3000 ft equipped with 3cm (9 GHz) RADAR and about 10 miles (18km) for a ship's RADAR and a few miles (3km) for a motor launch. However, bearing in mind that it is a short-range homing device, this should be adequate for final location.			

1.8.1	Additional wording		The SMC is responsible for utilising all available communication systems and designating specific frequencies for on-scene use during SAR operations, and for establishing reliable communications with adjacent operations centres. When appointed, the Coordinator Surface Search (CSS) or the On Scene Coordinator (OSC) is responsible for establishing reliable communications between all participating search units and the RCC.			
1.8.8	Additional wording		Ships of the Australian Defence Force will use their names as call signs when employed on SAR operations, ie 'This is HMAS Melbourne'.			
1.9.1 g	Additional wording		Mobile phone and texting communications; and			
1.9.1 h	new words		Electronic (Email, internet, skype and video conferencing)			
1.9.2	Update diagram number		Table 1-1			
1.9.5	change wording	RCC	JRCC Australia			
1.9.14	Additional wording		Vessel Tracking System (VTS) is utilised by most states/territories to monitor the location of SOLAS vessels with the reef systems and other locations posing heavy traffic or environmental concerns.			
1.9.23	change wording	ACA	ACMA			
1.9.27	new words		Capabilities and locations of these units are contained in local facilities registers.			
1.9.29	Additional wording	Air Wings	Air Wings/State and Community provided aerial assets			
1.12.1	Additional wording	It is the task of the Communications Officer to ensure that as far as practicable, the SMC's actions and decisions are never restricted through lack of communications.	It is the task of the Communications Officer, if available, otherwise the command team, to ensure that as far as practicable, the SMC's actions and decisions are never restricted through lack of communications.			
1.14.1	Additional wording	The Search Headquarters may be the nearest Police Station or building which already has telephone facilities and good access. If this is not available, consideration must be given to the following aspects in choosing the site for Search Headquarters	The Search Headquarters may be the nearest Police Station or building which already has landline telephone facilities and/or mobile service and good access. If this is not available, consideration must be given to the following aspects in choosing the site for Search Headquarters			
1.14.1 a	Additional wording	A house or building with telephone, light and power already connected.	A house or building with telephone landline and/or mobile service, light and power already connected.			

1.14.1 d	Additional wording		Consideration of radio repeaters should be made early.			
1.15.1	Additional wording	If a telephone is available, maximum use should be made of this facility,	If a telephone is available, maximum use should be made of this facility, particularly for communication of long or complicated messages,			
1.15.2	new words		Radios are always the preferred method of mass communication to all search assets.			
1.17.1 b	change wording	Search teams; and	Search assets; and			
1.17.2	Additional wording	The principle here is to use whatever communication systems are available, but generally the forward net would depend on radio.	The principle here is to use whatever communication systems are available, but generally the forward net would depend on radio as the primary method, and telephones can be a secondary method.			
1.17.4	new words		Appendix E-XXX contains the recognised radio terminology.			
1.19.1 a	Additional wording	A vehicle mounted radio attached to an external antenna will provide the best coverage although a hand-held device will also work, albeit with a limited range. Spare batteries should always be carried	A vehicle mounted radio attached to an external antenna will provide the best coverage although a hand-held device will also work, albeit with a limited range. Spare batteries should always be carried if the radio is not hard wired.			
1.19.1 e	Additional wording	While the above channels are dedicated, a search asset with a scanning radio will detect a missing person calling.	While the above channels are dedicated, a search asset with a scanning radio will detect a missing person calling on any channel within range.			
1.19.3	New heading		Loss of communications:			
1.20.1	Additional wording	To achieve efficiency, standard radio procedure should be used. Although two- way conversations will be needed, messages should be written.	To achieve efficiency, standard radio procedure should be used. Although two- way conversations will be needed, messages should be written for reference at a future time.			
1.21.2 g	New section		The use of text messages may be more successful than verbal communications. Text messages require less signal strength and will be received when a mobile telephone comes within range even if it is some time since it was originally sent.			
1.21.2	Additional wording	Other methods of communicating, which can be used but require some degree of planning are	Other methods of communicating, which can be used but require some degree of prior planning are			
2.1.4 c	Additional wording	Actual and forecast weather conditions;	Prior, actual and forecast weather conditions;			
2.1.4 e	Additional wording	Nature of terrain;	Nature of terrain/sea conditions;			
2.2.3 b	Additional wording	A surface vessel or craft has transmitted a distress signal.	A surface vessel or craft has transmitted or displayed a distress signal.			

2.2.7	Removed words		The official reference document for Land SAR operations is the National Search and Rescue Manual.			
2.3.1	Additional wording	The RCC shall maintain records for each incident in which all information should be recorded as it is received, either in full or by reference to other permanent records such as flight plans, forms, charts,	The RCC shall maintain records for each incident in which all information should be recorded as it is received, either in full or by reference to other permanent records such as flight plans, forms, charts, maps,			
2.3.3	Additional wording	Each day's search activity shall be plotted. The total search area shall be subdivided into sections assigned to each SAR unit showing individual search patterns, heights,	Each day's search activity shall be plotted. The total search area shall be subdivided into sections assigned to each SAR unit showing individual search patterns, aircraft heights and speeds,			
2.3.3	Additional wording		Areas assigned but not searched need to be readily identified for reassignment, leaving no 'holes' within the search area.			
2.3.4	Additional wording		These records will contribute to determining the POD of searches and may also			
2.3.5	Additional wording	Records shall be kept of names of all volunteers used in SAR operations on assets tasked by the RCC usually in the form of a manifest.	Records shall be kept of names of all searchers (volunteers and professional) used in SAR operations on assets tasked by the RCC usually in the form of a manifest or 'T' cards (ie Aircraft and aerial observers, vessels and crew, search teams)			
2.3.6	Additional wording	When a search has been terminated without locating a missing aircraft or its occupants, all records, charts, etc.	When a search has been terminated without locating a missing target (aircraft or its occupants vessel or its occupants or missing person), all records, charts, maps etc.			
2.3.7	Additional wording	Records relating to search and rescue operations, including air, on behalf of other organisations shall be retained.	Records relating to search and rescue operations, including air, land and marine searches, conducted by other organisations shall be retained.			
2.4.3 a	Additional wording	**Awareness.** Knowledge by any person or agency in the SAR system that an emergency situation exists or may exist.	**Awareness.** When the SAR system becomes aware that an emergency situation exists or may exist.			
2.5.4	Renumbered		Renumbered			
2.5.16	Renumbered		Moved old section 2.5.17 to new position at 2.5.16			
2.5.18 d	Additional wording	The command/control elements need to pass on specific information to searchers in the field,	The SMC will utilise the intelligence as the basis of briefings to pass on specific and relevant information to searchers in the field,			
2.5.19	New section		Psychological issues (Happiness, depression, family trouble, financial trouble, legal trouble)			
2.5.19 Missing person	Renumbered		Renumbered			

2.5.21	Additional wording	When conducting a search for an object such as aircraft, vessel, vehicle, or any other article	When conducting a search for an object such as aircraft, vessel, vehicle, or any other article (Police evidence search),			
2.6.5	Additional wording		(This does not mean that the SMC has doubt that a SAR situation exists, more that there is doubt about the level of safety of those involved).			
2.7.2 iv, v	New section		Vessels known to be on the same route, in the same area or within communication range, by way of VMS, VTS, Coastal radio stations or vessel broadcasts. Persons known to be on the same route, in the same area or within communications range, by way of electronic/social media (Television, radio, Facebook, mass texting etc) and/or speaking to persons located within the search area.			
2.7.3 b iii	New section		Using electronic methods to track mobile telephones, leave text or voice mail messages or utilise electronic/social media (Television for witnesses, radio, Facebook or similar)			
2.7.5 d	Additional wording	Obtain information about the aircraft, ship or other craft from other sources not previously contacted, such as:	Obtain information about the aircraft, vessel or person from other sources not previously contacted, such as:			
2.7.8 e	Additional wording	Estimate the position of the distressed craft	Estimate the position of the target			
2.7.8 g i	change wording	Craft may be dispatched from their bases in accordance with the search plan.	Search assets may be dispatched from their bases in accordance with the search plan.			
2.7.8 g ii	change wording	Craft may be diverted in-flight or en-route.	Aircraft and vessels may be diverted in-flight or en-route.			
2.8.2	Additional wording	A SAR rated officer shall be appointed as the RCC Intelligence Officer and given the task of seeking information and assessing and verifying information received.	Where possible a SAR rated officer shall be appointed as the RCC Intelligence Officer and given the task of seeking information and assessing and verifying information received.			
2.8.5-8	change wording		Remove craft and replace with target			
2.8.15 a	change wording	Missing person. As much information as possible regarding the target(s) needs to be obtained.	Missing target (Aircraft, vessel, person). As much information as possible regarding the target(s) needs to be obtained.			
2.8.15 c	change wording	In extremes, this will indicate the possible time frame for the missing person's survival.	In extremes, this will indicate the possible time frame for any involved person's survival.			
2.8.15 g	Additional wording		Renumbered and included further equipment: Vessels (Inshore and off shore), RPAS (Drones), electronic aids (Tracking devices, mobile telephone locators etc.)			

2.8.18 a	Additional wording	About Missing Persons	About Missing Persons (whether from vessel, aircraft or missing)			
2.8.18 a	Additional wording		Social media and Mobile telephone tracking			
2.8.18 c	Additional wording		Electronic sources and archives; and Reconnaissance teams			
2.8.18 d	Additional wording		Charts (RAN, RN etc; Electronic (Google maps, Google Earth, satelite images			
2.8.18 e	Additional wording		Volunteer services (SES, Coast Guard, Volunteer Marine Rescue)			
2.8.23	Additional wording		(Experience, capability, preparedness);			
2.8.24	change wording	Briefing Phase (Dissemination) - The decision to mount a search has been made and search teams are being prepared to commence the operation. Team leaders are required to attend a briefing at which orders will be given regarding the conduct of the search. Details that need to be covered are:	Briefing Phase (Dissemination) - The decision to mount a search has been made and search assets are being prepared to commence the operation. Pilots, masters and team leaders are required to attend a briefing at which orders will be given regarding the conduct of the search. Details that need to be covered are:			
2.8.24 a	New section		Briefing needs to be in the SMEAC format, standard among SAR assets.			
2.8.24	Renumbered		Renumbered			
2.8.26	Additional wording	Search Operations Phase - In the conduct of the operation, the search teams must constantly	Search Operations Phase - In the conduct of the operation, the search assets must constantly			
2.8.28	Additional wording	As search teams return to the Field Search Headquarters, team leaders need to be debriefed.	As search assets return to the RCC, pilots, masters and team leaders need to be debriefed.			
2.8.29	Additional wording	This information will then be distributed to teams still in the field or before new teams are deployed.	This information will then be distributed to assets still searching or before new assets are deployed.			
2.8.43	Additional wording	e.g. the police.	e.g. a police officer with SAR training.			
Heading 2.8.47	Additional wording	**Examination of Recorded Communications - Aircraft and vessels**	**Examination of Recorded Communications - Aircraft and vessels**			
2.8.54	Additional wording	Mistakes have also commonly resulted from differences between forecast and actual weather	Mistakes have also commonly resulted from differences between forecast and actual weather so contact with the BOM is of vital importance.			
2.8.55	Additional wording	An analysis of the weather existing at the time a the craft encountered difficulty and the interaction of weather and terrain (for aircraft) should be made. The opinion of meteorologists should be sought in this respect, as should the views of suitably experienced qualified mariners and pilots.	An analysis of the weather existing at the time a target encountered difficulty and the interaction of weather and terrain or sea conditions should be made. The opinion of meteorologists should be sought in this respect, as should the views of suitably experienced qualified mariners, pilots and land search experts.			

2.8.56	Additional wording	Effort should be made to obtain reports of a sea or in flight conditions from mariners, pilots who were in the area at the time the craft encountered difficulty.	Effort should be made to obtain reports of conditions in flight, at sea or land areas from mariners, pilots or others who were in the area at the time the target encountered difficulty.			
2.8.60 e	Additional wording	Nature of terrain	Nature of terrain, topography, sea conditions, current, winds and other meteorological events.			
2.8.72	Additional wording		Consideration should be given to the use of Night Vision Googles (NVG) or Forward Looking Infra-Red Radar (FLIR) particularly when searching from the air.			
Heading 2.8.73	New heading		**First and last search light**			
2.8.73	New section		First and last search light describes the optimal times that searching should commence and cease taking into account the angle of the sun and the limiting factors caused by a low sun on searchers. First search light is 45 minutes after sunrise and last search light is 45 minutes before sunset. These times allow for the sun to either rise above the horizon sufficiently for searching towards the east, or to be sufficiently above the horizon for searching towards the west. In mountainous or built up areas these times may vary due to darkness extending for lengthier periods. Given the urgency and circumstances a SMC may choose to utilise these times to conduct searches.			
2.8.74	New section		Civil twilight is that period of time when the sun is 6°(24 minutes) below the horizon, either before sunrise or after sunset. This time can be utilised by aircraft to travel to their respective search area, but originally related to when a star sighting could be taken from an aircraft.			
2.8.75	New section		Nautical twilight is that period when the sun is 12° (48 minutes) below the horizon, either before sunrise or after sunset. This time can be utilised by vessels to travel to their respective search area but originally related to when a star sighting could be taken from a ship.			
2.8.78	Additional wording	If weather will not allow for a search operation to be mounted without endangering additional lives, the search effort should be deferred.	If weather will not allow for a search operation to be mounted without endangering additional lives, the search effort should be deferred or suspended.			

2.8.86	Additional wording	Terrain may also limit the time available for search. For example low-level searches in mountain areas are normally limited to daylight only.	Terrain may also limit the time available for search. For example low-level searches in mountain areas are normally limited to daylight only, often restricted by increased shadows due to deep valleys and high mountains.			
2.8.98-123	New section		Moved to Chapter 3 3.16.16-41			
3.1.1	Additional wording	The search area described will be of rudimentary construction, e.g. a circle, square or rectangle depending on the nature of the distressed craft. The search area will be of sufficient proportions to cover all reasonable alternative tracks of the distressed craft and will incorporate areas highlighted by intelligence information.	The search area described will be of rudimentary construction, e.g. a circle, square or rectangle depending on the nature of the target. The stage 1 search area (equivalent to a Reflex search on land) will be of sufficient proportions to cover all reasonable alternative tracks of the target and will incorporate areas highlighted by intelligence information.			
3.2.1 a	Additional wording	Evaluating the situation, including the results of any previous searching	Evaluating the situation, including the results of any previous searching (This may include incidents that have occurred in that location in the past and search efforts on previous days);			
3.2.2	Additional wording		While the JRCC and the ADF generally cease search efforts upon the Time Frame for Survival (TFFS) being reached, police have obligations under jurisdictional Coroner's Acts to continue searching for, and recovering, deceased persons that were previously the subject of a SAR operation.			
3.2.5	Additional wording	This is usually done by determining the maximum distance the survivors could have travelled between the time of their last known position (LKP) and the known or assumed time of the distress incident and drawing a circle of that radius around the LKP. Knowing the extreme limits of possible locations allows the search planner to determine where to seek further information related to the missing craft or persons and whether an incoming report might apply to the incident. However, systematic search of such a large area is normally not practical.	This is usually done by determining the maximum distance the survivors could have travelled, (by aircraft, vessel, vehicle or on foot) between the time of their last known position (LKP) and the known or assumed time of the distress incident and drawing a circle of that radius around the LKP (S/T/D calculation). Knowing the extreme limits of possible locations allows the search planner to determine where to seek further information related to the missing craft or persons and whether an incoming report might apply to the incident. However, systematic search of such an initially large area is normally not practical.			
3.2.7	Additional wording	The incident may have been witnessed: reported as a navigational fix by another craft or the craft in distress	The incident may have been witnessed: reported as a navigational fix by another craft or the craft in distress (Manually or electronically);			
3.2.9	Additional wording	The SMC should try to reduce this area to an area of high probability that can be used as the initial search area or use it.	The SMC should try to reduce this area to an area of high probability that can be used as the initial search area or, if the area is small enough for adequate searching with available assets, use it.			

3.2.11	Additional wording	The first step in search planning is to determine Datum.	Datum: The first step in search planning is to determine Datum. Datum is a calculated reference for the possible location of a target allowing for all environmental factors, and forms the basis for all marine and aviation search drift modelling.			
3.2.12	new words	A **datum point** is the datum developed at a specific time when the initial position of the search object is known.	A **datum point** is the most probable location of the target, corrected for drift, calculated for a specific time. It is only possible to determine a datum if an origin location is known.			
3.2.13	new words		Datum lines are also developed when there is a known start and end point in a vessel/aircraft's route, with drift calculated off that base line.			
3.3.4	new words	Where a craft reports encountering a distress situation, the location is reasonably well known and there are other craft in the near vicinity, it may be possible to divert an asset to the area or intercept the distressed crafts track with instructions to undertake a track crawl search along the known route.	Where a target reports encountering a distress situation, the location is reasonably well known and there are other assets of opportunity in the near vicinity, it may be possible to divert an asset to the area or intercept the distressed targets track with instructions to undertake a track crawl search along the known route.			
3.3.5	Additional wording	If circumstances allow, the diverted asset may be instructed to proceed parallel to the distressed craft's track at an appropriate off-set distance and to return at the same off-set distance on a reciprocal heading.	If circumstances allow, the diverted asset may be instructed to proceed parallel to the distressed targets track at an appropriate off-set distance to one side and to return at the same off-set distance on a reciprocal heading on the other side of the targets track.			
3.3.6 c	Additional wording	A quick appraisal of readily available assets	A quick appraisal of readily available assets (from a local facilities or asset register);			
3.3.13	Additional wording	The possibility of a communications failure, and a subsequent diversion should not be overlooked. The operating agency should be questioned concerning policy as to diversion.	The possibility of a communications failure, and a subsequent diversion should not be overlooked. The operating agency, in the event of a commercial target, should be questioned concerning policy as to diversion. In the event of it being a non-commercial or pleasure target, inquiries should be made with family and friends as to possible diversion actions.			
3.3.20	new words		These statistical distances were from incidents prior to GPS enabled navigation. It could reasonably be assumed that GPS navigation would result in aircraft crashes being closer to the intended track of the target aircraft but there have been not recent studies to confirm this.			

3.4.6	Additional wording		The ATNPS formula is a useful tool in understanding the relationships between Area covered, time available, number of assets, speed of the assets and track spacing or distance between assets.			
3.4.10	change wording	To ascertain if the drift rate presents a problem, compare the targets drift rate to the rate of creep of the search aircraft. If the targets drift rate exceeds the aircraft's rate of creep, remedial action is necessary.	To ascertain if the drift rate presents a problem, compare the targets drift rate to the rate of creep of the search aircraft or vessels. If the targets drift rate exceeds the asset's rate of creep, remedial action is necessary.			
3.4.12 b	change wording	Use a track spacing equal to sweep width (C = 1.0, or at least 0.5);	Use a track spacing equal to sweep width (C = 1.0, or no lower than 0.5);			
3.4.12 c	Additional wording		(Available light, first and last search light, electronic searching);			
3.4.12 d	Additional wording		(Refer to the ATNPS formula);			
3.4.14	Additional wording		This will prevent unsearched areas and maintain the momentum of the search. It is almost impossible to resume a search in an area after that asset has been diverted to another search area. Holes in searches create doubt and reduce the overall POD.			
3.4.15	Additional wording		Searching both a land and marine environment with aircraft provides the most rapid response and greatest chance of survival. In instances where aircraft are unavailable or in insufficient numbers then a vessel search will become necessary in a marine incident. A vessel search may be limited initially to a trackline search to provide a maximum POD. Vessel visual, electronic, wreckage and beacon searches are limited by the height of eye (Hoe) of searchers and the sea conditions at the time.			
3.5.10	Additional wording	Where: A = LKP, TAS = 100 kt, W/V+180/15, Endurance remaining at A = 90 minutes. Therefore A-B = 22.5 NM 3.5.10 and radius B-C = 150 NM	Where: A = LKP, TAS = 100 kt, W/V +180/15 (Wind vector is 180°T (Blowing from the south) at 15kts), Endurance remaining at A = 90 minutes. Therefore A-B = 22.5 NM (15kt winds x 90 mins endurance (1.5hrs)) and radius B-C = 150 NM (100 kt speed x 90 mins endurance (1.5hrs))			
3.5.19	new diagram		New E diagram			

3.5.21	Additional wording		X is given the figure of 5nm when it is not known what method, if any, had been used to determine LKP. The SMC can modify this distance based on reliable intelligence and/or information from the pilot/master. Y is given the figure of 1nm as almost all search assets will be making continuous navigation checks using GPS and/or other manual fix methods.			
3.5.50	Additional wording		The leeway for a person in the water with a wind speed of 20kt would be: Lw = [(0.011 x 20) + 0.07] Lw = [0.22 + 0.07] Lw = 0.29kt			
3.6.19	Additional wording		If the Total Drift Line (TDL) of the initial plot is less than 8nm then there is no need to apply any Individual Drift Error (IDE) as per diagram 3-23. The 6nm circle is drawn around datum, and subsequently boxed up to represent the search area. If the second and subsequent TDL's exceed 8nm then the IDE needs to be applied to the circle around datum. The IDE in these cases is the TDL divided by 8 (1/8th or Rule of Eights). The IDE is then added to the initial 6nm circle.			
Figure 3-23	new diagram		New recomputing diagram			
Figure 3-24	new diagram		New Boxed search area diagram			
Figure 3-25	new diagram		New Total search area			

3.11.12	New section		There are three possible places to commence a land search from: LKP: This is the Last Known Position of the target, and relates to when the target was visually seen by a witness. This may be at the start of a bush walk or perhaps in their room at a care facility. PLS: This is the Place Last Seen, and is subtly different from LKP. A PLS is often identified during the intelligence phase when witnesses come forward with information on possible sightings of the target. This information should be assessed against time, ability of target to travel to that location and other factors of the incident. IPP: This is an Initial Planning Point and is a location identified by the SMC where the search should commence. An example may be a missing bush walker, their LKP was their bedroom at their dwelling the day before, and the PLS may be the same location. This is not the best location to commence a search unless information suggests the target never left home. If their vehicle was located at the entrance to bush walking area, and their intention was to go bush walking it is logical to commence the search from the vehicle. Even though there was no visual sighting of the target leaving the vehicle it becomes a good Initial Planning Point until further information comes to light.			
3.16.16	Additional wording	Urban Environment: Land searches in urban areas are often required.	Urban Environment: Land searches in urban areas are often required for targets such as those intending suicide and those with dementia or similar ailments.			
3.18.14	Removed words	An Australian LPB study was conducted between 2000-2006, details of which are contained at site http://sarbayes.org/natsar.pdf	An initial Australian LPB study was conducted between 2000-2006			
3.20.3	Replace old and difficult to read diagrams	Land SAR Stages	New diagrams 3-35 to 3-51			
3.21	New diagrams to explain overlays	Recording of search areas	New diagrams to expand word content 3-52 to 3-61			
4.1.2	additional wording		(This may be a combination of SAR specific assets, other local assets or assets of opportunity that happen to be in or near the search area);			
4.1.2 Note	additional wording	**Note**: JRCC Australia uses a computer-based program to design search areas, assign search patterns,	**Note**: JRCC Australia and most police jurisdictions use a computer-based program to design search areas, assign search patterns,			

4.2.1	Rewording	As discussed in the previous chapter, a search typically involves three stages including the immediate response, a search based on a nominated area either side of track, and a search based on a mathematically derived search area. The following sections describe these stages in further depth.	As discussed in the previous chapter, an aerial or maritime (whether using oceanic principles or coastal search planning) search typically involves three stages: Stage 1: The immediate response; Stage 2: a search based on a nominated area either side of track, and; Stage 3: a search based on a mathematically derived search area. The following sections describe these stages in further depth.			
4.2.2	additional wording	The stage one search normally consists of:	The stage one, initial or reflex search normally consists of:			
	additional wording	That a surface response for search or rescue as may be required;	Deploying a surface asset for search and/or rescue as may be required by the situation and location;			
4.2.4 d	additional wording		(Only in this initial stage of the search);			
4.2.5	additional wording	A stage two search is normally not required for a maritime incident. During stage two, the search area is normally 10 NM either side of the missing craft's track.	During stage two, the search area is normally 10 NM either side of the missing targets track for aircraft and vessels when undertaking an aerial search. Surface searching will be at smaller distances either side of the track.			
4.2.6	additional wording	It may be reduced or extended either side of the track after consideration of the following factors, as applicable: a) The height and speed of the missing aircraft; c) Possible actions of the missing craft during an emergency, e.g. an aircraft searching for a suitable area to land or attempting to reach land if flying over water,	This distance may be reduced or extended either side of the track after consideration of the following factors, as applicable: a) The speed of the missing aircraft or vessel; b) The height of the missing aircraft; c) Possible actions of the missing target during an emergency, e.g. an aircraft searching for a suitable area to land or attempting to reach land if flying over water, or a vessel attempting to run for shelter;			
4.2.9	additional wording	A Stage Three search is a further development of Stage Two, where the search area is expanded to cover the probability area calculated by reference to the missing craft's and search aircraft's navigation errors, modified by intelligence and any allowance for drift.	A Stage Three search is a further development of Stage Two, where the search area is expanded to cover the probability area mathematically calculated by reference to the potential navigational errors of the missing target and search assets. These errors will be modified by intelligence and any allowance for drift.			
4.2.10 e	additional wording	Logistical support including availability of fuel for search aircraft if operating from more remote airfields;	Logistical support including availability of fuel for search aircraft and vessels if operating from more remote airfields and bases;			

4.3.1	additional wording	Once the search area has been determined, a systematic search for the target should be planned. Factors such as the weather conditions, time available for search, aircraft, search altitude, sighting range, size of target, etc., should be taken into account.	Many of the general factors involved in aerial and maritime search have similarities in their prosecution and planning and are considered together in this manual. Once the search area has been determined, a systematic search for the target should be planned. Factors such as the weather conditions, time available for search, aircraft and vessel speed, search altitude, sighting range and height of eye, size of target, etc., should be taken into account.			
4.3.2	changed wording	Search Area coverage is the systematic search of selected areas of land, or water, to ensure the optimum probability of detecting the object being sought.	Search Area coverage is the systematic search of selected areas of land, or water, to ensure the optimum probability of detection of the object being sought			
4.3.3	changed wording	The type and number of available search aircraft will be a factor in determining search area coverage. More time will be required to search a large area thoroughly when there are limited numbers of search aircraft available unless the distance between successive sweeps of the area is increased. This is not desirable since it would reduce the probability of detecting the target. It may, therefore, be necessary to seek additional search aircraft from other sources. It is usually preferable to cover a search area from the beginning with an adequate number of search aircraft.	The type and number of available search assets will be a factor in determining search area coverage. More time will be required to search a large area thoroughly when there are limited numbers of search assets available unless the distance between successive sweeps of the area is increased. This is not desirable since it would reduce the probability of detection of the target. It may, therefore, be necessary to seek additional search assets from other sources. It is usually preferable to cover a search area from the beginning with an adequate number of search assets.			
4.3.4	additional wording	When the aircraft operate far from their home base, consideration should be given to them being redeployed at an advance base so that more time will be available for the search and less time will be spent on flights to and from the search area.	When search assets operate far from their home base, consideration should be given to them being redeployed at an advance base so that more time will be available for the search and less time will be spent on travel to and from the search area.			
4.3.5	changed wording	An adequate number of well-placed, trained observers as well as altitude and speed of the search aircraft are important factors determining the POD of a target.	When using an aircraft as a search asset an adequate number of well-placed, trained observers as well as altitude and speed are important factors determining the POD of a target.			
4.3.7	additional wording		There are a number of terms relating to visibility from a search asset:			
4.3.7 a	additional wording		Meteorological visibility: This is the maximum visibility taking into account the weather features present in the search area at the time of the search. This will vary depending on height of asset, cloud base, cloud coverage, clear skies etc.			

4.3.7 b	additional wording		Search visibility is the actual distance a searcher can see under good conditions. A searcher may be able to see the horizon from a vessel or aircraft but would have very little chance of seeing a target at that distance.			
4.3.7 c	additional wording		Sweep width is the calculated distance that a searcher has a reasonable chance of locating the target. It is based on a bell curve where the probability of a search not seeing the target within the sweep width is the same as them seeing the target beyond the sweep width. In Figure 4.2 (Below) the number of missed detections (B) inside the effective area swept equals the number of detections (A) that occur outside the area swept.			
4.3.7 c	New diagram		New Figure 4.2 Bell curve			
4.3.7 d	additional wording		Track spacing is the mathematically derived distance between each search leg. Where possible the track spacing should be equal to or less that the sweep width to ensure a high POD.			
4.3.9 d	additional wording	Precipitation reduces visibility; and	Precipitation, sleet and snow or other storm event reduces visibility; and			
4.3.11	changed wording	On a glassy sea any object, or disturbance, will probably attract the attention of the eye.	On a glassy sea any object, or disturbance, will probably attract the attention of a searchers eye.			
4.3.15	New section		The weather correction factor (Fw) is applied to the sweep width calculation to account for the degradation in weather conditions. This generally means that sweep widths will need to be closed to achieve a good POD in poor conditions.			
4.3.16	additional wording	At low search altitudes the speed of the aircraft will affect the sweep width due to the angular velocity of targets moveing through the RADAR scanner's field of view, blurring theof targets at very close ranges, and decreasing the exposure time theof targets to the scanner.	At low search altitudes the speed of the aircraft will affect the sweep width due to the angular velocity causing targets to: a) Move through the RADAR scanner's field of view, blurring the targets at very close ranges, and decreasing the exposure time the targets to the scanner. b) Move through a searchers field of view, again resulting in the blurring of the targets and limiting the time to identify and respond to a target being seen. c) Generally, higher speeds will increase the adverse influence of these factors at search altitudes below 500 feet.			
4.3.20	New section		Search heights will be quoted as height above ground level (AGL) or above mean sea level (AMSL).			

4.3.25	New section		Cloud cover is often referred to in Octa's (Eights). Zero (0) Octa's is a cloud freen sky, while eight (8) Octa's is total cloud cover.			
4.3.39	New section		To use the Sweep Width tables the following formula applies: Vessels: Sweep Width (W)= Uncorrected sweep Width (Wu) x Weather Correction (Fw) x Fatigue (Ff) (Target is a person in the water, height of eye of vessel is 8', visibility is 15km, wind is 20kts and seas are 1.5m. The vessel crew is fatigued. W = 0.3nm (from the Sweep Width table for vessels) x 0.5 (Weather correction factor table) x 0.9 (Fatigue section 4.3.18) W = 0.3 x 0.5 x 0.9 W = 0.135nm (0.25km) Aircraft: Sweep Width (W)= Uncorrected sweep Width (Wu) x Weather Correction (Fw) x Velocity (Fv) (Target is a person in the water, helicopter is flying at 500', speed of 60kts, visibility is 10km, wind is 20kts and seas are 1.5m) W = 0.1 (from Sweep Width for helicopter table) x 0.5 (Weather correction factor table) x 1.5 (Speed correction factor table) W = 0.1 x 0.5 x 1.5 W = 0.075nm (0.14km)			
4.3.41	additional wording	In conditions where the wind speed is less than 15 knots and/or visibility is greater than three (3) nm, use a track spacing of up to three (3)nm	In conditions where the wind speed is less than 15 knots and/or visibility is greater than 3 nm (5.5km), use a track spacing of up to 3nm (5.5km)			
4.3.42	additional wording	Where winds are greater than 15 knots and /or visibility is less than three (3) NM but greater than one (1) NM, a track spacing of one (1) NM	Where winds are greater than 15 knots and /or visibility is less than 3nm (5.5km) but greater than 1nm (1.9km), a track spacing of 1nm (1.9km)			
4.3.44	New diagram		New Coverage diagram			
4.3.54	additional wording		To ensure the concentration of search effort around the most probable position, drift and other environmental factors must be continuously factored in.			

4.3.55	new wording	When using the POD Graph in Appendix D-5:12, the POD for any particular search is obtained by reference to the appropriate Search graph line depending on the search conditions apparent.	POD graph is contained in Appendix D-5:12. The bottom horizontal line is the Coverage factor (C) and the vertical side is the Probability of detection (POD) as a percentage, starting from 0% at the bottom to 100% at the top. The graph also contains five search lines, relating to the first, second, third, fourth and fifth search of the same area. To use the graph identify the Coverage factor (C) from the search, then follow this factor upwards until it crosses the appropriate search line. The POD can then be read on the vertical scale. Eg. A Coverage factor for a first search is 0.8, the POD would be approximately 68%.			
4.3.59	moved section		The probability of detection curve is valid only when the search pattern tracks are accurately followed.			
4.4.1	additional wording	The navigational accuracy with which a search aircraft is able to reach a search area and fly a search pattern has an important bearing on the coverage of the area and the POD. Dead reckoning navigation alone generally produces poor results. Map reading can be effective but normally only over land or coastal areas in visual meteorological conditions.	The navigational accuracy with which a search aircraft and vessels are able to reach a search area and undertake a search pattern has an important bearing on the coverage of the area and the POD. Dead reckoning navigation alone generally produces poor results. Map/chart reading can be effective but normally only over land or coastal areas in visual meteorological conditions. With the advent of the Global Positioning Systems (GPS) and the provision of satellites from a variety of nations (preventing monopoly on access and potential disruption in times of conflict) almost remove any navigational inaccuracies due to manual navigation and does not require the search asset to be within visual range of navigational markers. The GPS does not alleviate the need to keep a visual appreciation of location where possible.			
4.4.3	additional wording	Greater search accuracy is obtained when visual, RADAR or radio navigational aids are within reception range of search units or when aircraft are equipped with area type navigation equipment (RNAV) e.g. GPS or Inertial Navigational Systems (INS).	Greater search accuracy is obtained when visual, RADAR or radio navigational aids are within reception range of search assets or when aircraft/vessels are equipped with area type navigation equipment (RNAV) e.g. GPS or Inertial Navigational Systems (INS).			
4.5.1 d	additional wording		The SMC needs to be cognisant of vertical and horizontal separation requirements of aerial assets. In instances where multiple aerial assets are being used for a single search, aircraft tasking expertise should be sought from the JRCC Australia.			

4.5.5	New section		There is no NOTAM equivalent with the maritime search area. The SMC and vessel masters must have continual situational awareness of the search environment, the possibility of both small and large vessels transiting the area, and the need to halt or modify the search patterns to avoid collisions or dangerous situations.			
4.5.6 a	additional wording		(non-GPS beacon, GPS beacon, GPS location, 2 or 3 point fix, dead reckoning, unknown);			
4.5.6 e	additional wording		(transit time to search area);			
4.5.9	additional wording	When it is known, or likely, that an emergency radio beacon may be available in the target vessel or aircraft or to the survivors, an electronic search using an appropriate pattern, (e.g. track line search), should be carried out by at aircraft flying at a high level. This may occur at the same time as a visual search is carried out at a lower altitude or on the surface. In planning this search the coverage and possibility of detection by the COSPAS-SARSAT system may be considered It is also valuable to consider the location of the incident and the possibility of overflying aircraft detecting a signal.	When it is known, or likely, that an emergency radio beacon (EPIRB, ELT or PLB) may be available in the target vessel or aircraft or with the survivors, an electronic search using an appropriate pattern, (e.g. track line search), should be carried out by aircraft flying at a high level. This may occur at the same time as a visual search is carried out at a lower altitude or on the surface. In planning this search the coverage and possibility of detection by the COSPAS-SARSAT system may be considered through contact with the JRCC Australia. It is also valuable to consider the location of the incident and the possibility of overflying aircraft detecting a signal.			
4.5.13	additional wording		This is generally the trackline if known.			
4.5.14	additional wording		In a marine environment the search vessel/s will follow the trackline initially, the second leg would be off-set to one side, at one track spacing for the length of the search. The third and subsequent legs would alternate either side of the trackline until the entire area has been completed. The SMC should be aware of drift effects to ensure the target will not drift out of the search area before it is completed.			
Figure 4-3	New diagram		New diagram Vessel trackline search			
Figure 4-4	New diagram		New diagram Aircraft parallel track search			
4.5.18	additional wording		The SMC should be aware of the drift rate to ensure that the target is not drifting through the search area faster than the search assets are capable of searching.			
Figure 4-5	New diagram		New diagram Aircraft trackline search			
Figure 4-6	New diagram		New diagram aircraft trackline seach new area			

4.5.3	additional wording	This could allow the search object to drift out of the search area before the search facility arrives in the vicinity.	This could allow the search object to drift out of the search area before the search facility arrives in the vicinity or during the search.			
Figure 4-7	New diagram		New diagram Expanding Square search			
Figure 4-8	New diagram		New diagram Sector Search Pattern - Aircraft			
4.5.19	additional wording	An area 10 miles radius is to be searched at a mean track spacing of 3NM. From the table, the angle between tracks is 36 degrees and the time at 120kts is 1 hour.	An area 10 miles radius is to be searched at a mean track spacing of 3NM. From the table, the angle between tracks is 36 degrees and the total distance to be flown by a single search aircraft is 120nm. 120nm flown at 120kts will take 1 hour to search (A helicopter at 60kts would take twice as long at 2 hours).			
4.5.30 b	additional wording	Mountainous search areas should be assigned to multi-engine aircraft whenever possible	Mountainous search areas should be assigned to multi-engine aircraft whenever possible, in the same manner that multi-engine aircraft are used over water for safety in the event of a mechanical issue;			
4.5.35	additional wording		Where possible a GPS record of the search tracks should be downloaded at the completion of each search task and overlayed on a master map. Further information can then be added by the flight crew.			
4.5.38 a	additional wording	Squares or rectangles;	Squares or rectangles (Using a GPS or similar to define the boundary);			
4.5.39 a	additional wording	An area of approximately 20 – 30 square nautical miles is a good size	An area of approximately 20 – 30 square nautical miles (65-100km^2) is a good size			
Figure 4-12	New diagram		New diagram Helicopter search area			
Figure 4-13	New diagram		New diagram Irregular search area			
Figure 4-14	New diagram		New diagram Flare search pattern			
4.7.6	additional wording		New generation EPIRB's can be hydrostatically operated at pre-determined depths eliminating the necessity of manual activation. Float free mountings are becoming mandatory for commercial vessels within Australian waters.			
4.7.7	additional wording		New generation PLB's are becoming waterproof with limited floatation, making them popular for mariners. They are often carried by individual crew members on larger vessels in case of falling overboard.			
4.7.9 b	additional wording		Sea conditions can effectively limit a beacons detectability. Signals can be masked when the beacon is in the trough between successive wave crests, creating an intermittent signal that may be difficult to accurately home in on.			

4.7.15	additional wording		Larger vessels are increasingly carrying hydrostatically operated beacons that activate at pre-determined depths, generally as a result of the vessel sinking.			
4.7.37	New section		Detecting a beacon by hand can be done with one or more hand-held 121.5MHz DF sets. A single device is used in a gentle sweeping action from side to side, attempting to maintain the strongest signal in the centre of the arc of swing. Slowly walking towards the strongest signal while continually sweeping from side to side will eventually arrive at the beacon. With two or more DF sets each can be set some distance apart and the apparent direction of the strongest signal plotted onto a map, the 'cocked hat' where the bearings intersect should be the most probable location of the beacon. The DF sets may have to be moved several times to take into account obstructions caused by the environment.			
Figure 4-13	New diagram		New diagram Irregularly shaped search area			
Figure 4-15	New diagram		New diagram SH and SF			
Figure 4-16	New diagram		New diagram Hand-held DF set usage			
4.7.47	additional wording	Visible moonlight can significantly improve detection of unlighted search objects when using NVGs. Search object light sources, like strobe or similar lights, or even cigarettes, can greatly improve detection even in poor visibility conditions.	Visible moonlight can significantly improve detection of unlighted search objects when using NVGs. Search object light sources, like strobe or similar lights, mobile telephone screens or even cigarettes, can greatly improve detection even in poor visibility conditions. Recent studies have found that certain LED lights, because of the frequencies they emit on, are invisible to NVG.			
4.8.23	additional wording		Observers are generally supplied by the State Emergency Services in most states/territories.			
4.8.36	additional wording		The SMC must also be aware that many police and volunteer rescue vessels will use their name as part of their call sign.			
4.8.49	additional wording	Police authorities undertake the responsibility for coordination of land search.	Police authorities in all States/Territories undertake the responsibility for coordination of land search.			
4.8.53	changed wording	The National Land Search Operations Manual should be refered to for procedures in relation to search techniques.	Details on land searching is contained within this manual.			

4.9.2	changed wording	When assessing available search capacity, care must be taken not to over-estimate the time that a particular aircraft and its crew can spend in a search area or the capability of the observers to remain effective over long periods of flight time.	When assessing available search capacity, care must be taken not to over-estimate the capability of assets with respect to: a) the time that a particular aircraft and its crew can spend in a search area or the capability of the observers to remain effective over long periods of flight time. b) the time that a particular vessel and crew can spend in a search area or the capability of the crew to remain effective over long periods of cruising time. This is very relevant in poor sea conditions and where there is significant distance to the search area. c) the time that any land search team can spend in the search area and remain effective. Weather, terrain, distance to search area and vegetation has a large impact on this capability.			
4.9.8 d	New section		Velocity of the search assets in nm (km)			
4.9.17	New diagram		New sums			
Figure 4-17	New diagram		New diagram Allocation of search areas			
4.9.37	additional wording		(The letters 'I' and 'O' are not used due to possible confusion with numbers.)			
Figure 4-18	New diagram		New diagram Allocation information			
4.10.6	additional wording		Where possible two systems of description should be used simultaneously, such as a map/chart overly with coordinates for the search area boundaries. Two methods of explanation will minimise any confusion. This will become problematic for searches over water out of sight of land.			
	additional wording	The Universal Grid is overprinted on all charts of the JOG series and is also shown on the majority of larger scale maps.	The Universal Grid is overprinted on all charts of the Joint Operations Graphic (JOG) (Military) series and is also shown on the majority of larger scale maps. These grid lines are also printed on all civilian topographic maps produced under the Universal Transverse Mercator (UTM) system.			
4.10.11	additional wording		(There are a number of maps that have the same name although they are of different scales, making the edition number a necessity)			
4.10.43	additional wording		The use of a GPS or on-board electronic navigation system to provide the LKP or SP of the target and bearing continuously will provide the surface asset with situational awareness, bearing in mind it does not provide any subsequent movement due to drift or leeway.			

4.13.3	additional wording		The location of deceased persons will require adherence to local procedures in compliance with the respective Coroner's Acts.			
4.13.6	additional wording	With respect to SAR, SES members are trained in the following:	With respect to SAR, SES members are trained in any/or all of the following depending on location:			
4.13.59 a	additional wording	A visual search along, and also parallel to, the track of the missing target. (A fast and reconnaissance search)	A visual search along, and also parallel to, the track or intended route of the missing target. (A fast / Reconnaissance search)			
New heading	New section		Reflex Search			
4.13.62	New section		A reflex search (Bicycle Wheel Search) is one undertaken in the very beginning of a SAR when time is limited to develop a formal search plan. It is based on the premise that the missing person maybe close to their LKP.			
4.13.63	New section		The SMC identifies the likely routes of the missing person based on information received, knowledge of the location, past events and the nature of the terrain. The first available search assets are initially tasked to search a limited distance along each identified route, checking for signs of the missing person and making visual and aural searches. This initial search should be timed to be completed by the time the SMC arrives on scene.			
4.13.64	New section		A reflex search will provide the SMC with situational awareness if the missing person is not located. Information on the terrain, weather, vegetation, likely routes, unlikely routes and hazards will be available for the SMC.			
4.13.76	New section		Line searches (parallel or creeping) are the most common undertaken in the General Search strategy. A signle line of searchers, evenly spread apart, searching to either side ensuring good coverage of the search area. The spacing between searchers is highly dependent on the vegetation and terrain, the thicker the vegetation the closer the searchers need to be to each other. The general rule of thumb is that searchers should be able to see the ankle of the person next to them, the Ankle Rule.			

4.13.79	additional wording	The contact or line search can be used to saturate an area of high probability, although it is usually the concluding stage of a search operation	The contact search can be used to saturate an area of high probability, although it is usually the concluding stage of a search operation when searching for an unresponsive target or physical evidence of the target. Searchers are in contact with each other, very close together to prevent any area of ground not being searched.			
4.14.2	additional wording		For land searches the Coverage factor (C) is a relationship between the mathematical area capable of being searched (ATNPS formula) and the area (Ag) given to each search asset to search. Eg. A team have been given 1km² to search with 10 searchers, 10m spacing, 2kph search speed and 4 hours to search. At the conclusion of the search they advise that they have completed the entire 1km² search area. A = T x N x P x S A = 4hrs x 10 searchers x 2kph x 0.01km (10m as a kilometre) A = 0.8 C = A ÷ Ag C = 0.8 ÷ 1 C = 0.8 (A Coverage factor of 0.8 in a land SAR gives a POD of 56%) This is not a reflection on the search team, what it means is that even though the team did search the entire area given to them, in the time taken with the resources and spacing it was mathematically only possible to search 0.8km², indicating that there were gaps and periods when the searchers were more than 10m apart.			
4.14.5	additional wording	The sweep width will depend on the type, size, colour and shape of the target, its colour contrast with the surrounding medium and whether or not the target is moving and responsive	The spacing (sweep width) will depend on the type, size, colour and shape of the target, its colour contrast with the surrounding medium and whether or not the target is moving and responsive, or immobile and unresponsive.			
4.14.27	New diagram		New diagram Visual Horizon			
4.14.27	New diagram		New diagram Effective sweep width			
4.14.29	additional wording	In areas where navigation aids are limited, search patterns should be selected so that greatest possible use is made of them.	In areas where navigation aids are limited, search patterns should be selected so that greatest possible use is made of these aids. Regular checks need to be made by team leaders to ensure the search is still in the area assigned.			
4.14.30 i	additional wording	Possible risk to searchers	Possible risk to searchers through not being able to see obstacles.			

4.14.30 iii	additional wording	The possible accidental destruction of vital clues .	The possible accidental destruction of vital clues outside the torchlight.			
4.14.34	new wording	With the increasing occurrence of dementia/Alzheimer suffers wandering from their homes it is often necessary to search these sites.	With the increasing occurrence of missing persons with dementia/Alzheimer wandering from their homes it is often necessary to search these sites.			
Figure 2-20	New diagram		New bell curve diagram			
4.15.1 d	New section		Safety: Any search undertaken should have the safety of searchers as a paramount concern. While SAR can be a risky and dangerous operation the risk - v - gain has to be assessed constantly.			
4.15.28	additional wording		The search is also valuable in state forestry areas and new growth forests used for logging. The grid nature of these areas allows searchers to be stationed at diagonal corners, providing vision on two sides while other searching is undertaken within the forests.			
4.15.30	additional wording		Statistically, this search pattern provides the best chance of detecting a responsive or unresponsive target.			
4.15.35	additional wording		Those areas not searched are done so because there is nothing that has caught the eyes of the searchers (Shape, shine silhouette, movement, spacing and lines).			
4.15.41	additional wording	It is used when the area to be covered can be done in a single sweep.	It is used when the area to be covered can be done in sweeps. Some search areas may require several sweeps of a search team due to size or density of the vegetation. If a single team is conducting this search the outside searcher will be marking objects at 10m intervals to identify the area that has already been searched and will allow for alignment on the following search. Marking is now done with biodegradable tape on trees or other objects at eye height. At the conclusion of each sweep the team will move one team width to the side and resume the search in the opposite direction.			
4.15.56	additional wording		It is also a good search where there is a possibility the target has sustained an injury (perhaps as a result of a traffic crash/aircraft incident) and has wandered of a track or road a short distance and has collapsed.			
4.15.85	additional wording	Urban searching requires houses, yards, industrial areas and vacant allotments.	Urban searching requires houses, yards, industrial areas, vacant allotments as well as the drains, creeks, underpasses and associated urban hiding places being searched and cleared.			

4.15.86	additional wording	When searching a house it is important to ensure that all persons are outside and that no one enters except the searchers	When searching a house (this can also include any dwelling, apartments, nursing or care facilities) it is important to ensure that all persons are outside and that no one enters except the searchers. It has to be remembered, that if the target person can leave the house then there is also a possibility that they could return. Re-searching the house should be done as the opportunity arises but at least twice daily.			
4.16.14	additional wording	These, in turn, will be influenced by the nature of the terrain, the amount of flotsam on the sea etc. Over heavily timbered, mountainous terrain the allowance may need to be as high as 50% of total search time.	These, in turn, will be influenced by the nature of the terrain, *the geography* etc. Unlike marine searching, searchers in a land search remain insitu during any investigation and are generally ready to move on within a very short space of time. Investigation time is signified by the letter 'Z'			
5.1.5	Swap order to put location first		Swap a and b			
5.1.6	Additional wording		Pre-deployment should be considered taking into account the location and/or trackline of the incident.			
5.1.8	Additional wording		Rescue assets should be included in the initial briefing even if they are not going to be immediately deployed.			
5.3.2	Swapped order	ATSB and the police	Police and the ATSB			
5.3.4	Additional wording		Where practicable always approach an air crash incident from up wind.			
5.4.9 f	Additional wording		(Medical advice should be sought before giving anything to survivors);			
5.4.18	Additional wording		Where possible any hazardous or dangers condition should be included in the briefing and actions taken to mitigate where possible (Specialist personnel, PPE, waiting until daylight etc)			
5.4.20 a	Additional wording	A written list is carried and frequent checks are made to confirm all personnel are accounted for.	A written list of team members is carried and frequent checks are made to confirm all personnel are accounted for.			
6.2.1.f	Spelling correction		filed			
6.3	Additional wording	Suspension of a search when the target is not found	Suspension/termination of a search when the target is not found.			
6.3.5	Additional wording	Consideration may be given to notifying decision to suspend or terminate search effort at least one day prior to suspension of operations.	Consideration may be given to notifying the next of kin of the decision to suspend or terminate search effort at least one day prior to suspension of operations.			

6.3.9	Additional wording	On occasions, after the suspension/termination of a search, it may be necessary for the Police or Defence to continue to search for bodies and/or aircraft/vessel wreckage.	On occasions, after the suspension/termination of a search for a live target, it may be necessary for the Police or Defence to continue to search for bodies and/or aircraft/vessel wreckage.			
6.3.11	New section		There are instances where family members are not satisfied with the search efforts prior to suspension/Termination and wish to continue the search using their own funds and/or assets. In these instances, the SAR authority that had responsibility for the coordination of the initial operation should provide assistance with:			
6.4	Additional wording		An evaluation and assessment of the new intelligence is necessary, as is assessing the value of any further searching.			
6.6.1	Additional wording	Following an incident the conduct of a debrief of agencies and groups involved should be considered.	Following any SAR incident the conduct of a debrief of agencies and groups involved should be considered.			
6.6.8 c	change wording	A debrief by the controller of everyone involved in the conduct of the operation prior to the conclusion.	A debrief by the SMC of everyone involved in the conduct of the operation prior to the conclusion.			
7.6.3	Additional wording	In water temperatures above 21°C survival time depends solely upon the fatigue factor of the individual, some individuals having survived in excess of 80 hours at these temperatures.	In water temperatures above 21°C survival time depends solely upon the fatigue factor of the individual, with some individuals having survived in excess of 80 hours at these temperatures.			
7.6.1	Additional wording		Figure 7.1 illustrates the relationship between water temperature and immersion time.			
7.6.9 d	change wording	Exercising (such as the situation where a survivors without lifejackets must swim to stay afloat); or	Exercising (such as the situation where a survivor without a lifejacket must swim to stay afloat); or			
Figure 7.1	New graph					
7.7.3	change wording	Hypothermia can happen during cold nights in desert country or anytime in the colder areas of the state.	Hypothermia can happen during cold nights in desert country or anytime in the colder areas of Australia.			
7.7.2	change wording	The warmest sea water will get to is about 29°C, with a worldwide average of 19°C.	The warmest sea water will generally get is about 29°C, with a worldwide average of 19°C.			
7.7.3	Additional wording	It occurs when the body's temperature falls below 35°C. It is characterised by intense shivering, followed by loss of co-ordination, confusion and irrationality. If it is not halted unconsciousness will follow and then death.	. It occurs when the body's core temperature falls below 35°C. It is characterised by intense shivering, followed by loss of co-ordination, confusion and irrationality. If it is not halted unconsciousness will follow and then ultimately death.			
7.7.4	Deleted duplicate 7.3.1					
7.7.5	Deleted duplicate 7.3.2					

7.7.6	Moved to 7.3.7					
7.3.6	Additional wording	Individuals who observe an emergency situation and reporting it to the SAR system should also be considered as being under stress. Many times it will be necessary for SAR personnel to specifically request essential information from an individual reporting an emergency.	Individuals who observe an emergency situation and who are reporting it to the SAR system should also be considered as being under stress. It will be necessary for SAR personnel to specifically request essential information from an individual reporting an emergency, as it may not be forthcoming.			
Figure 7.3	New diagram					
7.8.2	change wording		The above graph replaces the older axionomic diagram and makes determining wind chill easier. An air temperature is -20°C and a wind speed of approximately 30 km/h produces an equivalent wind chill temperature of approximately -33°C on exposed flesh. The green areas will not pose much threat to exposed flesh for short periods and can be tolerated by most healthy people. Yellow areas are temperatures that pose an increase in frostbite risk for exposures over 10 to 30 minutes. The orange areas will pose a frostbite threat in 5 to 10 minutes. Pink is a high risk of frostbite between 2 to 5 minutes and red is a very high risk for exposures of more than 2 minutes.			
7.9.1	Additional wording		and is also based on a survivor not undertaking any strenuous activities.			
7.9.2	Additional wording	The temperature on the bottom line is the ambient air temperature corrected for wind chill using Figure 7-3 to make the conversion.	The temperature on the bottom line is the ambient air temperature corrected for wind chill using Figure 7-3 to make the conversion. The scale on the left represents survival time in days.			
7.9.3	Additional wording		Any activities that increase the rate of perspiration or body fluid loss may initially warm that person up but will contribute to wet chill and will ultimately shorten the time frames provided by this graph.			
Figure 7-5			New Wet chill survivability graph			
7.10.1	Additional wording		unless they can find or made heat and/or shelter.			
7.10.2	Additional wording		The scale on the left represents survival time in days.			
7.13.1	Additional wording		in environments where moisture loss was at a minimum.			

7.14.1	Additional wording	Is the next most serious of the heat related illnesses. It is brought on by long periods of activity in a hot environment. This not only occurs with persons in arid areas but also to fire-fighters and factory workers working in confined spaces with high temperatures.	This is the next most serious of the heat related illnesses. It is brought on by long periods of activity in a hot environment. This not only occurs with persons in arid areas but also to fire-fighters and factory workers working in confined spaces with high temperatures.			
7.14.3	Additional wording	First aid treatment of heat exhaustion is vital. If conscious lay the victim down in a cool and shaded area with legs slightly elevated, remove or loosen tight clothing, give water in small quantities. If vomiting or unable to drink seek urgent medical attention. If the victim is unconscious place them in the recovery position in a cool and shaded area. Check breathing, airway and circulation. Keep them cool and seek urgent medical attention.	First aid treatment of heat exhaustion is vital. If conscious lay the victim down in a cool and shaded area with legs slightly elevated, remove or loosen tight clothing, give water in small quantities. If vomiting or unable to drink seek urgent medical attention. If the victim is unconscious place them in the recovery position in a cool and shaded area. Check breathing, airway and circulation. Keep them cool and seek urgent medical attention. Lowering core body temperature via a wet sheet fanned to produce a cooling effect through evaporation is very effective.			
7.15.1	Additional wording		Immediately seek urgent medical assistance.			
7.16.1	Additional wording	The below graphs provide a guide to expected desert survivability but should not be regarded as arbitrary. The old survival adage of three (3) minutes without air, 3 days without water and 3 weeks without food should be remembered when referring to these graphs.	The below graphs, Figures 7-4 and 7-5, provide a guide to expected desert survivability but should not be regarded as arbitrary. The old survival adage of three (3) minutes without air, 3 days without water and 3 weeks without food should be remembered when referring to these graphs.			
7.16.2	Additional wording	The shade air temperature on the bottom line of both graphs represents the temperature as measured by a thermometer out of direct sunlight.	The shade air temperature on the bottom line of both graphs represents the temperature as measured by a thermometer out of direct sunlight, such as you would find in a Stevenson Screen.			
7.16.4	change wording	The above graph provides the time frames for a missing person whom is stationary, either in a vehicle, shelter or other location not directly exposed to the sun.	Figure 7-4 provides the time frames for a missing person whom is stationary, either in a vehicle, shelter or other location not directly exposed to the sun.			
7.16.5	change wording	The below graph provides the time frames for a person attempting self-help, walking at night time.	Figure 7-5 provides the time frames for a person attempting self-help, walking at night time.			
7.16.6	Additional wording		Any activity undertaken that would cause loss of body fluids through excessive sweating or urination will significantly reduce the potential time frame for survival. Survival manuals often suggest constructing solar stills or other means of water production in these situations. Doing so will often expend far more fluids than can be collected, particularly within the Australian outback where most plants have adapted strategies to reduce moisture loss.			

7.16.10	Additional wording	Example: A person is missing in the alpine area of NSW. The wind is 40kph from the south. Air temperature is 0°C degrees and they are wearing nothing but underclothes. Using the wind chill table we can ascertain that the equivalent air temperature is going to be very cold, about -12°C. Consultation with the hypothermia graph will give an approximate period of survival of between ¼ day (6hrs) and 4 ½ days. If our missing person can find shelter and warmth they may survive to the 4 ½ day period. If they remain out in the open with limited clothing they will possibly perish within the 6 hours. It now starts to rain, soaking our MP. Consulting the Wet Chill Survival graph we can see that there will be a distinct shortening of the TFFS. It is now between about 4 hours and 2 days, depending on what the MP is able to find by way of shelter and warmth. The POM can be as short as 2 ½ hours to just over a day. There is a definite amount of urgency required now. The desert survival charts can be read in a similar way, but be aware these were developed for the northern hemisphere. There are a number of recorded instances where persons have perished in as little as four hours without water.	Example: A person is missing in the alpine area of NSW. The wind is 40kph from the south. Air temperature is 0°C degrees and they are wearing nothing but underclothes. Using the wind chill table (Table 7-2) we can ascertain that the equivalent air temperature is going to be very cold, about -12°C. Consultation with the hypothermia graph (Figure 7-2) will give an approximate period of survival of between ¼ day (6hrs) and 4 ½ days. If our missing person can find shelter and warmth they may survive to the 4 ½ day period. If they remain out in the open with limited clothing they will possibly perish within the 6 hours. It now starts to rain, soaking our MP. Consulting the Wet Chill Survival graph (Figure 7-3) we can see that there will be a distinct shortening of the TFFS. It is now between about 4 hours and 2 days, depending on what the MP is able to find by way of shelter and warmth. The POM can be as short as 2 ½ hours to just over a day. There is a definite amount of urgency required now. The desert survival charts can be read in a similar way, but be aware these were developed for the northern hemisphere. There are a number of recorded instances where persons have perished in the deserts of Australia in as little as four hours without water.			
7.16.11	New section		Starvation: If a person is recovered alive and they have been without food and water for a significant period of time be aware that there are pitfalls to offering them food and/or water even though they may request it. Advice is to initially provide them with UHT (Long Life) milk and dried meat similar to biltong or jerky. Both of these are easily digested and do not generally cause problems if given in small doses. If in doubt always seek medical advice.			
1.1.20	Include approved MEDEVAC wording		Medical Assistance to Vessels at Sea 1.1.20 The Joint Rescue Coordination Centre (JRCC) Australia is operated by the Australian Maritime Safety Authority (AMSA), a Commonwealth statutory authority established under the Australian Maritime Safety Act 1990. The International Convention on Maritime Search and Rescue 1979 requires parties to the Convention to provide (among other things) on request, medical advice, initial medical assistance and medical evacuation (MEDEVAC). 1.1.21 JRCC Australia will coordinate these services in the Australian search and rescue region (SRR). JRCC Australia will arrange medical advice through a dedicated Tele Medical Advice Service (TMAS). 1.1.22 The assessment by the TMAS doctor determines the type and level of medical assistance required. This includes when a person is deemed to			NATSAR Council

			be in grave or imminent danger and requires immediate assistance and medical evacuation. For search and rescue (SAR) purposes this is considered a “distress” incident. 1.1.23 If a MEDEVAC is required, the JRCC will determine the most appropriate way to safely remove and transport the casualty to a medical facility or a place where medical assistance can be provided. Considerations including, vessel type and facilities, time of day, on-scene weather, available assets, location (in particular distance offshore), requirements for accompanying medical staff and suitability for recovery of patient by helicopter, may all play a factor in determining the most appropriate MEDEVAC response. 1.1.24 Once the requirement for a MEDEVAC and the use of state and territory resources is confirmed JRCC Australia may, in consultation with Australian state and territory health organisations, transfer coordination of the medevac incident to the appropriate jurisdictional contact. 1.1.25 If on TMAS advice the person/s requiring evacuation life is not at risk, the circumstances would not require a medical evacuation for SAR purposes. In these circumstances, a medical transport of the person should be arranged as considered appropriate; assistance can be requested of JRCC Australia to identify suitable assets as required.			

NATSAR Manual Amendment Schedule – Approved at NATSAR 43 for inclusion in 2020 edition

General amendments

Current manual reference	Reason for amendment	Previous Wording	New Wording (For images or tables that cannot fit within this document are to be attached to email to Secretariat)	Council Approval (Y/N)	Responsible	Comments
Introduction	Re-word for clarity	In providing a search and rescue response, nothing in the content of the manual precludes properly qualified officers from using their initiative in providing a SAR response in circumstances not covered by these procedures. In short, the Manual is a body of guidance rather than an operational straitjacket. In so doing, however, officers' actions should conform as closely as possible to the instructions contained in the manual that are most closely pertinent to the circumstances, and keep all other involved parties informed. Officers should be prepared to justify their actions if necessary.	The National Search and Rescue Manual acts as a set of procedures and guidelines in providing a search and rescue response within Australia. It is understood that the knowledge and experience of officers can extend beyond what is covered within this manual and therefore initiative should be used accordingly in search and rescue operations. It is however, necessary to follow the guidelines outlined within this manual as closely related to the circumstances presented and keep all relevant parties well informed throughout the process. Officers should be prepared to justify their actions if necessary.	Pending (submitted by Secretariat)	AMSA, Secretariat	
Appendices: Pages 411, 412 and 417	Incorrect formulas (three worksheets)	(pg 411) Sweep Width Factor W – (Wu x Fs x Ff) (pg 412) Sweep Width Factor W – (Wu x Fs x Ff) (pg 417) Sweep Width Factor W = Wu.Fw.Ff	(pg 411) Sweep Width Factor W = (Wu x Fw x Fs x Ff) (pg 412) Sweep Width Factor W = (Wu x Fv x Ff) (pg 417) Sweep Width Factor W = (Wu x Fw x Ff)	Pending (submitted by Craig Longmuir, ARC)		
Appendices: Figure D-5:12 (page	Image quality	(see image)	Request for image to be replaced by one with a higher pixel/quality	Pending (submitted by Craig Longmuir, ARC)		
Acronyms & Abbreviations	To properly define the term Last Known Position. As a confirmed, 'last known' position, it cannot be a computed or DR position that is estimated or calculated, from the Last Known Position.	Term – Last Known Position Definition - Last witnessed, reported, or computed DR position of a distressed craft.	The Last Known Position is a term used in search planning to indicate the last known location of the person, marine craft or aircraft the subject of a search and /or rescue mission. It is also known by its acronym LKP. The LKP may be a boat ramp where a small craft was launched, a reporting point or navigation aid where an aircraft last reported its position or the location where it can be confirmed a person was last sighted e.g., at the start of a walking track. The Last Known Position differs from the other term used in marine search planning of Splash Point or SP.	Pending (submitted by John Rice, SAR Training Australia)		This or serial 6 (Splash Point) are not IAW with IAMSAR Manual Vol II Glossary LKP description 2011 edition. Will need to check 2019 edition (not yet issued) to see if IAMSAR definition has changed. Council to decide on use of LKP or SP - noting the IAMSAR manual guidance is preferred but not mandatory. (LKP is used within IAMSAR manual vol. 2, 2016)
Acronyms & Abbreviations	To properly define the term Splash Point.	Term - Splash Point Definition – See Last Known Position	A term used in marine search planning to indicate a known point of distress. Also referred to by its acronym SP.	Pending (submitted by John Rice, SAR Training Australia)		Council to decide on use of LKP or SP - noting the IAMSAR manual guidance is preferred but not mandatory. (LKP is used within IAMSAR manual vol. 2, 2016)

Vol. 2 - 3.11.12	Remove the term Point Last Seen (PLS) as it is only used three times in the entire document and is the same as the more commonly used term Last Known Position.	b) Identifying the Last Known Position (LKP), Point Last Scene (PLS) of the MP and any error associated with that location; c) Estimating the MP' post LKP/PLS movements and any associated error of that estimate;	b) Identifying the Last Known Position (LKP) of the MP and any error associated with that location; c) Estimating the MP' post LKP movements and any associated error of that estimate;	Pending (submitted by John Rice, SAR Training Australia)		
Vol 2 – 3.16.9	Remove the term PLS from the text and where appropriate and use the term last known position or LKP	Contain any search area as quickly as possible. This can be done by using FAST and reconnaissance strategies in deploying teams to tracks, PLS, intended destination, lookouts, major camp grounds or known 'trap points' where a person or persons must pass through. These would be the initial high probability areas.	Contain any search area as quickly as possible. This can be done by using FAST and reconnaissance strategies in deploying teams to tracks, last known position (LKP), intended destination, lookouts, major camp grounds or known 'trap points' where a person or persons must pass through. These would be the initial high probability areas.	Pending (submitted by John Rice, SAR Training Australia)		
Vol 2 – 3.2.5	Fix wording and grammar.	The first step in either marine or land search planning is to determine the limits of the area containing all possible survivor locations. This is usually done by determining the maximum distance the survivors could have travelled between the time of their last known position (LKP) and the known or assumed time the distress incident and drawing a circle of that radius around the LKP. Knowing the extreme limits of possible locations allows the search planner to determine where to seek further information related to the missing craft or persons and whether an incoming report might apply to the incident. However, systematic search of such a large area is normally not practical. Therefore, the next step is to develop one or more scenario/s or sets of known facts plus some carefully considered assumptions, describing what may have happened to the survivors since they were last known to be safe. Each scenario must be consistent with the known facts of the case, have a high likelihood of being true and allow the search planner to establish a corresponding geographic reference or datum for the survivors' most probable position (MPP).	The first step in search planning is to determine the limits of the area containing all possible survivor locations. This is usually done by determining the maximum distance survivors could have travelled, or survivors in the water might have drifted, between the time of their last known position (LKP) or splash point (SP), and the known or assumed time that search assets can reach the commence search point, by drawing a circle with a radius equal to that distance around the LKP or SP. Knowing the extreme limits of possible locations allows the search planner to determine where to seek further information related to the missing craft or people and whether any incoming intelligence might apply to the incident. This initially may result in a very large search area that may be too large to search with the available resources. Therefore, the next step is to develop one or more scenario/s or sets of known facts plus some carefully considered assumptions, describing what may have happened to the survivors since they were last known to be safe. Each scenario must be consistent with the known facts of the case, have a high likelihood of being true and allow the search planner to establish a corresponding geographic reference or datum for the survivors' most probable position (MPP).	Pending (submitted by John Rice, SAR Training Australia)		

Vol 2 – 3.5.29	To include the term Splash Point for situations when a distress position is known.	To determine a value for Drift Error (De) it is necessary to complete a Datum Plot. A Datum Plot provides information both to calculate De and to measure the displacement of the Datum from the Last known Position (LKP) for the period under consideration. Drift error is derived by the resolution of the three factors (average sea current, average wind current, leeway), by way of vector addition.	To determine a value for Drift Error (De) it is necessary to complete a Datum Plot. A Datum Plot provides information both to calculate De and to measure the displacement of the Datum from the Last known Position (LKP) or Splash Point (SP) for the period under consideration. Drift error is derived by the resolution of the three factors (average sea current, average wind current, leeway), by way of vector addition.	Pending (submitted by John Rice, SAR Training Australia)		
Vol 2 – 3.5.59	To include the term splash point and to fix wording in relation to individual drift error calculated in relation to leeway left and right vectors.	3.5.59 Drift Error (De) is the radius of a circle of probability around the Datum. The circle is externally tangential to two circles of probability drawn around the end of each leeway vector. Generally, the radius of each circle is equal to 12.5% of the distance from Last Known Position (LKP) to the appropriate leeway vector. The value of De, therefore, is the sum of the radii of the two leeway probability circles and the distance between the ends of the leeway vector [Distance Left-Right (LR)] divided by two, i.e.	Drift Error (De) is the radius of a circle of probability around the Datum. The circle is externally tangential to two circles of drift error probability drawn around the end of each leeway vector. Generally, the radius of each circle is equal to 12.5% of the distance from the Last Known Position (LKP) or Splash Point (SP) to the end of the appropriate leeway vector. The value of De, therefore, is the sum of the radii of the two leeway probability circles and the distance between the ends of the leeway vector [Distance Left-Right (LR)] divided by two, i.e.	Pending (submitted by John Rice, SAR Training Australia)		
Vol 2 - 3.6.3	Proceeding to a last known position of a marine craft or person in the water will not produce any possibility that the target will be located at that location. A marine targets LKP may be many hundreds of miles from its distress location.	In most cases, considering the short response time to coastal SAR incidents, if the search unit proceeds to the last known position (LKP) of the craft in distress it will be found. However, the craft in distress may not be in sight because of inaccuracies in the initial position reported; inherent errors associated with drift factors; and/or errors in navigation of the search unit.	In most cases, considering the short response time to coastal SAR incidents, if the search unit proceeds to the Splash Point (SP) of the craft in distress it will be found. However, the craft in distress may not be in sight because of inaccuracies in the initial position reported; inherent errors associated with drift factors; and/or errors in the navigation of the search unit.	Pending (submitted by John Rice, SAR Training Australia)		In most cases, considering the short response time to coastal SAR incidents, if the search unit proceeds to the LKP or SP of the craft in distress it will be found. However, the craft in distress may not be in sight because of inaccuracies in the initial position reported; inherent errors associated with drift factors; and/or errors in the navigation of the search unit.
Vol 2 – 3.6.4	Change the term LKP to SP	If the time since the craft became distressed is less than four (4) hours and it is not located at the LKP draw a 6 NM radius centred at the LKP. Then draw a square search area with the sides tangential to the circle. This will give a search area of 144 NM² (as shown in Figure 3-16).	If the time since the craft became distressed is less than four (4) hours and it is not located at the SP draw a 6 NM radius centred at the LKP. Then draw a square search area with the sides tangential to the circle. This will give a search area of 144 NM² (as shown in Figure 3-16).	Pending (submitted by John Rice, SAR Training Australia)		If the time since the craft became distressed is less than four (4) hours and it is not located at the LKP or SP draw a 6 NM radius centred at the LKP or SP. Then draw a square search area with the sides tangential to the circle. This will give a search area of 144 NM² (as shown in Figure 3-16).

Vol 2 – 3.6.10	To incorporate the term SP into the description.	If the craft in distress reports a position in shallow water there is always the possibility that the vessel may attempt to anchor. Therefore, particular attention should be paid to the situation when the LKP is outside the established search area. In many cases, it should be possible to search along the drift line from the LKP to the datum during the initial search. However, it may be necessary to search the drift line after the search area has been completed.	If the craft in distress reports a position in shallow water there is always the possibility that the vessel may attempt to anchor. Therefore, particular attention should be paid to the situation when the LKP or SP is outside the established search area. In many cases, it should be possible to search along the drift line from the LKP or SP to the datum during the initial search. However, it may be necessary to search the drift line after the search area has been completed.	Pending (submitted by John Rice, SAR Training Australia)		
Vol 2 – 3.6.19	To incorporate the term SP into the description. Datum1 and Datum2 should be Datum1 and Datum2	The target is drifted from its LKP to datum1 and an E = 6 NM is plotted. The targets drift is recalculated sometime later and its drift is established as eight (8) NM from datum1. Using 1/8th of the targets drift as error, one (1) NM is added to the initial six (6) NM error used for the first datum. Therefore the error used for datum2 is 6 NM + 1 NM = 7 NM. See Figure 3-23 below.	The target is drifted from its LKP or SP to datum1 and an E = 6 NM is plotted. The target's drift is recalculated sometime later and its drift is established as eight (8) NM from datum1. Using 1/8th of the targets drift as error, one (1) NM is added to the initial six (6) NM error used for the first datum. Therefore the error used for datum2 is 6 NM + 1 NM = 7 NM. See Figure 3-23 below.	Pending (submitted by John Rice, SAR Training Australia)		
Vol 2 – 3.11.12	Remove the term Point Last Scene (sic) (PLS)as it is the same as LKP	Search planning involves the following steps: a) Evaluating the situation, including the results of any previous searching; b) Identifying the Last Known Position (LKP), Point Last Scene (PLS) of the MP and any error associated with that location; c) Estimating the MP' post LKP/PLS movements and any associated error of that estimate;	Search planning involves the following steps: a) Evaluating the situation, including the results of any previous searching; b) Identifying the Last Known Position (LKP), of the MP and any error associated with that location; c) Estimating the MP's post LKP movements and any associated error of that estimate;	Pending (submitted by John Rice, SAR Training Australia)		
Vol 2 – 3.16.9	Remove the term PLS as it is the same as LKP.	Contain any search area as quickly as possible. This can be done by using FAST and reconnaissance strategies in deploying teams to tracks, PLS, LKP, intended destination, lookouts, major camp grounds or known 'trap points' where a person or persons must pass through. These would be the initial high probability areas.	Contain any search area as quickly as possible. This can be done by using FAST and reconnaissance strategies in deploying teams to tracks, LKP, intended destination, lookouts, major camp grounds or known 'trap points' where a person or persons must pass through. These would be the initial high probability areas.	Pending (submitted by John Rice, SAR Training Australia)		
4.3.1	Incomplete sentence	Once the search area has been determined, a systematic search for the target should be planned. Factors such as the weather conditions, time available for search, aircraft speed, search altitude, sighting range, size of target, etc., should be taken into account. These factors are related but some may be more important than others. In planning a search operation, the SMC should endeavour to meet the requirements of the more important factors while satisfying the….	Once the search area has been determined, a systematic search for the target should be planned. Factors such as the weather conditions, time available for search, aircraft speed, search altitude, sighting range, size of target, etc., should be taken into account. These factors are related but some may be more important than others. In planning a search operation, the SMC should endeavour to meet the requirements of the more important factors while satisfying the requirements of the others as far as practicable.	Pending (submitted by Craig Longmuir, ARC)		

Abbreviations	Delete as it has been decommissioned	AULUTW Australian Local User Terminal West	(delete)	Pending (submitted by Peter Kelly, ARC)		
1.5.2	Change to management of AUMCC	The Cospas-Sarsat System provides distress alert and location data to RCCs for 406 MHz beacons activated anywhere in the world. In the Australia/New Zealand region, the Australian Mission Control Centre (AUMCC) is located in the JRCC Australia and processes data collected by satellite tracking stations in Australia and New Zealand.	The Cospas-Sarsat System provides distress alert and location data to RCCs for 406 MHz beacons activated anywhere in the world. In the Australia/New Zealand region, the Australian Mission Control Centre (AUMCC) is managed by AMSA and processes data collected by satellite tracking stations in Australia and New Zealand.	Pending (submitted by Peter Kelly, ARC)		

NATSAR Manual Amendment Schedule – Approved at NATSAR 43 for inclusion in 2020 edition

Amendments – Jim Whitehead manual review

Current manual reference	Reason for amendment	Previous wording	New wording (For images or tables that cannot fit within this document are to be attached to email to Secretariat)	Council Approval (Y/N)	Responsible	Comments
Acronyms	Additional wording		VMS, VTS, IFER, MBZ, CTAF, GNSS, IERCC, LED, MSLD, MSLS, DCS, ACA			
1.1.3 a	Additional wording	Rapid transmission of distress messages from aircraft, ships, and small craft , including for medical assistance;	Rapid transmission of distress messages from aircraft, ships, small craft and persons, including for medical assistance;			
1.2.3	Additional wording	These emergency signals may be made by radio, satellite, RADAR (e.g. transponders), flags, pyrotechnics, flashing lights, smoke, sounds, shapes, ground panels. (Appendix D-1 lists the more common signals and terminology in use.)	These emergency signals may be made by radio, satellite, telephone, texting, internet (email, Facebook etc), RADAR (e.g. transponders), flags, pyrotechnics, flashing lights, smoke, sounds, shapes and ground panels. (Appendix D-1 lists the more common signals and terminology in use.)			
1.4.2	Additional wording	Reflective mirrors, used by survivors to reflect the sun's rays towards a SAR unit, are an effective daylight device. Mirrors have been detected as far away as 45 miles and from as high as 10,000 feet, although the average distance is about 10 miles. Fluorescent material (known as retro-reflective tape) that reflects a large percentage of sunlight is usually sewn on one side of lifesaving craft coverings and has been detected as far away as 5 miles with an average of 3.5 miles.	Reflective mirrors (heliographs), used by survivors to reflect the sun's rays towards a SAR unit, are an effective daylight device. Mirrors have been detected as far away as 80 kilometres (45 miles) and from as high as 10,000 feet, although the average distance is about 18 kilometres (10 miles). Fluorescent material (known as retro-reflective tape) that reflects a large percentage of sunlight is usually sewn on one side of lifesaving craft coverings and has been detected as far away as 9 kilometres (5 miles) with an average of 6 kilometres (3.5 miles).			
1.43	Additional wording	Fluorescent sea dye marker, which stains the water a green or red colour, has been sighted as far away as 10 miles, with an average of three (3) miles. However, sea dye is not visible when searching up-sun because of surface glare.	Fluorescent sea dye marker, which stains the water a green or red colour, has been sighted as far away as 18 Kilometres (10 miles), with an average of 5 kilometres (3 miles). However, sea dye is not visible when searching up-sun because of surface glare.			
1.44	Additional wording	Orange smoke generating signals have been sighted as far away as 12 miles with an average of eight (8 miles. Smoke signals are most effective in calm wind conditions and open terrain. The effectiveness of smoke signals decreases rapidly with an increase of wind speed above 15 knots.	Orange smoke generating signals have been sighted as far away as 20 kilometres (12 miles) with an average of 14 kilometres (8 miles). Smoke signals are most effective in calm wind conditions and open terrain. The effectiveness of smoke signals decreases rapidly with an increase of wind speed above 15 knots (25 kph).			

1.4.6	Additional wording	On land, fires are arguably the most effective night time signal that survivors may use. Fires have been sighted as far as 50 miles away, with the average range varying with the size of the fire and the absence of other light sources on the earth's surface.	On land, fires are arguably the most effective night time signal that survivors may use. Fires have been sighted as far as 90 kilometres (50 miles) away, with the average range varying with the size of the fire, the absence of other light sources on the earth's surface, the terrain and Height of Eye of the search asset.			
1.4.7	Additional wording	Flashing strobe lights are an effective compact night signalling device available for individual survivors. Strobe lights have been sighted as far as 20 miles away with an average of 3.5 miles.	Flashing strobe lights are an effective compact night signalling device available for individual survivors. Strobe lights have been sighted as far as 35 kilometres (20 miles) away with an average of 6 kilometres (3.5 miles).			
1.4.8	Additional wording	Incandescent lights that are used on some individual lifejackets have a much smaller detectable range than strobe lights, generally about 0.5 mile.	Incandescent lights that are used on some individual lifejackets have a much smaller detectable range than strobe lights, generally about 1 kilometre (0.5 mile).			
1.4.9	Additional wording	Flares, star shells and rockets have been detected as far away as 35 miles, with an average of 25 miles.	Flares, star shells and rockets have been detected as far away as 60 kilometres (35 miles), with an average of 45 kilometres (25 miles) from the air.			
1.4.10	Additional wording	With the use of Night Vision Goggles (NVG) objects emitting small amounts of light such as mobile telephone screens are able to be seen from great distances. Larger light sources such as fires, torches, and strobe lights can be viewed from considerably farther.	With the use of Night Vision Goggles (NVG) objects emitting small amounts of light such as mobile telephone screens are able to be seen from great distances. There is no need for a telephone signal, it is the lit screen that is being detected. Larger light sources such as fires, torches, and strobe lights can be viewed from considerably farther. E-Flares and some LED strobe lights have been identified as being invisible on NVG due to the frequencies used. Searchers must be aware of this.			
1.5	change wording	Cospas-Sarsat	COSPAS-SARSAT			
1.5.9	Additional wording		called shadowing			

1.5.10	Additional wording		These satellites send the beacon message back to earth where it is detected by a MEOLUT (MEOSAR Local User Terminal). With sufficient information, the MEOLUT will generate a location for the distress beacon. The beacon activation information is forwarded to a Mission Control Centre (MCC) and then to the relevant Rescue Coordination Centre (RCC) which responds to the beacon activation. The MEOSAR system will detect beacons in almost real-time (i.e within 5 minutes). If the beacon is detected by three or more MEOSAR satellites, then the location of the beacon will be determined as well. When the full constellation of MEOSAR satellites is in operation, this will mean location will be determined within 10 minutes, 95 per cent of the time.			
1.5.14	Additional wording		within its footprint but not at the poles			
1.5.15 a	Additional wording		Emergency Locator Transmitters (ELT) used by aviators (Generally larger devices mounted in the tail of an aircraft);			
1.5.15 b	Additional wording		Emergency Position Indicating Radio Beacons (EPIRB) used by mariners (Water proof and required to float upright); and			
1.5.15 c	Additional wording		Personal Locator Beacons (PLB) used on land (Initially not required to be water proof or floatable but new generation ones are becoming so.).			
1.5.16	Additional wording		also known as a GPS)			
1.5.18	Additional wording		a side frequency of			
1.5.19	change wording	MCC	Change to JRCC			
1.5.20	change wording	Australian MCC	JRCC Australia			
1.7.3	new diagram		New SART image diagram			
1.7.4	Additional wording		Since the RADAR detection range depends primarily upon the height of the RADAR scanner and the height of the beacon, it is probably not realistic to expect a detection range of much more than 30 miles (55km) for an aircraft flying at 3000 ft equipped with 3cm (9 GHz) RADAR and about 10 miles (18km) for a ship's RADAR and a few miles (3km) for a motor launch. However, bearing in mind that it is a short-range homing device, this should be adequate for final location.			

1.8.1	Additional wording		The SMC is responsible for utilising all available communication systems and designating specific frequencies for on-scene use during SAR operations, and for establishing reliable communications with adjacent operations centres. When appointed, the Coordinator Surface Search (CSS) or the On Scene Coordinator (OSC) is responsible for establishing reliable communications between all participating search units and the RCC.			
1.8.8	Additional wording		Ships of the Australian Defence Force will use their names as call signs when employed on SAR operations, ie 'This is HMAS Melbourne'.			
1.9.1 g	Additional wording		Mobile phone and texting communications; and			
1.9.1 h	new words		Electronic (Email, internet, skype and video conferencing)			
1.9.2	Update diagram number		Table 1-1			
1.9.5	change wording	RCC	JRCC Australia			
1.9.14	Additional wording		Vessel Tracking System (VTS) is utilised by most states/territories to monitor the location of SOLAS vessels with the reef systems and other locations posing heavy traffic or environmental concerns.			
1.9.23	change wording	ACA	ACMA			
1.9.27	new words		Capabilities and locations of these units are contained in local facilities registers.			
1.9.29	Additional wording	Air Wings	Air Wings/State and Community provided aerial assets			
1.12.1	Additional wording	It is the task of the Communications Officer to ensure that as far as practicable, the SMC's actions and decisions are never restricted through lack of communications.	It is the task of the Communications Officer, if available, otherwise the command team, to ensure that as far as practicable, the SMC's actions and decisions are never restricted through lack of communications.			
1.14.1	Additional wording	The Search Headquarters may be the nearest Police Station or building which already has telephone facilities and good access. If this is not available, consideration must be given to the following aspects in choosing the site for Search Headquarters	The Search Headquarters may be the nearest Police Station or building which already has landline telephone facilities and/or mobile service and good access. If this is not available, consideration must be given to the following aspects in choosing the site for Search Headquarters			
1.14.1 a	Additional wording	A house or building with telephone, light and power already connected.	A house or building with telephone landline and/or mobile service, light and power already connected.			

1.14.1 d	Additional wording		Consideration of radio repeaters should be made early.			
1.15.1	Additional wording	If a telephone is available, maximum use should be made of this facility,	If a telephone is available, maximum use should be made of this facility, particularly for communication of long or complicated messages,			
1.15.2	new words		Radios are always the preferred method of mass communication to all search assets.			
1.17.1 b	change wording	Search teams; and	Search assets; and			
1.17.2	Additional wording	The principle here is to use whatever communication systems are available, but generally the forward net would depend on radio.	The principle here is to use whatever communication systems are available, but generally the forward net would depend on radio as the primary method, and telephones can be a secondary method.			
1.17.4	new words		Appendix E-XXX contains the recognised radio terminology.			
1.19.1 a	Additional wording	A vehicle mounted radio attached to an external antenna will provide the best coverage although a hand-held device will also work, albeit with a limited range. Spare batteries should always be carried	A vehicle mounted radio attached to an external antenna will provide the best coverage although a hand-held device will also work, albeit with a limited range. Spare batteries should always be carried if the radio is not hard wired.			
1.19.1 e	Additional wording	While the above channels are dedicated, a search asset with a scanning radio will detect a missing person calling.	While the above channels are dedicated, a search asset with a scanning radio will detect a missing person calling on any channel within range.			
1.19.3	New heading		Loss of communications:			
1.20.1	Additional wording	To achieve efficiency, standard radio procedure should be used. Although two- way conversations will be needed, messages should be written.	To achieve efficiency, standard radio procedure should be used. Although two- way conversations will be needed, messages should be written for reference at a future time.			
1.21.2 g	New section		The use of text messages may be more successful than verbal communications. Text messages require less signal strength and will be received when a mobile telephone comes within range even if it is some time since it was originally sent.			
1.21.2	Additional wording	Other methods of communicating, which can be used but require some degree of planning are	Other methods of communicating, which can be used but require some degree of prior planning are			
2.1.4 c	Additional wording	Actual and forecast weather conditions;	Prior, actual and forecast weather conditions;			
2.1.4 e	Additional wording	Nature of terrain;	Nature of terrain/sea conditions;			
2.2.3 b	Additional wording	A surface vessel or craft has transmitted a distress signal.	A surface vessel or craft has transmitted or displayed a distress signal.			

2.2.7	Removed words		The official reference document for Land SAR operations is the National Search and Rescue Manual.			
2.3.1	Additional wording	The RCC shall maintain records for each incident in which all information should be recorded as it is received, either in full or by reference to other permanent records such as flight plans, forms, charts,	The RCC shall maintain records for each incident in which all information should be recorded as it is received, either in full or by reference to other permanent records such as flight plans, forms, charts, maps,			
2.3.3	Additional wording	Each day's search activity shall be plotted. The total search area shall be subdivided into sections assigned to each SAR unit showing individual search patterns, heights,	Each day's search activity shall be plotted. The total search area shall be subdivided into sections assigned to each SAR unit showing individual search patterns, aircraft heights and speeds,			
2.3.3	Additional wording		Areas assigned but not searched need to be readily identified for reassignment, leaving no 'holes' within the search area.			
2.3.4	Additional wording		These records will contribute to determining the POD of searches and may also			
2.3.5	Additional wording	Records shall be kept of names of all volunteers used in SAR operations on assets tasked by the RCC usually in the form of a manifest.	Records shall be kept of names of all searchers (volunteers and professional) used in SAR operations on assets tasked by the RCC usually in the form of a manifest or 'T' cards (ie Aircraft and aerial observers, vessels and crew, search teams)			
2.3.6	Additional wording	When a search has been terminated without locating a missing aircraft or its occupants, all records, charts, etc.	When a search has been terminated without locating a missing target (aircraft or its occupants vessel or its occupants or missing person), all records, charts, maps etc.			
2.3.7	Additional wording	Records relating to search and rescue operations, including air, on behalf of other organisations shall be retained.	Records relating to search and rescue operations, including air, land and marine searches, conducted by other organisations shall be retained.			
2.4.3 a	Additional wording	**Awareness.** Knowledge by any person or agency in the SAR system that an emergency situation exists or may exist.	**Awareness.** When the SAR system becomes aware that an emergency situation exists or may exist.			
2.5.4	Renumbered		Renumbered			
2.5.16	Renumbered		Moved old section 2.5.17 to new position at 2.5.16			
2.5.18 d	Additional wording	The command/control elements need to pass on specific information to searchers in the field,	The SMC will utilise the intelligence as the basis of briefings to pass on specific and relevant information to searchers in the field,			
2.5.19	New section		Psychological issues (Happiness, depression, family trouble, financial trouble, legal trouble)			
2.5.19 Missing person	Renumbered		Renumbered			

2.5.21	Additional wording	When conducting a search for an object such as aircraft, vessel, vehicle, or any other article	When conducting a search for an object such as aircraft, vessel, vehicle, or any other article (Police evidence search),			
2.6.5	Additional wording		(This does not mean that the SMC has doubt that a SAR situation exists, more that there is doubt about the level of safety of those involved).			
2.7.2 iv, v	New section		Vessels known to be on the same route, in the same area or within communication range, by way of VMS, VTS, Coastal radio stations or vessel broadcasts. Persons known to be on the same route, in the same area or within communications range, by way of electronic/social media (Television, radio, Facebook, mass texting etc) and/or speaking to persons located within the search area.			
2.7.3 b iii	New section		Using electronic methods to track mobile telephones, leave text or voice mail messages or utilise electronic/social media (Television for witnesses, radio, Facebook or similar)			
2.7.5 d	Additional wording	Obtain information about the aircraft, ship or other craft from other sources not previously contacted, such as:	Obtain information about the aircraft, vessel or person from other sources not previously contacted, such as:			
2.7.8 e	Additional wording	Estimate the position of the distressed craft	Estimate the position of the target			
2.7.8 g i	change wording	Craft may be dispatched from their bases in accordance with the search plan.	Search assets may be dispatched from their bases in accordance with the search plan.			
2.7.8 g ii	change wording	Craft may be diverted in-flight or en-route.	Aircraft and vessels may be diverted in-flight or en-route.			
2.8.2	Additional wording	A SAR rated officer shall be appointed as the RCC Intelligence Officer and given the task of seeking information and assessing and verifying information received.	Where possible a SAR rated officer shall be appointed as the RCC Intelligence Officer and given the task of seeking information and assessing and verifying information received.			
2.8.5-8	change wording		Remove craft and replace with target			
2.8.15 a	change wording	Missing person. As much information as possible regarding the target(s) needs to be obtained.	Missing target (Aircraft, vessel, person). As much information as possible regarding the target(s) needs to be obtained.			
2.8.15 c	change wording	In extremes, this will indicate the possible time frame for the missing person's survival.	In extremes, this will indicate the possible time frame for any involved person's survival.			
2.8.15 g	Additional wording		Renumbered and included further equipment: Vessels (Inshore and off shore), RPAS (Drones), electronic aids (Tracking devices, mobile telephone locators etc.)			

2.8.18 a	Additional wording	About Missing Persons	About Missing Persons (whether from vessel, aircraft or missing)			
2.8.18 a	Additional wording		Social media and Mobile telephone tracking			
2.8.18 c	Additional wording		Electronic sources and archives; and Reconnaissance teams			
2.8.18 d	Additional wording		Charts (RAN, RN etc; Electronic (Google maps, Google Earth, satelite images			
2.8.18 e	Additional wording		Volunteer services (SES, Coast Guard, Volunteer Marine Rescue)			
2.8.23	Additional wording		(Experience, capability, preparedness);			
2.8.24	change wording	Briefing Phase (Dissemination) - The decision to mount a search has been made and search teams are being prepared to commence the operation. Team leaders are required to attend a briefing at which orders will be given regarding the conduct of the search. Details that need to be covered are:	Briefing Phase (Dissemination) - The decision to mount a search has been made and search assets are being prepared to commence the operation. Pilots, masters and team leaders are required to attend a briefing at which orders will be given regarding the conduct of the search. Details that need to be covered are:			
2.8.24 a	New section		Briefing needs to be in the SMEAC format, standard among SAR assets.			
2.8.24	Renumbered		Renumbered			
2.8.26	Additional wording	Search Operations Phase - In the conduct of the operation, the search teams must constantly	Search Operations Phase - In the conduct of the operation, the search assets must constantly			
2.8.28	Additional wording	As search teams return to the Field Search Headquarters, team leaders need to be debriefed.	As search assets return to the RCC, pilots, masters and team leaders need to be debriefed.			
2.8.29	Additional wording	This information will then be distributed to teams still in the field or before new teams are deployed.	This information will then be distributed to assets still searching or before new assets are deployed.			
2.8.43	Additional wording	e.g. the police.	e.g. a police officer with SAR training.			
Heading 2.8.47	Additional wording	**Examination of Recorded Communications - Aircraft and vessels**	**Examination of Recorded Communications - Aircraft and vessels**			
2.8.54	Additional wording	Mistakes have also commonly resulted from differences between forecast and actual weather	Mistakes have also commonly resulted from differences between forecast and actual weather so contact with the BOM is of vital importance.			
2.8.55	Additional wording	An analysis of the weather existing at the time a the craft encountered difficulty and the interaction of weather and terrain (for aircraft) should be made. The opinion of meteorologists should be sought in this respect, as should the views of suitably experienced qualified mariners and pilots.	An analysis of the weather existing at the time a target encountered difficulty and the interaction of weather and terrain or sea conditions should be made. The opinion of meteorologists should be sought in this respect, as should the views of suitably experienced qualified mariners, pilots and land search experts.			

2.8.56	Additional wording	Effort should be made to obtain reports of a sea or in flight conditions from mariners, pilots who were in the area at the time the craft encountered difficulty.	Effort should be made to obtain reports of conditions in flight, at sea or land areas from mariners, pilots or others who were in the area at the time the target encountered difficulty.			
2.8.60 e	Additional wording	Nature of terrain	Nature of terrain, topography, sea conditions, current, winds and other meteorological events.			
2.8.72	Additional wording		Consideration should be given to the use of Night Vision Googles (NVG) or Forward Looking Infra-Red Radar (FLIR) particularly when searching from the air.			
Heading 2.8.73	New heading		**First and last search light**			
2.8.73	New section		First and last search light describes the optimal times that searching should commence and cease taking into account the angle of the sun and the limiting factors caused by a low sun on searchers. First search light is 45 minutes after sunrise and last search light is 45 minutes before sunset. These times allow for the sun to either rise above the horizon sufficiently for searching towards the east, or to be sufficiently above the horizon for searching towards the west. In mountainous or built up areas these times may vary due to darkness extending for lengthier periods. Given the urgency and circumstances a SMC may choose to utilise these times to conduct searches.			
2.8.74	New section		Civil twilight is that period of time when the sun is 6°(24 minutes) below the horizon, either before sunrise or after sunset. This time can be utilised by aircraft to travel to their respective search area, but originally related to when a star sighting could be taken from an aircraft.			
2.8.75	New section		Nautical twilight is that period when the sun is 12° (48 minutes) below the horizon, either before sunrise or after sunset. This time can be utilised by vessels to travel to their respective search area but originally related to when a star sighting could be taken from a ship.			
2.8.78	Additional wording	If weather will not allow for a search operation to be mounted without endangering additional lives, the search effort should be deferred.	If weather will not allow for a search operation to be mounted without endangering additional lives, the search effort should be deferred or suspended.			

2.8.86	Additional wording	Terrain may also limit the time available for search. For example low-level searches in mountain areas are normally limited to daylight only.	Terrain may also limit the time available for search. For example low-level searches in mountain areas are normally limited to daylight only, often restricted by increased shadows due to deep valleys and high mountains.			
2.8.98-123	New section		Moved to Chapter 3 3.16.16-41			
3.1.1	Additional wording	The search area described will be of rudimentary construction, e.g. a circle, square or rectangle depending on the nature of the distressed craft. The search area will be of sufficient proportions to cover all reasonable alternative tracks of the distressed craft and will incorporate areas highlighted by intelligence information.	The search area described will be of rudimentary construction, e.g. a circle, square or rectangle depending on the nature of the target. The stage 1 search area (equivalent to a Reflex search on land) will be of sufficient proportions to cover all reasonable alternative tracks of the target and will incorporate areas highlighted by intelligence information.			
3.2.1 a	Additional wording	Evaluating the situation, including the results of any previous searching	Evaluating the situation, including the results of any previous searching (This may include incidents that have occurred in that location in the past and search efforts on previous days);			
3.2.2	Additional wording		While the JRCC and the ADF generally cease search efforts upon the Time Frame for Survival (TFFS) being reached, police have obligations under jurisdictional Coroner's Acts to continue searching for, and recovering, deceased persons that were previously the subject of a SAR operation.			
3.2.5	Additional wording	This is usually done by determining the maximum distance the survivors could have travelled between the time of their last known position (LKP) and the known or assumed time of the distress incident and drawing a circle of that radius around the LKP. Knowing the extreme limits of possible locations allows the search planner to determine where to seek further information related to the missing craft or persons and whether an incoming report might apply to the incident. However, systematic search of such a large area is normally not practical.	This is usually done by determining the maximum distance the survivors could have travelled, (by aircraft, vessel, vehicle or on foot) between the time of their last known position (LKP) and the known or assumed time of the distress incident and drawing a circle of that radius around the LKP (S/T/D calculation). Knowing the extreme limits of possible locations allows the search planner to determine where to seek further information related to the missing craft or persons and whether an incoming report might apply to the incident. However, systematic search of such an initially large area is normally not practical.			
3.2.7	Additional wording	The incident may have been witnessed: reported as a navigational fix by another craft or the craft in distress	The incident may have been witnessed: reported as a navigational fix by another craft or the craft in distress (Manually or electronically);			
3.2.9	Additional wording	The SMC should try to reduce this area to an area of high probability that can be used as the initial search area or use it.	The SMC should try to reduce this area to an area of high probability that can be used as the initial search area or, if the area is small enough for adequate searching with available assets, use it.			

3.2.11	Additional wording	The first step in search planning is to determine Datum.	Datum: The first step in search planning is to determine Datum. Datum is a calculated reference for the possible location of a target allowing for all environmental factors, and forms the basis for all marine and aviation search drift modelling.			
3.2.12	new words	A **datum point** is the datum developed at a specific time when the initial position of the search object is known.	A **datum point** is the most probable location of the target, corrected for drift, calculated for a specific time. It is only possible to determine a datum if an origin location is known.			
3.2.13	new words		Datum lines are also developed when there is a known start and end point in a vessel/aircraft's route, with drift calculated off that base line.			
3.3.4	new words	Where a craft reports encountering a distress situation, the location is reasonably well known and there are other craft in the near vicinity, it may be possible to divert an asset to the area or intercept the distressed crafts track with instructions to undertake a track crawl search along the known route.	Where a target reports encountering a distress situation, the location is reasonably well known and there are other assets of opportunity in the near vicinity, it may be possible to divert an asset to the area or intercept the distressed targets track with instructions to undertake a track crawl search along the known route.			
3.3.5	Additional wording	If circumstances allow, the diverted asset may be instructed to proceed parallel to the distressed craft's track at an appropriate off-set distance and to return at the same off-set distance on a reciprocal heading.	If circumstances allow, the diverted asset may be instructed to proceed parallel to the distressed targets track at an appropriate off-set distance to one side and to return at the same off-set distance on a reciprocal heading on the other side of the targets track.			
3.3.6 c	Additional wording	A quick appraisal of readily available assets	A quick appraisal of readily available assets (from a local facilities or asset register);			
3.3.13	Additional wording	The possibility of a communications failure, and a subsequent diversion should not be overlooked. The operating agency should be questioned concerning policy as to diversion.	The possibility of a communications failure, and a subsequent diversion should not be overlooked. The operating agency, in the event of a commercial target, should be questioned concerning policy as to diversion. In the event of it being a non-commercial or pleasure target, inquiries should be made with family and friends as to possible diversion actions.			
3.3.20	new words		These statistical distances were from incidents prior to GPS enabled navigation. It could reasonably be assumed that GPS navigation would result in aircraft crashes being closer to the intended track of the target aircraft but there have been not recent studies to confirm this.			

3.4.6	Additional wording		The ATNPS formula is a useful tool in understanding the relationships between Area covered, time available, number of assets, speed of the assets and track spacing or distance between assets.			
3.4.10	change wording	To ascertain if the drift rate presents a problem, compare the targets drift rate to the rate of creep of the search aircraft. If the targets drift rate exceeds the aircraft's rate of creep, remedial action is necessary.	To ascertain if the drift rate presents a problem, compare the targets drift rate to the rate of creep of the search aircraft or vessels. If the targets drift rate exceeds the asset's rate of creep, remedial action is necessary.			
3.4.12 b	change wording	Use a track spacing equal to sweep width (C = 1.0, or at least 0.5);	Use a track spacing equal to sweep width (C = 1.0, or no lower than 0.5);			
3.4.12 c	Additional wording		(Available light, first and last search light, electronic searching);			
3.4.12 d	Additional wording		(Refer to the ATNPS formula);			
3.4.14	Additional wording		This will prevent unsearched areas and maintain the momentum of the search. It is almost impossible to resume a search in an area after that asset has been diverted to another search area. Holes in searches create doubt and reduce the overall POD.			
3.4.15	Additional wording		Searching both a land and marine environment with aircraft provides the most rapid response and greatest chance of survival. In instances where aircraft are unavailable or in insufficient numbers then a vessel search will become necessary in a marine incident. A vessel search may be limited initially to a trackline search to provide a maximum POD. Vessel visual, electronic, wreckage and beacon searches are limited by the height of eye (Hoe) of searchers and the sea conditions at the time.			
3.5.10	Additional wording	Where: A = LKP, TAS = 100 kt, W/V+180/15, Endurance remaining at A = 90 minutes. Therefore A-B = 22.5 NM 3.5.10 and radius B-C = 150 NM	Where: A = LKP, TAS = 100 kt, W/V +180/15 (Wind vector is 180°T (Blowing from the south) at 15kts), Endurance remaining at A = 90 minutes. Therefore A-B = 22.5 NM (15kt winds x 90 mins endurance (1.5hrs)) and radius B-C = 150 NM (100 kt speed x 90 mins endurance (1.5hrs))			
3.5.19	new diagram		New E diagram			

3.5.21	Additional wording		X is given the figure of 5nm when it is not known what method, if any, had been used to determine LKP. The SMC can modify this distance based on reliable intelligence and/or information from the pilot/master. Y is given the figure of 1nm as almost all search assets will be making continuous navigation checks using GPS and/or other manual fix methods.			
3.5.50	Additional wording		The leeway for a person in the water with a wind speed of 20kt would be: Lw = [(0.011 x 20) + 0.07] Lw = [0.22 + 0.07] Lw = 0.29kt			
3.6.19	Additional wording		If the Total Drift Line (TDL) of the initial plot is less than 8nm then there is no need to apply any Individual Drift Error (IDE) as per diagram 3-23. The 6nm circle is drawn around datum, and subsequently boxed up to represent the search area. If the second and subsequent TDL's exceed 8nm then the IDE needs to be applied to the circle around datum. The IDE in these cases is the TDL divided by 8 (1/8th or Rule of Eights). The IDE is then added to the initial 6nm circle.			
Figure 3-23	new diagram		New recomputing diagram			
Figure 3-24	new diagram		New Boxed search area diagram			
Figure 3-25	new diagram		New Total search area			

3.11.12	New section		There are three possible places to commence a land search from: LKP: This is the Last Known Position of the target, and relates to when the target was visually seen by a witness. This may be at the start of a bush walk or perhaps in their room at a care facility. PLS: This is the Place Last Seen, and is subtly different from LKP. A PLS is often identified during the intelligence phase when witnesses come forward with information on possible sightings of the target. This information should be assessed against time, ability of target to travel to that location and other factors of the incident. IPP: This is an Initial Planning Point and is a location identified by the SMC where the search should commence. An example may be a missing bush walker, their LKP was their bedroom at their dwelling the day before, and the PLS may be the same location. This is not the best location to commence a search unless information suggests the target never left home. If their vehicle was located at the entrance to bush walking area, and their intention was to go bush walking it is logical to commence the search from the vehicle. Even though there was no visual sighting of the target leaving the vehicle it becomes a good Initial Planning Point until further information comes to light.			
3.16.16	Additional wording	Urban Environment: Land searches in urban areas are often required.	Urban Environment: Land searches in urban areas are often required for targets such as those intending suicide and those with dementia or similar ailments.			
3.18.14	Removed words	An Australian LPB study was conducted between 2000-2006, details of which are contained at site http://sarbayes.org/natsar.pdf	An initial Australian LPB study was conducted between 2000-2006			
3.20.3	Replace old and difficult to read diagrams	Land SAR Stages	New diagrams 3-35 to 3-51			
3.21	New diagrams to explain overlays	Recording of search areas	New diagrams to expand word content 3-52 to 3-61			
4.1.2	additional wording		(This may be a combination of SAR specific assets, other local assets or assets of opportunity that happen to be in or near the search area);			
4.1.2 Note	additional wording	**Note**: JRCC Australia uses a computer-based program to design search areas, assign search patterns,	**Note**: JRCC Australia and most police jurisdictions use a computer-based program to design search areas, assign search patterns,			

4.2.1	Rewording	As discussed in the previous chapter, a search typically involves three stages including the immediate response, a search based on a nominated area either side of track, and a search based on a mathematically derived search area. The following sections describe these stages in further depth.	As discussed in the previous chapter, an aerial or maritime (whether using oceanic principles or coastal search planning) search typically involves three stages: Stage 1: The immediate response; Stage 2: a search based on a nominated area either side of track, and; Stage 3: a search based on a mathematically derived search area. The following sections describe these stages in further depth.			
4.2.2	additional wording	The stage one search normally consists of:	The stage one, initial or reflex search normally consists of:			
	additional wording	That a surface response for search or rescue as may be required;	Deploying a surface asset for search and/or rescue as may be required by the situation and location;			
4.2.4 d	additional wording		(Only in this initial stage of the search);			
4.2.5	additional wording	A stage two search is normally not required for a maritime incident. During stage two, the search area is normally 10 NM either side of the missing craft's track.	During stage two, the search area is normally 10 NM either side of the missing targets track for aircraft and vessels when undertaking an aerial search. Surface searching will be at smaller distances either side of the track.			
4.2.6	additional wording	It may be reduced or extended either side of the track after consideration of the following factors, as applicable: a) The height and speed of the missing aircraft; c) Possible actions of the missing craft during an emergency, e.g. an aircraft searching for a suitable area to land or attempting to reach land if flying over water,	This distance may be reduced or extended either side of the track after consideration of the following factors, as applicable: a) The speed of the missing aircraft or vessel; b) The height of the missing aircraft; c) Possible actions of the missing target during an emergency, e.g. an aircraft searching for a suitable area to land or attempting to reach land if flying over water, or a vessel attempting to run for shelter;			
4.2.9	additional wording	A Stage Three search is a further development of Stage Two, where the search area is expanded to cover the probability area calculated by reference to the missing craft's and search aircraft's navigation errors, modified by intelligence and any allowance for drift.	A Stage Three search is a further development of Stage Two, where the search area is expanded to cover the probability area mathematically calculated by reference to the potential navigational errors of the missing target and search assets. These errors will be modified by intelligence and any allowance for drift.			
4.2.10 e	additional wording	Logistical support including availability of fuel for search aircraft if operating from more remote airfields;	Logistical support including availability of fuel for search aircraft and vessels if operating from more remote airfields and bases;			

4.3.1	additional wording	Once the search area has been determined, a systematic search for the target should be planned. Factors such as the weather conditions, time available for search, aircraft, search altitude, sighting range, size of target, etc., should be taken into account.	Many of the general factors involved in aerial and maritime search have similarities in their prosecution and planning and are considered together in this manual. Once the search area has been determined, a systematic search for the target should be planned. Factors such as the weather conditions, time available for search, aircraft and vessel speed, search altitude, sighting range and height of eye, size of target, etc., should be taken into account.			
4.3.2	changed wording	Search Area coverage is the systematic search of selected areas of land, or water, to ensure the optimum probability of detecting the object being sought.	Search Area coverage is the systematic search of selected areas of land, or water, to ensure the optimum probability of detection of the object being sought			
4.3.3	changed wording	The type and number of available search aircraft will be a factor in determining search area coverage. More time will be required to search a large area thoroughly when there are limited numbers of search aircraft available unless the distance between successive sweeps of the area is increased. This is not desirable since it would reduce the probability of detecting the target. It may, therefore, be necessary to seek additional search aircraft from other sources. It is usually preferable to cover a search area from the beginning with an adequate number of search aircraft.	The type and number of available search assets will be a factor in determining search area coverage. More time will be required to search a large area thoroughly when there are limited numbers of search assets available unless the distance between successive sweeps of the area is increased. This is not desirable since it would reduce the probability of detection of the target. It may, therefore, be necessary to seek additional search assets from other sources. It is usually preferable to cover a search area from the beginning with an adequate number of search assets.			
4.3.4	additional wording	When the aircraft operate far from their home base, consideration should be given to them being redeployed at an advance base so that more time will be available for the search and less time will be spent on flights to and from the search area.	When search assets operate far from their home base, consideration should be given to them being redeployed at an advance base so that more time will be available for the search and less time will be spent on travel to and from the search area.			
4.3.5	changed wording	An adequate number of well-placed, trained observers as well as altitude and speed of the search aircraft are important factors determining the POD of a target.	When using an aircraft as a search asset an adequate number of well-placed, trained observers as well as altitude and speed are important factors determining the POD of a target.			
4.3.7	additional wording		There are a number of terms relating to visibility from a search asset:			
4.3.7 a	additional wording		Meteorological visibility: This is the maximum visibility taking into account the weather features present in the search area at the time of the search. This will vary depending on height of asset, cloud base, cloud coverage, clear skies etc.			

4.3.7 b	additional wording		Search visibility is the actual distance a searcher can see under good conditions. A searcher may be able to see the horizon from a vessel or aircraft but would have very little chance of seeing a target at that distance.			
4.3.7 c	additional wording		Sweep width is the calculated distance that a searcher has a reasonable chance of locating the target. It is based on a bell curve where the probability of a search not seeing the target within the sweep width is the same as them seeing the target beyond the sweep width. In Figure 4.2 (Below) the number of missed detections (B) inside the effective area swept equals the number of detections (A) that occur outside the area swept.			
4.3.7 c	New diagram		New Figure 4.2 Bell curve			
4.3.7 d	additional wording		Track spacing is the mathematically derived distance between each search leg. Where possible the track spacing should be equal to or less that the sweep width to ensure a high POD.			
4.3.9 d	additional wording	Precipitation reduces visibility; and	Precipitation, sleet and snow or other storm event reduces visibility; and			
4.3.11	changed wording	On a glassy sea any object, or disturbance, will probably attract the attention of the eye.	On a glassy sea any object, or disturbance, will probably attract the attention of a searchers eye.			
4.3.15	New section		The weather correction factor (Fw) is applied to the sweep width calculation to account for the degradation in weather conditions. This generally means that sweep widths will need to be closed to achieve a good POD in poor conditions.			
4.3.16	additional wording	At low search altitudes the speed of the aircraft will affect the sweep width due to the angular velocity of targets moveing through the RADAR scanner's field of view, blurring theof targets at very close ranges, and decreasing the exposure time theof targets to the scanner.	At low search altitudes the speed of the aircraft will affect the sweep width due to the angular velocity causing targets to: a) Move through the RADAR scanner's field of view, blurring the targets at very close ranges, and decreasing the exposure time the targets to the scanner. b) Move through a searchers field of view, again resulting in the blurring of the targets and limiting the time to identify and respond to a target being seen. c) Generally, higher speeds will increase the adverse influence of these factors at search altitudes below 500 feet.			
4.3.20	New section		Search heights will be quoted as height above ground level (AGL) or above mean sea level (AMSL).			

4.3.25	New section		Cloud cover is often referred to in Octa's (Eights). Zero (0) Octa's is a cloud freen sky, while eight (8) Octa's is total cloud cover.			
4.3.39	New section		To use the Sweep Width tables the following formula applies: Vessels: Sweep Width (W)= Uncorrected sweep Width (Wu) x Weather Correction (Fw) x Fatigue (Ff) (Target is a person in the water, height of eye of vessel is 8', visibility is 15km, wind is 20kts and seas are 1.5m. The vessel crew is fatigued. W = 0.3nm (from the Sweep Width table for vessels) x 0.5 (Weather correction factor table) x 0.9 (Fatigue section 4.3.18) W = 0.3 x 0.5 x 0.9 W = 0.135nm (0.25km) Aircraft: Sweep Width (W)= Uncorrected sweep Width (Wu) x Weather Correction (Fw) x Velocity (Fv) (Target is a person in the water, helicopter is flying at 500', speed of 60kts, visibility is 10km, wind is 20kts and seas are 1.5m) W = 0.1 (from Sweep Width for helicopter table) x 0.5 (Weather correction factor table) x 1.5 (Speed correction factor table) W = 0.1 x 0.5 x 1.5 W = 0.075nm (0.14km)			
4.3.41	additional wording	In conditions where the wind speed is less than 15 knots and/or visibility is greater than three (3) nm, use a track spacing of up to three (3)nm	In conditions where the wind speed is less than 15 knots and/or visibility is greater than 3 nm (5.5km), use a track spacing of up to 3nm (5.5km)			
4.3.42	additional wording	Where winds are greater than 15 knots and /or visibility is less than three (3) NM but greater than one (1) NM, a track spacing of one (1) NM	Where winds are greater than 15 knots and /or visibility is less than 3nm (5.5km) but greater than 1nm (1.9km), a track spacing of 1nm (1.9km)			
4.3.44	New diagram		New Coverage diagram			
4.3.54	additional wording		To ensure the concentration of search effort around the most probable position, drift and other environmental factors must be continuously factored in.			

4.3.55	new wording	When using the POD Graph in Appendix D-5:12, the POD for any particular search is obtained by reference to the appropriate Search graph line depending on the search conditions apparent.	POD graph is contained in Appendix D-5:12. The bottom horizontal line is the Coverage factor (C) and the vertical side is the Probability of detection (POD) as a percentage, starting from 0% at the bottom to 100% at the top. The graph also contains five search lines, relating to the first, second, third, fourth and fifth search of the same area. To use the graph identify the Coverage factor (C) from the search, then follow this factor upwards until it crosses the appropriate search line. The POD can then be read on the vertical scale. Eg. A Coverage factor for a first search is 0.8, the POD would be approximately 68%.			
4.3.59	moved section		The probability of detection curve is valid only when the search pattern tracks are accurately followed.			
4.4.1	additional wording	The navigational accuracy with which a search aircraft is able to reach a search area and fly a search pattern has an important bearing on the coverage of the area and the POD. Dead reckoning navigation alone generally produces poor results. Map reading can be effective but normally only over land or coastal areas in visual meteorological conditions.	The navigational accuracy with which a search aircraft and vessels are able to reach a search area and undertake a search pattern has an important bearing on the coverage of the area and the POD. Dead reckoning navigation alone generally produces poor results. Map/chart reading can be effective but normally only over land or coastal areas in visual meteorological conditions. With the advent of the Global Positioning Systems (GPS) and the provision of satellites from a variety of nations (preventing monopoly on access and potential disruption in times of conflict) almost remove any navigational inaccuracies due to manual navigation and does not require the search asset to be within visual range of navigational markers. The GPS does not alleviate the need to keep a visual appreciation of location where possible.			
4.4.3	additional wording	Greater search accuracy is obtained when visual, RADAR or radio navigational aids are within reception range of search units or when aircraft are equipped with area type navigation equipment (RNAV) e.g. GPS or Inertial Navigational Systems (INS).	Greater search accuracy is obtained when visual, RADAR or radio navigational aids are within reception range of search assets or when aircraft/vessels are equipped with area type navigation equipment (RNAV) e.g. GPS or Inertial Navigational Systems (INS).			
4.5.1 d	additional wording		The SMC needs to be cognisant of vertical and horizontal separation requirements of aerial assets. In instances where multiple aerial assets are being used for a single search, aircraft tasking expertise should be sought from the JRCC Australia.			

4.5.5	New section		There is no NOTAM equivalent with the maritime search area. The SMC and vessel masters must have continual situational awareness of the search environment, the possibility of both small and large vessels transiting the area, and the need to halt or modify the search patterns to avoid collisions or dangerous situations.			
4.5.6 a	additional wording		(non-GPS beacon, GPS beacon, GPS location, 2 or 3 point fix, dead reckoning, unknown);			
4.5.6 e	additional wording		(transit time to search area);			
4.5.9	additional wording	When it is known, or likely, that an emergency radio beacon may be available in the target vessel or aircraft or to the survivors, an electronic search using an appropriate pattern, (e.g. track line search), should be carried out by at aircraft flying at a high level. This may occur at the same time as a visual search is carried out at a lower altitude or on the surface. In planning this search the coverage and possibility of detection by the COSPAS-SARSAT system may be considered It is also valuable to consider the location of the incident and the possibility of overflying aircraft detecting a signal.	When it is known, or likely, that an emergency radio beacon (EPIRB, ELT or PLB) may be available in the target vessel or aircraft or with the survivors, an electronic search using an appropriate pattern, (e.g. track line search), should be carried out by aircraft flying at a high level. This may occur at the same time as a visual search is carried out at a lower altitude or on the surface. In planning this search the coverage and possibility of detection by the COSPAS-SARSAT system may be considered through contact with the JRCC Australia. It is also valuable to consider the location of the incident and the possibility of overflying aircraft detecting a signal.			
4.5.13	additional wording		This is generally the trackline if known.			
4.5.14	additional wording		In a marine environment the search vessel/s will follow the trackline initially, the second leg would be off-set to one side, at one track spacing for the length of the search. The third and subsequent legs would alternate either side of the trackline until the entire area has been completed. The SMC should be aware of drift effects to ensure the target will not drift out of the search area before it is completed.			
Figure 4-3	New diagram		New diagram Vessel trackline search			
Figure 4-4	New diagram		New diagram Aircraft parallel track search			
4.5.18	additional wording		The SMC should be aware of the drift rate to ensure that the target is not drifting through the search area faster than the search assets are capable of searching.			
Figure 4-5	New diagram		New diagram Aircraft trackline search			
Figure 4-6	New diagram		New diagram aircraft trackline seach new area			

4.5.3	additional wording	This could allow the search object to drift out of the search area before the search facility arrives in the vicinity.	This could allow the search object to drift out of the search area before the search facility arrives in the vicinity or during the search.			
Figure 4-7	New diagram		New diagram Expanding Square search			
Figure 4-8	New diagram		New diagram Sector Search Pattern - Aircraft			
4.5.19	additional wording	An area 10 miles radius is to be searched at a mean track spacing of 3NM. From the table, the angle between tracks is 36 degrees and the time at 120kts is 1 hour.	An area 10 miles radius is to be searched at a mean track spacing of 3NM. From the table, the angle between tracks is 36 degrees and the total distance to be flown by a single search aircraft is 120nm. 120nm flown at 120kts will take 1 hour to search (A helicopter at 60kts would take twice as long at 2 hours).			
4.5.30 b	additional wording	Mountainous search areas should be assigned to multi-engine aircraft whenever possible	Mountainous search areas should be assigned to multi-engine aircraft whenever possible, in the same manner that multi-engine aircraft are used over water for safety in the event of a mechanical issue;			
4.5.35	additional wording		Where possible a GPS record of the search tracks should be downloaded at the completion of each search task and overlayed on a master map. Further information can then be added by the flight crew.			
4.5.38 a	additional wording	Squares or rectangles;	Squares or rectangles (Using a GPS or similar to define the boundary);			
4.5.39 a	additional wording	An area of approximately 20 – 30 square nautical miles is a good size	An area of approximately 20 – 30 square nautical miles (65-100km²) is a good size			
Figure 4-12	New diagram		New diagram Helicopter search area			
Figure 4-13	New diagram		New diagram Irregular search area			
Figure 4-14	New diagram		New diagram Flare search pattern			
4.7.6	additional wording		New generation EPIRB's can be hydrostatically operated at pre-determined depths eliminating the necessity of manual activation. Float free mountings are becoming mandatory for commercial vessels within Australian waters.			
4.7.7	additional wording		New generation PLB's are becoming waterproof with limited floatation, making them popular for mariners. They are often carried by individual crew members on larger vessels in case of falling overboard.			
4.7.9 b	additional wording		Sea conditions can effectively limit a beacons detectability. Signals can be masked when the beacon is in the trough between successive wave crests, creating an intermittent signal that may be difficult to accurately home in on.			

4.7.15	additional wording		Larger vessels are increasingly carrying hydrostatically operated beacons that activate at pre-determined depths, generally as a result of the vessel sinking.			
4.7.37	New section		Detecting a beacon by hand can be done with one or more hand-held 121.5MHz DF sets. A single device is used in a gentle sweeping action from side to side, attempting to maintain the strongest signal in the centre of the arc of swing. Slowly walking towards the strongest signal while continually sweeping from side to side will eventually arrive at the beacon. With two or more DF sets each can be set some distance apart and the apparent direction of the strongest signal plotted onto a map, the 'cocked hat' where the bearings intersect should be the most probable location of the beacon. The DF sets may have to be moved several times to take into account obstructions caused by the environment.			
Figure 4-13	New diagram		New diagram Irregularly shaped search area			
Figure 4-15	New diagram		New diagram SH and SF			
Figure 4-16	New diagram		New diagram Hand-held DF set usage			
4.7.47	additional wording	Visible moonlight can significantly improve detection of unlighted search objects when using NVGs. Search object light sources, like strobe or similar lights, or even cigarettes, can greatly improve detection even in poor visibility conditions.	Visible moonlight can significantly improve detection of unlighted search objects when using NVGs. Search object light sources, like strobe or similar lights, mobile telephone screens or even cigarettes, can greatly improve detection even in poor visibility conditions. Recent studies have found that certain LED lights, because of the frequencies they emit on, are invisible to NVG.			
4.8.23	additional wording		Observers are generally supplied by the State Emergency Services in most states/territories.			
4.8.36	additional wording		The SMC must also be aware that many police and volunteer rescue vessels will use their name as part of their call sign.			
4.8.49	additional wording	Police authorities undertake the responsibility for coordination of land search.	Police authorities in all States/Territories undertake the responsibility for coordination of land search.			
4.8.53	changed wording	The National Land Search Operations Manual should be refered to for procedures in relation to search techniques.	Details on land searching is contained within this manual.			

4.9.2	changed wording	When assessing available search capacity, care must be taken not to over-estimate the time that a particular aircraft and its crew can spend in a search area or the capability of the observers to remain effective over long periods of flight time.	When assessing available search capacity, care must be taken not to over-estimate the capability of assets with respect to: a) the time that a particular aircraft and its crew can spend in a search area or the capability of the observers to remain effective over long periods of flight time. b) the time that a particular vessel and crew can spend in a search area or the capability of the crew to remain effective over long periods of cruising time. This is very relevant in poor sea conditions and where there is significant distance to the search area. c) the time that any land search team can spend in the search area and remain effective. Weather, terrain, distance to search area and vegetation has a large impact on this capability.			
4.9.8 d	New section		Velocity of the search assets in nm (km)			
4.9.17	New diagram		New sums			
Figure 4-17	New diagram		New diagram Allocation of search areas			
4.9.37	additional wording		(The letters 'I' and 'O' are not used due to possible confusion with numbers.)			
Figure 4-18	New diagram		New diagram Allocation information			
4.10.6	additional wording		Where possible two systems of description should be used simultaneously, such as a map/chart overly with coordinates for the search area boundaries. Two methods of explanation will minimise any confusion. This will become problematic for searches over water out of sight of land.			
	additional wording	The Universal Grid is overprinted on all charts of the JOG series and is also shown on the majority of larger scale maps.	The Universal Grid is overprinted on all charts of the Joint Operations Graphic (JOG) (Military) series and is also shown on the majority of larger scale maps. These grid lines are also printed on all civilian topographic maps produced under the Universal Transverse Mercator (UTM) system.			
4.10.11	additional wording		(There are a number of maps that have the same name although they are of different scales, making the edition number a necessity)			
4.10.43	additional wording		The use of a GPS or on-board electronic navigation system to provide the LKP or SP of the target and bearing continuously will provide the surface asset with situational awareness, bearing in mind it does not provide any subsequent movement due to drift or leeway.			

4.13.3	additional wording		The location of deceased persons will require adherence to local procedures in compliance with the respective Coroner's Acts.			
4.13.6	additional wording	With respect to SAR, SES members are trained in the following:	With respect to SAR, SES members are trained in any/or all of the following depending on location:			
4.13.59 a	additional wording	A visual search along, and also parallel to, the track of the missing target. (A fast and reconnaissance search)	A visual search along, and also parallel to, the track or intended route of the missing target. (A fast / Reconnaissance search)			
New heading	New section		Reflex Search			
4.13.62	New section		A reflex search (Bicycle Wheel Search) is one undertaken in the very beginning of a SAR when time is limited to develop a formal search plan. It is based on the premise that the missing person maybe close to their LKP.			
4.13.63	New section		The SMC identifies the likely routes of the missing person based on information received, knowledge of the location, past events and the nature of the terrain. The first available search assets are initially tasked to search a limited distance along each identified route, checking for signs of the missing person and making visual and aural searches. This initial search should be timed to be completed by the time the SMC arrives on scene.			
4.13.64	New section		A reflex search will provide the SMC with situational awareness if the missing person is not located. Information on the terrain, weather, vegetation, likely routes, unlikely routes and hazards will be available for the SMC.			
4.13.76	New section		Line searches (parallel or creeping) are the most common undertaken in the General Search strategy. A signle line of searchers, evenly spread apart, searching to either side ensuring good coverage of the search area. The spacing between searchers is highly dependent on the vegetation and terrain, the thicker the vegetation the closer the searchers need to be to each other. The general rule of thumb is that searchers should be able to see the ankle of the person next to them, the Ankle Rule.			

4.13.79	additional wording	The contact or line search can be used to saturate an area of high probability, although it is usually the concluding stage of a search operation	The contact search can be used to saturate an area of high probability, although it is usually the concluding stage of a search operation when searching for an unresponsive target or physical evidence of the target. Searchers are in contact with each other, very close together to prevent any area of ground not being searched.			
4.14.2	additional wording		For land searches the Coverage factor (C) is a relationship between the mathematical area capable of being searched (ATNPS formula) and the area (Ag) given to each search asset to search. Eg. A team have been given 1km² to search with 10 searchers, 10m spacing, 2kph search speed and 4 hours to search. At the conclusion of the search they advise that they have completed the entire 1km² search area. A = T x N x P x S A = 4hrs x 10 searchers x 2kph x 0.01km (10m as a kilometre) A = 0.8 C = A ÷ Ag C = 0.8 ÷ 1 C = 0.8 (A Coverage factor of 0.8 in a land SAR gives a POD of 56%) This is not a reflection on the search team, what it means is that even though the team did search the entire area given to them, in the time taken with the resources and spacing it was mathematically only possible to search 0.8km², indicating that there were gaps and periods when the searchers were more than 10m apart.			
4.14.5	additional wording	The sweep width will depend on the type, size, colour and shape of the target, its colour contrast with the surrounding medium and whether or not the target is moving and responsive	The spacing (sweep width) will depend on the type, size, colour and shape of the target, its colour contrast with the surrounding medium and whether or not the target is moving and responsive, or immobile and unresponsive.			
4.14.27	New diagram		New diagram Visual Horizon			
4.14.27	New diagram		New diagram Effective sweep width			
4.14.29	additional wording	In areas where navigation aids are limited, search patterns should be selected so that greatest possible use is made of them.	In areas where navigation aids are limited, search patterns should be selected so that greatest possible use is made of these aids. Regular checks need to be made by team leaders to ensure the search is still in the area assigned.			
4.14.30 i	additional wording	Possible risk to searchers	Possible risk to searchers through not being able to see obstacles.			

4.14.30 iii	additional wording	The possible accidental destruction of vital clues .	The possible accidental destruction of vital clues outside the torchlight.			
4.14.34	new wording	With the increasing occurrence of dementia/Alzheimer suffers wandering from their homes it is often necessary to search these sites.	With the increasing occurrence of missing persons with dementia/Alzheimer wandering from their homes it is often necessary to search these sites.			
Figure 2-20	New diagram		New bell curve diagram			
4.15.1 d	New section		Safety: Any search undertaken should have the safety of searchers as a paramount concern. While SAR can be a risky and dangerous operation the risk - v - gain has to be assessed constantly.			
4.15.28	additional wording		The search is also valuable in state forestry areas and new growth forests used for logging. The grid nature of these areas allows searchers to be stationed at diagonal corners, providing vision on two sides while other searching is undertaken within the forests.			
4.15.30	additional wording		Statistically, this search pattern provides the best chance of detecting a responsive or unresponsive target.			
4.15.35	additional wording		Those areas not searched are done so because there is nothing that has caught the eyes of the searchers (Shape, shine silhouette, movement, spacing and lines).			
4.15.41	additional wording	It is used when the area to be covered can be done in a single sweep.	It is used when the area to be covered can be done in sweeps. Some search areas may require several sweeps of a search team due to size or density of the vegetation. If a single team is conducting this search the outside searcher will be marking objects at 10m intervals to identify the area that has already been searched and will allow for alignment on the following search. Marking is now done with biodegradable tape on trees or other objects at eye height. At the conclusion of each sweep the team will move one team width to the side and resume the search in the opposite direction.			
4.15.56	additional wording		It is also a good search where there is a possibility the target has sustained an injury (perhaps as a result of a traffic crash/aircraft incident) and has wandered of a track or road a short distance and has collapsed.			
4.15.85	additional wording	Urban searching requires houses, yards, industrial areas and vacant allotments.	Urban searching requires houses, yards, industrial areas, vacant allotments as well as the drains, creeks, underpasses and associated urban hiding places being searched and cleared.			

4.15.86	additional wording	When searching a house it is important to ensure that all persons are outside and that no one enters except the searchers	When searching a house (this can also include any dwelling, apartments, nursing or care facilities) it is important to ensure that all persons are outside and that no one enters except the searchers. It has to be remembered, that if the target person can leave the house then there is also a possibility that they could return. Re-searching the house should be done as the opportunity arises but at least twice daily.			
4.16.14	additional wording	These, in turn, will be influenced by the nature of the terrain, the amount of flotsam on the sea etc. Over heavily timbered, mountainous terrain the allowance may need to be as high as 50% of total search time.	These, in turn, will be influenced by the nature of the terrain, *the geography* etc. Unlike marine searching, searchers in a land search remain insitu during any investigation and are generally ready to move on within a very short space of time. Investigation time is signified by the letter 'Z'			
5.1.5	Swap order to put location first		Swap a and b			
5.1.6	Additional wording		Pre-deployment should be considered taking into account the location and/or trackline of the incident.			
5.1.8	Additional wording		Rescue assets should be included in the initial briefing even if they are not going to be immediately deployed.			
5.3.2	Swapped order	ATSB and the police	Police and the ATSB			
5.3.4	Additional wording		Where practicable always approach an air crash incident from up wind.			
5.4.9 f	Additional wording		(Medical advice should be sought before giving anything to survivors);			
5.4.18	Additional wording		Where possible any hazardous or dangers condition should be included in the briefing and actions taken to mitigate where possible (Specialist personnel, PPE, waiting until daylight etc)			
5.4.20 a	Additional wording	A written list is carried and frequent checks are made to confirm all personnel are accounted for.	A written list of team members is carried and frequent checks are made to confirm all personnel are accounted for.			
6.2.1.f	Spelling correction		filed			
6.3	Additional wording	Suspension of a search when the target is not found	Suspension/termination of a search when the target is not found.			
6.3.5	Additional wording	Consideration may be given to notifying decision to suspend or terminate search effort at least one day prior to suspension of operations.	Consideration may be given to notifying the next of kin of the decision to suspend or terminate search effort at least one day prior to suspension of operations.			

6.3.9	Additional wording	On occasions, after the suspension/termination of a search, it may be necessary for the Police or Defence to continue to search for bodies and/or aircraft/vessel wreckage.	On occasions, after the suspension/termination of a search for a live target, it may be necessary for the Police or Defence to continue to search for bodies and/or aircraft/vessel wreckage.			
6.3.11	New section		There are instances where family members are not satisfied with the search efforts prior to suspension/Termination and wish to continue the search using their own funds and/or assets. In these instances, the SAR authority that had responsibility for the coordination of the initial operation should provide assistance with:			
6.4	Additional wording		An evaluation and assessment of the new intelligence is necessary, as is assessing the value of any further searching.			
6.6.1	Additional wording	Following an incident the conduct of a debrief of agencies and groups involved should be considered.	Following any SAR incident the conduct of a debrief of agencies and groups involved should be considered.			
6.6.8 c	change wording	A debrief by the controller of everyone involved in the conduct of the operation prior to the conclusion.	A debrief by the SMC of everyone involved in the conduct of the operation prior to the conclusion.			
7.6.3	Additional wording	In water temperatures above 21°C survival time depends solely upon the fatigue factor of the individual, some individuals having survived in excess of 80 hours at these temperatures.	In water temperatures above 21°C survival time depends solely upon the fatigue factor of the individual, with some individuals having survived in excess of 80 hours at these temperatures.			
7.6.1	Additional wording		Figure 7.1 illustrates the relationship between water temperature and immersion time.			
7.6.9 d	change wording	Exercising (such as the situation where a survivors without lifejackets must swim to stay afloat); or	Exercising (such as the situation where a survivor without a lifejacket must swim to stay afloat); or			
Figure 7.1	New graph					
7.7.3	change wording	Hypothermia can happen during cold nights in desert country or anytime in the colder areas of the state.	Hypothermia can happen during cold nights in desert country or anytime in the colder areas of Australia.			
7.7.2	change wording	The warmest sea water will get to is about 29°C, with a worldwide average of 19°C.	The warmest sea water will generally get is about 29°C, with a worldwide average of 19°C.			
7.7.3	Additional wording	It occurs when the body's temperature falls below 35°C. It is characterised by intense shivering, followed by loss of co-ordination, confusion and irrationality. If it is not halted unconsciousness will follow and then death.	. It occurs when the body's core temperature falls below 35°C. It is characterised by intense shivering, followed by loss of co-ordination, confusion and irrationality. If it is not halted unconsciousness will follow and then ultimately death.			
7.7.4	Deleted duplicate 7.3.1					
7.7.5	Deleted duplicate 7.3.2					

7.7.6	Moved to 7.3.7					
7.3.6	Additional wording	Individuals who observe an emergency situation and reporting it to the SAR system should also be considered as being under stress. Many times it will be necessary for SAR personnel to specifically request essential information from an individual reporting an emergency.	Individuals who observe an emergency situation and who are reporting it to the SAR system should also be considered as being under stress. It will be necessary for SAR personnel to specifically request essential information from an individual reporting an emergency, as it may not be forthcoming.			
Figure 7.3	New diagram					
7.8.2	change wording		The above graph replaces the older axionomic diagram and makes determining wind chill easier. An air temperature is -20°C and a wind speed of approximately 30 km/h produces an equivalent wind chill temperature of approximately -33°C on exposed flesh. The green areas will not pose much threat to exposed flesh for short periods and can be tolerated by most healthy people. Yellow areas are temperatures that pose an increase in frostbite risk for exposures over 10 to 30 minutes. The orange areas will pose a frostbite threat in 5 to 10 minutes. Pink is a high risk of frostbite between 2 to 5 minutes and red is a very high risk for exposures of more than 2 minutes.			
7.9.1	Additional wording		and is also based on a survivor not undertaking any strenuous activities.			
7.9.2	Additional wording	The temperature on the bottom line is the ambient air temperature corrected for wind chill using Figure 7-3 to make the conversion.	The temperature on the bottom line is the ambient air temperature corrected for wind chill using Figure 7-3 to make the conversion. The scale on the left represents survival time in days.			
7.9.3	Additional wording		Any activities that increase the rate of perspiration or body fluid loss may initially warm that person up but will contribute to wet chill and will ultimately shorten the time frames provided by this graph.			
Figure 7-5			New Wet chill survivability graph			
7.10.1	Additional wording		unless they can find or made heat and/or shelter.			
7.10.2	Additional wording		The scale on the left represents survival time in days.			
7.13.1	Additional wording		in environments where moisture loss was at a minimum.			

7.14.1	Additional wording	Is the next most serious of the heat related illnesses. It is brought on by long periods of activity in a hot environment. This not only occurs with persons in arid areas but also to fire-fighters and factory workers working in confined spaces with high temperatures.	This is the next most serious of the heat related illnesses. It is brought on by long periods of activity in a hot environment. This not only occurs with persons in arid areas but also to fire-fighters and factory workers working in confined spaces with high temperatures.			
7.14.3	Additional wording	First aid treatment of heat exhaustion is vital. If conscious lay the victim down in a cool and shaded area with legs slightly elevated, remove or loosen tight clothing, give water in small quantities. If vomiting or unable to drink seek urgent medical attention. If the victim is unconscious place them in the recovery position in a cool and shaded area. Check breathing, airway and circulation. Keep them cool and seek urgent medical attention.	First aid treatment of heat exhaustion is vital. If conscious lay the victim down in a cool and shaded area with legs slightly elevated, remove or loosen tight clothing, give water in small quantities. If vomiting or unable to drink seek urgent medical attention. If the victim is unconscious place them in the recovery position in a cool and shaded area. Check breathing, airway and circulation. Keep them cool and seek urgent medical attention. Lowering core body temperature via a wet sheet fanned to produce a cooling effect through evaporation is very effective.			
7.15.1	Additional wording		Immediately seek urgent medical assistance.			
7.16.1	Additional wording	The below graphs provide a guide to expected desert survivability but should not be regarded as arbitrary. The old survival adage of three (3) minutes without air, 3 days without water and 3 weeks without food should be remembered when referring to these graphs.	The below graphs, Figures 7-4 and 7-5, provide a guide to expected desert survivability but should not be regarded as arbitrary. The old survival adage of three (3) minutes without air, 3 days without water and 3 weeks without food should be remembered when referring to these graphs.			
7.16.2	Additional wording	The shade air temperature on the bottom line of both graphs represents the temperature as measured by a thermometer out of direct sunlight.	The shade air temperature on the bottom line of both graphs represents the temperature as measured by a thermometer out of direct sunlight, such as you would find in a Stevenson Screen.			
7.16.4	change wording	The above graph provides the time frames for a missing person whom is stationary, either in a vehicle, shelter or other location not directly exposed to the sun.	Figure 7-4 provides the time frames for a missing person whom is stationary, either in a vehicle, shelter or other location not directly exposed to the sun.			
7.16.5	change wording	The below graph provides the time frames for a person attempting self-help, walking at night time.	Figure 7-5 provides the time frames for a person attempting self-help, walking at night time.			
7.16.6	Additional wording		Any activity undertaken that would cause loss of body fluids through excessive sweating or urination will significantly reduce the potential time frame for survival. Survival manuals often suggest constructing solar stills or other means of water production in these situations. Doing so will often expend far more fluids than can be collected, particularly within the Australian outback where most plants have adapted strategies to reduce moisture loss.			

7.16.10	Additional wording	Example: A person is missing in the alpine area of NSW. The wind is 40kph from the south. Air temperature is 0°C degrees and they are wearing nothing but underclothes. Using the wind chill table we can ascertain that the equivalent air temperature is going to be very cold, about -12°C. Consultation with the hypothermia graph will give an approximate period of survival of between ¼ day (6hrs) and 4 ½ days. If our missing person can find shelter and warmth they may survive to the 4 ½ day period. If they remain out in the open with limited clothing they will possibly perish within the 6 hours. It now starts to rain, soaking our MP. Consulting the Wet Chill Survival graph we can see that there will be a distinct shortening of the TFFS. It is now between about 4 hours and 2 days, depending on what the MP is able to find by way of shelter and warmth. The POM can be as short as 2 ½ hours to just over a day. There is a definite amount of urgency required now. The desert survival charts can be read in a similar way, but be aware these were developed for the northern hemisphere. There are a number of recorded instances where persons have perished in as little as four hours without water.	Example: A person is missing in the alpine area of NSW. The wind is 40kph from the south. Air temperature is 0°C degrees and they are wearing nothing but underclothes. Using the wind chill table (Table 7-2) we can ascertain that the equivalent air temperature is going to be very cold, about -12°C. Consultation with the hypothermia graph (Figure 7-2) will give an approximate period of survival of between ¼ day (6hrs) and 4 ½ days. If our missing person can find shelter and warmth they may survive to the 4 ½ day period. If they remain out in the open with limited clothing they will possibly perish within the 6 hours. It now starts to rain, soaking our MP. Consulting the Wet Chill Survival graph (Figure 7-3) we can see that there will be a distinct shortening of the TFFS. It is now between about 4 hours and 2 days, depending on what the MP is able to find by way of shelter and warmth. The POM can be as short as 2 ½ hours to just over a day. There is a definite amount of urgency required now. The desert survival charts can be read in a similar way, but be aware these were developed for the northern hemisphere. There are a number of recorded instances where persons have perished in the deserts of Australia in as little as four hours without water.			
7.16.11	New section		Starvation: If a person is recovered alive and they have been without food and water for a significant period of time be aware that there are pitfalls to offering them food and/or water even though they may request it. Advice is to initially provide them with UHT (Long Life) milk and dried meat similar to biltong or jerky. Both of these are easily digested and do not generally cause problems if given in small doses. If in doubt always seek medical advice.			

NATSAR Manual Amendment Schedule - Approved at Tele 1, 2020 for inclusion in 2020 edition

Current manual reference	Reason for amendment	Previous wording	New wording (For images or tables that cannot fit within this document are to be attached to email to Secretariat)	Council Approval (Y/N)	Responsible
Glossary	Additional wording		The word is pronounced 'Mayday' from the French m'aider (help me).	**Y**	QLD, AMSA
Glossary	Additional wording		The words are pronounced 'Pan pan' from the French panne (a breakdown).	**Y**	QLD, AMSA
Glossary	Additional wording		The word is pronounced 'See-cure-e-tay' from the French sécurité.	**Y**	QLD, AMSA
2.5.18 a	Additional wording		2.5.17 The Information Stages: The information process is divided into four stages: a) Collection - Information related to the search should be collected in the shortest possible time and often comes from unlikely sources (Consider beacon registration, NOK, flight plans, manifests, intentions, BOM etc) Information required may relate to the:	**Y**	QLD, AMSA

Vol 2 - 2.5.18 a)	New dot point		Collection - Information related to the search should be collected in the shortest possible time and often comes from unlikely sources (Consider beacon registration, NOK, flight plans, manifests, intentions, BOM etc) Information required may relate to the:
			i) Missing person(s), vessel or aircraft;
			ii) Missing object(s);
			iii) Environment;
			iv) Sea conditions; Terrain/topography; and
			v) Weather.
			vi) Survival times
				Y	QLD, AMSA

2.5.18 c	Additional wording		2.5.17 c Evaluation - Within this mass of information, there will be sections that are irrelevant, unreliable or dated. It becomes necessary to evaluate all information and discard all that is inappropriate, and make decisions accordingly. To change information into intelligence it must be value added, verified and/or confirmed with other sources.	**Y**	QLD, AMSA
2.6.11	change wording	For overdue craft	2.6.11. For a SAR involving an overdue target, the Alert phase is declared when apprehension exists as to the safety of an aircraft/vessel or persons. Apprehension exists due to the lack of progress or positions of persons, vehicles or aircraft or inability to confirm safety in a suitable timeframe. At the Alert phase coordinators should begin or continue communications searches, land searches and in some cases tasking of vessels/aircraft to high probability locations. Vessels in the area may be asked to maintain a sharp lookout, report all sightings and render assistance if needed.	**Y**	QLD, AMSA
2.6.14	Additional wording	The Distress Phase exists when there is reasonable certainty that persons, vessels or aircraft are in imminent danger and require immediate assistance. For overdue craft, a distress exists when communications searches and other forms of investigation have not succeeded in locating the craft or revising its ETA so that it is no longer considered overdue. If there is sufficient concern for the safety of a craft and the persons aboard to justify search operations, the incident should be classified as being in the Distress Phase	2.6.14. The Distress Phase exists when there is reasonable certainty that the targets are in imminent danger and require immediate assistance. For SAR incidents involving an overdue target, a distress exists when communications searches and other forms of investigation have not succeeded in locating the target or revising its ETA so that it is no longer considered overdue. If there is sufficient concern for the safety of a target and the persons aboard to justify search operations, the incident should be classified as being in the Distress Phase.	**Y**	QLD, AMSA
2.7.8	change wording		2.7.8 e) Estimate the position of the target, estimate the degree of uncertainty of this position and determine the extent of the area to be searched and if a significant search effort is anticipated, use search planning techniques to maximise the chances of finding the survivors.	**Y**	QLD, AMSA
2.8.11 a	Additional wording		Contacting the aircraft/vessel operator and destination and alternative airports/ports to confirm that the aircraft/vessel has not arrived.	**Y**	QLD, AMSA
2.8.11 c	New section		Having physical checks of harbours and/or loading facilities at uncontrolled locations (may vary depending on vessel size).	**Y**	QLD, AMSA
2.8.11 d	Additional wording		Thoroughly evaluating the flight/vessel plan, weather, terrain, sea conditions, possible communication delays, last known position, text of radio calls, pilot/master qualifications, and the performance of the aircraft/vessel under favourable conditions.	**Y**	QLD, AMSA
2.8.11 f	Additional wording		Notify the operating agency of the aircraft/vessel.	**Y**	QLD, AMSA
3.2.15	new words		3.2.15 Datum is computed periodically during a search incident when drift forces continue to affect the position of the search target. Updated datum are usually labelled sequentially: - Datum1, Datum2, Datum3, etc. A new computation is required on each asset tasking or at regular intervals during a SAR incident. Drift should also to be validated against local environmental data when available. This allows for the movement of the water through a search area and ensures assets are searching the correct area in relation to LKP.	**Y**	QLD, AMSA

3.4.7	Additional wording		3.4.7 A controlling factor peculiar to most maritime areas is the drift rate. In situations where a high drift rate is encountered, the SMC must allow for sufficient extension of the search area in the direction of drift in order to prevent the target from slipping out of the area during the search. An alternative to this is to plan smaller successive search areas in the direction of the drift, thereby reducing search legs and ensuring the target remains in the searched area.	**Y**	QLD, AMSA
4.5.17	additional wording		**Parallel Track Pattern Multi-Unit** 4.5.17 This is based on the same principle as the single asset search, except that more than one boat is searching in line abreast, one track spacing apart. It is particularly useful when a number of search assets, fishing boats or pleasure craft are available for searching an area and can be instructed what to do by radio. The OSC will direct the search from his position with all turns and distances taken from the OSC's vessel. Aircraft would not likely be tasked to perform a multi asset parallel track search. Aircraft would not likely be tasked to perform a multi asset parallel track search.	**Y**	QLD, AMSA
4.5.1	additional wording		4.5.1. This procedure is referred to as an expanding square search as it begins at the reported position or most probable location and expands outwards in concentric squares. It is a very precise pattern and requires accurate navigation. It may be advisable for vessels, especially when searching for a person in the water with either an expanding square search (SS) to use dead reckoning (DR) navigation rather than more accurate navigational methods. DR navigation will minimize pattern distortion relative to the search object since it will automatically account for the currents affecting the search object's drift during the search. (Using timings for search legs rather than fixed or electronic navigation aids the search vessel and target will generally be drifting at similar rates through the search area.)	**Y**	QLD, AMSA
4.5.22	additional wording		4.5.12. The searching of coastal islands and their foreshores must always be considered when they are located within the search area, or near to it. Uninjured survivors in sight of land may attempt to make landfall, however they often overestimate their physical capabilities or underestimate the distances involved. (The distance to the horizon (km) calculation is 3.57 x √h, therefore a person floating in the water would have visibility out to 1.59km (0.85nm) [3.57 x √0.2m (eye height of approx 20cm above water level)]. A small coral key may be visible from a distance of 6.5km, while land of 20m above sea level may be visible from 17.5km in flat sea conditions.)	**Y**	QLD, AMSA
4.5.25	additional wording		4.5.15. Should an island fall within a high probability area or there is evidence available that may suggest survivors have reached that point, serious consideration should be given to conducting a land search. Consideration could also be given to the use of RPAS or drones to cover the foreshores and searchable areas of all islands if available. If there are conventional aircraft searching for police or if the JRCC has aviation coordination, for safety reasons drones should not be used without prior approval from the Aviation Coordinator. It is possible that with good planning drones may be suitable to be included in some searches.	**Y**	QLD, AMSA
4.7.19	additional wording	When searching for beacon signals on 243.0 MHz over water, the track spacing quoted in Table 4-5 should be reduced by 20%	When searching for beacon signals on 243.0 MHz over water, the track spacing quoted in Table 4-5 should be reduced by 20% due to the lesser strength of the signal.	**Y**	QLD, AMSA
4.9.7 c	New section		a) How long will it take to search the whole area? b) I've got 6 hours, how much of the area can I search? c) How many assets will I need to cover the search area d) We've got 5 hours and 4 boats, what track spacing must I use? e) We've got to cover the area by 1600hrs, how many craft will I need?	**Y**	QLD, AMSA
4.9.8 c	New section		4.10.8. The factors to be considered are: a) The area to be searched in square nautical miles (km²) b) Time in hours c) Number of assets d) Velocity of the search assets in nm (km) e) Track spacing in nautical miles (km)	**Y**	QLD, AMSA

<table>
<tr><td>4.9.8 Note</td><td>New section</td><td>A = TVS (A TV Station)</td><td>Note: If any four are known then the fifth can be calculated using the formula:
A = T (Time) x N (Number) x P (Pacing/velocity) x S (Spacing)
Example 1: How much area can be searched with 3 aircraft flying at 100kts in 3 hours at a track spacing of 2nm?
A = T x N x P/V x S
A = 3hrs x 3 aircraft x 100kts x 2nm
A = 1800nm²
Example 2: How long will it take to search an area of 2000nm² with 4 aircraft flying at 90kts and a track spacing of 3nm?
T = A ÷ (N x P/V x S)
T = 2000nm² ÷ (4 aircraft x 90kts x 3nm)
T = 2000nm² ÷ 1080
T = 1.85hrs (1hr and 51 minutes)</td><td>Y</td><td>QLD, AMSA</td></tr>
<tr><td>4.9.10 g</td><td>additional wording</td><td></td><td>This investigating time is signified by the letter Z.</td><td>Y</td><td>QLD, AMSA</td></tr>
<tr><td>4.13.86</td><td>New section</td><td></td><td>In the instance that evidence is the search target, a 'contact search', which requires searchers on their hands and knees, will be the norm. Crawling searchers will be able to use their hands or small tools to move all the ground cover aside. There will be no gaps between searchers, and the speed of progress will be that of the slowest searcher.</td><td>Y</td><td>QLD, AMSA</td></tr>
<tr><td>5.1.3</td><td>Additional wording</td><td></td><td>5.1.3. It is essential that from the start of any SAR action, the coordinating SAR Authority plans for the rescue of survivors and ensures that the appropriate resources are alerted, briefed and positioned so that the rescue may take place with the minimum of delay after the location of the survivors. For every search plan there has to be a partner rescue plan.</td><td>Y</td><td>QLD, AMSA</td></tr>
<tr><td>5.5.1</td><td>Additional wording</td><td>The SMC is responsible for the coordination of surface vessels engaged in the rescue of survivors in or on the sea except that in-shore rescue may be arranged and coordinated by the police.</td><td>5.5.1 The SMC is responsible for the coordination of surface vessels engaged in the rescue of survivors in or on the sea. Both the JRCC and Police are responsible for rescue at sea, with the first alerted assuming initial responsibility to coordinate a response prior to transfer to the best placed authority to take overall coordination if required, IAW IGA para 5.1 III (NATSARMAN Appendix A) and NATSARMAN Appendix B.</td><td>Y</td><td>QLD, AMSA</td></tr>
<tr><td>6.1.1</td><td>Additional wording</td><td></td><td>6.1.1. d. All known persons on board are accounted for, or it has been determined that there is no longer a chance of survival (Time Frame for Survival has been exceeded based on medical opinion)</td><td>Y</td><td>QLD, AMSA</td></tr>
<tr><td>Figure 7-3</td><td>New diagram</td><td></td><td>Wind Chill Chart
<table><tr><td>Air Temp C°</td><td>5</td><td>0</td><td>-5</td><td>-10</td><td>-15</td><td>-20</td><td>-25</td><td>-30</td><td>-35</td><td>-40</td><td>-45</td></tr><tr><td>Wind Speed kph</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>5</td><td>4</td><td>-2</td><td>-7</td><td>-13</td><td>-19</td><td>-24</td><td>-30</td><td>-36</td><td>-41</td><td>-47</td><td>-53</td></tr><tr><td>10</td><td>3</td><td>-3</td><td>-9</td><td>-15</td><td>-21</td><td>-27</td><td>-33</td><td>-39</td><td>-45</td><td>-51</td><td>-57</td></tr><tr><td>15</td><td>2</td><td>-4</td><td>-11</td><td>-17</td><td>-23</td><td>-29</td><td>-35</td><td>-41</td><td>-48</td><td>-54</td><td>-60</td></tr><tr><td>20</td><td>1</td><td>-5</td><td>-12</td><td>-18</td><td>-24</td><td>-30</td><td>-37</td><td>-43</td><td>-49</td><td>-56</td><td>-62</td></tr><tr><td>25</td><td>1</td><td>-6</td><td>-12</td><td>-19</td><td>-25</td><td>-32</td><td>-38</td><td>-44</td><td>-51</td><td>-57</td><td>-64</td></tr><tr><td>30</td><td>0</td><td>-6</td><td>-13</td><td>-20</td><td>-26</td><td>-33</td><td>-39</td><td>-46</td><td>-52</td><td>-59</td><td>-65</td></tr><tr><td>35</td><td>0</td><td>-7</td><td>-14</td><td>-20</td><td>-27</td><td>-33</td><td>-40</td><td>-47</td><td>-53</td><td>-60</td><td>-66</td></tr><tr><td>40</td><td>-1</td><td>-7</td><td>-14</td><td>-21</td><td>-27</td><td>-34</td><td>-41</td><td>-48</td><td>-54</td><td>-61</td><td>-68</td></tr><tr><td>45</td><td>-1</td><td>-8</td><td>-15</td><td>-21</td><td>-28</td><td>-35</td><td>-42</td><td>-48</td><td>-55</td><td>-62</td><td>-69</td></tr><tr><td>50</td><td>-1</td><td>-8</td><td>-15</td><td>-22</td><td>-29</td><td>-35</td><td>-42</td><td>-49</td><td>-56</td><td>-63</td><td>-69</td></tr><tr><td>55</td><td>-2</td><td>-8</td><td>-15</td><td>-22</td><td>-29</td><td>-36</td><td>-43</td><td>-50</td><td>-57</td><td>-63</td><td>-70</td></tr><tr><td>60</td><td>-2</td><td>-9</td><td>-16</td><td>-23</td><td>-30</td><td>-36</td><td>-43</td><td>-50</td><td>-57</td><td>-64</td><td>-71</td></tr><tr><td>65</td><td>-2</td><td>-9</td><td>-16</td><td>-23</td><td>-30</td><td>-37</td><td>-44</td><td>-51</td><td>-58</td><td>-65</td><td>-72</td></tr><tr><td>70</td><td>-2</td><td>-9</td><td>-16</td><td>-23</td><td>-30</td><td>-37</td><td>-44</td><td>-51</td><td>-58</td><td>-65</td><td>-72</td></tr><tr><td>75</td><td>-3</td><td>-10</td><td>-17</td><td>-24</td><td>-31</td><td>-38</td><td>-45</td><td>-52</td><td>-59</td><td>-66</td><td>-73</td></tr><tr><td>80</td><td>-3</td><td>-10</td><td>-17</td><td>-24</td><td>-31</td><td>-38</td><td>-45</td><td>-52</td><td>-60</td><td>-67</td><td>-74</td></tr></table></td><td>Y</td><td>QLD, AMSA</td></tr>
<tr><td>Glossary</td><td>Amendments made to the phases due to changes in 2.6.11</td><td>Uncertainty Phase - A situation wherein doubt exists as to the safety of an aircraft or a marine vessel, and of the persons on board.
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.
Alert Phase - A situation wherein apprehension exists as to the safety of an aircraft or marine vessel, and of the persons on board.</td><td>Uncertainty Phase - A situation wherein uncertainty exists as to the safety of an aircraft/vessel or persons.
Distress Phase - A situation wherein there is reasonable certainty that an aircraft/vessel or persons are threatened by grave and imminent danger or requires immediate assistance.
Alert Phase - A situation wherein apprehension exists as to the safety of an aircraft/vessel or persons.</td><td>Y</td><td>QLD, AMSA</td></tr>
</table>

NATSAR Manual – MEDEVAC Reference

NATSAR 43/2019

Finalised wording for the NATSAR Manual – December 2019 edition

The Joint Rescue Coordination Centre (JRCC) Australia is operated by the Australian Maritime Safety Authority (AMSA), a Commonwealth statutory authority established under the Australian Maritime Safety Act 1990. The International Convention on Maritime Search and Rescue 1979 requires parties to the Convention to provide (among other things) on request, medical advice, initial medical assistance and medical evacuation (MEDEVAC).

JRCC Australia will coordinate these services in the Australian search and rescue region (SRR). JRCC Australia will arrange medical advice through a dedicated Tele Medical Advice Service (TMAS).

The assessment by the TMAS doctor determines the type and level of medical assistance required. This includes when a person is deemed to be in grave or imminent danger and requires immediate assistance and medical evacuation. For search and rescue (SAR) purposes this is considered a “distress” incident.

If a MEDEVAC is required, the JRCC will determine the most appropriate way to safely remove and transport the casualty to a medical facility or a place where medical assistance can be provided. Considerations including, vessel type and facilities, time of day, on-scene weather, available assets, location (in particular distance offshore), requirements for accompanying medical staff and suitability for recovery of patient by helicopter, may all play a factor in determining the most appropriate MEDEVAC response.

Once the requirement for a MEDEVAC and the use of state and territory resources is confirmed JRCC Australia may, in consultation with Australian state and territory health organisations, transfer coordination of the medevac incident to the appropriate jurisdictional contact.

If on TMAS advice the person/s requiring evacuation life is not at risk, the circumstances would not require a medical evacuation for SAR purposes. In these circumstances, a medical transport of the person should be arranged as considered appropriate; assistance can be requested of JRCC Australia to identify suitable assets as required.