

Lesson 2

SEARCH AND RESCUE UNIT (SRU) DUTIES

Overview

Introduction

The SMC has several tools available to help develop the optimum search plan. Yet, the SMC's best laid plan, based upon the most accurate datum calculations and using the best resources available, will likely fail to locate and rescue the persons in distress, if the operators on scene do not perform the duties that apply to Search and Rescue units. You will have to utilize proper search techniques such as visual scanning for day and night searches and the use of electronic sensors.

Objectives

After completing this lesson, you should be able to:

- **SELECT** the appropriate SRU
 - **IDENTIFY** the duties that may be assigned to the SRU
 - **PERFORM** the procedures of the first SRU on scene.
 - **PERFORM** the assigned tasks of a Search Action Plan (SAP)
 - **STATE** the visual scanning techniques
 - **IDENTIFY** the electronic sensor search devices and their consideration
 - **COMPLY** with the night and reduced visibility search operation guidance
 - **STATE** the reason(s) for conducting a survivor debriefs
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References

The information in this lesson can be found in the following references:

1. Coast Guard Add, Sec. 1.2.3.1, 1.2.3.3, 3.4.2.1, 3.4.2.2, 3.4.2.3, 3.4.5, 3.9.5.7, H.5.1.2, App. C.1 and C.2
2. National SAR Supplement, Ch 1.18
3. IAMSAR Manual, Vol. III Chap 5.13 and App. G.1 – G.3
4. BOAT Manual, Vol. I, Part 2, Chapter 4, Sec A.3 and A.8
5. Boat Crew Seamanship Manual, Chap 4, Sec D
6. Coast Guard Air Operations Manual, Chapter 3, Section A
7. CG Regulations, 4-1-2

SRU Selection

SAR Briefing

SRU participation in a SAR mission begins with notification and briefing. For a planned search, whenever possible, the SRU should be briefed prior to departing. However, the urgency of the call may require a briefing while en route. This briefing shall, at a minimum, discuss the mission objective and all foreseeable hazards that might be encountered by the responding units.

In addition to the information stated in CG Addendum 1.2.3.1 and 1.2.3.3 make sure you obtain the following information:

- Location of emergency.
 - Nature of distress.
 - Number of persons onboard (POB).
 - Description of the craft.
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Resource Selection

Deciding which resource to use is one of the most critical decisions made in mission planning. An inappropriate choice may result in an inability to complete the mission or severely diminish the team's effectiveness. The following factors should be considered in SRU selection decisions:

- Expected distance to travel
 - Expected duration of the mission
 - Expected distance offshore (radar, GPS, communications)
 - Number of potential passengers / survivors and their conditions
 - Equipment status
 - Day/Night (radar and/or NVG desirable for night and search operations)
 - SRU speed
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Mission Planning – Boats

A full understanding of the goals of the mission and its likely duration are essential to determine the appropriate boat-mission match. Prior to getting underway, consideration must be given to the following:

- Boat limitations
- Boat readiness
- Boat capabilities
- Boat endurance
- Crew experience
- Weather limitations

SRU Selection

- Towing capabilities
 - Habitability for both crew and passengers
 - Ability for helicopters to safely hoist personnel and/or equipment
 - Damage control capabilities
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Mission Planning - Aircraft

Many factors must be considered in planning an aviation mission. Weather, airspace clearances, recovery bases, flight plans, and aircraft performance data are just a few. Some can be modified to suit the missions, and some, like the weather, are factors over which one has no control. Because of the complex interrelationship among planning factors, it is best to involve aviators in the operational planning. Mission planners should provide aviators with prioritized objectives, then let them determine how best to use the aviation assets to meet the objectives.

- Fuel – weight considerations, fuel management, fuel availability
 - Aircrew – alerting, minimum crew assignments, flight scheduling standards, and crew rest requirements
 - Environment – weather, temperature, air density, icing potential, turbulence, aircraft weight and configuration, runway conditions, etc.
 - Risk Management – emergencies, mission modification
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Mission Acceptance

CG Regulations 4-1-2, BOAT Manual, Part 2, Ch 3, Sec. B.5, and Air Ops Man, Ch 2, Sec E.2 and E3 are all worded a bit differently, we have worded it “**Mission Acceptance**” to put it into simple terms.

Accepting a mission is the responsibility and at the final discretion of the Coxswain, A/C Commander, or Officer in Charge / Commanding Officer on scene in accordance with the BOAT Manual, Air Operations Manual and Coast Guard Regulations and is hugely based on operation risk assessments.

SRU Duties

Crew Briefing

Informal crew briefings are required before the SRU gets underway / airborne. Briefings for the crew help create a shared mental picture of what is expected to happen and strives to set rules for the mission. The informal crew briefing shall be comprised of the following topics:

- Mission Objective - Include the mission objective, known information and risks regarding the mission, and the planned course of action.
- Duties and Responsibilities - Be specific in assigning duties and responsibilities. Do not let the crew have to second guess what needs to be done, or in special situations, how it should be done.
- Positive Climate for Teamwork - Establish a positive climate for teamwork. The crew is encouraged to double-check each other, point out errors, speak up when they have relevant information, and ask questions when they do not understand.
- Improvement Goals - Restate the goal for improving one or two weak areas in crew coordination. This goal was generated from a previous crew debriefing. Try to be as specific as possible in describing what is considered an improvement.
- Informal crew debriefings should be performed after most missions. The debriefing is the best opportunity to evaluate performance and recognize individual and team accomplishment. When correctly performed, the debriefing can serve as a valuable tool for continuous improvement. It can show the way from just 'doing things right' to knowing how to do "right things right".

SAR Operations

A SAR facility is any mobile resource used to conduct SAR operations, including designated SAR units (SRUs) that have the training and equipment necessary for proficient operations. An SRU may have SAR as a primary duty, or it may be made available for a SAR mission by a parent agency not having primary SAR duty.

Facilities selected to perform SAR missions need to be able to reach the scene of a distress quickly and be suitable for the following types of operations:

- providing assistance, e.g., escorting an aircraft or providing guidance on ditching, standing by a ship sinking or on fire;
 - conducting a search;
 - delivering supplies and survival equipment; and
 - rescuing survivors and delivering them to a place of safety and proper medical care.
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SRU Duties

Preparations – SRU crewmembers should make every effort to prepare for the search prior to arrival in the search area. Electronic navigation equipment should be prepared for use, with the search area boundaries, search pattern, and turning points input as waypoints. Direction finding, monitoring, and radios should be tuned to appropriate channels. Depending upon the resource used and the weather conditions, equipment necessary to perform the rescue should also be prepared for immediate use.

Searching en route – When there is a possibility that the search object is outside the assigned search area, searching while en route to the assigned search area is one way the SRU can increase the search area size. By posting lookouts while en route to and from the search area, effective track line searching can be accomplished and the results should be passed to the OSC and the SMC.

SAR facilities should contact the OSC about 15 minutes before arrival concerning estimated time of arrival (ETA), operational limitations, communications capabilities, search speed, and on-scene endurance.

If no OSC is assigned, SAR facilities should be coordinated directly by the SMC while on scene. SAR facilities should normally:

- Execute search or rescue action plans, and afterwards report to the OSC the area searched, ceiling, visibility, wind, and search results, including results of any electronic searches.
- Maintain communications with the OSC until released by the OSC.
- When survivors are sighted, promptly advise the OSC of the position, survivor identity and physical condition, wind, weather, sea conditions, and remaining endurance on scene. Signal to the survivors, keep them in sight and affect a rescue if possible. If a rescue is not possible and the facility must depart, note survivor position precisely, and mark if possible.
- When wreckage, debris, empty lifeboats or life rafts, oil slicks, sea dye marker, flares, smoke, or any unusual object is sighted, inform the OSC of the position, nature of the sighting, concentration of multiple objects, wind, weather and sea condition, and evaluation of the sighting.
- If a radio, radar, sonar, emergency signal, or survivor transmission is detected, advise the OSC of signal type, exact times; facility position,

On-Scene Procedures

First SRU On-scene / Initial Response

Without specific tasking from the SMC, you should report on scene conditions to the SMC and prepare for your initial search. When preparing for an initial search, the first SRU on scene should follow the guidance provided in sections 3.4.2.2 and 3.4.2.3 of the Coast Guard Addendum.

On Scene Procedures

Reporting the weather – Sea height and wind speed effect sweep width and track spacing. You should report the on scene weather conditions to the OSC/SMC as you start your search and report any weather changes as your search progresses.

Datum Marker Buoy (DMB)/Self Locating Datum Marker Buoy (SLDMB) – When necessary, the SMC will instruct one of the SRUs to deploy a DMB/SLDMB to measure water current. If tasked to deploy a DMB/SLDMB, make sure you report the time and position where it was inserted, along with the frequency. If you don't have an actual DMB/SLDMB, you can improvise by inserting a fender or a life ring, or any other object that would not be affected by winds. A strobe light should be attached to the improvised DMB to aid in relocation.

Distress Signals – A distressed vessel has a limited number of VDS, if any at all, and experienced mariners usually do not activate these signals until they actually see or hear an SRU. You should consider the use of audible signals such as an air horn or whistle when searching for survivors. Pyrotechnic devices may be used to make the SRU's presence known to the distressed vessel. Any signal used, whether visual or audible, must not be mistaken by other SRUs as a distress signal.

Aural searches – Surface SRUs should make every effort to reduce background noises, and consider stopping the engines, if safe, to permit faint calls for help to be heard. When searching, if possible, scanners should be posted away from the engines and radios.

Reports – SITREPs (normally over the radio) inform “UP” the chain of command. They should be sent to the SMC upon arrival on scene and whenever important information needs to be passed. SITREPs should be made a minimum of once daily. Operations and position reports should be made on a regular basis, normally every 30 minutes for small boats and multi-engine fixed wing aircraft and every 15 minutes for helicopters and single-engine fixed wing aircraft. Cutters will follow local communications plans. Strict radio discipline is needed to ensure information is quickly passed and received.

Remain on track - Stay focused. What are you out there doing? Searching! Not just navigating through a search pattern.

Search Action Plan

SAP

After an attainable search action plan is developed for accomplishment by the OSC and facilities on-scene, it is provided to them in a search action message. Potential parts of the message are given below. An example of a search action message is provided in Appendix c of the CG Addendum. The message should include a situation summary of the on-scene situation, including the nature of the emergency, the last known position, search object description, types of detection aids and survival equipment which survivors may have, present and forecast weather, and search facilities on-scene. The message should include a listing of the search area(s) and sub-areas that can be searched by the search facilities in the allotted time. The message should assign primary and secondary control channels, on-scene, monitor and press channels, and special radio procedures, schedules, or relevant communication factors.

SAP Sections

The message normally includes six parts:

- **Situation:** includes a brief description of the incident, position, and time; number of persons on board (POBs); primary and secondary search objects, including the amount and types of survival equipment; weather forecast and period of forecast; and search facilities on-scene.
 - **Search area(s):** present in column format with headings for area, size, corner points, other essential data.
 - **Execution:** present in column format with headings for area, search facility, parent agency or location, pattern, creep direction, commence search points, and altitude.
 - **Co-ordination:** designates the SMC and OSC; search facility on-scene times; track spacings and coverage factors desired; OSC instructions, such as on the use of datum marker buoys; airspace reservations; aircraft safety instructions; search facility change of operational control information if pertinent; parent agency relief instructions; and authorizations for non-SAR aircraft in the area.
 - **Communications:** prescribes control channels; on-scene channels; monitor channels; method to identify OSC and search facilities (such as radar transponder codes); and press channels.
 - **Reports:** requirements for OSC reports of on-scene weather, progress, and other SITREP information; and for parent agencies to provide at the end of daily operations, such as sorties, hours flown, hours and area(s) searched, and coverage factor(s).
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Search Action Plan

SAP Modifications

You should make every effort to follow the SAP. When the SAP needs to be modified, report the problem to the OSC/SMC, along with a recommendation to correct the problem. Situations that may require a SAP to be modified include:

- Hazards to navigation in the search area;
 - Insufficient water depth;
 - Inappropriate track spacing based upon prevailing weather conditions;
 - Position of the sun in relation to the scanners.
 - Sea / Swell direction (riding in the trough)
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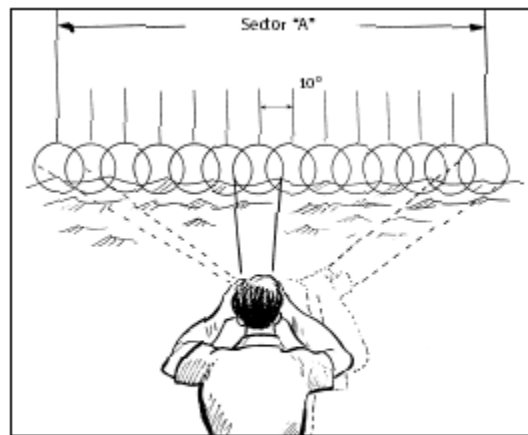
Scanning Techniques

Scanning techniques

Effective scanning is accomplished with a series of short, regularly spaced eye movements that bring successive areas of the ground or water into the central visual field. Each movement should not exceed 10 degrees. Each area should be observed for at least two seconds, plus time to refocus if necessary.

Although horizontal back-and-forth movements are preferred by most scanners, each scanner should develop the scanning pattern that is most comfortable and then adhere to it. Effective scanning patterns involve the block system; the viewing area is divided into segments and the scanner methodically scans for the search object in each block in sequential order:

- Side-to-side scanning method:
 - Start at the far left of the visual area,
 - Make a methodical sweep to the right,
 - Pause very briefly in each viewing block to focus the eyes,
 - At the end of the scan, repeat.
- Side scanners in aircraft should scan from bottom to top and then top to bottom to avoid longer times for refocusing and allow the forward motion of the aircraft to move their field of vision along the track.
- Know what your track spacing is and only search out to that distance.



Scanning Techniques

Sightings

During a large-scale, open-water search, many objects other than the search object may be sighted. Diverting from the search to identify such objects diminishes the uniformity of the search and reduces the overall POD. To avoid this, diverting from the search pattern is not recommended unless survivors are sighted or the object will not be located on subsequent search legs.

When the search object has been located, the SMC (or the OSC or master or pilot-in-command of the SAR facility as the case may be) must decide on the method of rescue to be followed and the facilities to be used. The following factors should be considered:

- action taken by the sighting craft and the SAR action which can be taken by other craft on-scene;
- location and disposition of the survivors;
- condition of survivors and medical considerations;
- number of persons reported to be on board the distressed craft and the number who have been located;
- environmental conditions, observed and forecasted;
- available SAR facilities and their state of readiness (to reduce delay, the SAR facilities which are likely to be used should be alerted and deployed to a suitable location while the search is in progress);
- effect of weather conditions on SAR operations;
- time of day (remaining daylight) and other factors relating to visibility; and
- any risks to SAR personnel, such as hazardous materials.

When the search object has been located, ensure that the search facility understands that the rescue of survivors may be even more difficult and hazardous than the search.

Identification

The search facility should indicate to the survivors that they have been sighted, by any of the following methods:

- flashing a signaling lamp or searchlight; or
 - firing two, preferably green, signal flares a few seconds apart; or
 - if the search facility is an aircraft, the pilot may be able to fly low over the survivors with landing lights on or rocking the wings.
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Scanning Techniques

SRU Unable to perform the rescue

If the search facility is unable to affect an immediate rescue, ensure that it knows it may consider other steps such as:

- dropping communications and survival equipment;
- keeping the distress scene in sight at all times, thoroughly surveying the scene and accurately plotting its location, and marking it with a dye marker, smoke float or floating radio beacons;
- reporting the sighting to the SMC with available information on:
 - time of sighting \pm time zone to be specified;
 - position of the search object;
 - description of the distress scene;
 - number of sighted survivors and their apparent condition;
 - apparent condition of the distressed craft;
 - supplies and survival equipment required by survivors (in general, supply of water should take priority over that of food);
 - all messages, including radio transmissions, received from survivors;
 - weather and, if applicable, sea conditions;
 - type and location of nearby surface craft;
 - action taken or assistance already given, and future actions required;
 - remaining fuel and on-scene endurance of search facility or land facility making the report; and
 - apparent risks involved in the rescue, including hazardous materials.

Electronic Sensor Searches

For information and guidance on types of electronic search devices refer to Chapter 3.4.6 in the Coast Guard Addendum.

Night and Reduced Visibility Searches

Reduced visibility, either due to night or weather, significantly reduces the effectiveness of a search, particularly for objects which are not readily located using radar or other electronic sensors. For planning and conducting searches during night or under otherwise reduced visibility conditions, refer to Chapter 3.4.5 in the Coast Guard Addendum for guidance.

Survivor Debrief

Survivor Debriefing

SAR case studies provide opportunities to analyze survivor experience and also lifesaving equipment performance. Survival in hostile environments is affected by many variables including the physical condition of the survivors, action of the survivors, reinforcement given by rescue resources prior to rescue, and safety or survival equipment. Further information and guidance on survivors debriefs can be found in Chapter 3.9.5.7 in the Coast Guard Addendum.
