

CASARA Spotter/Air Observer

MILITARY SPOTTER GUIDE

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Note: This is not an official CASARA document. Training staff may find it useful, however, for preparing CASARA members for the military spotting role.

GENERAL INFORMATION

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CONTENTS

1.0	The Role of CASARA Spotters On Military Aircraft.....	5
2.0	Personal Readiness and Preparation	5
2.1	Am I Good-to-Go? Personal Preflight Checklist	
2.2	Clothing	
2.3	Basic Survival Gear	
2.4	Overnight Bag	
3.0	General Mission Flow.....	10
3.1	Briefing and Departure	
3.1.1	Arrival and Sign-In	
3.1.2	Ground Briefing	
3.1.3	Boarding the Aircraft	
3.1.4	On Board	
3.1.5	Transit to Search Area	
3.2	Search Phase	
3.2.1	Initial Electronic Search	
3.2.2	Visual Search	
3.3	Rescue Phase	
3.3.1	SAR Tech Priority	
3.3.2	Rescue Elements	
3.4	Return and Debriefing	
3.4.1	Disembarking	
3.4.2	Debriefing – Training Flights	
3.4.3	Debriefing – SAR Actual Flights	
3.4.4	Signing Out	
4.0	Spotting Protocols.....	17
4.1	Scanning	
4.2	Calling the Aircraft Around	
4.3	Confirming or Dismissing a Target	
4.4	Spotter Effectiveness	
4.5	Over Water Searches	
4.6	Night Searches	
4.7	Seat Rotation Protocol	
5.0	Next Steps	25

REFERENCES

IMPORTANT NOTE:

This guide is meant to supplement the unit's primary spotter training materials (e.g. CASARA Training Manual, and/or "The Eyes of Life"). It does not provide in-depth information on spotting techniques, nor does it discuss the roles and responsibilities of CASARA crewmembers or the training required to qualify as a spotter and maintain currency.

Instead, this guide is intended to introduce CASARA volunteers to spotting on board military aircraft, and to provide reference material for recurrent training. Since this guide was written within the Trenton SRR, the majority of the references are relevant to the CC-130 Hercules aircraft. Much of the information is still applicable, however, to CASARA spotters in other SAR regions or flying on other types of military aircraft.

It should be noted that spotting and aerial observing techniques may be revised periodically, and that the protocols for CASARA members volunteering as spotters on board military aircraft may also be subject to change. Therefore, for any training or operational missions, the on-scene direction given by military or designated CASARA personnel responsible for CASARA volunteers will be considered definitive, and supersede the content of this guide.

LIST OF ACRONYMS/ABBREVIATIONS:

AGL	above ground level
CASARA	Civil Air Search and Rescue Association
CC-115	Canadian Forces designator for the Buffalo, a twin-engine high wing turboprop aircraft
CC-130	Canadian Forces designator for the Hercules, a 4-engine high wing turboprop aircraft
CH-149	Canadian Forces designator for the Cormorant, a military version AW 101 helicopter
CH-146	Canadian Forces designator for the Griffon, a military version Bell 412 helicopter
CLA	creeping line ahead (search pattern)
ELT	emergency locator transmitter
ERO	engines running onload (or offload)
FOD	foreign object damage
GPS	global positioning system
ID	identification
JRCC	Joint Rescue Coordination Centre (e.g. Victoria, BC – Trenton, ON – Halifax, NS)
LKP	last known position
MLM	marine location marker
MRSC	Maritime (Marine) Rescue Sub-Centre (e.g. Québec, QC – St. John's, NL)
NOCL	Notice of Crash/Casualty Location
NVGs	night vision goggles
OPI	office of primary interest
RTB	return to base
SAR	search and rescue
SAR Actual	a term used to describe a bona-fide SAR tasking – i.e. not a training activity
SAR Tech	Search and Rescue Technician (Canadian Forces SAR specialist)
SKAD	survival kit, air-droppable
SME	subject matter expert
SRR	Search and Rescue Region (e.g. Victoria, Trenton, Halifax)
SRU	search and rescue unit (e.g. military or other resource assisting with a SAR mission)

1.0 THE ROLE OF CASARA SPOTTERS ON MILITARY AIRCRAFT



In addition to providing its own aircraft, ground vehicles, and trained crews, the Civil Air Search and Rescue Association (CASARA) also supports the Canadian Forces in its domestic search and rescue duties by providing spotters to serve on board military aircraft.

From your experience as a CASARA spotter on light aircraft, you know that visual searching requires intense concentration and discipline, and can quickly lead to fatigue. On a typical search, a Canadian Forces SAR aircraft may be airborne for several hours over land or water, day or night. In this case, trained civilian volunteers can provide a critical service by sharing spotting duties with the military SAR specialists on board.

As always, being a CASARA spotter brings great responsibility. The term “The Eyes of Life” is sometimes used to describe spotters, since their visual searching skills may in fact mean the difference between life and death to a person in distress. Every time you fly, it is therefore important that you are committed to doing your job effectively, professionally, and with absolute attention to detail.

At first, working on a military aircraft, and verbally guiding the crew to fly over a target can be a daunting task. The aircraft will likely be much larger and faster than anything you have flown in as a CASARA spotter. The environment inside the aircraft will be unfamiliar, and it is not unusual to feel somewhat hesitant giving directions to the pilots of a military aircraft.

Participating in CASARA military spotter training is therefore very important. During a training flight you will become familiar with the working environment inside the aircraft; the roles of the crew; the flight characteristics and maneuverability of the aircraft; how to do your job; and how you as a CASARA spotter fit into the team. You will become more comfortable and skilled with your spotting duties on each subsequent flight. And of course, being part of the team on board a Canadian Forces SAR aircraft can be a very rewarding and enjoyable experience.

2.0 PERSONAL READINESS AND PREPARATION

2.1 Am I Good-to-Go? The Personal Pre-Flight Checklist

Being ready to do a professional job is an important part of your role as a CASARA spotter. By accepting a training flight or an actual SAR mission, you are confirming that you are ready and able to perform to the best of your abilities.

If you are not feeling well, or are recovering from some sort of injury (sports, backache, etc.), you won't be able to perform at your peak. Similarly, it will be difficult to focus if you are worried about missing work or an important family event. In these cases, you should decline a tasking. A military search and rescue unit will not break off a search for the sole reason of returning you to base, unless it is a medical emergency.

It is therefore a good idea to run yourself through the "I'M SAFE" checklist before committing to a training mission or a SAR operation. The original version of this checklist was developed by United States flight instructor J.C. Boylls for his student pilots, but has value for all aircrew:

- I Illness.** Confirm that you are feeling healthy, and not suffering from a headache, allergies, or other distracting symptoms. Flying will be especially uncomfortable if you have a head cold or blocked sinuses, and cannot adapt to rapid changes in air pressure.
- M Medication.** You should not be taking any medication that may impair your ability to act as a spotter. The side effects of many drugs, including cold remedies and anti-nausea pills, may impair your alertness, coordination, vision, and/or concentration. If you find that a medication has these side effects on the ground, they will probably be even more pronounced in the air. Check with your doctor.
- S Stress.** If you are under a great deal of stress at home or at work, it may affect your ability to focus on your duty as a spotter.
- A Alcohol.** The effects of alcohol on the body are magnified with altitude. Civilian pilots must maintain at least an 8-hour separation between their last consumption of alcohol and going flying, and spotters are encouraged to follow the same rule.
- F Fatigue.** A recent or chronic lack of sleep will affect your vision, your ability to process information, and your reaction time. These are critical skills needed for effective spotting. If you are tired, decline the tasking or training mission.
- E Emotional State.** Spotting requires concentration. If you are upset or preoccupied about something, it may be difficult to stay focused on the task at hand. The very nature of search and rescue operations -- attempting to locate people who may be lost, gravely injured, or dead -- requires in itself a certain level of emotional stability.

When you accept a SAR tasking, you are actually working for the person who is lost or in distress. You therefore owe it to yourself, to your fellow crewmembers, and to that person to ensure that you are in your best possible condition.

2.2 Clothing

Dress for the worst weather, climate, and terrain conditions that you may expect to encounter for the time of year. Keep in mind that while training flights will usually remain within a short flying distance of your home base, there is a chance that the aircraft may be diverted for an actual SAR mission, perhaps several hundred miles or more from where you started your

day. A summer's day in Southern Ontario may be very different than that same summer's day in Nunavut. You should always dress as though you will be working outdoors, not in a climate-controlled environment.

Similar to training or operational flights in CASARA aircraft, long pants and boots must be worn – no shorts, sandals, or light running shoes will be permitted. Dress in layers. Cotton jeans and track pants rate very poorly in terms of outdoor survival and should be avoided. Sunglasses (non-polarized, and without heavy tints that could distort colour) should be worn when appropriate, as they reduce glare and fatigue even on overcast days, and particularly when flying over water, snow, and ice.

In consideration of those who are working beside you in the confines of the aircraft, do not wear heavily-perfumed colognes, aftershave, hairspray, etc. These scents may irritate those who have allergies, and may make those suffering from nausea or airsickness feel worse.

An important note on FOD – Foreign Object Damage:

LEAVE YOUR JEWELLERY, LAPEL PINS, and SMALL CHANGE AT HOME.

Do not wear jewellery on board the aircraft (women and men), except for medical alert bracelets or pendants. Earrings tend to hurt when worn under headsets, and rings and bracelets can snag on objects in the aircraft interior, potentially causing injury to your hands and fingers.

Remove all metal or plastic badges and lapel pins from your clothing, and empty your pockets of loose change. Check for loose buttons, fasteners, etc. If you have small objects – such as the survival items noted in the next section – secure them inside pockets that are fastened by a zipper, Velcro closure, or buttons. Lost items, especially small ones, can get stuck in critical moving parts inside the aircraft, causing them to become damaged or jammed. Do not let *your* lost items be the cause of such an incident.

If you think you have lost something, do not hesitate to report it to a crewmember – they'd rather help you find it, than find it later as the result of an equipment malfunction.

2.3 Basic Survival Gear

Similar to flying in small aircraft, you should carry some basic survival gear on your person. Items stowed in backpacks or baggage will be of little use if a rapid exit from the aircraft is required. Suggested basic items include:

- pocket/survival knife (blade well-shielded)
- safety matches (i.e. *not* strike-anywhere matches) in sturdy container
- a compact foil personal survival blanket
- your prescription eyeglasses/contact lenses, as applicable
- any prescribed medications you require

Extra items could include things like a small headlamp, signal mirror, high-calorie energy bar, etc. Remember, though, that you must be able to stand or sit comfortably for several hours, and should not be weighed down with too much gear. Also, as with commercial flights, do not carry any material that would be deemed hazardous, such as flares or fire-starting cubes. Each military SAR aircraft is equipped with survival and First Aid equipment that can be used in case of emergency. These will be identified during the pre-flight briefing.

2.4 Overnight Bag

Although it rarely happens, circumstances such as weather, unscheduled mechanical inspections, or new search and rescue priorities may require a military SAR aircraft to divert to another airport. You may be faced with a long wait or even an overnight stay somewhere many hours from home.

While CASARA members will be reimbursed for hotel and accommodation expenses in such circumstances, you are required to come equipped with the basic personal items you require for an overnight stay, as well as cash or credit cards to cover up-front expenses. You must therefore bring a small backpack or duffle bag on board containing:

- your personal identification and your provincial/territorial Health Card;
- a credit card and/or sufficient cash to pay up front for your hotel room and meals [*you will be reimbursed later by CASARA for these expenses*];
- a change of clothes including socks and undergarments;
- basic toiletries and any vision care required (e.g. toothbrush, contact lens kit);
- any prescribed medication you may require for a few days;
- telephone numbers of people at work or home that you may need to contact to advise that you will be delayed.

Remember, however, to pack economically. Space for additional gear may be limited, especially if you are assigned to a military helicopter.

TIP: Keep a checklist with the contents of your overnight bag and personal survival gear close at hand, and ensure these items are readily available. This will help you respond more quickly and efficiently in the event you are called for a SAR Actual.

A Few Words About airsickness.

Airsickness is an inevitable companion for those who work on board aircraft. While most qualified CASARA aircrew are not prone to airsickness under normal conditions, even the most seasoned flyer may succumb from time to time.

Unlike most CASARA aircraft where each crewmember has his/her own window and the ability to see the horizon when the aircraft is turning or changing altitude, the only large windows in the rear of an aircraft such as the Hercules are the spotter windows (when installed). CASARA crewmembers waiting for their shift will often be sitting or standing well forward of the spotter windows, and will not therefore have a good visual reference point outside the aircraft.

These conditions can challenge the human body's ability to determine its position in space relative to the motion of the aircraft. Simply put, the motion-detecting systems in your inner ear are telling your brain that you are moving, but your eyes aren't able to keep track of, or "agree" with those perceptions. The result for many people is a feeling of discomfort and nausea.

How can I minimize my chances of becoming airsick?

- Eat a light meal *no less than* 3 hours before flying. That's right – an empty stomach is not in fact the best strategy for prevention. However, avoid consuming lots of dairy products and high-protein foods, and give very spicy or greasy meals a miss.
- Avoid smoking before flying . . . and of course, no drinking alcohol.
- Avoid watching or talking to someone who is airsick, as this alone may be enough to trigger a sympathetic reaction in some people.
- Ensure that you are well-rested and in good health ("I'M SAFE" checklist, section 2.1).
- There are prescription- and non-prescription medications available to prevent motion sickness, but some have side effects such as drowsiness, blurred vision, and reduced mental alertness – none of which are the qualities of a good spotter. If you take prescription medication, check with your doctor first, and describe in detail the requirements of your work as a spotter. Be sure any medication you take will not impair your fitness as a spotter.
- Certain people find accupressure treatment is effective – most commonly applied by a simple band worn around the wrist, available in some pharmacies and health stores.

What should I do if I begin to feel airsick?

- If you are in the spotter window, announce on the intercom that you need to be relieved, and rotate out (Section 4.7). You cannot be effective when you are airsick.
- Loosen tight clothing, and move to a cooler part of the aircraft near a fresh air vent.
- Sit down, facing front if possible, and look out a window toward the horizon.
- Ask for, and use, as many airsickness bags as you need. Being shy risks redecorating yourself or the aircraft!
- If you feel extremely ill, advise a crewmember.

Don't get discouraged if you get airsick on a training flight. Training flights are often far more nausea-inducing than actual SAR operations, since spotter after spotter is given the chance to turn the aircraft around simulated targets. This generally produces a flight that is characterized by constant turning and pitching. Actual SAR flights – especially if turbulence is light -- will generally be more comfortable for everyone on board.

3.0 GENERAL MISSION FLOW

The following section outlines the elements of a typical SAR mission using the CC-130 Hercules aircraft. Each individual mission will vary, however, depending on the SAR scenario, geographic location, type of aircraft in use, and operational profile.

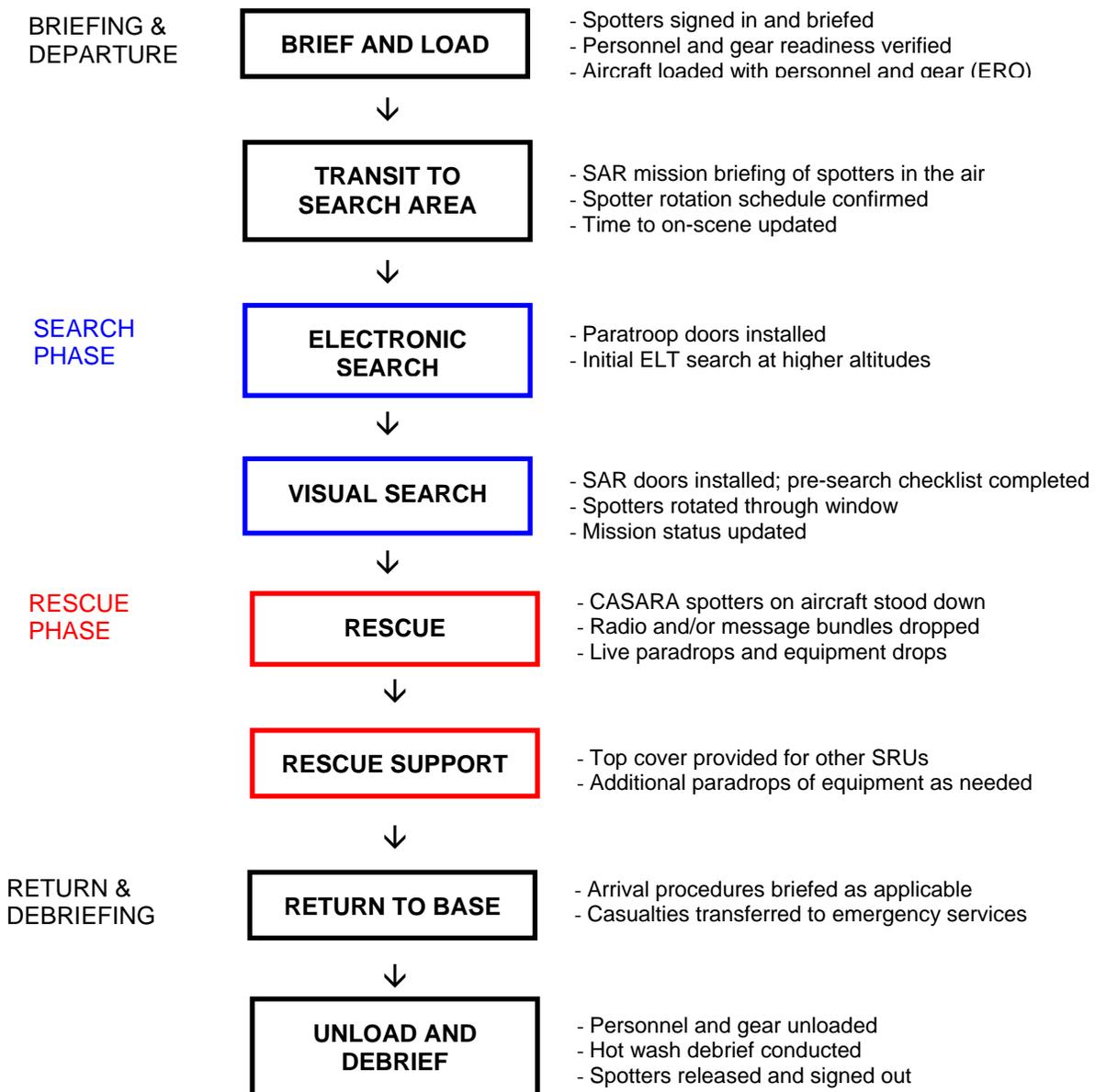


Fig. 1: Typical SAR Mission Flow, CC-130 Hercules aircraft

3.1 Briefing and Departure

3.1.1 Arrival and Sign-in

A meeting place, such as a hangar or airport service lounge, will be designated for briefing and sign-in. Be on time, but be sure to drive safely to this rendezvous point, particularly if you are called in for an actual SAR mission. You will definitely miss the flight if you get into an accident on the way to the airport. The information required during sign-in will include:

- your CASARA ID number, and/or the last 3 digits of your Social Insurance Number;
- your flying weight, including all clothing, boots, gear;
- your time of arrival (and later, departure);
- the name and contact information for your next-of-kin who may be contacted *that day* in the event of a prolonged delay or emergency.

3.1.2 Ground Briefing

Depending upon the nature of the mission – a training flight, or an actual SAR operation – there will usually be a briefing by a CASARA or military coordinator. Listen carefully and take notes for personal reference as required, paying particular attention to the size, colour, and shape of the search object. Once the primary briefing is complete, do not hesitate to ask questions if you have any uncertainty regarding the details of the mission. During this time, the coordinator will also verify that the spotters are properly dressed and equipped.

3.1.3 Boarding the Aircraft

Before you exit the airport building, the military or CASARA coordinator will advise what boarding procedures will be used. In some cases, you may be boarding a helicopter or fixed-wing aircraft that has one or more engines running. This allows for a quick turn-around time, and may sometimes be referred to as a “hot load”, or “engines running onload/offload” (ERO). Extra vigilance will be required.

The prop-wash from an operating fixed-wing aircraft or helicopter will be powerful. Ensure hats and all other loose items are stowed or secured before approaching the aircraft. Protect your eyes from dust, grit, and ice or snow particles that may be carried by the wind or prop/rotor wash. In winter, airport pavements may be slippery, so use extra caution particularly at night and in windy conditions. Follow the coordinator or ground attendant to the designated door or ramp that will be open for boarding. Take extra care when using an aft ramp, as head clearance on some types of aircraft may be limited.

TIP: Similar to a ship, things toward the front part of the aircraft where the cockpit is located are referred to as “forward”, and things toward the rear of the aircraft (tail) are referred to as being “aft”. It is rare, however, that you will hear the terms “port” and “starboard” used during air SAR operations. “Left” and “right” – from the perspective of the pilot – are used instead.

3.1.4 On Board

Personal gear.

Stow your personal gear where directed, including your overnight bag and any excess clothing such as winter parkas, etc. On some aircraft, carabiners (“D”-shaped rings with a spring-loaded opening) may be available to secure your bag to cargo webbing or similar attachment points. If you are not sure, ask.

Safety briefing.

Depending upon the type of aircraft, the Loadmaster (Hercules operations), SAR Tech, Flight Engineer, or other designated crewmember will provide the CASARA spotters with a safety briefing. Listen and watch attentively even if you have flown on that type of aircraft before, as procedures and locations of equipment may have changed. Ensure you understand how to fasten and adjust the seat belts in the crew seating area.

Moving around the aircraft in flight.

The protocols about moving around the aircraft once airborne will vary by type, and also according to the requirements of the crew and the mission of the day. At a minimum, you must be seated with your seat belt fastened during take off and landing, at all other times specified by the crew. When the crew gives the signal, you may get up and move around, although those not involved in active spotting should remain clear of the spotter windows.

Be aware that even on a seemingly calm day, unexpected jolts from turbulence may occur. The aircraft is also capable of making steep turns, which may catch you by surprise. Use caution when moving about, and choose handholds carefully. In the Hercules, for example, heavy steel cables may be strung overhead from fore to aft; these do not make good handholds as they are rough and may cut your hands.

On a training flight, there may be the opportunity to visit the cockpit either on the ground or while in flight. Follow the instructions of the supervising crewmember. Keep conversation to a minimum, particularly when the crew is actively involved in spotter training, or when they are busy with air traffic control. This is a great opportunity to see first hand how the cockpit crew operates, and the view they have from their stations relative to the view you have from the spotter’s seat (see Fig. 2).

Washroom facilities.

Washroom facilities on board SAR aircraft can usually be summed up as “limited”, particularly for female crewmembers. If it is not covered in the briefing, ask what facilities or arrangements are available. While it is important to remain properly hydrated during the flight, avoid drinking large quantities of tea or coffee (natural diuretics that may accelerate the need to urinate) before going flying. It is difficult to concentrate in the spotter window with a full bladder.

Who's Who: Canadian Forces SAR Aircraft and Crews

The crew complement on board Canadian Forces SAR aircraft may vary depending upon the type and configuration of the aircraft and the mission of the day. One of the officers on board will be designated the Aircraft Commander (AC); he or she may be one of the pilots or the navigator. One of the SAR Techs will also be designated the "Team Lead" for SAR operations.

A **CC-130 SAR Hercules** (fixed wing aircraft) will usually have seven (7) crewmembers:

Pilot	Cockpit (front seat – left)
Co-pilot	Cockpit (front seat –right)
Flight Engineer	Cockpit (middle seat behind pilots)
Navigator	Cockpit (nav station)
Loadmaster	Aft cabin
SAR Techs (2)	Aft cabin



A **CH-113 Cormorant** (helicopter) will usually have five (5) crewmembers:

Pilot	Cockpit (front seat – right)
Co-pilot	Cockpit (front seat – left)
Flight Engineer	Cockpit/hoist
SAR Techs (2)	Aft cabin



A **CC-115 Buffalo** (fixed wing aircraft) will usually have six (6) crewmembers:

Pilot	Cockpit (front seat – left)
Co-pilot	Cockpit (front seat –right)
Navigator	Cockpit (nav station)
Flight Engineer	Cockpit/cabin
SAR Techs (2)	Aft cabin



A **CH-146 SAR Griffon** (helicopter) will usually have four or five (4-5) crewmembers:

Pilot	Front seat – right
Co-pilot	Front seat – left
Flight Engineer	Cabin/hoist
SAR Techs (1 or 2)	Cabin



3.1.5 Transit to the Search Area

The spotter coordinator on board (SAR Tech or other designated person) will arrange spotters into shifts, either for training or for actual SAR missions. Take note of your position in the rotation and be ready for your shift. Once a rotation schedule is established, the spotters are usually responsible for executing shift changes without additional prompting from the crew. Section 4.7 describes the spotter rotation procedure in detail.

During the operational briefing, the SAR Tech will also indicate the planned search altitude and visual scanning range, and provide any additional details or instructions on how the search will be conducted and expectations of the spotters. The estimated time to on-scene/on-search will also be provided.

3.2 Search Phase

3.2.1 Initial Electronic Search

If the SAR flight is intended for the initial detection of the 121.5 or 406 MHz signal from an ELT or other emergency beacon, the search altitude for a fixed-wing aircraft such as the Hercules may range from 10,000 – 40,000 feet. The primary objective during this phase is the electronic detection of a distress beacon, rather than a visual search. It may be carried out day or night; in all flyable weather conditions; and at normal enroute cruise speed. In this configuration, the Hercules will normally have the two solid paratroop doors in place instead of the transparent SAR doors (spotter windows). See Figure 2.

3.2.2 Visual Search

In a SAR Hercules configured for visual searching, the paratroop doors will be replaced with clear Plexiglas-type SAR doors (spotter windows). Visual searches will often be conducted at 3000 feet AGL and below, and at a slower-than-cruise search speed. A pre-search checklist will be carried out by the crew to ensure all aspects of the aircraft and personnel are ready, including the spotters.

While the search is underway, spotters will rotate through the windows as scheduled and using the protocol detailed in section 4.7. On longer searches, rest breaks may include snacks or a light meal (e.g. box lunch). Updates from JRCC about the search object and/or lost persons may be forthcoming as the flight progresses, as well as information on any other search and rescue units (SRUs) that may have been tasked to the area.

Information on other SRUs working in the vicinity – especially light CASARA aircraft – may help distinguish them from transient aircraft or indeed from the search object itself. As a rule, the cockpit crew will be the first to detect and identify any nearby aircraft either visually, electronically, or through radio contact. If, however, a spotter sees an unidentified aircraft in close proximity to their SAR aircraft, or one which resembles the search object, this should be identified without delay over the intercom.

3.3 Rescue Phase

3.3.1 SAR Tech Priority

During a SAR Actual, if a possible target is identified it is critical that the SAR Tech(s) can get into the spotter window as rapidly as possible, and take over communications. The SAR Techs must be able to get a clear view of the target and coordinate with the cockpit crew. As a CASARA Spotter, do not feel in any way slighted by this. If the target is considered likely to be the search object, the rescue phase has begun, and the SAR Techs must have complete and unobstructed access to the interior of the search aircraft and their equipment.

Once the rescue phase is underway, your job as a spotter is complete, and you must now relocate quickly and safely to the forward portion of the cabin (or other area as designated). While the urge to watch the action unfold will be compelling, remain seated in your designated area and remain clear of all aisles and equipment. Spotters must not distract the SAR Techs and crew as they carry out this precise and demanding phase of the operation.

3.3.2 Rescue Elements

Depending upon the type of SAR aircraft, prevailing weather conditions, and the nature of the emergency, the rescue phase may involve a number of stages. In Hercules operations, the rescue phase may include some or all of the following elements:

- Communicating with the persons in distress by dropping a message bundle and/or two-way radio;
- Live paratroop deployment of SAR Techs into the site;
- Paratroop of gear (e.g. SKAD, pumps, medical equipment, sleds);
- Post-paratroop monitoring and coordination with the surface and JRCC;
- Providing top cover for a rescue helicopter or vessel tasked to the scene; and
- Subsequent paratroops of additional support equipment and/or personnel.

3.4 Return and Debriefing

3.4.1 Disembarking

When the aircraft has completed its mission and is preparing to return to base, you will be briefed on the landing and disembarking procedure. Obviously, if the aircraft is transporting casualties, the crew's first priority is to ensure they are transferred quickly and efficiently to emergency services on the ground. After landing, wait for a signal from the crew before undoing your seatbelt and getting up. As with boarding, all engines may or may not be shut down when you disembark (e.g. ERO). If the engines are still running, be ready for prop-wash or downdraft, and ensure all head gear, loose clothing and personal items are secured before leaving. Follow carefully the directions of the crewmember who is marshalling you, and be vigilant for slippery conditions on the airport ramp. Remember that head space may be limited when exiting some types of aircraft, and/or there may be a larger-than-average distance to step down onto the pavement below.

3.4.2 Debriefing - Training Flights

If you have just completed a CASARA spotter training flight, you will generally be debriefed by the supervising military or CASARA member as to your performance. There may also be a group debriefing to review common points. If you met the standard criteria, you will be declared “operational”, and may be called in future to serve as a military spotter during a SAR Actual.

If you are not declared “operational” at the end of the training session, do not be discouraged – it may simply be a matter of improving your skills and confidence in guiding the aircraft over a target. You may be able gain this experience through subsequent CASARA training flights, in advance of the next military spotter training opportunity.

3.4.3 Debriefing - SAR Actual Flights

The type and length of debriefing following a SAR mission will vary depending upon the situation. The debriefing may be carried out by a supervising crewmember, or by one of the staff in the search headquarters. The term “hot wash” may be used for this type of immediate after-action review of the mission and performance.

Be honest and complete with your comments. If you have second thoughts about something you saw, but didn’t identify as a possible target while in the spotter’s seat, now is the time to mention it if you have not done so before. Describe your possible sighting and try to identify the area as comprehensively as possible. While this is certainly not the optimal way of identifying a possible search object, going home without speaking up could deny the search effort what may be a critical piece of the puzzle.

3.4.3 Signing Out

Don’t forget to sign out before you leave, whether it is a training mission or an actual SAR operaton. If you leave and fail to sign out, this could cost the spotter coordinator valuable time and resources trying to establish your whereabouts. This is particularly undesirable during a major search operation.

4.0 SPOTTER PROTOCOLS

4.1 Scanning Techniques

The same basic scanning techniques you were taught in small aircraft apply to military SAR operations. Each line you scan should be comprised of several individual “snapshots” as your eyes move across the terrain, rather than one continuous sweep. Consult your unit’s training personnel if you need a refresher on spotting techniques.

Unlike a small aircraft, the purpose-built spotter positions in military SAR aircraft often have concave windows that permit a much larger field of view, particularly downward. For greatest search effectiveness, move your seat forward into the window to maximize your field of view. Adjust your scan to include the angle down and below the aircraft, as well as out to the limits of your assigned scanning distance.

Don’t forget to incorporate a regular glance backward to the rear or “six” position (see Fig. 3) to look for flares or other signals from people on the ground that might have been triggered by the aircraft passing overhead.

4.2 Calling the Aircraft Around

Calling a military aircraft around a target follows the same basic principles you have been taught in CASARA aircraft. However, there are some significant differences to consider:

- Unless you are assigned to a military helicopter that can slow to a hover, calling a much larger and faster aircraft around a target requires these principles to be applied with extra speed and efficiency.
- On larger fixed-wing aircraft such as the Hercules, the physical distance between the pilot and the spotter positions is much greater than in a light airplane. There may be as much as 15 metres (49 feet) between the pilot and your spotter’s seat. The cockpit crew will adjust for this, but be aware of this difference in perspective.

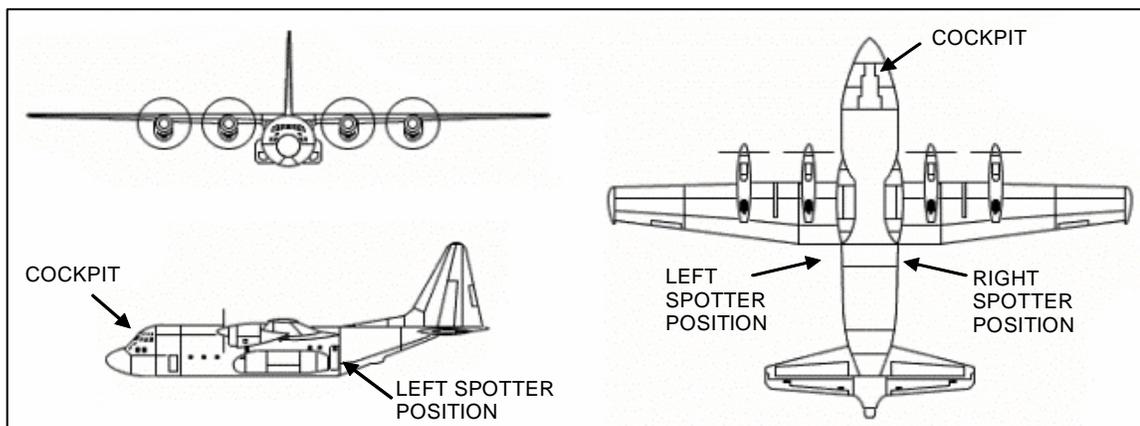


Fig. 2 – Relative position of spotter windows and cockpit, CC-130 SAR Hercules

Clock Positions.

Similar to spotting from small aircraft, clock positions are used to indicate the relative position of a target from the aircraft. See Figure 3.

- Spotters seated on the left side of the aircraft will be searching from 6 o'clock to 12 o'clock, with 9 o'clock at the centre point of their window;
- Spotters seated on the right side of the aircraft will be searching from 12 o'clock through to 6 o'clock, with 3 o'clock at the centre point of their window.

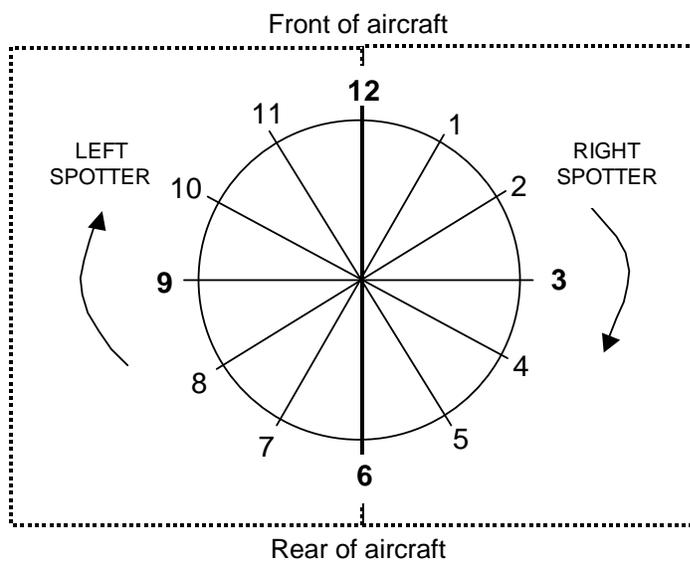


Fig. 3 – Clock positions covered by left and right spotters

Simulated targets: Training

During a training flight, the SAR Tech or other supervising crewmember will identify a target for the spotter to call the aircraft around on. It could be a barn, vehicle, rock outcrop, clump of trees, clearing in the bush, ice formation, etc. Ensure you are clear on what the SAR Tech has identified as a target; but be quick, as it will rapidly disappear from view if you are in a fast-moving aircraft. Keeping a finger on the target in the window as the aircraft manoeuvres may help you keep it in sight.

Spotter-Pilot Communications

Communications should be kept as short and efficient as possible. For example, there is no need to announce, “*Right spotter here, turn the aircraft to the right*”. Simply say assertively, “*Right turn*”. It is important, however, to communicate continuously with the crew to update the position of a target, and to describe where it is relative to other features on the ground. Getting the right balance and feel for

these communications will come with practice and with the observation and feedback from more experienced crewmembers.

Table 1 outlines the steps involved in guiding a search aircraft to a target – a procedure referred to as a “call-around”. It includes a sample dialogue that could be heard on the intercom between the pilot and the spotter, when describing the target depicted in Fig. 4 below.



Fig. 4 – Sample image from the spotter’s window on the right hand side of the aircraft (use in conjunction with Table 1 “Steps in a Typical Call-Around”).

Table 1: STEPS IN A TYPICAL CALL-AROUND

Key Elements	Sample Dialogue
<p>1 CALL THE TURN</p> <p>Get the aircraft turning so that the target is kept in sight, and that the aircraft can begin to fly toward it. Keeping a finger on the target as the aircraft manoeuvres may help keep it in sight.</p>	<p>SPOTTER: "Right turn".</p>
<p>2 GIVE POSITION AND DISTANCE TO TARGET</p> <ul style="list-style-type: none"> - Clock Position - Distance - Brief Description of Target 	<p>SPOTTER: "4 o'clock, about half a mile – I see a small patch of burnt orange trees and something white on the ground, on the shore of a lake."</p>
<p>3 TALK THE PILOT THROUGH THE TURN</p> <p>Update the clock position, distance, and rate of turn. Guide the pilot on the angle of bank (tightness of the turn) as required, to bring the aircraft toward the target.</p>	<p>SPOTTER: "Okay – keep the turn going, the target is now at our 3 o'clock, a quarter of a mile."</p> <p>"Good – level out now. Target is just coming through 2 o'clock".</p>
<p>4 DESCRIBE POSITION - FROM BIG TO SMALL</p> <p>Draw the pilot's attention to larger features and landmarks, and then work down to more detailed features and terrain.</p> <p>The pilot may also prompt the spotter with landmarks seen from the cockpit</p> <p>(e.g. "Where is it in relation to that major road?" "Is it on the far side of those power lines?" etc.)</p>	<p>SPOTTER: "Do you have the wishbone-shaped lake at 3 o'clock, within half a mile of the aircraft?"</p> <p>PILOT: "Affirmative".</p> <p>SPOTTER: "There's a very distinctive finger of land jutting out from the far shoreline."</p> <p>PILOT: "Roger"</p> <p>SPOTTER: "The target is at 2 o'clock now, immediately opposite that finger, on shore of the lake closest to the aircraft."</p>
<p>5 DESCRIBE THE TARGET IN DETAIL</p> <ul style="list-style-type: none"> - Colour - Shape - Proximity to other features 	<p>SPOTTER: "Yes – there's an irregular white object on the ground, right below a small clump of orange-coloured trees, on the near shore of the lake."</p> <p>PILOT: "Roger – we have it."</p>
<p>6 CALL "ON TOP" OF TARGET</p> <p>This call permits the aircrew to mark the target's location using the GPS. A countdown can help them anticipate when the aircraft will be overhead.</p>	<p>SPOTTER: "Stand by for 'On Top'".</p> <p>"'On Top' in three . . two . . one . . ON TOP NOW."</p>

4.3 Confirming/Dismissing a Target

During an actual SAR mission, do not take sole responsibility for dismissing what you think might have been a target. If you have any doubt as to what you've just seen from the spotter's window, call the aircraft around and permit the rest of the crew to take a closer look. That scorched stand of trees may simply be the result of a lightning strike, or the metallic debris at the edge of that field may just be a piece of old farm equipment -- but it is better to be sure and have a possible target confirmed or dismissed by another more experienced pair of eyes. Experienced spotters will know that only small sections of the search object may be visible due to factors such as terrain, vegetation, shadow, waves, ice, snowdrifts and/or the circumstances of the incident. Often it is just something that looks out of place – perhaps an unnatural shape or a brief flash of colour – that signals the location of the search object.

4.4 Spotter Effectiveness

During the visual search phase, it is important that spotters report any conditions that may downgrade their effectiveness and thus their probability of detecting the search object. This is also an important component when debriefing the search mission. Such conditions may include a low sun angle (e.g. dawn, dusk, high latitudes); reflections and glare off water or snow-covered surfaces; low cloud, fog, or haze, etc. It is possible that the aircrew may be able to amend their search pattern to improve the conditions for spotters, and therefore enhance the probability of detecting something on the ground. Also: Is the spotter window dirty or covered in condensation? There are materials available on board to clean the inside of the window if required.

4.5 Over-Water Searches

When flying over large bodies of water, objects sighted while on search may be difficult if not impossible to re-acquire on a call-around. Prior to an over-water search mission, the supervising SAR Tech may brief you on the use of Marine Location Markers or “MLM smokes”. These tube-like pyrotechnic devices are launched by hand through the smoke chute (flare tube) at the spotter's position. They ignite after contacting the water, and while floating on the surface produce a yellow flame and white smoke for a minimum of 12 minutes. When an object is sighted in the water, an MLM smoke should be deployed immediately. The smoke will mark the position while the aircraft is called around to re-acquire and identify the object.

4.6 Night Searches

Spotters and aircrews engaged in flight operations or visual searches during hours of darkness may often use equipment that enhances their night vision. This may include night vision binoculars or goggles (NVGs). CASARA spotters will be briefed on the use and care of night vision equipment prior to launching on a night search. During NVG operations on board an aircraft, interior and exterior lighting will be dimmed. Special care should be taken while moving about the aircraft under dimly-lit conditions, to avoid tripping over communications cords or other hazards, and injuring yourself or damaging equipment. Spotters on rest periods should not use flashlights or illuminate other sources of bright light as these can adversely affect the performance of NVGs, and momentarily blind crews.

4.7 Seat Rotation Protocol

If practical, the standard length of a spotter's shift will be 20 minutes. In an aircraft such as the Hercules, which can be airborne on a search for several hours at a time, it is desirable that spotters can be rotated through these shifts efficiently and without requiring a break in the search pattern.

At no point in time during a shift change must the scan of the search area be interrupted. To this end, a specific procedure has been established to rotate spotters in and out of the window which preserves the continuity of visual coverage. This seat change procedure is described in detail by the six steps illustrated in the next section of this guide.

- 1) Approach the spotter that is to be relieved from the cockpit (forward) side of the aircraft. Tap the spotter on the shoulder to alert them that a rotation has begun.
- 2) Still maintaining his/her scan, the spotter will move out of the chair toward the aft. As the relief spotter, you will now take your position in the chair.
- 3) Adjust the chair so that it is comfortable for you, and when settled, give the outgoing spotter a thumbs-up.
- 4) The outgoing spotter will pass you the communications cord. Plug in your headset, and request a radio check from the pilot. Start your scan.
- 5) Once you have received a positive communications check from the pilot, you are ready to release the outgoing spotter. Give him/her a second thumbs up. Maintain your scan throughout this period.
- 6) Once the outgoing spotter has received your second thumbs up, they he/she will depart the window and rest their eyes for the next shift.

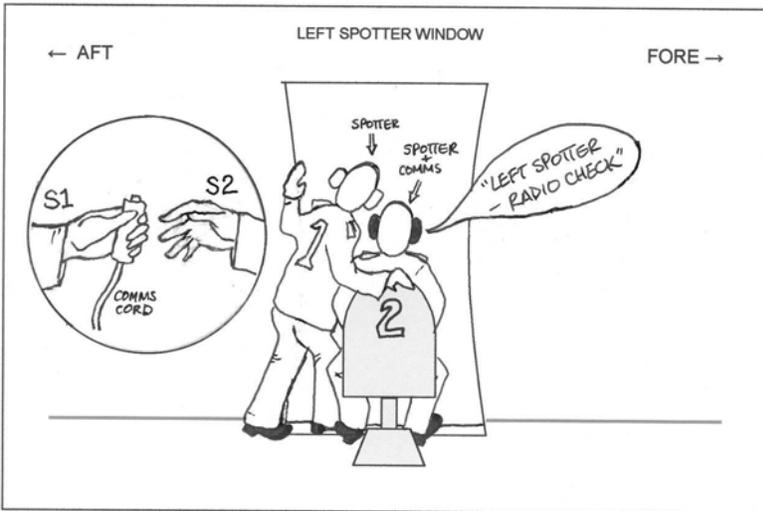
Once you are established in the window, the pilot will usually identify a landmark or object for you that will define the limit of your scanning range. This is often referred to as a "range check" or "scanning distance check". This is a very important tool to help you adjust your scan, and to ensure you are covering the full distance.

After you have been relieved by the next spotter, you should return to the designated standby area and rest your eyes, so that you can be ready and refreshed for your next shift in the spotter's window. Once a spotter rotation schedule is established by the supervising SAR Tech or CASARA coordinator, it usually becomes the responsibility of the spotters to manage and execute their own shift changes without prompting. Make a note of who you are scheduled to relieve in the spotter's chair. Be ready a little in advance, to ensure a smooth transition when their shift draws to a close.

	<p>Step 1:</p> <p>Spotter 1 (S1) is nearing the end of a shift.</p> <p>The relief spotter, Spotter 2 (S2) approaches S1 from the forward side of the chair.</p> <p>S2 taps S1 on the shoulder to signify the start of a rotation.</p> <p>S1 CONTINUES SPOTTING.</p>
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	<p>Step 2:</p> <p>S1 CONTINUES SPOTTING but moves out of the chair toward the aft. S1 also retains communications with the pilot.</p> <p>S2 moves into the chair and takes time to adjust it comfortably, and fasten the seat belt, as required.</p>
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	<p>Step 3:</p> <p>Once comfortable in the seat and ready to go, S2 signals this by giving a thumbs up, within S1's field of view.</p> <p>S1 CONTINUES SPOTTING and maintains communications with the pilot.</p>
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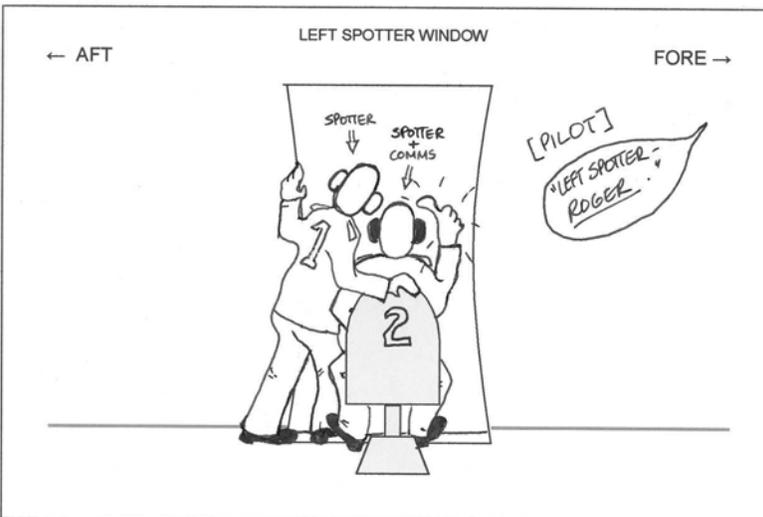


Step 4:

After receiving the first thumbs up, S1 passes the communications cord to S2.

S2 plugs in the headset, and requests a radio check from the pilot. S2 ALSO BEGINS SPOTTING.

S1 CONTINUES SPOTTING.

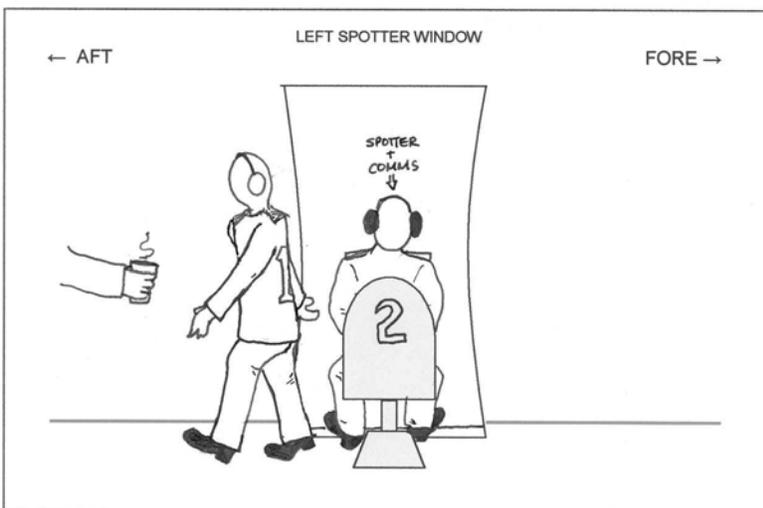


Step 5:

S1 CONTINUES SPOTTING. S2 CONTINUES SPOTTING.

If S2 receives a positive radio check from the pilot, all is set and ready to go.

S2 gives a second thumbs up to S1.



Step 6:

S1 is released from the window, and should rest until the next shift begins.

S2 CONTINUES SPOTTING, and has communications with the pilot. S2 is now the primary spotter.

5.0 NEXT STEPS

Only regular practice will permit you to develop your skills as a military spotter, and keep them sharp until your next training session or SAR mission on a military aircraft.

In the interim, when spotting from a CASARA aircraft or training simulator, the same principles will continue to apply:

- get the plane turning;
- give an initial clock position and distance to the target;
- briefly describe the target;
- pinpoint the location of the target by referring to landmarks from big to small; and
- over the intercom, keep updating the position of the target relative to the aircraft.

With the agreement of your CASARA crew during a SAR exercise, you can even simulate an “On-Top” call. And don’t hesitate to speak with your Chief Spotter, Training Officer, or other unit official if you have any questions about spotting techniques or protocols. You will find that your confidence and abilities will only improve with time and practice.

Volunteering as a military spotter with CASARA is an experience that can bring a great sense of satisfaction for a job well done. You will also be one very few Canadians who have the opportunity to fly on board Canadian Forces SAR aircraft; see their professional crews in action; and work with them as part of the team. But most of all, you will meet some very friendly and talented people, who share with you a dedication and commitment to search and rescue:

“So That Others May Live”.

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