U.S. Department of Homeland Security

United States Coast Guard

AUXILIARY AVIATION TRAINING MANUAL

COMDTINST M16798.5B

"Proud Traditions – Worthy Missions"

U.S. Department of Homeland Security
United States Coast Guard

Commandant
United States Coast Guard

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Subj: AUXILIARY AVIATION TRAINING MANUAL

1. PURPOSE. This Manual applies to all members of Coast Guard Forces who are involved with Coast Guard Auxiliary Aviation Operations, including Auxiliarists, and military and civilian personnel.

2. ACTION. Area and District Commanders, commanders of maintenance and logistics commands, commanding officers of headquarters units, assistant commandants for directorates, Judge Advocate General, and special staff offices at Headquarters shall ensure all Auxiliarists, all Directors of Auxiliary, and any military or civilian Coast Guard members who are involved with Auxiliary Aviation Operations become thoroughly familiar with this Manual. Internet release authorized.

3. DIRECTIVES AFFECTED. The previous edition of this Manual titled, the *Coast Guard Auxiliary Air Operations Training Text*, COMDTINST M16798.5A, is hereby canceled and should be recycled.

4. DISCUSSION. This Manual outlines techniques and training guidance necessary for effective operation of the Coast Guard Auxiliary Aviation Program. The Coast Guard Auxiliary has been a critical part of the Coast Guard's historic transition to the Department of Homeland Security (DHS), and the Auxiliary now assumes the role and responsibility as the Department's lead organization of dedicated volunteers. This Manual further sets the course for the ready, reliable, and relevant Auxiliary operational support of the full spectrum of Coast Guard missions, both traditional and new, and in a different and far more complex maritime security (MARSEC) environment. This new *Auxiliary Aviation Training Manual* should be reviewed in its entirety. Further information about the Coast Guard Auxiliary Aviation Program can be found on the Chief Director, Auxiliary web site at http://www.cgaux.info/g_ocx/. Where this Manual may conflict with the *Auxiliary Operations Policy Manual*, COMDTINST M16798.3, (series), the *Auxiliary Operations Policy Manual* takes precedence.

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5. MAJOR CHANGES. This Manual represents a major revision of the previous *Coast Guard Auxiliary Air Operations Training Text* promulgated 17 September 1993. Due to the extensive changes, units and individuals are encouraged to conduct a thorough review of the Manual. This edition of the Manual contains the following significant policy changes:

   a. Improved format of entire Manual to facilitate ease of use, including utilizing information mapping features, and reorganizing text.

   b. Inserted terms and definitions into various chapters.

   c. Expanded Crew Resource Management (CRM) material (*Chapter 3*).

   d. Included Risk Assessment Matrix material (*Chapter 3*).

   e. Improved human factors affecting flight safety (*Chapter 8*).

   f. Improved survival discussion and techniques (*Chapter 9*).

   g. Enhanced Maritime Domain Awareness (MDA) and Multi-Mission concepts (*Chapter 10*).

   h. Updated Search and Rescue (SAR) information (*Chapter 11*).

   i. Developed list of acronyms (*Appendix D*).

6. ENVIRONMENTAL ASPECT AND IMPACT CONSIDERATIONS. Environmental considerations were examined in the development of this Manual and have been determined to be not applicable.

7. RESPONSIBILITY. Commandant (G-OCX2), in coordination with G-OCA, CG-1131, and the Coast Guard Air Training Center, Mobile, is responsible for the content and upkeep of this Manual. Questions or concerns about the material contained in this Manual should be addressed to Commandant (G-OCX) at (202) 267-1001.

8. FORMS/REPORTS. Most of the forms mentioned in this Manual are stocked at the Auxiliary National Supply Center (ANSC). All forms are made available to any Auxiliarist through the Flotilla Staff Officer - Materials (FSO-MA) or secondarily, the local Director of Auxiliary (DIRAUX). Many of the forms are also available on the World Wide Web at the following address: http://www.uscgaux.org/~forms/forms.html.

D.W. KUNKEL
Director of Operations Capability

NON-STANDARD DISTRIBUTION:

All Auxiliary Operators
All Flotilla Commanders
Civil Air Patrol Headquarters (6 copies)
National Ocean Survey (2 copies)
Auxiliary National Supply Center (3 copies)

RECORD OF CHANGES

CHANGE NUMBER	DATE OF CHANGE	DATE ENTERED	ENTERED BY

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Chapter 1
Auxiliary Aviation Program Overview

Introduction

The Coast Guard Auxiliary Aviation (AUXAIR) Program was established by the Commandant of the Coast Guard to "assist the Coast Guard in any mission(s) or operations(s) authorized by law and authorized by the Commandant." (see *Auxiliary Aviation Program*, COMDTINST 16798.1 (series))

The U.S. Coast Guard Auxiliary Aviation Program is one of the operational programs within the Auxiliary framework. It has its own structure, separate from surface operations or communications, and is distinctive in that it is organized on a District basis without a parallel structure at the division or flotilla level. This is partly due to the unique nature of aviation, in that an aircraft facility is able to transcend flotilla and division geographic boundaries and, in many cases, an entire District's area in one flight.

In this Chapter

This chapter contains the following sections:

Section A. Program Organization

Introduction

This section describes the organization of the Auxiliary Aviation Program at the National and District levels. Auxiliarists wishing to participate in the aviation program should study and understand the program organization and function and the regulations which guide the program. Information on general Auxiliary administration and policy may be found in the *Auxiliary Manual*, COMDTINST M16790.1 (series). Operational program guidance and regulations are found in the *Auxiliary Operations Policy Manual*, COMDTINST M16798.3 (series).

These chapters include specific details of training and experience required for qualification as Auxiliary pilots and observers. This reference covers additional regulations for flight while acting "under orders" as Auxiliarists, along with safety and operational requirements.

While assigned by a Coast Guard unit commander to duty under orders, qualified and current Auxiliary pilots are considered Coast Guard pilots and approved aircraft are considered Coast Guard facilities. Ordered flights file a Federal Aviation Administration (FAA) or military flight plan designating the aircraft as "C Charlie - Coast Guard Aircraft". (see *Chapter 6*)

A.1. National

The structure of the Auxiliary Aviation Program is discussed in the *Auxiliary Aviation Program*, COMDTINST 16798.1 (series). This instruction establishes a National Staff for Aviation as part of the Operations Department. The Aviation Division consists of a Division Chief, Air Operations (DVC-OA). Serving on the Division Chief's staff is a Branch Chief (BC) for:

- Air Flight Surgeon (BC-OAA)
- Aviation Capabilities (BC-OAC)
- Aviation Management (BC-OAM)
- Aviation Recruitment (BC-OAR)
- Flight Safety (BC-OAS)
- Aviation Training (BC-OAT)
- Homeland Security Flight Operations (BC-OAH)
- Standards (BC-OAF)
- Special Projects (BC-OAP)
- Other positions as required

The Aviation division works directly with the Operation division (G-OCX2) in the Chief Director, Auxiliary office (G-OCX).

A.2. District

Success of the Auxiliary Aviation Program will be due in large part to coordination and liaison within the District structure with Coast Guard air stations, units and Sectors. Maintaining these important relationships and assisting these entities in joint training is essential to the Auxiliary Aviation Program's success.

At the District level, the Auxiliary Aviation Program is organized under a District Staff officer for Aviation (DSO-AV) and several Assistant District Staff officers for Aviation (ADSO-AV). **Figure 1-1** provides a typical District aviation organization. The District Flight Safety officer (DFSO) is an advisor to the aviation staff and to the District Commodore for safety of flight issues. The DFSO's responsibilities include working with the DSO-AV in evaluating the safety of District aviation programs and procedures, developing and implementing an aviation incident plan and being a member of the District Aviation Board. The DFSO reports directly to the District Commodore on these matters and on overall safety of Auxiliary flight issues. Further information on District staff positions is found in the *Auxiliary Manual*, COMDTINST M16790.1 (series).

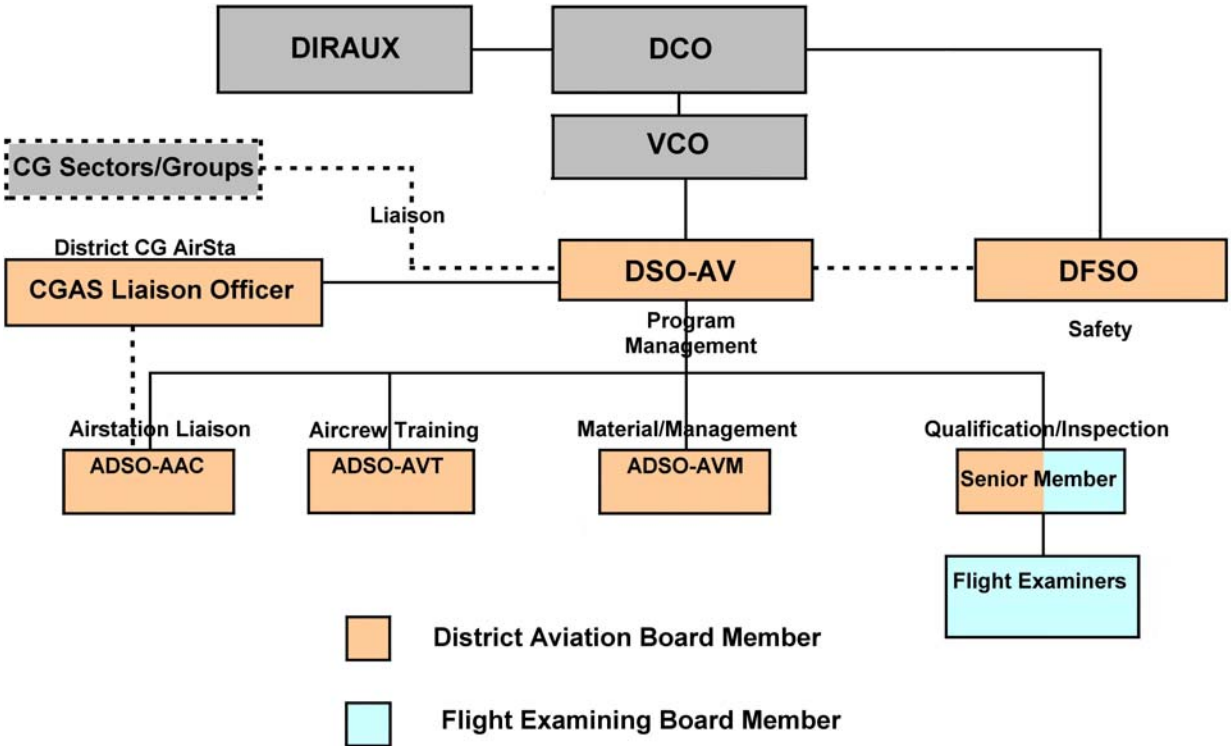


Figure 1-1
District Aviation Organization (Typical)

Section B. Program Support Requirements

Introduction

The mission of Auxiliary operations is to provide operational, logistical, and training support for appropriate Coast Guard programs. Auxiliary aircraft are most often used as observation and communication platforms. The decision to employ Auxiliary resources rests with the Coast Guard Operational Commanders. This section provides a brief description of Auxiliary Aviation Program support requirements and the Coast Guard missions for which they provide this support. Detailed descriptions of mission support requirements and the specific missions are discussed in the chapters referenced below.

B.1. Qualification Requirements

Pilots are required to be qualified and current for the mission. In the event that any mission occurs at night or in instrument meteorological condition (IMC), the *Auxiliary Operations Policy Manual*, COMDTINST M16798.3 (series), requires that in most circumstances there must be two instrument rated pilots at the controls.

While not a requirement for all missions, the pilot and crew should, whenever possible, be SAR capable. Whenever offshore flights are contemplated, the crew carries and/or wears water survival equipment appropriate to the aircraft type and water temperature. If Coast Guard personnel are carried on the flight, they do not automatically fulfill the requirement for qualified crew in a SAR or any other situation.

Refer to *Chapter 2* of this manual for a detailed description of qualification requirements for Auxiliary Aviation Program members.

B.2. Crew Resource Management/ Risk Assessment

It is the responsibility of the pilot-in-command (PIC) to complete a Coast Guard Auxiliary aviation (AUXAIR) Risk Assessment Matrix prior to the mission, and to revisit it during flight as conditions change. This information should be shared with the crew, who should participate in the process of determining the mission risk factors, and with the passengers when appropriate.

Refer to *Chapter 3* of this manual for a detailed description of crew resource management (CRM)/risk assessment.

B.3. Techniques of Observation

Refer to *Chapter 4* of this manual for a detailed description of techniques of observation Auxiliary flight crew members should follow to properly carry out air operation missions.

B.4. Observer and Air Crew Duties

Refer to *Chapter 5* of this manual for a detailed description of Auxiliary observer and air crew duties.

B.5. Communication/ Navigation

Refer to *Chapter 6* of this manual for a detailed description of communication/navigation procedures and equipment requirements.

B.6. Flight Environment

Refer to *Chapter 7* of this manual for specific flight environment operations, procedures, and missions.

B.7. Flight Safety

Refer to *Chapter 8* of this manual for a detailed description of flight safety concerns in Auxiliary air operations.

B.8. Emergency Landings and Survival

Refer to *Chapter 9* of this manual for a detailed description of emergency landings and survival.

B.9. Missions

Auxiliarists may be tasked by the Coast Guard or appropriate Auxiliary staff officers with missions in support of any authorized activity. These missions take many forms. When missions involve the movement of an Auxiliary facility (aircraft or surface vessel), they are termed patrols.

AUXAIR personnel participate in a number of Coast Guard missions as follows:

B.9.a. Multi-Mission Patrols

Most patrols are multi-mission in concept. Aircraft may be tasked with several simultaneous or sequential missions to be carried out on the same patrol. For example, while doing a maritime safety patrol:

- Coast Guard personnel can be taken onboard as part of an area familiarization mission.
- Training can be conducted with Auxiliary or Coast Guard vessels or radio stations.
- Observer or pilot trainees may be aboard as part of their training.
- Marine environmental or ice patrols may be conducted as part of the operation.

Some of the types of missions that are typically carried out in AUXAIR's multi-mission environment are as follows:

B.9.a.1. Maritime Domain Awareness and Maritime Safety Patrols

Maritime Domain Awareness (MDA) is a concept that underscores many of the missions of AUXAIR. MDA is not a mission of its own, but is an inherent part of virtually every activity in which operations is involved.

Refer to *Chapter 10* of this manual for an explanation of the flight crew's responsibilities in an MDA environment and in carrying out maritime safety missions.

B.9.a.2. Search and Rescue

Chapter 10 also contains detailed descriptions of the flight crew's responsibilities in maritime safety missions, including SAR and boating safety. *Chapter 11* of this manual describes certain policies, procedures, and practices for SAR prosecution.

B.9.a.3. Ports, Waterways, and Coastal Security	Auxiliary aircraft may be tasked with overflights of critical infrastructure areas to record and report information. The objective of these missions is to search for and report boaters in distress, obstructions to navigation, fires, or other disasters; and may include specific tasking to search for or identify vessels near bridges, in shipping lanes, in the approaches to harbors, or sensitive locations and/or to photograph such events and vessels. Refer to *Chapter 10* of this manual for a detailed description of Ports, Waterways, and Coastal Security (PWCS) missions.
B.9.a.4. Marine Environmental Protection	Auxiliary aircraft may be assigned missions to fly over channels or harbors to report pollution or oil or fuel spills. Auxiliary aircraft can assist Sectors in this mission by patrolling/observing harbors or other areas for unreported spills, and reporting their observations back to the applicable Sector. Refer to *Chapter 10* of this manual for a detailed description of the flight crew's responsibilities in carrying out marine safety (MS) and marine environmental protection missions.
B.9.a.5. Aids to Navigation	Coast Guard AUXAIR provides assistance to the Coast Guard and other concerned federal agencies in checking and verifying aids to navigation (ATON) and charting details, including reporting discrepant aids to navigation, verifying private aids, and submitting chart corrections/updates. Refer to *Chapter 10* of this manual for a detailed description of the AUXAIR flight crew's responsibilities in carrying out ATON missions.
B.9.a.6. Ice Reconnaissance	Auxiliary aircraft may be assigned missions to fly over channels or harbors to report ice conditions. Refer to *Chapter 10* of this manual for a detailed description of the AUXAIR flight crew's responsibilities in carrying out the ice reconnaissance mission.
B.9.a.7. Area Familiarization	Auxiliary aircraft provide excellent resources for familiarization of a Coast Guard unit's area of responsibility (AOR). Commanding officers (COs) may request that personnel at Coast Guard Groups, Sectors, other units, or cutters, travel as passengers or crew aboard Auxiliary aircraft for area familiarization purposes. Refer to *Chapter 10* of this manual for a detailed description of the AUXAIR flight crew's responsibilities in carrying out area familiarization missions.
B.9.a.8. Photographic Missions	Auxiliarists are encouraged to carry digital cameras on patrols, since photographs of areas of interest are of great assistance in Homeland Security of harbors, pollution spills, vessel traffic, public relations events, and environmental concerns. Refer to *Chapter 10* of this manual for a detailed description of the AUXAIR flight crew's responsibilities in carrying out photographic missions.

B.10. Other Missions

Auxiliary aircraft may be used for any mission deemed appropriate by the Order-Issuing Authority (OIA), as long as the mission is not in violation of the regulations set forth in the *Auxiliary Operations Policy Manual*, COMDTINST M16798.3 (series), or the current Federal Aviation Regulations (FAR). Some of these other missions include:

B.10.a. Logistics Flights

The Auxiliary Aviation Program is often tasked with transport of personnel or equipment both within a District and across its boundaries. There are specific requirements in the *Auxiliary Operations Policy Manual*, COMDTINST M16798.3 (series), for passenger transport flights, especially where IMC (flight into IMC) may be encountered. There are also specific regulations concerning flights and arrival times into military fields. In times of local disaster or emergencies (flood, storms, earthquake, etc.), the use of Auxiliary aircraft may be requested by outside agencies. Only the District commands and/or Coast Guard air station may approve such use. (see the *Auxiliary Operations Policy Manual*, COMDTINST M16798.3 (series))

Refer to *Chapter 12* of this manual for a detailed description of the AUXAIR flight crew's procedures in carrying out logistics flight missions.

B.10.b. Regatta Support/Safety Zone Support

Regatta support/safety zone support missions are conducted by AUXAIR to provide an overview of marine events and check for the presence of hazards or of vessels entering into "safety zones".

B.10.c Exercise Support

Auxiliary aircraft may be deployed on actual or practice Coast Guard or defense and non-defense exercises. In some cases Auxiliary aircraft serve as "targets" for detection and intercept, in others the AUXAIR asset will provide support for the exercise through observation or transport.

B.11. General Mission Requirements

Prior to takeoff, the crew will contact the Coast Guard unit authorizing the mission to confirm takeoff time and to request last minute tasking instructions. In the more complex PWCS missions, each of the Sectors in whose AOR the flight will take place will be contacted prior to the mission, tasking instructions requested, and SAR capability advised. This communication will help to ensure that the Coast Guard is aware that an Auxiliary facility will be in the air and whether it can be called upon for SAR.

B.11.a. Diversion to Other Missions

Pilots and crews must keep in mind that aircraft and crews may also be diverted to other missions, such as SAR or marine environmental protection (MEP), by the OIA. It is important to keep track of fuel usage and flight time to quickly evaluate the ability of the crew and aircraft to acceptance a SAR mission.

B.11.b. Pilot-in-Command Responsibilities

In all cases of diversion from the original mission, it is the responsibility of the PIC to ensure the facility and crew are equipped and trained for the new mission, and they review the Risk Assessment Matrix to ensure their capacity to complete the new mission safely.

The PIC must ensure the following are considered:

- Fuel levels should be assessed.
- Personal protective equipment (PPE) should be adequate to the environmental conditions.
- Pilot qualification level and crew experience should be correct for the task.
- Crew briefing requirements for the new mission.

B.12. Reporting Requirements

It is essential for Auxiliary flight crews to document all flight missions. The following reporting requirements apply.

B.12.a. Patrol Log

The PIC will normally designate one of the crew to maintain a Patrol Log (see **Figure 1-2**). During the patrol, the designated crew member completes this log to document observations made, the time and location of observations, and latitude and longitude (or geographical location) of any event and of radio reports made.

This log is maintained during all flights, logging key data to record all mission actions. An example of a Patrol Log is provided in **Figure 1-2**. Other formats may be used, provided the required information is recorded. Information collected on the log should include the following:

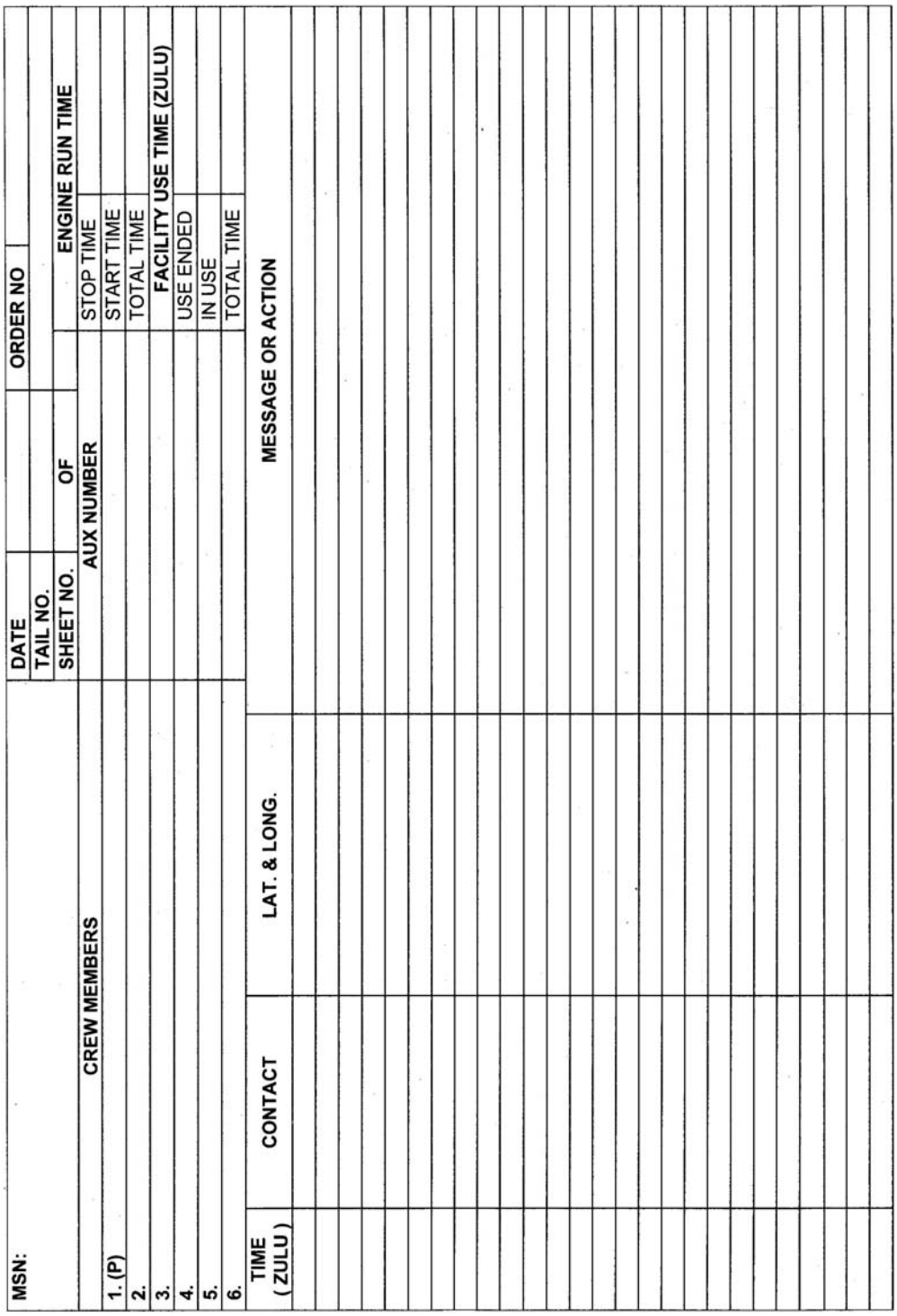
- Registration "N" number of the aircraft along with the date and patrol order number
- Names and Auxiliary member (EMPID) numbers of all persons onboard
- Engine start time
- Time of takeoff
- Point of takeoff
- Time and critical data for every communication or status message
- Name and time of touch down of any airports at which that the aircraft lands
- Time of departure from that airport
- When on a SAR:
  - Time that the aircraft arrives in the search area
  - Distance from the takeoff point to the search area
  - Time and location of ANY significant sighting
  - On-scene weather (including ceiling, wind speed and direction, visibility, wave heights, and direction of wave movement)
  - If search object is located, log time on-scene and time departing scene
  - Time the aircraft departs the scene of the search
  - Areas searched including altitude and track spacing used
  - Hours on the search
- Engine stop time
- Total hours flown

This information is necessary for after-mission follow-up for the Coast Guard to prepare its situation reports (SITREPS) and for the Auxiliarists to properly log their flight time.

B.12.b. Post-Mission Report

Following the mission, the crew confirms that they have returned, prepares a Post-Mission Report, and submits it to the authorizing Coast Guard unit(s). Information obtained in the Patrol Log is used to construct this report.

Photographs of major items of interest are very useful additions to mission reports. The crew should consider carrying a digital camera and should consider including photographs with the Post-Mission Report.



MSN:		DATE		ORDER NO	
		TAIL NO.			
		SHEET NO.	OF		ENGINE RUN TIME
CREW MEMBERS	AUX NUMBER			STOP TIME	
1. (P)				START TIME	
2.				TOTAL TIME	
3.				FACILITY USE TIME (ZULU)	
4.				USE ENDED	
5.				IN USE	
6.				TOTAL TIME	

TIME (ZULU)	CONTACT	LAT. & LONG.	MESSAGE OR ACTION

Figure 1-2
Auxiliary Patrol Log Example

Chapter 2
Qualification

Introduction

This chapter provides a detailed description of qualification requirements for Auxiliary Aviation Program members.

In this Chapter

This chapter contains the following sections:

Section A. Entering the Aviation Program

Introduction

Only those Auxiliarists who are basically qualified (BQ) may enter the aviation program. In the aviation program, Auxiliary pilots must maintain their civilian aviation qualifications in accordance with applicable FAR. The FAA is the authority that licenses Auxiliary pilots. In addition, most Auxiliary flights are conducted under FAA jurisdiction and must comply with all FAA air traffic control (ATC) instructions.

A.1. Training Materials

The Flotilla Commander (FC), materials officer (MA), or a member of the District Aviation Staff (the Assistant District Staff Officer for Aviation Training (ADSO-AVT)) may be contacted to obtain the air operations training publications. Alternatively, they may be downloaded from the Auxiliary National web site. These publications are the *Auxiliary Operations Policy Manual*, COMDTINST M16798.3 (series), and this manual.

A.2. Test Preparation

The *Auxiliary Operations Policy Manual*, COMDTINST M16798.3 (series), and *Auxiliary Aviation Program*, COMDTINST 16798.1 (series), should have been read and understood prior to taking any aviation written test. Though there may only be sections of the *Auxiliary Operations Policy Manual*, COMDTINST M16798.3 (series), that refer specifically to aviation, the entire manual must be reviewed, since every chapter applies to Auxiliary missions.

The aviation qualification test is open-book and can only be taken on-line through links from the Auxiliary National web site (www.uscgaux.org). Assistance with training, mentoring, and examinations can be obtained through the Assistant District Staff Officer for Aviation Training (ADSO-AVT).

The test is in two parts; parts A and B. Part A, the Pilot/Observer Test, must be taken by all members wishing to participate in air operations. Part B, the Pilot Supplemental Test, must be taken as well by those candidates for pilot or air crew qualification.

A.3. Practical Training

After having passed the test(s), the trainee may begin the practical flying portion of the appropriate syllabus in accordance with District policy. The trainee may only fly on missions that do not require the aircraft to go beyond a safe gliding distance from the shore until the Water Survival Test and Egress Training have been completed.

A.4. Observer Entry Requirements

In order to become a qualified observer, the trainee completes ten hours of actual flight time on ordered missions, and passes other requirements in the syllabus in boating safety, communications, navigation, and observer skills. During this time, the trainee will be evaluated for observer skills; especially in the area of communications, visual identification, and CRM. When signed off on these skills according to District policy, the trainee will be recommended to the Director for approval as a qualified observer.

A.5. Pilot Entry Requirements

To become an Auxiliary pilot, certain additional requirements are necessary, including:

- An applicant for Auxiliary pilot status must be an FAA-certificated and current pilot with a minimum of 200 flight hours PIC time.
- The applicant must pass ground and flight checks.

A.6. Currency Maintenance

Maintaining currency requires a certain amount of annual training and/or operations. In accordance with the *Auxiliary Operations Policy Manual*, COMDTINST M16798.3 (series), the minimal annual requirements to maintain qualification are:

- Annual swim test (water survival)
- Annual egress training
- Annual District aviation safety workshop

Additional requirements for annual flight experience are detailed in the *Auxiliary Operations Policy Manual*, COMDTINST M16798.3 (series).

Section B. Flight Crew Program Certification Levels

Introduction

Applicants for flight crew positions in AUXAIR may become qualified at several different levels as follows:

- Observer
- Air Crew
- Pilot

B.1. Observer Qualification

Observers generally perform observation and communication duties aboard Auxiliary aircraft facilities. They also participate in mission planning and are a critical part of the team supporting each mission. Observers are trained in and pass written and practical tests in the following:

- Coast Guard communications.
- Nautical and aeronautical chart reading and navigation.
- Local area familiarization.
- Emergency egress from aircraft and water survival.
- Elements of observer technique, recognition of vessels and persons on the water, distress situations, SAR response, types of missions, and related activities.

B.2. Air Crew Qualification

Air crew qualification is an upgraded qualification for observers who successfully complete a series of tasks consisting of observer duties and pilot and crew knowledge.

B.3. Pilot Qualification

Pilots may be qualified in the following certification levels:

- Aircraft commander
- First pilot
- Co-pilot

B.3.a. Aircraft Commander

Aircraft commanders are pilots that meet all of the following requirements:

- Have more than 1000 flight hours as PIC.
- Possess a current instrument rating.
- Have been checked out in SAR procedures by an Auxiliary IP/FE.

Aircraft commanders may fly any operational mission and conduct aircraft facility inspections, when authorized.

B.3.b. First Pilot	First pilots are pilots that meet all of the following requirements: • Have more than 500 flight hours as PIC. • Have been checked out in SAR procedures by an Auxiliary . First pilots may fly any operational mission.
B.3.c. Co-Pilot	Co-pilots are pilots with more than 200 flight hours as PIC. Co-pilots may only fly within gliding distance from the shore and on specific types of missions.

Section C. Aircraft Facilities

Introduction	In order to be recommended and selected as a "facility" by the Auxiliary, aircraft must meet specific requirements for equipment and condition.
C.1. Aircraft Capabilities	Auxiliary aircraft consist of various types and models, with a wide range of capabilities. These aircraft are generally the property of individual members and are usually based at civilian airports located around the District. The Auxiliary members owning or controlling the aircraft volunteer them to be used on missions. If a partnership or corporation owns the aircraft, Auxiliarists must own or control specific proportions (see *paragraph C.2* of this section) and must agree to volunteer the aircraft to become Coast Guard Auxiliary facilities. Achieving this status requires certain equipment to be aboard the aircraft for any mission, or to be part of the aircraft itself, such as a dedicated very high frequency (VHF) antenna. This equipment is specified in the *Auxiliary Operations Policy Manual*, COMDTINST M16798.3 (series). Once accepted as facilities, such aircraft may be authorized for missions under Coast Guard orders. When conducting authorized missions, these aircraft facilities are considered to be Coast Guard aircraft.
C.2. Facility Requirements	The *Auxiliary Operations Policy Manual*, COMDTINST M16798.3 (series), details requirements for facilities. Aircraft tendered as facilities must meet the requirements for all Auxiliary facilities as well as specialized requirements for aircraft facilities.
C.2.a. Inspection	The DIRAUX will determine annual inspection policies within the District. These aircraft facilities will be inspected by flight examiners or instructor pilots and aircraft commanders ***specially*** appointed by the DIRAUX in accordance with the *Auxiliary Operations Policy Manual*, COMDTINST M16798.3 (series).
C.2.b. Equipment	Auxiliary aircraft must meet special requirements in order to qualify as facilities, including (but not limited to) having the following equipment onboard: • Shoulder harnesses for front seats • Personal survival equipment • Communications equipment • Navigation equipment
C.2.c. Ownership – Privately Owned	In order to be accepted as a facility, privately owned aircraft are at least 25%-owned by Auxiliarists. (see the *Auxiliary Operations Policy Manual*, COMDTINST M16798.3 (series), *Chapter 1, Section B*)

C.2.d. Ownership – Corporately Owned	In order for a corporately owned aircraft to be accepted as a facility, corporately-owned aircraft must submit additional forms prior to acceptance in order to document permission from all owners for Coast Guard use of the aircraft. Samples of relevant corporate resolutions and information are given in the *Auxiliary Operations Policy Manual*, COMDTINST M16798.3 (series), *Chapter 1, Section B*.
C.2.e. Ownership – Multiple Ownership	In order for an aircraft that has multiple owners to be accepted as a facility, additional forms must be submitted prior to acceptance to document permission from all owners for Coast Guard use of the aircraft. (see the *Auxiliary Operations Policy Manual*, COMDTINST M16798.3 (series), *Chapter 1, Section B*)
C.2.f. Non-Owner Pilots	Facilities may be flown on missions by qualified and current Auxiliary pilots who do not own the facility. The owner of the aircraft must submit a letter approving the specific pilot(s) to act as PIC on missions in the aircraft.
C.3. Application	Once all equipment and other requirements for a facility are in order, the applicant will fill out an Auxiliary Aircraft Facility and Offer For Use Form (ANSC-7005) and have the aircraft inspected by a flight examiner/instructor pilot or designated aircraft commander. (see *Appendix A*)

Chapter 3
Crew Resource Management

Introduction

CRM and risk management begin well before an aircraft gets airborne. The CRM concept should be developed and reviewed annually at Coast Guard AUXAIR safety workshops. The Auxiliary risk assessment matrix is exercised and reviewed by the pilot and crew during the pre-flight briefings. The crew should participate in pre-flight aircraft system checks as well as emergency procedures and standard operating procedures checks. The role of every crewmember should be clear for each aspect of the flight. During the flight, the crew should practice CRM procedures and re-visit risk assessment and management whenever any aspect affecting the mission profile changes.

In this Chapter

This chapter contains the following sections:

Section A. Background

Introduction

CRM deals with resource management in flight operations and encompasses elements of risk management. CRM is the utilization of all available resources to maximize the safety and effectiveness of the mission. Resources include autopilots, avionics systems, operating manuals, and people, including crewmembers, air traffic controllers, and others in the aviation operating environment.

Although CRM concepts were originally developed for large aircraft, these concepts have been modified to apply to small aircraft as well.

A.1. CRM Training Requirements

As part of a program started in 2003, all Auxiliary pilots and air crew are required to participate in initial and annual Coast Guard CRM Training. The initial training is given by a representative of the Coast Guard Aviation Training Center and, for new pilots and air crew, must be taken within one year of initial currency. Annual training in CRM is mandated in the *Auxiliary Operations Policy Manual*, COMDTINST M16798.3 (series), as part of the regular aviation workshops presented by each District.

A.2. Minimizing Risk

Human error continues to be the single largest causal factor in aviation accidents. Current statistics indicate that 70-80% of all aviation accidents are attributable to human error. Although this manual cannot cover all of the facets of CRM, some highlights are presented here. Mounting accident/incident data suggests that while superior airmanship is an essential component of what we do, it is insufficient in and of itself to assure flight safety. Safe and efficient Auxiliary flight operations depend on teamwork and understanding of human behavior. A good reference is the *FAA Advisory Circular 120-51B*. The goal of CRM is to improve individual and crew performance by using all of the resources available to minimize risk. Information on current developments in CRM can be obtained from various Internet locations including the Coast Guard Aviation Safety and Naval Safety Center websites.

Some of the key CRM concepts include:

- Situational awareness
- Stress and performance
- Decision-making
- Attitude and crew performance
- Effective communication
- Information processing

A.3. Principles of CRM and Risk Management

The principles of CRM and risk management are an essential part of the Coast Guard Auxiliary Aviation Program. These principles also apply even in the single-pilot environment by using all available resources both in the cockpit and on the surface. The human factor is the single most important element for safe and effective aircraft operations. An understanding of CRM will help the pilot to better utilize the crew and at the same time will help the crew to understand that they must take an active part in the operation of each flight.

Section B. CRM Study

Introduction

The following CRM study emerged from the circumstances surrounding the crash of a DC-8 on approach to the Portland, Oregon International Airport on 28 December 1978. The investigation revealed that the captain, a pilot with over 27,000 flight hours, 5,500 hours in type, lost "situational awareness" while attempting to resolve a minor problem with the landing gear. This loss of situational awareness, manifesting itself in the captain's disregard for the input from his first officer and engineer, resulted in the aircraft running out of fuel 6 nautical miles (NM) from the airport.

The three key concepts in the above study are:

- All crewmembers should participate in all aspects of the flight.
- All crewmembers should have an understanding of the basic elements for a safe flight.
- All crewmembers should be able to communicate effectively within the flight environment.

B.1. Probable Cause

The National Transportation Safety Board (NTSB) investigation concluded probable cause to be the captain's failure to:

- Monitor the aircraft fuel state.
- Respond to the low fuel indications.
- Respond to the crewmembers' advisories regarding the fuel state.

Contributing to the accident was the failure of the other two flight crewmembers to either fully comprehend the critical nature of the fuel state or to successfully communicate their concerns to the captain.

B.2. Safety Recommendation

All commercial air carriers should be encouraged to have their flight crews indoctrinated in the principals of flight deck resource management with particular emphasis on the merits of participatory management for captains and assertive training for other cockpit crew members. As a result of the investigation and the recommendation of the NTSB, that airline, and three other airlines, immediately started presenting CRM training to their flight crews. In addition, a spin-off training called Line Oriented Flight Training (LOFT), was derived. LOFT training is accomplished in simulators where flight crews are confronted with emergencies, or other situations that require and measure their ability to interact effectively to resolve problems.

As this relates to Auxiliary flying, clear and concise information sharing greatly increases the ability to safely and effectively conduct assigned missions.

B.3. CRM in the Real World

A real-world example of how CRM may have saved lives can be found in psychologist David Myers' *Social Psychology* textbook, comparing two airline crashes in the 1980's:

According to Myers, "Helmrich (1997)…notes that flawed group dynamics were evident when an Air Florida plane lifted off from Washington's National Airport on a winter day in 1982. Ice in a sensor caused the speed indicators to read too high, leading the captain to apply too little power as the plane ascended:

> **First Officer:** Ah, that's not right.
> **Captain:** Yes, it is, there's 80 [referring to speed].
> **First Officer:** Nah, I don't think it's right. Ah, maybe it is.
> **Captain:** Hundred and twenty.
> **First Officer:** I don't know.

It wasn't right, and the First Officer's muting his concerns led to the plane's stalling and crashing into a Potomac River bridge, killing all but five people onboard."

But in 1989, the three-person crew flying a United Airlines DC-10 flight from Denver to Chicago responded as a model team to imminent disaster. The crew, which had been trained in CRM, faced the disintegration of the center engine, severing lines to the rudder and ailerons needed to maneuver the plane. In the 34 minutes before crash landing just short of the Sioux City airport runway, the crew had to devise a strategy for bringing the plane under control, assessing damage, choosing a landing site, and preparing the crew and passengers for the crash. Minute-by-minute analysis of the cockpit conversation revealed intense interaction—31 communications per minute (one per second at its peak). In these minutes, the crew members recruited a fourth pilot who was flying as a passenger, prioritized their work, and kept one another aware of unfolding events and decisions. Junior crew members freely suggested alternatives and the captain responded with appropriate commands. Bursts of social conversation provided emotional support, enabling the crew to cope with the extreme stress, and to save 185 of the 296 people onboard.

Section C. CRM Concept

Introduction

The CRM concept is based in part on the following:

- Performance
- Focus
- Acquisition of CRM skills
- Motivation of crewmembers
- Assertiveness

C.1. Performance

Effective performance depends on both technical performance and interpersonal skills.

C.2. Focus

CRM focuses on crewmember attitudes and behaviors. A primary focus of CRM is effective team coordination. The team encompasses the flight crew, air traffic controllers, maintenance, and other groups that interact with the cockpit crew. Effective CRM involves the entire flight crew. CRM is not simply the responsibility of the PIC, nor should CRM be viewed as pilot training. All crewmembers are responsible for the effective management of the resources available to them.

C.3. Acquisition of CRM Skills

The acquisition of effective CRM skills requires the active participation of all crewmembers. Basic CRM skills are typically introduced in classroom lectures, but are perfected by active participation and practice on each flight.

C.4. Motivation of Crewmembers

The PIC must maintain a positive climate on the flight deck and encourage crewmembers to fully participate in crew activities. Creating the proper climate is essential. This can be done by maintaining an "open" cockpit atmosphere; having the crewmembers speak up when things do not seem right or ask questions if they do not understand. It is up to the PIC to promote positive relations by providing non-punitive critique and feedback.

C.5. Assertiveness

Assertive behavior indicates highly developed skills in both task and relationship and is most likely to produce an assertive response from other crewmembers and insure the open exchange of information. As a PIC, you have the authority to either accept or reject the advice or opinion of others. Listening and responding to your flight crew does not mean abdicating command.

Section D. Rules and Responsibilities

Introduction	This section describes rules and responsibilities for CRM/risk management.
D.1. Pilot-in-Command Responsibilities	***The PIC of an Auxiliary aircraft is ultimately responsible for the safe and orderly conduct of the flight.*** This responsibility and authority exists from the time the pilot begins flight/mission planning until completion of post-flight duties. It is imperative that flight crewmembers be aware of the authority of the PIC and be ready to comply quickly with his or her instructions. The successful completion of the mission or the safety of the crew may be jeopardized if the scope of this authority is not clearly understood.
D.1.a. Rules	The following CRM/risk management rules were primarily developed for the flight deck of an aircraft carrier, however the principles are valid for the AUXAIR environment that will probably consist of a pilot and one or two observers or other crew.
D.1.b. Single-Pilot Operations	For single-pilot operations the PIC is responsible for all aspects of the flight, including communications with ATC, and the completion of all checklists. It is not recommended to have a non-pilot conduct any checklist unless they have been trained to do so.
D.1.c. Two-Pilot Operations	When operations require two pilots, the PIC determines who will fly the mission. The pilot flying (PF) is directly responsible for the manipulation of the flight controls. The pilot not flying (PNF) should read checklists, reply to ATC transmissions, and perform any other duty requested by the PF. Further, during instrument flight operations the PNF will continually cross check the PF instruments.
D.2. Basic Rules for CRM	The basic rules for CRM are as follows: • In abnormal situations, the first order of business must be to decide who flies the aircraft and who monitors or works on the problem. The PIC may not want to be the PF, but rather manage the situation while the other pilot or autopilot flies the aircraft. • Positive delegation of monitoring duties is as important as positive delegation of flying duties. • The PF must not attempt to accomplish secondary tasks during busy portions of a flight. • Whenever uncertainty or conflicting opinions of fact occur, such as a misunderstood radio transmission, the conflict must be resolved unequivocally using external sources of information. (For example, request a repeat of the transmission.) • If any crewmember has doubts about a clearance, procedure, or flight condition, he/she is obligated to make that doubt known to other

crewmembers.

- Distractions should be minimized especially during key parts of the flight. A sterile cockpit (no extraneous conversation) should be enforced during takeoff, landing, and other mission evolutions requiring heightened awareness. Internal conversation should not occur when outside communications are being transmitted.

The use of checklists is an essential part of the process. In general, the PNF (or observer, if trained to do so) should read the checklist to the PIC and the PIC should verbally respond. It should be noted that some emergency checklists require some items to be done from memory. In these cases, it is recommended that the PNF DO the emergency checklist items, and read them as he is doing the tasks. This will keep the PF aware of the situation while alleviating him from being distracted.

D.2.a. Two-Challenge Rule

Clear communications are essential in the flight environment. Pilots should use standard phraseology found in the *FAA Airman's Information Manual* at all times. The two-challenge rule applies with two pilots aboard when a crewmember makes two clear attempts to communicate essential safety of flight information and receives no response from the PF. In this case, the PNF will take over manipulation of the flight controls to ensure safety of flight.

D.2.b. Instrument Approach

During an instrument approach, the PNF will call "1000 feet to minimums" when the aircraft is 1000 feet above minimums. The PNF will also verify that the altimeter setting is correct and the altitude crossing the Final Approach Fix (FAF) is accurate. The PNF will also call 100 feet to minimums, and begin looking for the approach lights and/or runway environment. The PF will call minimums when the aircraft arrives at the Minimum Descent Altitude (MDA) or the Decision Height (DH) for the approach. Upon reaching the Missed Approach Point (MAP) or DH, the PF will call minimums and, if the runway or approach lights are in sight, will transition to visual references, announce the runway environment in sight, and continue descent to landing. If the approach lights or runway environment is not in sight, the PF will continue to operate the aircraft referencing the instruments, and execute a missed approach. (see the FARs for a technical description of the runway environment)

D.3. Risk Assessment Matrix

The PIC completes the Auxiliary Risk Assessment Matrix (see the *Auxiliary Operations Policy Manual*, COMDTINST M16798.3 (series)) prior to flight and during flight as conditions warrant. The entire crew should be involved in the risk assessment process. Should the Risk Assessment Matrix score above threshold for medium risk (20 or as assigned by air station instruction), the PIC should determine if mission factors may be mitigated through such efforts as delaying takeoff time or changing mission parameters. If this results in risk factors that remain above the threshold, the PIC will review the matrix with the AUXAIR leadership and/or active duty command following local procedures and then determine the appropriate course of action.

The Risk Assessment Matrix is part of the pre-flight planning required for all missions, and should continue to be evaluated by the entire crew for any change in mission status or mission environment.

Chapter 4
Techniques of Observation

Introduction

This chapter describes techniques of observation employed by Auxiliary flight crewmembers.

In this Chapter

This chapter contains the following sections:

Section A. Air Observation

Introduction

Air observation is one of the key elements of an effective aviation mission.

A.1. Observers

For SAR and patrol activities, the real payload for the search aircraft is the observer, (whether rated as pilot, observer, or air crew). While the pilot is a contributor to the observations, the PIC's main task is to safely control and navigate the aircraft. The effectiveness of the search or patrol team can be no greater than the effectiveness of the observers.

All crew members, including the pilot, scan a search area assigned to them. Pilots should consider utilizing equipment available to lessen the workload of navigating the aircraft, such as aircraft trim and autopilot.

A.2. Training and Experience

Effective and efficient observation requires training and experience. Air observer scanning techniques must be accomplished in a systematic way to assure a high degree of coverage of the search or patrol area. Air observers must know what to look for. Objects look different from the air than they do from the surface. Moreover, if a crash or sinking is involved, the objects of the search will usually appear quite different from the original subject of the search. In addition, once the search object or suspected search object has been sighted, the air observer must know how to maintain surveillance of the object while communicating its relative position to the pilot so that the aircraft can be maneuvered into the most advantageous position.

These scan techniques, while challenging at first, can easily be accomplished after sufficient practice. Scan techniques should be practiced whenever possible, especially while performing other missions such as routine patrols.

A.3. Training Sorties

Crews can create training exercises to develop an "eye" for objects on the water. These training sorties should be properly coordinated with appropriate surface crews and assets. They provide excellent practice for air and surface crews. They also help the crews practice and develop effective search scan techniques, and help to build confidence in their ability to successfully execute these searches. The following are some sorties to consider for training.

A.3.a. "Oscar" Search	In this exercise, participants request a real search pattern from a local SAR mission coordinator (SMC) using different methods for the practice area to be searched. Create an "Oscar", a human-like dummy, in gray/blue or blue jean colored clothing, stuffed with styrofoam and weighted around its waist with a 10- to 20-pound anchor. In coordination with an Auxiliary vessel, an orange personal flotation device (PFD) is placed on Oscar, then Oscar is deposited in the water within the search area. The recovery vessel normally stands off ½ to 1 nautical mile, but within visual range of Oscar, in case someone tries to "rescue" it. The aircraft crew then uses search scan techniques to find Oscar. Once found, the surface vessel is directed to the recovery point. When the crew establishes the visual cues for finding Oscar with the orange PFD, the exercise may be repeated with the PFD removed.
A.3.b. Direction Finding Steers for Lost Vessels	This exercise involves using a Coast Guard or Auxiliary unit with direction finding (DF) capability to direct an Auxiliary aircraft to a "disoriented" or lost vessel. The exercise starts with the DF station requesting a "short count" from the "disoriented" vessel. The station then passes to the aircraft an estimated heading based on the bearing from the station to the vessel. The aircraft then flies over the station outbound on that heading, or takes a position from the station on the same bearing as the target vessel. The aircraft then gives a short count to the station while on that heading and applies corrections as directed by the station. Since range is unknown in this situation, the aircraft must fly along the bearing searching for the target vessel.
A.3.c. Reflective Mirror Recognition and Tracking	The recovery vessel may use a rescue mirror to "flash" the aircraft while the aircraft is searching. Crews observing the flash direct the pilot to the scene. This exercise is effective for learning to recognize the characteristics of a flashing rescue mirror.

Section B. Air Observer Sector Search Assignments

Introduction

The PIC is usually provided with instructions on the assigned search pattern to be flown from the SMC or On-Scene Commander (OSC). If not, the PIC should work with the crew to determine a pattern including leg directions and track spacing. Based upon the pattern selected, the visibility from the aircraft, and the number of observers aboard, specific relative sectors should have been assigned to each observer prior to the start of the mission as discussed in this section.

B.1. Seating

Auxiliary aircraft are typically light aircraft with one or two engines and seats for 2 to 6 persons.

B.2. Two-Place Aircraft

In two-place aircraft, the seats may be tandem (one behind the other) or side-by-side. For tandem seating, the air observer should be assigned to cover both sides alternately. In a side-by-side, two-place aircraft, the pilot scans outside the left side of the aircraft as well as ahead looking for other aircraft. The observer in the right seat is assigned to scan ahead and right of the aircraft. (see **Figure 4-1**)

B.3. Four-Place Aircraft

Many four-place aircraft are operated with two or three persons onboard. When only two persons are onboard, coverage is the same as for a two-place, side-by-side aircraft. When three persons are onboard, the observer in the rear seat should be assigned the position behind the pilot. The rear seat observer search sector should cover as much of the left side of the aircraft as possible. In high-wing aircraft, this may be a sector approaching 180 degrees in arc. In low-wing aircraft, the air observer in the rear seat may only be able to effectively search behind the wing. If the piloting duties are to be shifted between occupants of the two front seats, loading of the aircraft should be planned to permit the rear seat observer to cover either side by shifting seat position. (see **Figure 4-2**)

When all four seats are utilized (see **Figure 4-3**), the observer in the right rear seat covers the right side of the aircraft from abeam to full aft. The right front seat observer will cover the sector forward of the wing. Observers should coordinate the exact overlap depending on the geometry of the particular aircraft. Some overlap of coverage between the front and rear seat observers can be beneficial in the search.

B.4. Additional Observation Positions

For aircraft facilities with greater than four observation positions, sectors should be assigned depending upon each position's viewing angle. The sectors may overlap, but this is not objectionable since it will improve the probability of detection (POD).

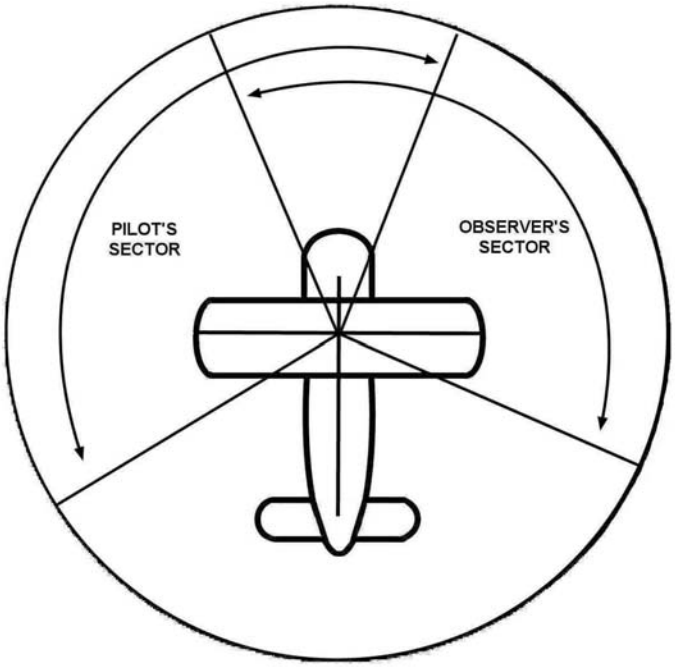


Figure 4-1
Observation Sectors With Two-Person Crew

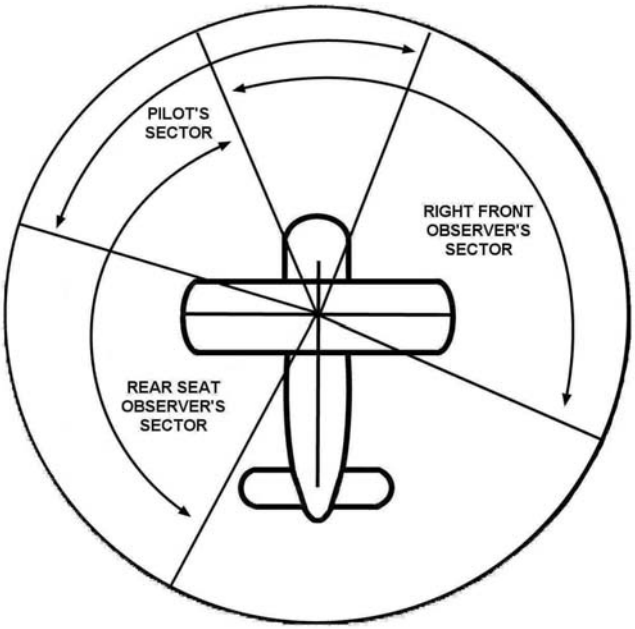


Figure 4-2
Observation Sectors With Three-Person Crew

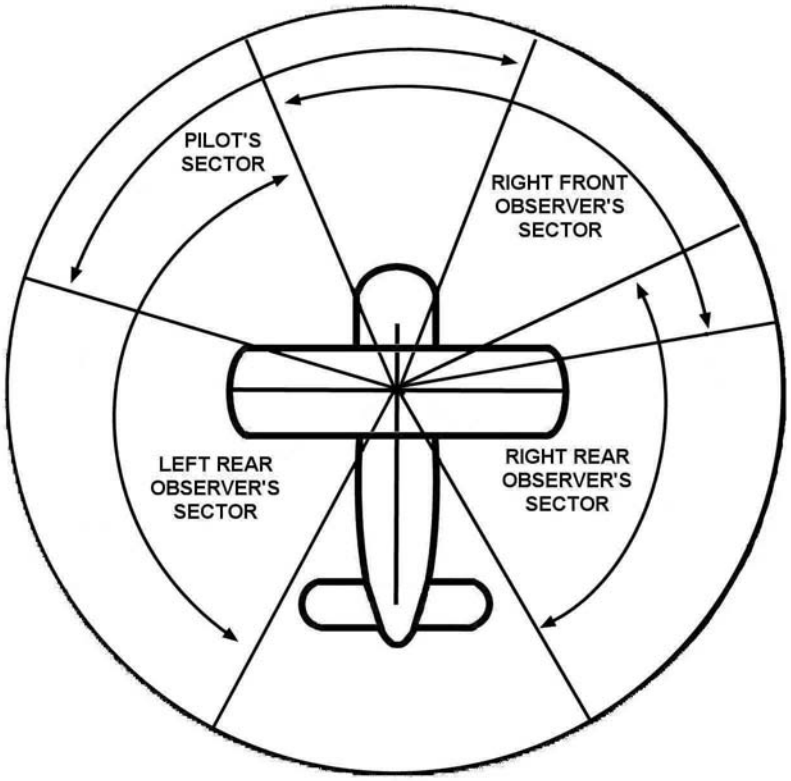


Figure 4-3
Observation Sectors With Four-Person Crew

Section C. Scanning Procedures

Introduction

To properly scan an area, the following must be considered for greatest success:

- Aircraft obstructions
- Aircraft speed
- Binoculars
- Altitude
- Contrast
- Motivation
- Scan degree
- Procedure
- Repeat scans

C.1. Aircraft Obstructions

Although aircraft are excellent search platforms, most small civilian aircraft have some obstructions that limit scanning sectors. This varies with the design of the aircraft and the observer's position. Generally, obstructions are more severe in low-wing aircraft than in high-wing aircraft. The PIC should evaluate the particular aircraft and inform observers of the limitations and how best to compensate for them.

C.2. Aircraft Speed

The speed of the aircraft affects the efficiency of observers by reducing the time in which they can scan a given sector. In searching, the slower the speed of the aircraft, the greater the probability of visual detection.

C.3. Binoculars

Binoculars rapidly bring on eye fatigue in aircraft and may cause nausea. Binoculars should be used only to confirm sightings made by the naked eye. Gyro-stabilized binoculars are preferred and may be checked out or borrowed at some air stations.

C.4. Altitude

When searching at low altitudes, the area closest to the aircraft (where detection probabilities are highest) will be passed quite rapidly. The rapidity with which this area will pass is dependent upon the masking caused by the design of the aircraft and by the speed of the aircraft. Low-wing aircraft present a particular problem in this regard. For a moderate speed low-wing aircraft with considerable masking, it may be necessary for rear seat observers to scan only the area in view behind the wing to obtain maximum effectiveness.

C.5. Contrast

Most searches by Auxiliary aircraft facilities will involve search over water. Often, over water searches will provide little or no contrast between sea and sky. Under these conditions, observers' eyes may focus short of the surface without the knowledge of the observer, and thus compromise the thoroughness of the search. To minimize this phenomenon, observers should occasionally focus their eyes on some specific items on the surface such as whitecaps or debris. If none is visible, the eyes should be focused periodically on some part of the aircraft such as the wing tips. A short "focusing" period of a second or so will overcome this problem and scanning can be resumed.

C.6. Motivation

Motivation is a highly important factor that can affect the performance of a search crew. During the early stages of a search, motivation is typically high. After fatigue sets in and hope of locating survivors begins to fade, maintaining a high level of motivation typically becomes a concern. To maximize the effectiveness of an extended search, every effort must be made to maintain a high degree of motivation.

C.7. Scan Degrees

Although the human eye sees over a wide angle, it focuses sharply only over an angle of about 10 degrees. This means that the detection of a hard-to-see target will usually occur within about 5 degrees of the central position point for the eye. In general, the eye must be looking right at an object to really see it. Moreover, the scan of the eye must be stopped for effective sharp vision. For these reasons, observers should scan their assigned sectors with discrete eye movements. Each movement should be about 3 to 4 degrees. The rate of movement should be two or three shifts per second. Using this technique, one scan across a 90-degree sector will take 10 to 15 seconds.

C.8. Procedure

The search of an assigned sector should start close to the aircraft and sequentially move outward from the aircraft in units of 3 to 4 degrees after each horizontal scan. Consecutive scans should be in opposite directions. That is, start the first scan from left to right, move up, make the second scan from right to left, move up another 3 to 4 degrees and scan back from left to right again. Continue this sequence to the horizon, or to the limit of meteorological visibility, or to a predetermined upper limit.

The observer's visual search scan should not extend out beyond the track space of the search pattern. If the track space is ½ nautical mile, the observation should not exceed ½ nautical mile. A useful tool to measure the search scan distance is to mark that distance by altitude with a thin grease pencil line on the window the observation is being made from. A useful tool or reference can be constructed from estimates of horizontal ground distance from the aircraft to various check points while flying at search altitudes.

C.9. Repeat Scans

For the pilot and front seat observer, scanning should be repeated again by returning the eyes for sequential sweeps starting close to the aircraft. This technique helps compensate for the changes in view caused by the forward motion of the aircraft and insures optimum coverage of the close-in area. When flying at low altitudes searching for small objects (such as a life raft or person in water), rear seat observers should employ a similar technique. In such cases, both front and rear seat observers should limit their outward scanning. When searching for persons in the water, this limit should be set at about half the track spacing for the aircraft at an altitude of 500 feet.

For example, for persons in the water, using ¼-nautical mile track spacing, the limit should be $^{1}/_{8}$ nautical mile or approximately 250 yards. For life rafts, the limit should be 2.5 nautical miles or less, and for boats under 60 feet in length, 10 nautical miles or less, even though the horizon may be over 25 nautical miles distant for an aircraft at 500 feet altitude. Thus, for small objects, even under optimum conditions, no search should be made above 10 degrees below the horizon and for rafts, no more than 2 degrees below the horizon. For boats up to 60 feet, the scan will extend virtually to the horizon. If the meteorological visibility is less than optimum, these distances should be further reduced.

Section D. Vessel Recognition

Introduction

This section briefly describes the importance of vessel identification and provides a number of pictorials to aid in vessel recognition.

D.1. Vessel Identification

Knowledge of various vessel types and configurations is important. To provide accurate reporting, it is critical that the vessel be identified and described properly by the reporting aircraft. Most Auxiliarists acquire a working knowledge of the plan view of various surface craft through public education courses, member training, and experience on the local waters. (see **Figure 4-4** through **Figure 4-9**)

Figure 4-4
Small Sailing Vessels

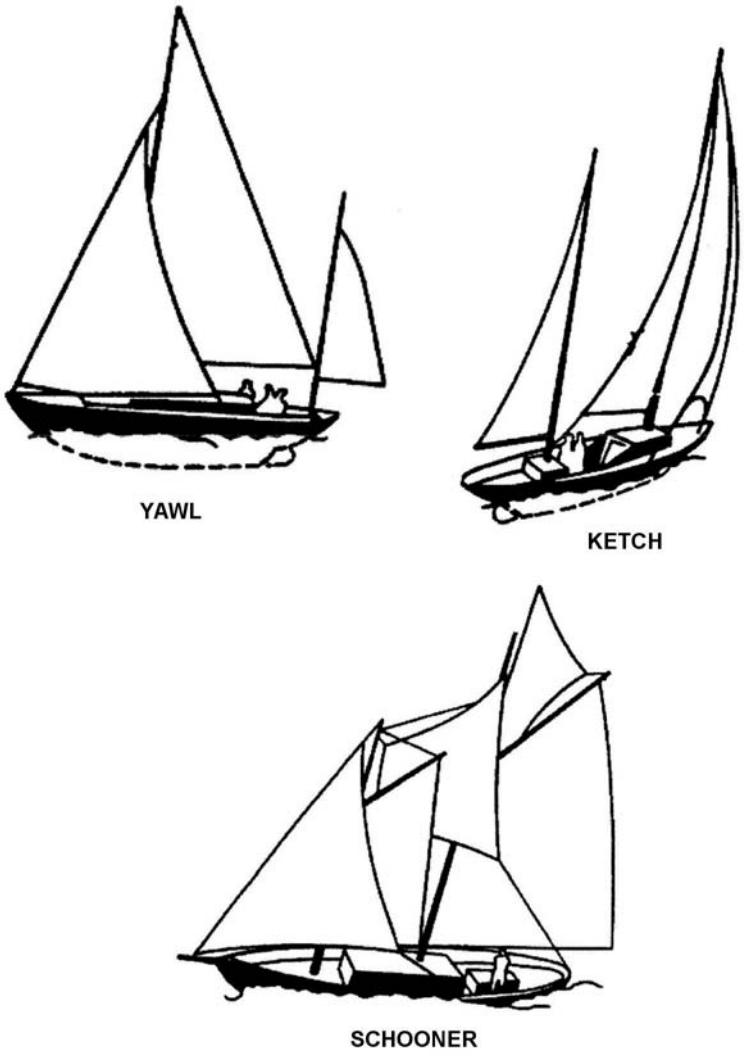
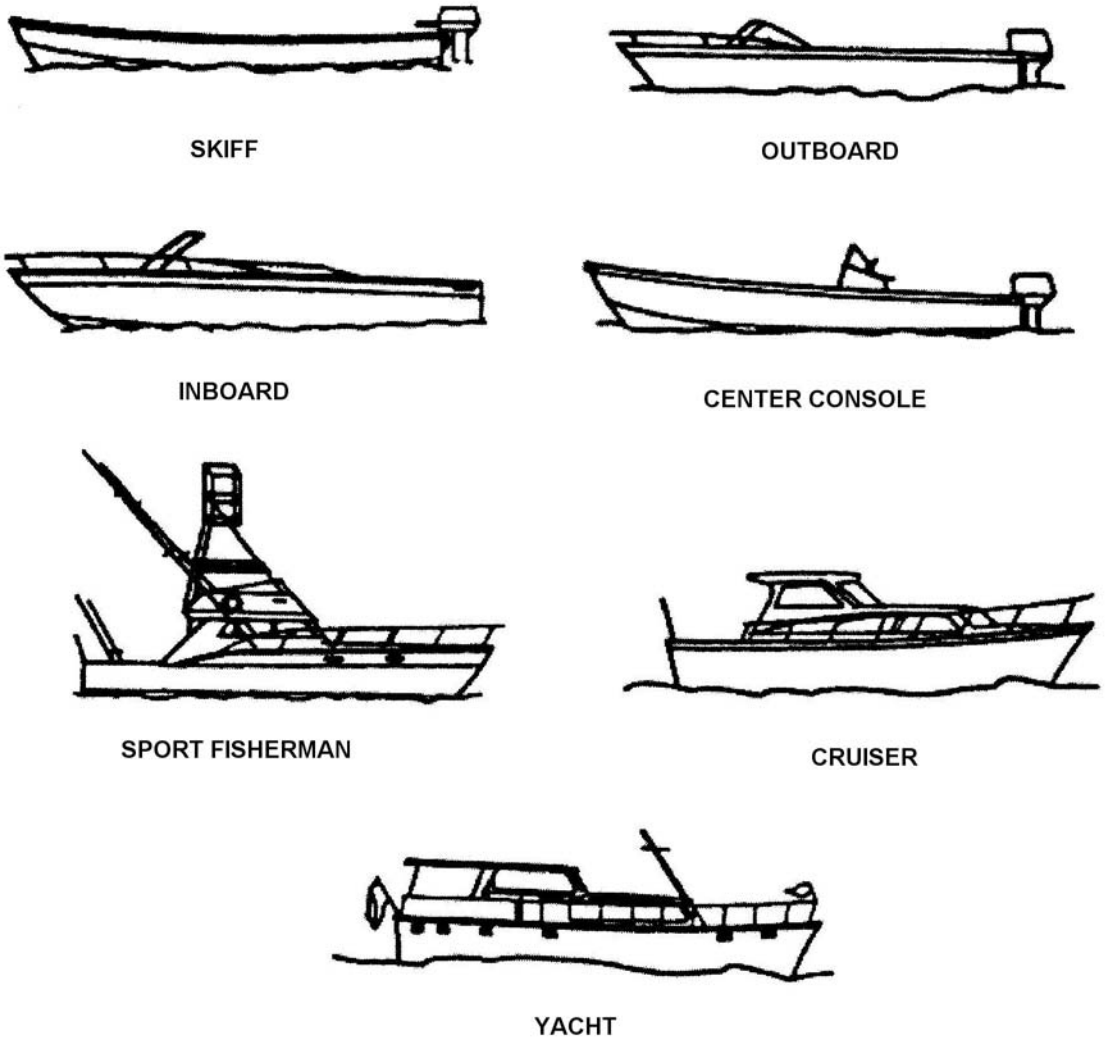
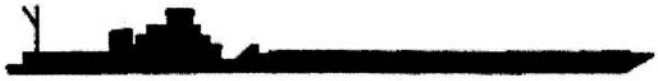


Figure 4-5
Large Sailing Vessels



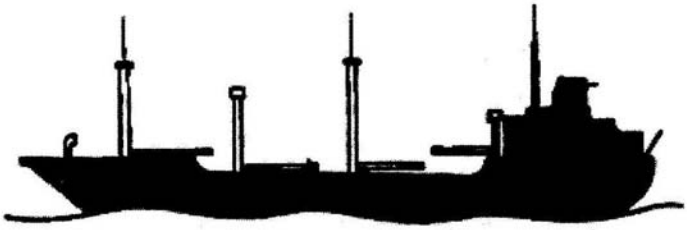
High Performance

Figure 4-6
Powered Vessels



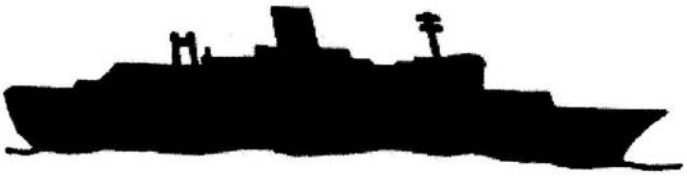
RIVER/INTERCOASTAL TYPE
TOW BOAT AND BARGE

TANKER



FREIGHTER

FREIGHTER



PASSENGER

Figure 4-7
Commercial Vessels

D.2. Coast Guard Vessels	The vessels in **Figure 4-8** and **Figure 4-9** are a sample of various types of Coast Guard boats and cutters which may be observed during operations.
D.2.a. Less Than 65 Feet in Length	Vessels less than 65' in length are "boats" and are referred to by their hull number in radio communications.

25' Transportable Port Security Boat (TPSB)

25' Transportable Port Security Boat/ Raider Boat (TPSB)

27' Guardian Smallboat

38' Deployable Pursuit Boat (DPB)

Motor Surf Boat (MSB)

Rigid Hull Inflatable Boat (RHIB)

Figure 4-8
Coast Guard Boats

Response Boat (RB)
(several types including Defender Class)

41' Utility Boat (UTB)

47' Motor Lifeboat (MLB)

Coast Guard ATON Vessels

49' Buoy Utility Stern Loading (BUSL)

55' ATON Boat (ANB)

Figure 4-8
Coast Guard Boats – Continued

D.2.b. 65 Feet and Greater in Length	Vessels 65' and greater in length are cutters and are referred to as “cutter <name>” in radio communications.

Coast Guard Tugs

65' Small Harbor Tug (WYTL)

140' Icebreaking Tug (WTGB)

Coast Guard Icebreakers

290' Inland Icebreaker (WAGB)

399' Polar Class Icebreaker (WAGB)

Figure 4-9
Coast Guard Cutters

Coast Guard ATON Vessels

65' River Buoy Tender (WLR)

100' Inland Buoy Tender (WLI)

175' Coastal Buoy Tender (WLM)

225' Seagoing Buoy Tender (WLB)

Figure 4-9
Coast Guard Cutters – Continued

Coast Guard Coastal Patrol Vessels

87' Coastal Patrol Boat (WPB)

110' Patrol Boat (WPB)

179' Patrol Coastal (WPC)

Figure 4-9
Coast Guard Cutters – Continued

Coast Guard Cutters

210' Medium Endurance Cutter (WMEC)

282' Medium Endurance Cutter (WMEC)

378' High Endurance Cutter (WHEC)

Coast Guard Sailing Vessel

295' Training Barque Eagle (WIX)

Figure 4-9
Coast Guard Cutters – Continued

Section E. Sea State Evaluation

Introduction

This section briefly describes the two factors for determining sea state. They are:

- Wind direction and velocity
- Wave height

E.1. Wind Direction and Velocity

The simplest method of estimating wind direction and velocity is to examine wind streaks on the water. These appear as long streaks up and down wind. Whitecaps fall forward with the wind, but are overrun by the waves, thus producing the illusion that the foam is sliding backwards. Wind direction may be determined utilizing this information along with observations of the direction of the streaks. Wind velocity can be accurately estimated by noting the appearance of whitecaps, foam, and wind streaks.

E.2. Wave Height

Wave height is estimated as a function of wind velocity. (see **Table 4-1**)

Table 4-1
Beaufort Wind Scale

SCALE	WIND (knots)	SEA INDICATIONS	WAVE HEIGHT (feet)
0	Calm	Mirror like.	0
1	1-3	Ripples with appearance of scales.	1/4
2	4-6	Small wavelets, glassy appearance, do not break.	1/2
3	7-10	Large wavelets, some crests begin to break, scattered whitecaps.	2
4	11-16	Small waves, becoming longer, fairly frequent whitecaps.	4
5	17-21	Moderate waves, pronounced long foam, many whitecaps.	6
6	22-27	Large waves begin to form, white foam crests are more extensive, some spray.	10
7	28-33	Sea heaps up, white foam from breaking waves begins to be blown in streaks along the direction of the waves.	14
8	34-40	Moderately high waves of greater length, edges of crests break into spindrift, foam blown in well-marked streaks in the direction of the wind.	18
9	41-47	High waves, dense streaks of foam, sea begins to roll, spray affects visibility.	23
10	48-55	Very high waves with overhanging crests, foam in great patches blown in dense white streaks, whole surface of sea takes on a white appearance, visibility is affected.	29

Chapter 5
Observer and Air Crew Duties

Introduction

This chapter describes the various duties with which the Auxiliarist observer and air crew are tasked in carrying out the many Coast Guard missions.

In this Chapter

This chapter contains the following sections:

Section A. Background

Introduction

The observer's role in the many multi-mission profiles with which AUXAIR is tasked is in looking for targets, both specific and non-specific, while keeping alert for incidental discovery such as an oil leak or disabled boat. They must then communicate with the pilot, as well as the Coast Guard unit guarding the working frequency and/or the Auxiliary unit providing assistance, to relay this information. Without this ability to communicate information, a search mission is of marginal value. The communication must be accurate, professional, concise, and clear.

In 1999, the Commandant authorized the certification level of Auxiliary air crew by promulgating the *Auxiliary Air Crew Qualification Program*, COMDTINST 16798.2 (series). This new qualification is intended to provide the Auxiliary pilot with a highly skilled crewmember who can assist in all phases of any mission. In effect, the air crew is an observer with additional skills. This is especially important during times of high cockpit workload. Air crew-qualified Auxiliarists should be able to fulfill all of the duties of an Auxiliary observer plus many of the non-flying skills required of a pilot.

A.1. Observer Requirements

Observers generally perform observation and communication duties aboard Auxiliary aircraft facilities. They also participate in mission planning and are a critical part of the team supporting a mission. Observers are trained in and pass written and practical tests in:

- Coast Guard communication (connecting and using marine radio, emergency radio, intercom).
- Nautical and aeronautical chart reading and navigation.
- Local area familiarization.
- Emergency egress from aircraft and water survival.
- Elements of observer technique, recognition of vessels and persons on the water, distress situations, SAR response, types of missions, and related activities.

A.2. PIC Responsibility

The PIC is responsible for all aspects of the flight including all radio transmissions. The PIC has the authority to delegate duties during any aviation mission. This responsibility and authority for the mission exists from the time the PIC accepts the mission through the flight planning for the mission and until completion of the mission. It is imperative that flight crewmembers understand this authority. The successful completion of the mission, as well as the safety of all crew members, may well be jeopardized if the scope of this authority is not clearly understood.

Section B. Observer Skills

Introduction

This section describes the necessary skills required of the Auxiliary observer.

B.1. Maintaining Communication

It is generally the responsibility of the observer to maintain communication with the Coast Guard and/or Auxiliary unit that is maintaining the radio guard. In this case, the observer is also responsible for informing the pilot of radio messages received. Depending on the equipment configuration in the aircraft, the pilot may or may not be able to hear the communications between observer and ground.

Non-standard external communications should be cleared with the pilot prior to transmission. Proper radio procedures (see *Section* C of *Chapter 6*) should be adhered to at all times.

B.2. Radio Familiarity

The observer must be familiar with the operation of the marine radio that is aboard the Auxiliary aircraft. The observer should be able to obtain and understand National Oceanic and Atmospheric Administration (NOAA) marine weather as received on the weather frequencies. Important information includes sea conditions, the presence of fog, the presence and movement of thunderstorms, and the forecast of surface winds for over-the-water areas. The observer should periodically check the marine weather if practical and pass on to the pilot any significant information that could affect the mission.

B.3. Position and Flight Status Reporting

Position and flight status (usually "ops normal") reports are made every 15 minutes for helicopters and single-engine aircraft and every 30 minutes for multi-engine fixed-wing aircraft.

This transmission should include:

- Unit called.
- Aircraft call sign.
- Flight status.
  - "Ops normal" when operations are normal.
    - When circling a fuel spill, that information would be given in place of the "ops normal".
    - When flying a search pattern, the search leg being flown, or number of legs completed would be given.
- Aircraft position (to the nearest minute of latitude/longitude or with reference to a known landmark).
- Heading.

B.4. Time Reporting

Time is given in the 24-hour clock and each digit is said separately. Times given by aircraft in informal radio traffic are expressed in minutes after the hour with the hour not given unless necessary (e.g., "minute two four").

B.5. Observer Abilities

The observer should be able to:

- Understand latitude and longitude and must be able to relate the current position to ground references as well as chart references. It will help considerably if the observer is able to read and interpret the latitude and longitude from the aircraft global positioning system (GPS) or long-range aid to navigation (LORAN) unit.
- Plot a course from one point on the sectional to another (from the present position to the commence search point (CSP)).
- Plot a search pattern on the sectional and on the marine chart.
- Maintain a geographical awareness so that at any given time the observer can tell the unit maintaining the aircraft guard the given location and direction of travel.
- Read and understand marine charts as well as air sectionals and terminal charts.

B.6. Identification of Vessels

Air observers are expected to be able to identify:

- Coast Guard vessels
- Auxiliary vessels
- Private and commercial vessel types

B.7. Equipment Familiarity

The observer should be familiar with all of the equipment required for operation. This includes, but is not limited to:

- Connecting and operating the marine radio.
- Operating the intercom (setting sensitivity and volume).
- Operating electronic navigation equipment.
- Using and locating all safety equipment (rafts, PFDs, first aid kits).
- Operating emergency radios.
- Using harnesses and seat belts.
- Opening and securing all doors and hatches, as directed by the pilot.

Section C. Air Crew Skills

Introduction

In addition to all of the observer skills listed in *Section B* of this chapter, a qualified Auxiliarist with the designation of air crew is trained in the following:

- Fuses and circuit breakers.
- Knowing the location of safety equipment. Learning how to check them and how to re-set them.

C.1. Communication Systems

Equipment used for communication by the air crew includes:

- Audio panel
- Intercom
- Radio

C.1.a. Audio Panel

Not all aircraft have audio panels, but those that do enable the pilot or crew to select various radio devices to output to speakers or headphones. The audio panel enables the monitoring of one or both radios at the same time and selects or deselects the various electronic navigational devices. Some audio panels have a marker beacon system. Air crew should be aware of what the various lights mean, as well as the aural sounds that go with the lights. The panel may have a master switch that shuts down all of the electronics.

C.1.b. Intercom

The function of the intercom is to enable the crew to communicate with each other via headsets. Intercoms are designed to isolate various crew positions upon selection thereby creating intercom groups of the pilot alone, crew alone, pilot and co-pilot alone, and all.

C.1.c. Radio

Radios may be transceiver-only units or may be combined with a navigational aid into a combined navigation/communication radio. Air crew should understand radio operation including:

- Turning on and off.
- Adjusting volume.
- Selecting a frequency.
- Using any flip-flop memory or memory presets.
- Using and controlling squelch.
- Selecting a radio for transmission/observation when more than one is in an aircraft.

C.2. Navigation Equipment

Instruments used for navigation include:

- Very High Frequency Omni Range (VOR)
- Automatic Direction Finder (ADF)
- LORAN
- GPS
- Instrument Landing System (ILS)
- Distance Measuring Equipment (DME)

Air crew should learn each system's use, the capabilities of each system, and how to use those systems located in the aircraft. Air crew should also be able to read the latitude and longitude from the LORAN or GPS.

C.3. Transponder

Transponders are used to transmit a signal that identifies a specific aircraft to ATC. Air crew should understand how to turn the transponder on and off, what is meant by "SQUAWK IDENT", and how to perform the action along with knowing how to select a code. Air crew should know the following available settings:

- OFF
- STANDBY
- ON
- ALTITUDE
- TEST

For visual flight rules (VFR) operations, code 1200 is normally used, unless a different code is assigned to the aircraft by an air traffic controller. Air crew should also be familiar with the following emergency codes and when to use them:

- 7500 (hijack code)
- 7600 (failure of radio communications)
- 7700 (emergency)

It is important to prevent accidental selection of one of these codes when moving from one code setting to another.

C.4. Instruments

Air crew should be able to read and know the location of some of the basic instruments such as the:

- Altimeter
- Heading indicator
- Magnetic compass
- Attitude indicator
- Airspeed indicator
- Tachometer
- Oil pressure indicator
- Oil temperature indicator
- Ammeter
- Fuel gauges
- Fuel pressure
- Landing gear indicator lights

C.5. Aircraft Communications

Communication procedures used for ATC differ from those used for Coast Guard communications; air crew must know both. Not only should air crew know what the communications procedures are, but also how to find the proper frequencies to use and the correct terminology for operation. Aircraft specific communications include:

- Clearance delivery
- Ground control
- Tower
- Departure and approach control
- Center
- Flight service
- Unicom

C.6. Navigation Skills

In addition to what the observer has been taught to read and understand regarding sectionals and terminal charts, air crew should be able to:

- Interpret the chart legend.
- Find frequencies of interest.
- Define special use airspace.
- Plot a course using sectional charts.
- Do time and distance calculations.
- Identify on the sectional and be familiar with the various types of airspace such as:
  - Class A, B, C, D, E, and G
  - Military Operating Areas (MOAs)
  - Restricted Areas
  - Air Defense Identification Zones (ADIZ)
  - Prohibited Areas
- Use low altitude enroute charts and approach plates in addition to the sectional charts.
- Back up the pilot in all phases of flight in regards to heading, altitude, and communications frequencies.

C.7. Weather

Air crew should be able to use and interpret:

- Automatic Terminal Information Service (ATIS)
- Automated Weather Observation Service (AWOS)
- Automated Surface Observation Service (ASOS)
- Automated Flight Service Station (AFSS)
- Direct User's Access Terminal (DUAT)
- Aviation Routine Weather Report (METAR)
- Aerodrome Forecasts (TAF)
- Winds Aloft (FD)
- Notice to Airmen (NOTAMS)
- NOAA

C.7.a. National Oceanic and Atmospheric Administration	Marine weather as received on the weather frequencies of most marine radios is useful in obtaining an overall weather picture. Important information includes sea conditions, the presence of fog, the presence and movement of thunderstorms, and forecast surface winds for the over water areas. This information is neither current nor complete enough to satisfy all of the requirements of aviation. Marine weather does not include ceilings (the lowest layer of broken or overcast layer of clouds), visibility, or the temperature/dew point spread. The air crew should listen to the transcribed NOAA marine weather and pass on to the pilot any significant information, which could affect the mission.
C.7.b. Aviation Weather	Area aviation weather reports are broadcast by FAA flight service stations (FSS) on the VOR or VOR tactical air navigation system (VORTAC) stations which have voice capability. Some navigation/communication transceivers have controls which cut out the reception of voice transmissions from the VOR/VORTACs. Be sure that the controls are set to receive the voice information when listening on navigation frequencies. Each FSS is assigned the geographical name of their location followed by the word "radio" for their radio call sign. Most FSSs are able to transmit and receive through a number of remote sites. Each of these remote sites has been assigned a discreet frequency, which is listed on the aeronautical chart. The FSS can also be contacted on VOR/VORTACs equipped for transmitting and receiving on the frequencies listed on the sectional chart. When listening on a VOR/VORTAC, always advise the FSS which VOR/VORTAC is being used, e.g., "Miami Radio, this is Three Alpha Bravo listening on the White Lake VORTAC, over".
C.7.c. Automated Terminal Information Service	Many of the more active airports have an ATIS, which is continually broadcast on a published frequency for the particular airport. In addition to the current weather, information concerning the active runways, special frequencies, and any hazards that exist or special procedures in use are broadcast. The broadcast is identified by a letter, which is changed each time the information is updated.
C.8. Checklists	Air crew should be familiar with checklists for the following procedures: • Preflight • Cockpit checks • Emergencies
C.8.a. Preflight	Air crew should walk through the preflight with the pilot using a checklist to help determine the condition of the aircraft. Air crew should understand the need for and the use of a checklist.
C.8.b. Cockpit Checks	Air crew should practice the use of a checklist using the challenge and response method.
C.8.c. Emergencies	Air crew should understand and practice immediate actions to be taken in emergencies. These actions should be confirmed by using the applicable checklist.

C.9. Equipment Familiarity

Although equipment on each Auxiliary aircraft may differ in its specific configuration, the concept of operation will be similar. While an Auxiliarist may be pilot or air crew certified, the individual may not be familiar with the operational characteristics of the various knobs and switches in a particular aircraft. *Any flight crewmember must be checked out by the pilot of the aircraft prior to operating any of the equipment in the aircraft and then only as requested by the pilot.*

Chapter 6
Communication/Navigation

Introduction

Communication and navigation skills are required for those Auxiliarists qualifying as pilots, air observers, or air crew. These skills must be initially learned, but unless practiced on a regular basis, it is unlikely that a sufficient skill level will be retained to remain comfortable and effective in the current mission environment.

When on a mission, it is important to know what other units, surface vessels, helicopters, etc., are involved, and the altitudes, separation requirements, and communications protocol. It is also important to know what information may be conveyed on these open frequencies and what should be reported on a land-line or post mission in writing.

This chapter describes the communication/navigation requirements and equipment necessary for effectively operating in the aviation mission environment.

In this Chapter

This chapter contains the following sections:

Section A. Radio Communications

Introduction	The primary purpose of AUXAIR patrols is to act as the eyes for Coast Guard and Coast Guard Auxiliary operations and transmit the information gathered to shore or other operating facilities. With the exception of ATON missions, ice patrols, and some sensitive information emanating from PWCS, this is accomplished primarily by radio; therefore, the ability and competency of all involved in using the radio is of utmost importance. The factors involved are: the radio, its installation, the antenna system, internal crew communications, and the operator's skill in using the radio with proper and effective radio technique.
A.1. Communication Partners	A typical Auxiliary aircraft on a multi-mission patrol, environmental flight, or SAR response will maintain communications both with an FAA facility and with Coast Guard and/or Coast Guard Auxiliary unit(s).
A.1.a. Vessel and Facility Communication	Coast Guard communications may be with Coast Guard cutters, small boats, aircraft, or ground radio stations on frequencies ranging from high frequency single side band to ultra high frequency (UHF), although communication is normally concentrated in the VHF-FM and VHF-AM bands. A qualified and competent observer can assist the Auxiliary pilot by handling some of these communications directly and by recording pertinent information obtained through these radio contacts.
A.1.b. FAA Communication	FAA communications are of such a nature that pilots may prefer to personally handle them since these communications relate to ATC and any actions required are often immediate. These include communications with airport ground control, clearance delivery, control tower instructions, air route traffic control centers (ARTCC), and approach control. These communications involve maintaining separation from other aircraft and will often contain flight restrictions or direction. Some of these communications, including those with FAA FSSs, will contain information that will be needed later by the pilot. The observer should be ready to record these instructions when requested by the pilot.
A.2. PIC Responsibility	The PIC is responsible for all aspects of a flight including audio transmissions from the aircraft. When in doubt, the air crew/observer should obtain approval from the pilot before making a transmission.
A.3. Patrol Communications	While on patrol, a facility maintains two-way communications with any Coast Guard unit; any Auxiliary station or detachment; any federal, state, or local agency (e.g., Army Corps of Engineers, police, fire department, etc.); or any local marina that agrees to maintain the scheduled communication guard and relay official information between the Coast Guard and Auxiliary facility. Prior coordination with the station maintaining the guard is needed to ensure that the station understands and agrees to immediately report a communication loss to the Coast Guard if the reporting period is exceeded.

A.4. Reporting Requirements

Facility operators follow all Coast Guard reporting requirements during a patrol. Position and flight status (usually "ops normal") reports are made every 15 minutes for helicopters and single-engine aircraft and every 30 minutes for multi-engine aircraft. The OIA may impose a more stringent reporting requirement.

A.5. Communication Loss

If communications are lost for more than the designated reporting period, the mission is aborted, the facility moved to a safe haven, and the OIA advised of the situation. For flights operating under direct air traffic control or those receiving VFR flight following, radio contact with the controlling agency satisfies this requirement.

In areas where there are known communication gaps, the OIA may authorize an alternate communications plan. The facility operator will notify the OIA or designee, before beginning the mission, of the patrol's start and end times and the names of all individuals aboard. The facility operator notifies the OIA, or designee, immediately upon return from the mission. At any time the mission is expected to run more than 15 minutes beyond the estimated time of arrival (ETA), the facility operator communicates a new ETA to the OIA, or designee, as soon as practicable, but in no case later than 15 minutes from the original ETA.

A.6. Communications Security

It is important for the flight crew to keep in mind that generally air/ground communications will occur on "open channels" and may be monitored by any person with a scanner, receiver, or transceiver.

Communications Security (COMSEC) and Operational Security (OPSEC) should always be considered as communications are being composed to ensure that sensitive information is not inadvertently disclosed by the transmissions. Unless the mission profile includes provisions to the contrary, or a request is received from a Coast Guard unit, the following precautions should be taken when planning transmissions on "open channels":

- The positions of Coast Guard or Auxiliary vessels should not be disclosed.
- Activities of law enforcement vessels should not be disclosed.
- Locations of military vessels should not be disclosed.
- Reports of suspicious activity might better be reported after landing unless notification is urgent.

Examples of when these reports are part of the mission profile or are otherwise permissible are:

- While on ice reconnaissance patrols, Auxiliary aircraft might be requested to relay the location of the ice breakers.
- During exercise support missions, the locations of military vessels may be requested.
- During regular missions, a Coast Guard unit may request that the flight crew report the location of one of its assets.
- During training missions, prior agreement may have been reached to direct vessels to the "aid" of a Coast Guard or Auxiliary vessel.

Section B. Radio Equipment

Introduction

This section describes the radio frequencies on which Auxiliary aircraft operate and the installation of the radio equipment.

B.1. Aircraft Band

One or more radio transceivers (VHF-AM) operating on VHF-AM in the frequency range of 118.000 to 135.975 MHz are common in all aircraft, and are aboard facilities flown by Auxiliarists. These units are compact and designed to fit in industry-standard spaces in the instrument panel. These transceivers are operated in the same manner as radios aboard vessel facilities. The front panel normally contains an off/on volume control, a squelch control, which is used to minimize background noise, and a frequency selector, which usually displays the frequency digitally. If there is more than one aircraft radio, there will generally be a selector switch that selects which radio is to be used for transmission and/or reception. It is possible, depending on aircraft installation, to have two radios on at one time enabling monitoring of both frequencies at the same time. The following are common aircraft frequencies:

- 121.500 MHz – Distress or emergency communications only
- 122.750/122.850 MHz – Air-to-air
- 126.200 MHz – Military airports
- 122.000 MHz – Flight Watch/FSS
- 122.900 MHz – Common Traffic Advisory Frequency (CTAF)
- 123.100 MHz – SAR frequency, air-to-air

B.2. Marine Band/Coast Guard Frequencies

Auxiliary aircraft carry one or more radio transceivers operating on VHF-FM in the frequency range of 156.050 to 162.025 MHz. Most VHF-FM marine-band transceivers used in Auxiliary aircraft are not designed to fit in the standard aircraft stack. These essential radios are usually mounted wherever space permits their safe mounting. Sometimes, due to switching or wiring complexities, the marine band radio cannot be interconnected with the aircraft microphone system, thus requiring a separate microphone. A less desirable method to obtain VHF-FM-band communications is to use a portable, handheld unit. In either case, an attachment to an external antenna is part of the facility requirements. The following are common frequencies for Coast Guard Auxiliary communications from aircraft:

- Channel 16 (156.800 MHz) – Maritime Distress and Calling
- Channel 21 (157.050 MHz) – CG Working Frequency
- Channel 22 (157.100 MHz) – CG to Public Liaison Frequency
- Channel 23 (157.150 MHz) – CG Working Frequency
- Channel 81 (157.075 MHz) – CG Working Frequency
- Channel 83 (157.175 MHz) – CG Working Frequency

B.3. VHF-FM Transceiver Installation

The installation should be designed to use the aircraft electrical system for power or battery charging of the marine radio, and should also use the aircraft intercom system to permit all crewmembers to hear the marine transmissions. The antenna should be hull mounted to the bottom of the aircraft for best results and dedicated exclusively to the VHF-FM radio. It may be incorporated as part of a "Y" lead for emergency use handheld VHF-AM units. It is important that all onboard are able to hear the communications on the VHF-FM unit in order to ensure effective CRM principles and reduce time and error in passing along information within the aircraft. **Figure 6-1** illustrates one method of connecting a handheld or portable marine unit to the aircraft systems.

Since common aircraft power systems are either 12- or 24-volt, a power converter may be needed to connect to the transceiver power or charging port.

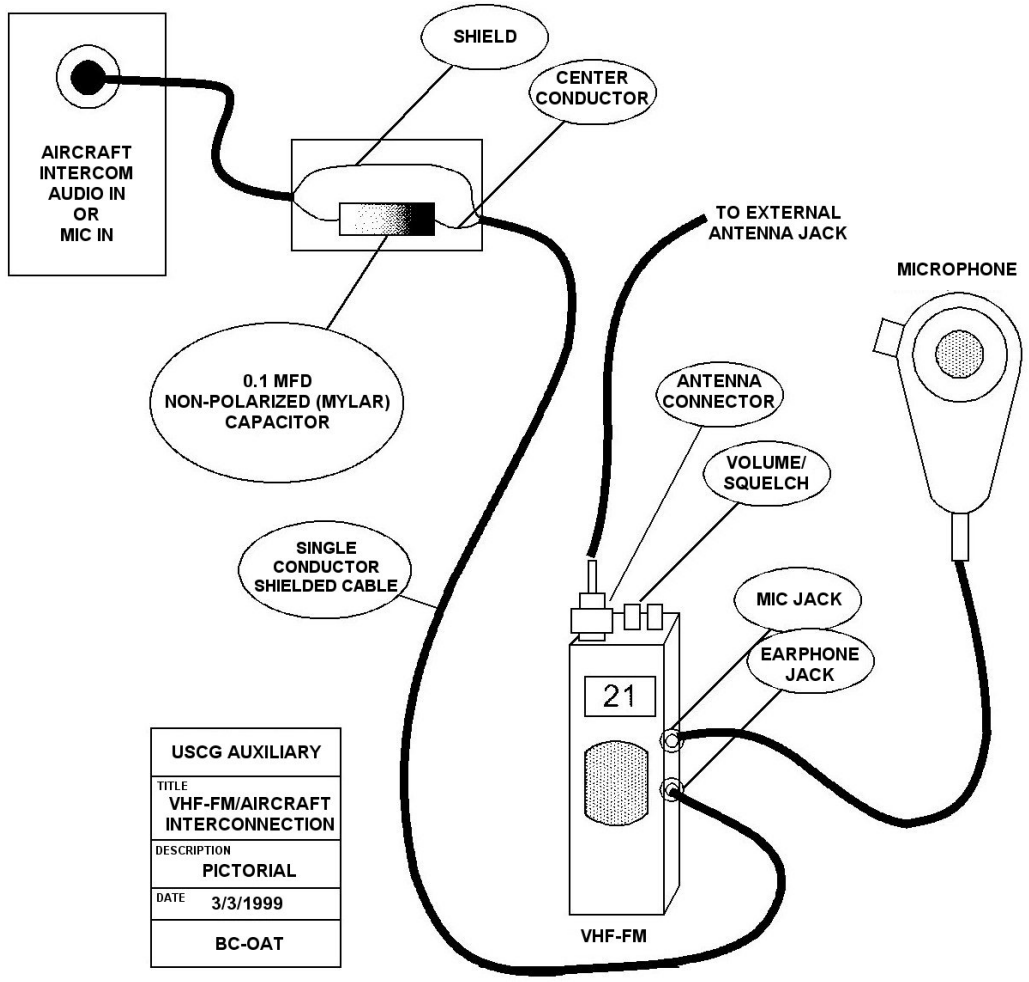


Figure 6-1
Interconnection of VHF-FM Transceiver in Auxiliary Aircraft

B.4. VHF-FM Transceiver Usage

In aircraft use, the microphone may pick up aircraft noise if it is not a noise-canceling type. This may make aircraft transmissions difficult to understand. For reception, an intercom connection is superior to a single earpiece. However, if an intercom is not available, an earpiece alone may be required.

Due to the increased range possible with VHF-FM radios transmitting from aircraft, low power should be used whenever possible. Aircraft may not transmit on any VHF-FM maritime/government frequency when operating above 3000 feet above ground level (AGL) except in emergencies or when necessary to maintain essential communications.

Section C. Radio Procedures

Introduction

This section describes the proper procedures to follow when transmitting information via radio communications.

C.1. Before Transmitting

Before transmitting:

- THINK – Plan what you are going to say. Brevity is important.
- PREPARE –
  - Know where you are.
  - Know the frequency you are listening on.
  - Anticipate questions you may be asked to answer.
- LISTEN – Be sure that no one else is using the frequency.

C.2. Aviation Phraseology

There are certain procedures and phraseologies that are specific to air operations. Observers and air crew should practice aviation communications until they become second nature. Practice not only improves communications, but also tends to overcome shyness or "mic fright".

C.3. Calls to a Coast Guard Unit

The following are examples of typical radio calls from an aircraft: (in this example the aircraft registration is "N123AB", and its FAA call sign <ID> is: "123AB"). However, when contacting Coast Guard or Auxiliary facilities on VHF-FM, the Auxiliary aircraft should always identify itself as "Coast Guard AUXAIR 123AB" on the initial call of any group of calls. The first call in any sequence of calls also uses the entire call sign, in this case "Coast Guard AUXAIR One Two Three Alpha Bravo". Subsequent calls in the sequence may use only the last three digits and/or letters, "Three Alpha Bravo".

C.3.a. Station Identifier

The station identifier of the station called should be repeated 2 to 3 times on the initial call.

EXAMPLE:

"Coast Guard Sector Charleston, Coast Guard Sector Charleston, this is Coast Guard AUXAIR One Two Three Alpha Bravo. Over."

C.3.b. Successive Transmissions

After communication is established, the call sign may be abbreviated to the name of the unit or the last three digits/letters of the call sign.

EXAMPLE:

"Charleston, this is Three Alpha Bravo, what is your message? Over."

C.3.c. Tactical Call Signs

When approved by an Air Station Commanding Officer (ASCO), tactical call signs may be used for a mission or missions when warranted by operational needs. If so assigned, a record of the designated tactical calls will be kept by the air station and referenced to the actual facilities in use.

C.4. Calls on Aeronautical Frequencies

When initiating calls on aeronautical frequencies, there are differences in phraseology and procedures from those of Coast Guard communications. Aircraft call signs remain the same, for example in this case "N123AB". Aircraft procedure normally includes the make or model of the aircraft as a prefix to the call. This allows the air traffic controller to better identify the aircraft when pointing it out as traffic to other aircraft. It also gives the controller an idea as to its operational capabilities.

C.4.a. Flying While Not Under Orders

When flying as a civilian aircraft, not under orders, the aircraft would identify itself on initial transmissions as: <Aircraft Type/Model> <Aircraft ID>.

EXAMPLE:

"Miami Tower, Cessna One Two Three Alpha Bravo."

C.4.b. Flying While Under Orders

When flying under orders, an Auxiliary aircraft is considered to be a Coast Guard aircraft. The call sign would be "Coast Guard AUXAIR <ID>" where the <ID> is the alphanumeric registration following the initial "N".

EXAMPLE:

"Miami Tower, this is Coast Guard AUXAIR One Two Three Alpha Bravo."

C.4.b.1. Auxiliary Aircraft Type or Model Reporting

On many occasions it is useful to indicate to ATC the type or model of Auxiliary aircraft that is flying under orders.

EXAMPLE:

"Miami Approach, this is Coast Guard AUXAIR Skyhawk One Two Three Alpha Bravo."

C.4.b.2. RESCUE Prefix Usage

When engaged in actual SAR operations, the prefix RESCUE may be appended to AUXAIR.

EXAMPLE:

"Republic Tower, this is Coast Guard AUXAIR Rescue One Two Three Alpha Bravo."

C.5. Aeronautical Station Designations

The following are aeronautical station designations:

- ARTCC: "Memphis Center"
- Approach control: "Boston Approach"
- Airport tower: "Baton Rouge Tower"
- Airport ground control: "Jacksonville Ground"
- Pre-taxi clearance control: "Kennedy Clearance"
- FSSs: "Portland Radio"
- Enroute flight advisory service: "Oakland Flight Watch"

C.6. Additional Reporting Procedures	The following are additional communication reporting procedures.
C.6.a. Time	Time is given in the 24-hour clock and each digit is said separately. Times given by aircraft in informal radio traffic are expressed in minutes after the hour with the hour itself not given unless necessary. EXAMPLE: 0825 – "zero eight two five" or "minute two five"
C.6.b. Altitudes	Altitudes are reported with separate digits for the thousands, plus hundreds, if appropriate. EXAMPLE: 4500 ft – "four thousand five hundred"; or, 10,000 ft – "one zero thousand"
C.6.c. Heading or Direction	Three digits are used when giving a heading or direction. EXAMPLE: 050 degrees – "heading zero five zero"; or 000 degrees – "due North heading zero zero zero"
C.6.d. Speed	Speed is given in knots. EXAMPLE: 120 knots – "one two zero knots"
C.6.e. Transfers Between Air Traffic Controllers	When the aircraft is "handed off" from one air traffic controller to another, always include altitude when making the initial contact. EXAMPLE: "Mobile Approach, this is Coast Guard AUXAIR Cessna One Two Three Alpha Bravo at seven thousand."
C.6.f. Short Counts	When a short transmission is required for receiver tuning or direction finding, a "short count" is employed. This consists of counting from one to five and back. The transmission should not exceed 10 seconds.
C.6.g. Long Counts	When a longer transmission is required, a "long count" is employed. This consists of counting from one to nine and back.

C.7. Good Communication Practice	The following good communication practices are intended to supplement the specific radio procedures provided above.
C.7.a. Listening	Listening is key to successful communications. Ensure the radio volume and squelch are properly set. Ensure one crewmember is tasked with continually listening for communications and not only when "ops normal" messages are due.
C.7.b. Microphone Operation	The microphone button should be used properly. Press to talk and hold the microphone key for a half-second before speaking. The microphone should be spoken into directly at a distance of about 1 inch from the lips. Engine and wind noise may cover most of the message if proper technique is not used. Shouting into the microphone will result in distortion of the signal.
C.7.c. Difficulty Maintaining Guard	When working a case with other assets and having difficulty maintaining guard because of radio reception, it may be possible to temporarily use other units as relays until better communications can be established.

Section D. Mission Communications

Introduction

Mission communications consist of an orderly sequence of communications between an Auxiliary aircraft and the Coast Guard unit that is holding the aircraft radio guard. These communications are normally planned and expected, but may occur spontaneously as an Auxiliary aircraft moves through the AOR of a Coast Guard unit.

To provide for the safety of the aircraft crew, a radio guard is kept with the local Coast Guard unit or Auxiliary radio station.

D.1. Departure

Immediately after takeoff, communications should be established with a regular Coast Guard unit or Auxiliary radio and a flight guard should be established. At a minimum, the following information should be transmitted:

- Time of takeoff
- Departure airport
- Number of persons onboard
- Mission and/or destination, including route, if known

EXAMPLE:

"Coast Guard Sector New York this is Coast Guard AUXAIR One Two Three Alpha Bravo. Over."

After a response from Sector New York, "We were airborne from Linden at one four zero zero with 3 persons onboard for a PWCS patrol. Request you take our radio guard. Over."

D.2. In-Flight Reporting

Facility operators follow all Coast Guard reporting requirements during a patrol. Position and flight status (usually "ops normal") reports are made every 15 minutes for helicopters and single-engine aircraft and every 30 minutes for multi-engine aircraft. If communication is lost, see *paragraph A.5* of this chapter. The OIA may impose a more stringent reporting requirement. This report should include:

- Unit called.
- Aircraft call sign.
- Flight status.
  - "Ops normal" when operations are normal.
    - When circling a fuel spill, that information would be given in place of the "ops normal".
    - When flying a search pattern, the search leg being flown, or number of legs completed would be given.
- Position is reported to the nearest minute of latitude/longitude or with reference to a known landmark.
- Heading.

EXAMPLE:

"Coast Guard Sector Charleston, this is Coast Guard AUXAIR One Two Three Alpha Bravo; operations normal; position 32 degrees 34 North, 80 degrees 01 West; heading two seven zero degrees. Over."

D.3. Changing Radio Guard Stations

When changing radio guard from one station to another, first establish a guard with the new station, then secure the guard with the previous station, advising them of the identity of the new guard station. If, for any reason, communication with the previous guard station is not possible, ask that the new station secure the guard with the previous station. In any event, the previous guard MUST be secured in a timely manner.

EXAMPLE:

"Coast Guard Station Tybee, this is Coast Guard AUXAIR One Two Three Alpha Bravo. I have transferred my radio guard to Coast Guard Sector Charleston. I request you secure my guard. Over."

At the end of the mission, the Coast Guard air station for which the mission was flown is informed that the aircraft is back on the ground and the mission has been completed.

D.4. Relaying Traffic

Because an aircraft presents a good radio location due to its altitude, it may be the only unit capable of communicating with the vessels or aircraft at the scene of a mission. If requested to relay information between the shore station and the units on-scene, it is imperative that the information be retransmitted exactly as it is received. Under no circumstances should any subjective interpretations be added to the information being relayed.

Section E. Radio Communications in SAR Situations

Introduction

This section describes the specific radio communications that are required during SAR situations.

E.1. Radio Communications

While performing a SAR mission, the crew member acting as radio operator of the VHF-FM radio should be experienced in communication with shore stations and understand the demands and requirements of the land-based watchstander. The station or Sector watchstander is often confronted with multiple tasks and operates several radios at a time. When the radio operator makes first contact, the transmitting frequency is identified and a full call sign for the aircraft is given. By identifying the channel, the watchstander will know from which radio unit the call is being received.

EXAMPLE:

"Station Brunswick, Station Brunswick, this is Coast Guard AUXAIR 123AB on Channel 16. Over."

E.2. Working Frequency

When hailing initially on channel 16, once contact is established, be prepared to switch to the Coast Guard "working frequency" or to a predetermined frequency. Once the communication has been established, further communications in the sequence may use abbreviated call signs. It is helpful to continue identifying as "AUXAIR" on VHF-FM, even when using abbreviated calls, since these frequencies are monitored by Coast Guard and Auxiliary units, vessels, radio stations, and aircraft, and it avoids confusion when watchstanders immediately understand the type of facility with which they are communicating or that they are monitoring.

EXAMPLE:

"AUXAIR 3AB switching to 83 Alpha. Over."

E.3. Frequency Monitoring

The crew should have an understanding of which frequency will be monitored between "ops normal" or other regularly scheduled contacts, and a guard on it should be maintained. When working a SAR case, it is beneficial to all if communications can be arranged on one frequency. For instance, if a guard is established on Channel 16 but other air assets are working Channel 22A, it will be necessary to monitor both Channel 22A and Channel 16.

EXAMPLE:

"Station Brunswick, this is AUXAIR 3AB on 16. Over."

If there is any doubt that the watchstander understood the intended message, confirmation should be requested.

Section F. Visual Communications

Introduction

Communication between an assisting Auxiliary aircraft and surface units is necessary if the aircraft giving assistance is to be effective. The communication may be with the target vessel, an assisting surface vessel, or both. The communication may consist of simple aircraft and surface maneuvers, surface manual signals, radio, or a combination of techniques. Regardless of the methods used, the aircraft will be of little value if some sort of workable communications between the surface vessel and the aircraft cannot be established. In the case of a surface vessel being assisted, the personnel onboard may have little or no knowledge of how to communicate with the aircraft. Therefore, considerable ingenuity and patience on the part of the flight crew may be necessary to establish a degree of effective communication.

F.1. Surface-to-Air Signals

Very often, only visual methods will be available for communications with vessels on the surface. This is particularly true during a patrol or search where the surface vessel is attempting to pass the message that it needs assistance. Flight crews should be alert to a variety of possible signals from the people on the surface to help in this identification, including:

- Body signals where one of the crewmembers of the unit in need of assistance faces in the direction of the aircraft and raises and lowers his arms or possibly just waves wildly. (see **Figure 6-2**)
- Use of a circle and square signal on a hoist, or a black square and black circle on a flag with an orange background. (see **Figure 6-2**)

F.1.a. Body Movement Signals

Body movement signals were developed for military use and are now widely accepted in the civilian community. They are found in various aircraft and SAR documents including the *Airman's Information Manual*, the *AOPA Handbook for Pilots*, and the *Search and Rescue (AUXSAR) Student Text*.

There are eleven such "standard" signals that can be made by a person aboard a surface vessel (**Figure 6-2**). The signals are simple body position and movement signals and are taught in various Auxiliary training courses. Most often, the signals will be used by an Auxiliary surface facility. However, members of the general boating public may have received instructions in their use or may have a document available, which describes the signals and explains their use.

Affirmative (Yes)

Negative (No)

All OK – do not wait

Pick us up – plane abandoned

Need mechanical help or parts – long delay

Need medical assistance – urgent (Lie prone)

Can proceed shortly – wait if practical

Our receiver is operating

Do not attempt to land here

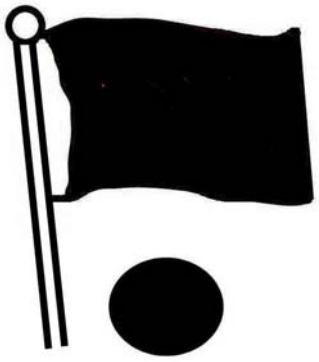
Land here (Point in direction of landing)

Use drop message

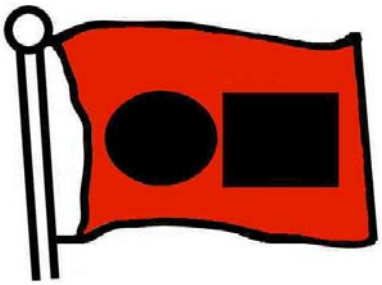
Figure 6-2
Body Movement Signals

F.1.b. Signal Flags

Signal flags are another effective method of signaling to an assisting aircraft. (see **Figure 6-3**)



Circle and Square Signal on a Hoist

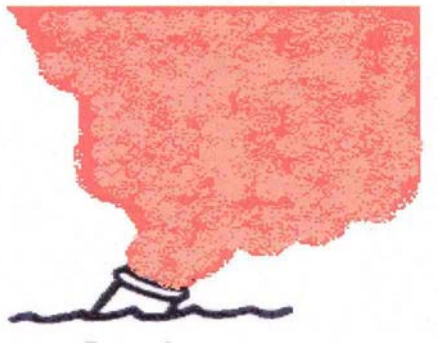


Black Square and Black Circle on Orange Background

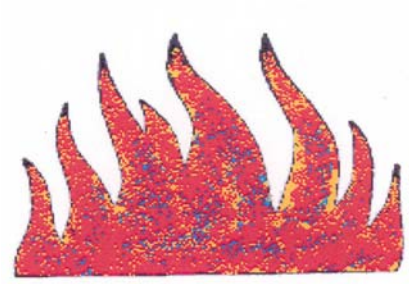
Figure 6-3
Signal Flags

F.2. Signal Fires or Smoke

Signal fires or smoke coming from a surface vessel may be from burning oil or oily rags in a can and can be detected from a considerable distance. (see **Figure 6-4**)



Smoke

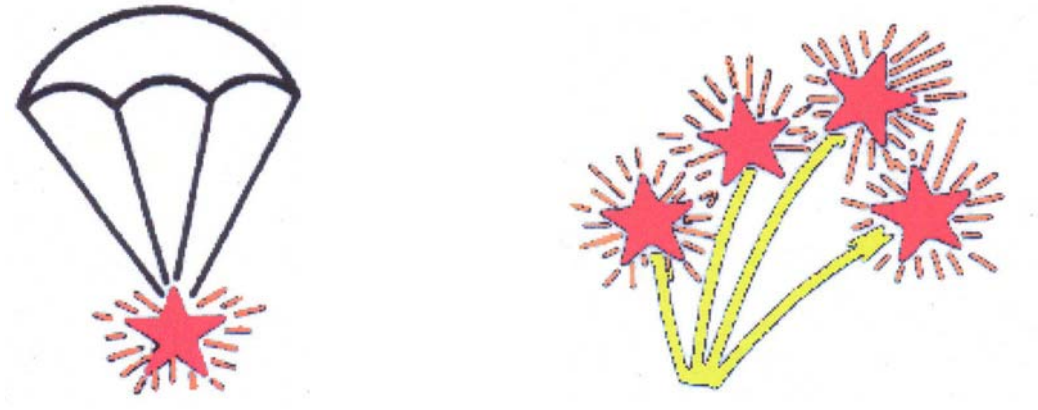


Flames

Figure 6-4
Signal Fires or Smoke

F.3. Pyrotechnic Signals

Pyrotechnics include flares and meteors from the surface as well as smoke. (see **Figure 6-5**) Pyrotechnic signals are used as both day and night visual aids along with handheld or floating smoke signals, used in daytime. These emit a large volume of bright orange smoke that remains visible for several minutes. Under high wind conditions, the smoke will dissipate rapidly making the signal less effective. Handheld flares, although better at night, may also be used as daytime signals. Coast Guard- or SOLAS-approved marine-type flares are much brighter than the old fuse type and are therefore much more visible from an aircraft.



Parachute Red Flare **Red Star Shells**

Figure 6-5
Pyrotechnics

F.4. Dye Markers

Dye markers appear on the water and may be any color. (see **Figure 6-6**)

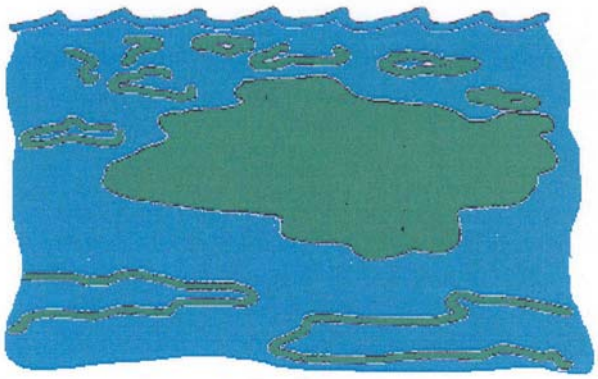


Figure 6-6
Dye Marker (any color)

F.5. Air-to-Surface Signals

Another need for visual communication may arise when the aircraft has the need to direct a surface vessel. This may occur when the aircraft is attempting to guide a surface vessel away from danger or towards another vessel to assist. The Coast Guard and the Coast Guard Auxiliary have been providing copies of Coast Guard Form CG-3488 to boat operators for many years. Thus, Auxiliarists can be expected to understand the maneuvers, and many members of the boating public will recognize them. In any event, they will probably be understood even if the surface vessel crew has not been exposed to this form although repetition may be necessary. (see *Appendix A*)

F.5.a. Assistance Request Initiation

To initiate a request for assistance, the surface vessel is circled at least once. Additional circling may be necessary to obtain the attention of the surface crew. This can be verified when members of the surface crew are observed to be watching the maneuvers of the aircraft.

After circling the vessel at least once, the aircraft is flown across (perpendicular to) the vessel's projected course while opening and retarding the throttle, rocking the wings or cycling the propeller pitch. Next, the aircraft is flown outbound in the direction that the surface vessel is to take. If the surface vessel does not respond, the procedure should be repeated.

F.5.b. Surface Vessel Declination

The surface vessel should also be observed for signals indicating that it cannot or will not accept the directions. Be alert for other signals such as a wave-off or the surface-to-air signal for "negative".

Another possible signal for a vessel to indicate "no" when underway might be to swing the bow of the vessel left and right in the manner of the aircraft maneuver of "negative". Obviously, if the surface vessel displays no reaction or response to repeated signal attempts, this should be accepted as tacit refusal of the directions, and other available means of obtaining the desired action should be pursued.

F.5.c. Surface Vessel Acceptance

When a surface vessel does accept the directions, it will often be signaled by picking up the desired heading. As the aircraft will be traveling at a much higher speed, it can circle back to the vessel periodically and pass close by while flying in the direction of the desired course. This technique can be used to verify the correct course is being followed and/or for indicating corrections in the course for the surface vessel. When the target seems to be in visual range of the assisting vessel, the aircraft then circles the target to serve as reference to the surface vessel. This same technique can be used to steer a vessel around an unseen hazard. The aircraft should circle at waypoints until the vessel arrives, then indicate the new course.

F.5.d. Aircraft No Longer Requires Assistance

If the conditions change during the operation freeing the vessel from danger, or other reasons develop such that the aircraft no longer desires the surface vessel to follow the course indicated, the aircraft should be flown close astern of the surface vessel at low altitude while changing the engine sound (by throttle or prop control) or rocking the wings until the vessel indicates understanding of the cancellation. The aircraft is then free to break contact.

F.6. Message Drops

Message drops are used for communication with surface craft or persons in distress. Aircraft must be certified in writing by the ASCO before deployment of any SAR device such as a drop message. Air crews so certified must practice regularly to maintain proficiency and accuracy in deploying message drops or any other SAR device. (see the *Auxiliary Operations Policy Manual*, COMDTINST M16798.3 (series))

F.7. Aircraft Acknowledgement Signs

The aircraft acknowledgment signals shown in **Figure 6-7** are used to respond to the visual body signals. These signals are straightforward and simple in their application. The signals used for "message received and understood," "affirmative", and "negative" should be performed smoothly and slowly. Care must be taken in making the signal for "negative" to avoid a skid at slow speed, which could develop into a violent stall. The signal can be performed as a series of shallow turns rather than "yawing" the aircraft, thereby avoiding the skid danger.

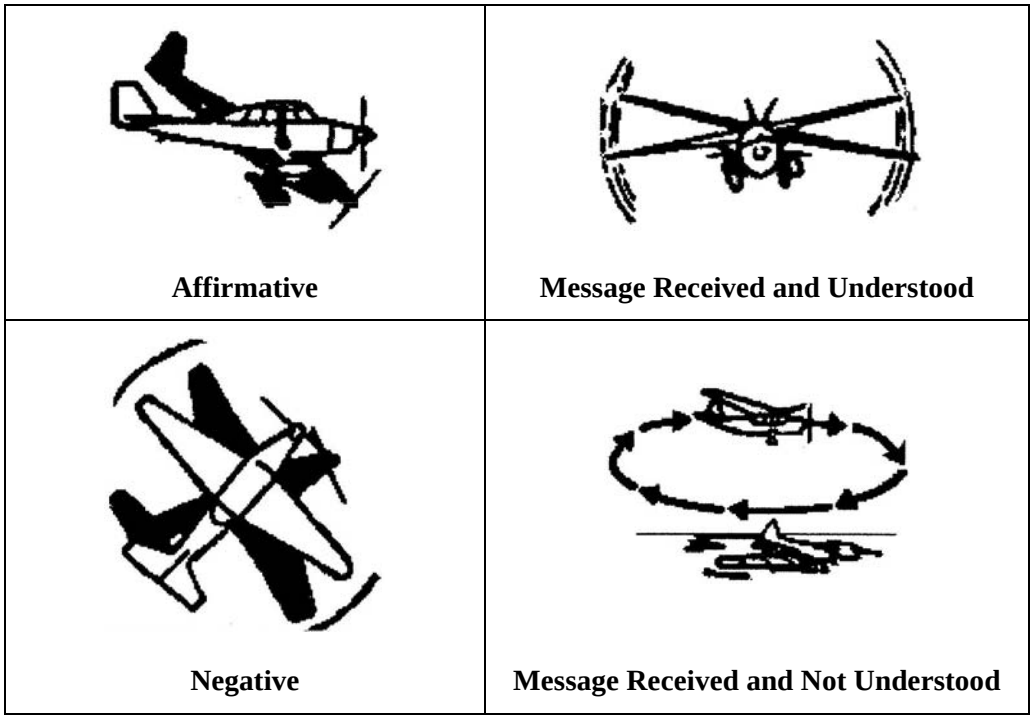


Figure 6-7
Aircraft Acknowledgement Signals

F.8. Ground Emergency Signals

There are recognized emergency communication symbols designed to be used by survivors ashore to impart information to aircraft. These are international symbols and can be found in various publications. Caution should be exercised because the accepted symbols were reduced in l981 by international agreement from eighteen to five. Some publications may still carry the out-of-date symbols. The new ground-to-air symbols are shown in **Figure 6-8**.

These signals may be made using fabric strips, wood, stones, or any material contrasting with the background surface. They may also be marked out in snow or on the ground or in sand. Pilots receiving such signals should acknowledge them by rocking the wings of the aircraft. (see **Figure 6-7**)

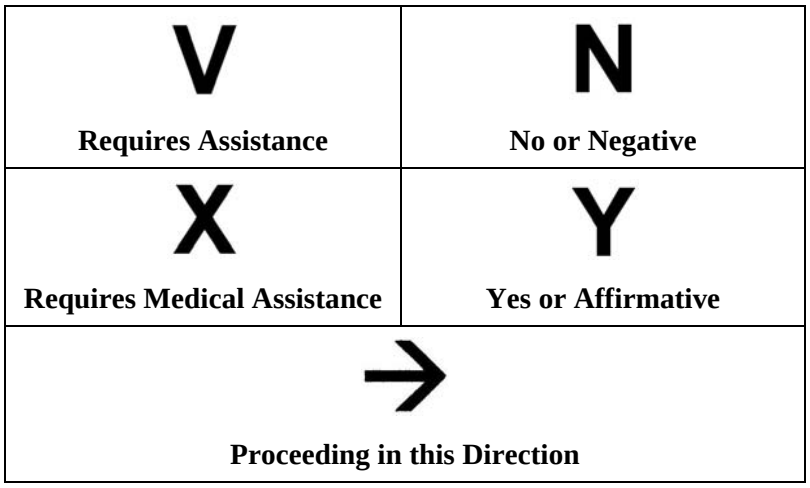


Figure 6-8
Ground Emergency Signals

F.9. Auxiliary Surface-to-Air Recognition

Positive identification of an Auxiliary vessel may be important when providing directions to a disabled vessel or distress location. Coast Guard vessels are easily identified by their distinctive hull markings. Auxiliary vessels, for the most part, resemble other private vessels. From the air, such identifying markings as ensigns, patrol boards names, and numbers may provide some help, although they may not be easily seen from above. The uniforms and PFDs worn by the Auxiliarists may be helpful for identification and the flashing amber and red "public service vessel" light may be of some help.

F.9.a. Circular Wake

If radio communications have been established, vessel identification can be confirmed by having the Auxiliary vessel turn in a tight circle. The circular wake is readily identified from the air.

F.9.b. Surface-to-Air Recognition Banner

Auxiliary vessels are encouraged to display a special Surface-to-Air Recognition Banner. (see **Figure 6-9**) This banner consists of a black capital "A" in block lettering on an International Orange background. The banner is normally displayed on the deck or top of the pilothouse with the base of the "A" facing the stern. The sign is approximately a 36-inch square. This banner is used to identify Auxiliary vessels on patrol from the air. (see *Auxiliary Operations Policy Manual*, COMDTINST M16798.3 (series), *Chapter 3, Section E*)

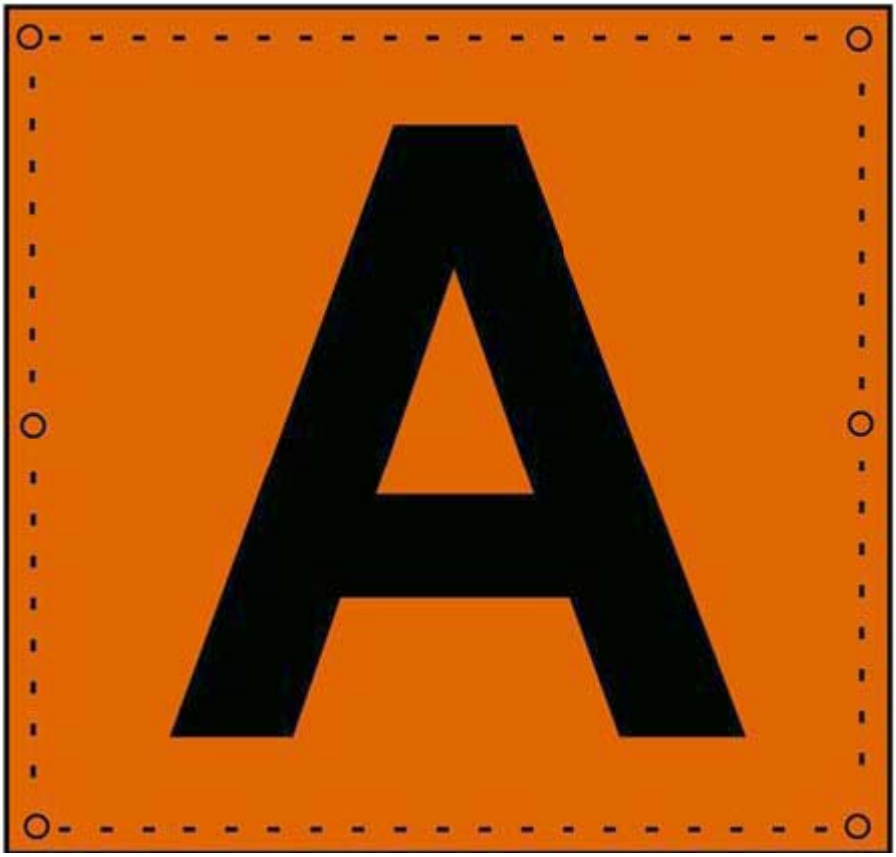


Figure 6-9
Surface-to-Air Recognition Banner

Section G. Navigation Equipment

Introduction	All aviation-qualified Auxiliarists are trained to understand, operate, and interpret the navigation equipment discussed in this section.
G.1. VOR Receiver	VHF VOR navigation receivers operate in the frequency range of 108.000 MHz to 117.950 MHz and receive signals from ground VOR stations. These signals provide azimuth information to the aircraft. This information is displayed as the magnetic bearing either to or from the VOR station. The term used to describe the azimuth information is the "radial" from the station. For practical purposes, this is the magnetic bearing from the station. If the aircraft were on the 140 radial of the Harvey VOR, the magnetic bearing from the Harvey VOR to the aircraft would be 140 degrees. If the aircraft were to fly directly to the station, it would fly a 320-degree heading (the reciprocal of 140 degrees).
G.1.a. VOR Audio Transmission	VORs are equipped to transmit some form of audio signal (Morse code or recorded voice) that is used to verify the identity of the station.
G.1.b. VOR Nautical Mile Calculation	VOR/TACAN (VORTAC) or VOR/DME stations have the additional ability to provide signals that may be used to compute the distance in nautical miles between the aircraft and the station. The VOR, VORTAC, and VOR/DME signals are line of sight. The computers within the typical navigation receivers and DME will display range and bearing to/from the station and, in the case of a VORTAC or VOR/DME, will display the range, ground speed, and time to the transmitting station, if a direct path is flown.
G.1.c VOR Voice Transmission	Some navigation/communication transceivers have controls which cut out the reception of voice transmissions from the VOR/VORTACs. Ensure the controls are set to receive the voice information when listening on navigation frequencies.
G.2. Automatic Direction Finder	The automatic direction finder (ADF) receiver may be tuned to frequencies from 200 to 415 kHz for low frequency radio beacons and from 535 to 1605 kHz to cover the standard AM broadcast band. When tuned to a station, the needle of the indicator will point toward the transmitting station, which also transmits a three-letter identification code, except during voice transmissions. The course may be displayed either as a bearing relative to the heading of the aircraft or as a magnetic bearing from the aircraft to the station. These beacons are subject to errors caused by various kinds of disturbances, such as lightening storms.

G.3. Long-Range Aid to Navigation

LORAN receiver uses a network of land-based radio transmitters. Before it can provide accurate navigational information, it must acquire signals from three or more stations. Most LORAN computers will display the aircraft's position in latitude/longitude coordinates that the flight crew must be able to understand. Many LORAN units have the capability to store a number of positions as waypoints and may display range and bearing, ground speed, cross-track error, and other information relative to these waypoints and to the aircraft's position. LORAN does not depend on line of sight signals. Special aviation LORAN units may contain databases that permit recall of information about airports and other navigation waypoints.

G.4. Global Positioning System

GPS depends on information received from satellites. The GPS computer displays the aircraft's position in latitude/longitude, and may also provide altitude information. The information available to the pilot is much the same as that given by LORAN, including ground speed, cross-track error, and relative positioning to various waypoints. The GPS units may also contain databases providing information about airports and navigational aids, and permitting flights to be planned and flown directly between data points. Some of the GPS units are equipped with "moving maps" which constantly update and show the position of the aircraft. (see *paragraph G.5.b* of this chapter for proper GPS display)

G.5. Use of Navigation Equipment for SAR

The following information applies when using the VOR system or LORAN/GPS navigation equipment for SAR missions:

G.5.a. VOR System

The VOR system is basically line of sight which increases the aircraft's effective range with altitude. The effective range for the VOR portion (azimuth) is greater than that for the DME (range). Either lines of position (radials) from two VOR stations or one line of position and distance from a VORTAC or VOR/DME station may determine a position fix. This information is then plotted on an aeronautical chart and converted to latitude/longitude, if required.

G.5.b. LORAN/GPS

A position determined by a LORAN or GPS navigation computer is normally displayed in latitude and longitude and may be passed directly to a vessel or shore station with no correction, adjustment, or other processing necessary. It is necessary to ensure that the characteristics of the unit and display properties are properly set or understood, so that it is clear whether the unit is displaying nautical or statute miles, and whether the bearings are magnetic or true. When flying over a significant target, the position may be entered as a waypoint. Recalling this waypoint will display the position and the LORAN or GPS will provide navigation directions relative to that position. Returning to the position, vectoring a surface craft to the position, or orienting a search about the position becomes an exercise in reading and interpreting the display.

Chapter 7
Flight Environment

Introduction

The environment for Auxiliary flight encompasses both flights over land and water. Flights over water are often performed at altitudes and distances that are out of gliding distance of shore. In addition, the offshore environment presents some hazards to flight which must be taken into account by the crew and PIC.

In this Chapter

This chapter contains the following sections:

Section A. Flight Operations

Introduction	This section describes flight operations and the general requirements for carrying Coast Guard operational orders.
A.1. All Flight Operations	Whenever an Auxiliary facility is operated under orders, certain Coast Guard regulations establishing authorized missions and operational limitations apply to the PIC and crew as described in the *Auxiliary Operations Policy Manual*, COMDTINST M16798.3 (series).
A.1.a. Auxiliary Pilots	Though Auxiliary pilots are "deemed to be Coast Guard pilots" when operating under Coast Guard orders, Auxiliary pilots conduct all flights under applicable FAR, local air traffic rules, and applicable Coast Guard and Auxiliary publications.
A.1.b. First Pilots or Aircraft Commanders	First pilots or aircraft commanders may act as PIC for SAR, communications relay, and special missions as described in the *Auxiliary Operations Policy Manual*, COMDTINST M16798.3 (series), *Annex 2*.
A.1.c. Auxiliary Patrol Missions	Regular Auxiliary patrols are normally conducted in daylight and during visual meteorological conditions (VMC). Auxiliary patrols for PWCS, ATON, marine environmental protection (MEP), enforcement of laws and treaties (ELT), ice operations, and chart updating missions are conducted only in daylight and only when the weather on-scene is forecast to be VMC.
A.2. Offshore Operations	Offshore operations occur when an aircraft is operated beyond gliding distance from shore. For this purpose, shore is defined as "land that is suitable for an emergency landing with a reasonable expectation of landing without injury to persons onboard the aircraft." (see the *Auxiliary Operations Policy Manual*, COMDTINST M16798.3 (series), *Annex 1)* When operating missions offshore, the flight crew may experience conditions not normally encountered in personal flying. Maritime safety missions, including SAR prosecution, are typically flown at a lower altitude than would normally be chosen for an over-water route. Offshore weather may be quite different from inshore or even shoreline airports. It is not unusual for haze conditions offshore to blend with reduced visual cues created by calm water and contribute to a lack of spatial awareness. Due to these circumstances, certain procedures have been mandated for all offshore operations in Auxiliary aircraft operating under orders, and it is recommended that at least one pilot aboard be instrument-rated when operating out of sight of land.
A.2.a. Aircraft on Auxiliary Missions	During offshore flight on Auxiliary aircraft under Coast Guard orders, both the aircraft and its occupants are provided with the following protective equipment: • PFDs • Rafts • Anti-exposure suits

A.2.b. Range Offshore

Single-engine Auxiliary aircraft maintain operations within 25 nautical miles of shore. When working with a surface facility, helicopter, or other asset with recovery capabilities, the shore is considered to extend to the location of the recovery asset. However, communications guard must be maintained with that asset for this exemption to apply, and in no case may a single-engine aircraft exceed 50 nautical miles from shore. Multi-engine Auxiliary aircraft normally do not proceed beyond 50 nautical miles from shore and must be meticulous about maintaining guard and regular position reports when operating over water and out of sight of land.

A.3. Night Operations

Any Auxiliary operational flight that includes flight at night or in IMC is required to have two pilots who hold current FAA instrument ratings.

Operational flights are defined as those that directly support Coast Guard operational missions or training for such missions. Each pilot's instrument time and experience should be considered when assigning missions. Night is defined (by the FAA) as the period after civil twilight following sunset, and prior to civil twilight preceding sunrise.

A.4. Instrument Meteorological Conditions

IMC is defined by FAA regulations and occurs whenever the flight conditions are less than that required for VMC. VMC minima vary with the type of airspace in which the aircraft is flying. In all cases, however, VMC will require clearance from clouds and reasonable flight visibility.

A.5. Second or Safety Pilot

Under flight at night or in IMC, the second pilot is the safety pilot, who holds a current FAA instrument rating. The safety pilot may be:

- An Auxiliary pilot, current in category.
- A Civil Air Patrol pilot, current in category.
- An active duty Coast Guard pilot, in the same category of aircraft, with either a Coast Guard or FAA instrument rating in the category.

Section B. Flight Procedures

Introduction	Flight procedures are those relating to the movement of Auxiliary facilities and the operation of these aircraft while under orders. Coast Guard orders from an appropriate Coast Guard command are issued before *any* mission involving an Auxiliary facility. Once these orders have been received and the mission embarked upon, aircraft facilities are deemed to be Coast Guard aircraft and public vessels of the United States in accordance with the *Auxiliary Operations Policy Manual*, COMDTINST M16798.3 (series).
B.1. Pilot-in-Command	The PIC of an Auxiliary facility is a Coast Guard Auxiliary aviator appropriately qualified. The PIC is the sole and final authority for the flight, responsible for ensuring the safe and orderly conduct of the flight. This includes evaluating crew capabilities, obtaining proper orders, maintaining fatigue standards, and expediting mission requirements. The PIC is responsible for ensuring that the crew and any passengers are properly briefed for the mission in accordance with the *Auxiliary Operations Policy Manual*, COMDTINST M16798.3 (series), *Annex 1*.
B.2. Safety Requirements	The following safety requirements are addressed below: • Wearing lap belts and shoulder harnesses • Alcoholic beverage consumption • Fuel reserves • Flight crew member fatigue
B.2.a. Lap Belts and Shoulder Harnesses	All crew members wear lap belts and shoulder harnesses in accordance with the *Auxiliary Operations Policy Manual*, COMDTINST M16798.3 (series), *Annex 1, Section C*.
B.2.b. Alcoholic Beverages	Crewmembers do not consume alcoholic beverages within 8 hours of conducting flight operations, including mission planning, or within 12 hours of consuming 3 or more alcoholic beverages.
B.2.c. Fuel Reserves	Auxiliary aircraft under orders follow the minimum fuel reserve requirements found in the FAR; however, additional fuel reserve is encouraged whenever possible.
B.2.d Flight Crew Fatigue	Flight crew members comply with flight crew fatigue standards. These standards apply to all persons aboard on a mission and to the performance of any task connected to the mission, even on the ground. A mission begins when the crewmember reports for the mission and ends when the mission, including post-flight, is complete. It is the responsibility of each flight crew member to keep track of their flight and mission time, and to advise the PIC and unit commander when they are approaching the limits of crew time. The standards are given in **Table 7-1**.

Table 7-1
Flight Crew Member Fatigue Standards

Mission Fatigue Standards	Individual Flight Time (hrs)	Crew Mission Time (hrs)
Rotary-Wing – Single-Pilot	6	12
Rotary-Wing – Multi-Pilot	8	12
Fixed-Wing – Any Number Pilots	8	12
Maximum hours of flight crew use per 24-hour period. A new 24-hour period begins any time a crewmember has completed 10 hours of rest.		

B.3. Minimum Crew

Unit commanders establish the minimum crew requirements for each mission based on the mission requirements and the type or details of the operational facility. The minimum crew for Auxiliary aircraft under normal operating conditions is the pilot plus one observer. The observer may be another pilot, air crew member, qualified observer, observer trainee, or member of the Coast Guard. When flying logistics missions under VMC, only the pilot is required.

B.4. Passengers

Guests are not permitted aboard Auxiliary aircraft under orders unless authorized by the OIA prior to the mission. The names of all crew, including trainees and passengers, should be communicated to the operational command prior to departure.

B.5. Flight Clothing

Auxiliary flight crew aboard a facility should wear identical uniforms. The following uniforms are approved while under orders in accordance with the *Auxiliary Operations Policy Manual*, COMDTINST M16798.3 (series):

- An Auxiliary flight suit, fire-retardant, with appropriate insignia
- Anti-exposure coveralls, as approved by a unit commander for flight use
- Any authorized Auxiliary uniform

B.6. Communications

On a patrol, two-way communications are maintained with a Coast Guard or other appropriate unit. These include Auxiliary units, or federal, state, or local government units. This communication includes position reporting on all ordered missions at specified intervals. (see *Chapter 6*)

B.7. Flight Plans

Flight plans are filed for all patrols, whether VFR or instrument flight rules (IFR). These are normally filed with an FAA FSS, using the standard FAA Form 7233-1. (see *Appendix A*) When flying from a military field, including Coast Guard air stations, a Military Flight Plan Form (DD-175) may be required. (see *Appendix A*)

As an alternative to filing with the FSS, Air Station COs may accept local area VFR flight plans from Auxiliary aviators provided that the flight starts from and returns to the same airport where the flight began.

Section C. Missions

Introduction

The *Auxiliary Operations Policy Manual*, COMDTINST M16798.3 (series), establishes the authorized missions and operational limitations for co-pilots, first pilots, and aircraft commanders. First pilots and aircraft commanders may act as PIC for SAR missions in Auxiliary aircraft.

C.1. Flight Rules

Auxiliary pilots conduct all flights under applicable FARs and local air traffic rules.

C.2. Special Missions

Special missions are defined as non-routine or unscheduled missions that fall outside the normal profile of:

- Logistics
- Training missions
- Standard patrols, for example:
  - Marine Environmental Protection
  - Ice operations
  - PWCS
- And/or have a higher than normal level of risk

These special missions, which include SAR response, communications relay, or other special missions at night and/or in IMC, have special requirements. Only first pilots and aircraft commanders fly as PIC for these missions. Night flight or IMC flight imposes other obligations, such as a requirement for two instrument-rated pilots.

The minimum altitude for these operations is 1,000 feet AGL over water or other unobstructed areas. In other areas, the minimum altitude is 1,000 feet above the highest obstacle. In IMC, the minimum altitude is the minimum vectoring altitude or Minimum Enroute Altitude (MEA) as applicable to the operational area.

C.3. Unit Commander Authority

The unit commander may authorize night and/or IMC training, logistics, or passenger transport missions subject to the limitations established in this manual.

C.4. Aviation Risk Management

Prior to all AUXAIR missions, the AUXAIR Risk Assessment Matrix should be completed by the PIC together with the crew. The Risk Assessment Matrix should be revaluated in flight as conditions change. (see *paragraph D.3* of *Chapter 3*)

C.5. Patrol Log Maintenance

In order to ensure that supporting documentation for all AUXAIR missions exists, it is necessary for a patrol log to be maintained. For each flight, the PIC will normally designate a crew member to maintain a log with key data that records all mission actions. (see *paragraph B.12.a* of *Chapter 1*)

Chapter 8
Flight Safety

Introduction

Safety in Auxiliary air operations requires continuous command emphasis on accident prevention programs. Aircraft performance abilities and human limitations, along with the many variables and hazards inherent in flight operations, tend to complicate the task of managing aviation resources effectively. If hazards are not recognized and eliminated or adequately provided for, accident potential can be higher and the operational effectiveness of the air program can be inhibited.

In this Chapter

This chapter contains the following sections:

Section A. Safety Awareness

Introduction

There are a number of factors that affect the safety of flight operations. This section provides an overview of safety awareness for all AUXAIR crewmembers.

A.1. Fitness of Crew

Certain adverse physiological or psychological factors can be responsible for causing accidents, both in the air and on the ground. These adverse factors include: fatigue; improper diet; poor physical condition; improper or excessive use of tobacco, alcohol or drugs; minor illness; and mental or emotional stresses. Although such factors cannot be completely eliminated, it is important that the existence of any of these factors is recognized and that appropriate action is taken to minimize the effects.

Training and equipment can only be effective if flying personnel are fit to fly. Inadequate nourishment, lack of sleep, excesses which lower efficiency, inattention to minor illnesses, distraction, and preoccupation are incompatible with flight safety. Abuse of the body in any form should be equated to improper maintenance of an aircraft. A professional approach by Auxiliary pilots to flying requires a thorough knowledge of one's limitations, idiosyncrasies, and physical and mental condition. Consult the *Operational Risk Management*, COMDTINST 3500.3 (series), for additional factors in employing operational risk management (ORM) techniques.

A.2. District Flight Safety Officer

Each District appoints a DFSO whose duties include detecting trends and analyzing aviation problems. This, combined with an aggressive program of making safety information available, can provide our AUXAIR community with up-to-date information on current practices and procedures. The Aviation Division National Staff has a Branch Chief for Aviation Safety who is also charged with providing guidance and safety information.

Aviation safety is our first priority – without safety we cannot perform our mission.

A.3. Rules of Risk Management

Detailed information on ORM can be found in other documents such as the *Operational Risk Management,* COMDTINST 3500.3 (series). Condensed rules of risk management are as follows:

- Integrate risk management into mission planning.
- Accept no unnecessary risk.
- Make decisions at the appropriate level.
- Accept risks only if benefits outweigh potential cost.

A.4. Potential Hazards

The following are potential hazards that may prevent mission success:

- Environment:
  - Weather
  - Visibility
  - Water or land environment
- Crew:
  - Experience
  - Level of training
  - Physical condition
  - Mental condition
- Resource capabilities:
  - Number of engines (platform type vs. mission)
  - IFR/VFR equipment
- Training
- Mission complexity
- Other

A.5. Human Error

A 1993 study determined that 60-65% of mishaps occurred due to human error. Approximately 90% of the human errors were due to:

- Poor judgment (67%)
- Inattentiveness (16+%)
- Ineffective supervision (5+%)

A.6. Risk vs. Gain

The following list details what may be gained from different level risk situations:

- High Risk:
  - If you do not act, the results will be catastrophic.
  - Possibility of saving life.
  - Probability of alleviating pain or suffering.
- Medium Risk:
  - If you do not act, the results will be significant.
  - Possibility of alleviating pain or suffering.
  - Probability of saving property.
- Low Risk:
  - If you do not act, the outcome will have minimal consequences.

Section B. Human Factors Affecting Flight Crew Safety

Introduction	This section describes specific human factors affecting flight crew safety and ways to prevent safety related problems.
B.1. Clothing Considerations	The following clothing considerations are strongly recommended for Auxiliary flight personnel.
B.1.a. Uniform/ Flight Suit	Flight crew safety must always be the first consideration in any Coast Guard ordered flight. With this thought in mind, the NOMEX fire-resistant flight suit and gloves are the uniform of first preference and provide the greatest degree of protection. It is the only uniform authorized for active duty aviators and every effort should be made by Auxiliary flight personnel to acquire the Auxiliary flight suit. Passengers may fly in their appropriate duty uniform. For more on uniform requirements, see the *Auxiliary Manual*, COMDTINST M16790.1 (series) and the *Auxiliary Operations Policy Manual*, COMDTINST M16798.3 (series).
B.1.b. Undergarment	It is strongly recommended that all undergarments be 100% cotton because of the tendency for synthetics to melt to the body during a fire.
B.1.c. Footwear	Wearing leather boots (pull-on or lace-up, 8-inch) and cotton socks by the flight crew is also strongly recommended. Low quarters, tennis shoes, fabric shoes, and fabric boots tend to absorb fuel or allow fuel to enter the top of the shoe and may leave the aviator wearing fuel-soaked footwear in an accident.
B.2. Medication Effects	According to the *FAA Airman's Information Manual* (8-1-1,c), pilot performance can be seriously degraded by prescribed and over-the-counter medications, and the medical condition for which they are taken. Many medications such as tranquilizers, sedatives, strong pain relievers, and cough-suppressant preparations have primary effects that may impair judgment, memory, alertness, coordination, vision, and the ability to do calculations. Others, such as antihistamines, blood pressure medications, muscle relaxants, and agents to control diarrhea and motion sickness, have side effects that may impair the same critical functions. Any medication that depresses the nervous system, such as a sedative, tranquilizer, or antihistamine, can make a pilot, flight crew, or observer much more susceptible to hypoxia. The FARs prohibit pilots from performing any duties as PF or PNF while using any medication that affects their faculties in any way contrary to safety. The safest rule is not to fly as a pilot, air crew, or observer while taking any medication, unless approved to do so by the FAA.

B.3. Alcohol Impairment

Alcohol is a well-recognized central nervous system depressant. Even small amounts of alcohol in the blood can impair judgment, reflexes, and muscular control. The level of alcohol in the body varies with the frequency and amount of alcohol intake, the length of time following cessation of drinking, and an individual's body weight. A zero alcohol level is essential for all aviation personnel to meet the rigorous demands of flight operations. Detectable blood alcohol or symptomatic hangovers are causes for grounding of flight crew personnel.

Aviation personnel are restricted from aerial flight for 12 hours after last alcohol use and must have no residual effects. This includes the use of "low" and "no" alcohol beer. Residual effects include lightheadedness, headache, fatigue, nausea, and lack of alertness.

NOTE

This restriction applies to all flight crew members – not just the pilot.

B.4. Blood or Bone Marrow Donation

Blood and/or bone marrow donation have potentially adverse effects on flight crew performance. (see the *Auxiliary Operations Policy Manual*, COMDTINST M16798.3 (series) for policy guidance)

B.5. Dehydration in Summer Months

Very often Auxiliary crews are called on to fly long missions at low altitudes, 1000 to 1500 feet AGL, during the summer months. Due to the possibility of dehydration during missions of this type, it is imperative that all crew members stay alert for the first signs of dehydration. The PIC always has the authority to halt a mission when it appears safety is becoming an issue and there should never be any hesitation to do so.

Be sure to carry water for all crew members. Stops to allow crew members to re-hydrate, cool-off, and rest are also a good idea. Symptoms of dehydration include:

- Profound loss of fluids through sweat, vomiting, urine, or bowel movements.
- Eyes that seem to sink into the eye sockets.
- Dry mouth or sticky mucus membranes.
- Loss of normal skin elasticity.
- Decreased or absent urination.
- Decreased tearing in eyes.

Section C. NASA Aviation Safety Reporting System

Introduction

The National Aeronautics and Space Administration (NASA) aviation safety reporting system (ASRS) was designed and is operated by NASA to ensure the confidentiality and anonymity of the reporter and all other parties in a reported occurrence or incident. The FAA will not seek, and NASA will not release or make available to the FAA, information that might reveal the identity of any party involved in an occurrence or incident reported under ASRS.

C.1. Purpose

This cooperative safety-reporting program invites pilots and other users of the National Aviation System to report to NASA actual or potential discrepancies and deficiencies involving the safety of operations. The effectiveness of this program in improving safety depends on the free, unrestricted flow of information from the users of the National Aviation System. Based on information from the program, the FAA will take corrective action as necessary to remedy defects or deficiencies in the National Aviation System. The reports may also provide data for improving the current system and planning for the future.

A NASA ASRS advisory committee conducts periodic meetings to evaluate and ensure the effectiveness of the reporting system.

C.2. Reporting Procedures Form

Reporting procedures are found in NASA ARC Form 277B (see *Appendix A*), which is preaddressed and postage free, and is available at FAA offices. This form or a narrative report should be completed and mailed to: Aviation Safety Reporting System, P.O. Box 189, Moffett Field, CA 94035-0189.

C.3. NASA Responsibilities

The NASA ASRS provides for the receipt, analysis, and sterilization of aviation safety reports. In addition, periodic reports of findings obtained through the reporting system are published and distributed to the public, aviation community, and FAA.

C.4. Use of Reports for Enforcement Purposes

Section 91.57 of the FARs (14 CFR 91.57) prohibits the use of any report submitted to NASA under the ASRS (or information derived there from) in any disciplinary action, except information concerning criminal offenses or accidents. While certificate action and fines are not allowed, letter of correction or warning can still be issued. These will be removed from the pilot's files in 2 years if no other violation occurs.

C.5. Non-Field Report FAR Violation

When a violation of the FAR comes to the attention of the FAA from a source other than a field report filed with NASA under ASRS, appropriate action will be taken.

C.6. FAA Enforcement Policy

It is the policy of the FAA Administrator to perform the responsibility under the Federal Aviation Act for the enforcement of the Act and the FAR in a manner that will best reduce or eliminate the possibility of, or recurrence of, aircraft accidents. The FAA enforcement procedures are set forth in Part 13 of the FAR (14 CFR Part 13) and FAA enforcement handbooks.

In determining the type and extent of enforcement action to be taken in a particular case, the following factors are considered:

- Nature of the violation.
- Whether the violation was inadvertent or deliberate.
- The certificate holder's level of experience and responsibility.
- Attitude of the violator.
- The hazard to safety of others which should have been foreseen.
- Action taken by employer or other Government authority.
- Length of time which has elapsed since violation.
- The certificate holder's use of the certificate.
- The need for special deterrent action in a particular regulatory area, or segment of the aviation community.
- Presence of any factors involving national interest, such as the use of aircraft for criminal purposes.

C.7. Violations Without Civil Penalty or Certificate Suspension

Filing a report with NASA concerning an incident or occurrence involving a violation of the Act or the FAR is considered by the FAA to be indicative of a constructive attitude. Such an attitude will tend to prevent future violations. Accordingly, though a violation may be found, neither a civil penalty nor certificate suspension will be imposed if all of the following criteria are met:

- The violation was inadvertent and not deliberate.
- The violation did not involve a criminal offense, or accident, or action under Section 609 of the Act which discloses a lack of qualification or competency, which are wholly excluded from this policy.
- The person has not been found in any prior FAA enforcement action to have committed a violation of the Federal Aviation Act, or any regulation promulgated under that Act for a period of 5 years prior to the date of the occurrence.
- The person proves that, within 10 days after the violation, he or she completed and delivered or mailed a written report of the incident or occurrence to NASA under ASRS. When filing a NASA form, the crew members should send a return receipt to protect themselves and have a record of filing within 10 days of a potential violation.

Section D. FAA Exemption – Flight Below 500 Feet

Introduction

This section describes the FAR exemption that allows Coast Guard flight crews to fly below 500 feet, or closer than 500 feet to a vessel, person, or structure during SAR.

D.1. Flight Below 500 Feet Exemption

Appendix C of the *Auxiliary Operations Policy Manual*, COMDTINST M16798.3 (series), describes the exemption from the FAR, specifically CFR Part 14, FAR 91.119. The Coast Guard renews this exemption with the FAA every two years. In essence, this partial exemption from the regulation specifically regards flights below 500 feet for the "saving of lives". The exemption reads, in part:

"Minimum Safe Altitudes: To assist with SAR efforts, descent below 500 feet AGL/AWL may be necessary to better identify objects during search missions. We are confident that an acceptable margin of safety can be maintained over open water at altitudes below 500 feet and less than 500 feet of lateral separation without hazard to persons or property. This exemption will allow Coast Guard Auxiliary aircraft to better prosecute their assigned Coast Guard missions in the same fashion as Coast Guard aircraft.

VFR Cruising Altitude: In order to track commercial vessels via Automatic Identification System (AIS) as well as serve as training targets for active duty Coast Guard air intercept aircraft, operation at other than the appropriate VFR cruising altitudes is necessary." Such action should be coordinated with ATC when possible.

D.2. Low-Level Flight Restrictions

It is specifically noted in the *Auxiliary Operations Policy Manual*, COMDTINST M16798.3 (series) that this exemption is not intended to be blanket authority for low-level flight on SAR cases, but to enable better search capability. The exemption applies to certified Auxiliary pilots at the aircraft commander and first pilot levels only.

Pilots and crews should also be aware that this exemption applies solely to SAR missions, and does not authorize low-level flight, or close clearance to vessels, persons or structures for any other mission or purpose.

D.3. Low-Level Flight

As this low-level flight regime is inherently dangerous, it is implicit that Auxiliary pilots should not operate in this flight regime unless qualified and current, and then only under orders for an actual SAR mission. To do otherwise is not only dangerous, but may expose the Auxiliary pilot to FAA certificate action. Auxiliary pilots therefore are not authorized to fly below 500 feet AGL for any purpose other than takeoff and landing unless it is to aid people in distress or to save or protect property.

D.4. Minimizing Annoyance and Property Endangerment

Coast Guard Auxiliary aircraft should minimize the annoyance to persons and activities on the ground by exercising enough caution to ensure that no person on the ground could reasonably believe that life or property is in danger. Pilots plan flights to avoid over-flight of wildlife areas, except at altitudes above those shown as minimum on aeronautical charts.

Chapter 9
Emergency Landings and Survival

Introduction

This chapter describes the requirements and training for Auxiliary flight crew when conducting offshore operations, emergency landings, and survival at sea and on land.

In this Chapter

This chapter contains the following sections:

Section A. Offshore Operations

Introduction

Auxiliary flight rules authorize operations to 25 nautical miles from shore for single-engine aircraft. Therefore, it is an accepted risk that under some conditions search and operational altitudes will result in Auxiliary aircraft operating beyond gliding distance from land.

A.1. Special Requirements

Offshore operations may be part of any mission. Offshore operations are defined in the *Auxiliary Operations Policy Manual*, COMDTINST M16798.3 (series), as operations out of gliding distance of shore. Shore is defined as land that is suitable for an emergency landing with reasonable expectation of landing without injury to persons onboard the aircraft.

The following are special requirements to be met before any offshore operation is conducted or contemplated. (see *Auxiliary Operations Policy Manual*, COMDTINST M16798.3 (series))

- The pilot must be a first pilot or aircraft commander.
- All crewmembers must be current in Egress Training and Water Survival training.
- Appropriate PPE must be worn or carried.
- The aircraft must be equipped with specific rescue and survival equipment, such as rafts, signaling, and first-aid gear.
- Offshore missions are flown only in daytime and under VMC.

A.2. Survival Equipment

Crews flying offshore are equipped with certain survival equipment. This equipment and its carriage or wear is subject to the requirements of the *Auxiliary Operations Policy Manual*, COMDTINST M16798.3 (series), and District policy. Some of the equipment is personal protective gear, and some, such as life rafts, are part of the aircraft complement. Landing, egress, and survival briefings are a part of each flight over water.

Section B. Beach Landings

Introduction	This section describes general considerations and procedures for beach landings.
B.1. Considerations	Beach landings should only be attempted as an emergency measure. The fact that the aircraft can make it to the beach in itself may not prevent consideration of a water ditching. The beach may be crowded with bathers or rock jetties and adequate landing space may not be available.
B.2. Landing Procedure	If a beach landing must be made, select an area that is clear of debris and land on the area of sand nearest the water to take advantage of the firmness of the wet sand. Use a soft field landing technique and touch down lightly at minimum airspeed, but avoid a stall. Keep the yoke back on touch down whether in tricycle or conventional gear aircraft. Keep in mind that if one wheel is on the hard pack and the other is in the surf (or on the soft sand), control may be lost and the aircraft may flip. When landing with a retractable gear aircraft, it may be advisable to keep the gear up.

Section C. Ditching

Introduction

This section describes procedures to follow when it becomes necessary to ditch the aircraft.

C.1. Required Actions

Flight crews should check their specific aircraft flight manuals for ditching information on the specific make and model of aircraft they are operating. If it becomes necessary to ditch in the water, the following actions should be taken:

- Broadcast distress information on appropriate frequencies.
- If time permits, review ditching, brace positions, and evacuation procedures with the crew.
- Secure or jettison any loose gear that could be hazardous on impact.
- The inflatable raft must be readily accessible and, if possible, held securely by a crewmember.
- Secure the canopy or door(s) in the open position to prevent jamming upon impact.
- If in a retractable gear aircraft, do not extend the landing gear.
- Execute the ditching maneuvers in accordance with the aircraft flight manual.

C.2. Landing in Seas Less Than One Foot

If seas are less than one foot, with no visible white caps, approach into the wind. Use flaps as necessary to reduce landing speed. Make a soft field landing. Use power, if available, to reduce landing speed and give greater control. Land at as slow a speed as possible, but DO NOT STALL.

C.3. Landing in Seas Greater Than One Foot

If the seas are greater than one foot, approach cross-swell (parallel to the wave crests of the major swell). Approach to take advantage of any head wind component while avoiding landing directly into the face of a swell. As the size of swells increases, the landing heading must increasingly parallel the swell, accepting crosswind components. (see **Figure 9-1**)

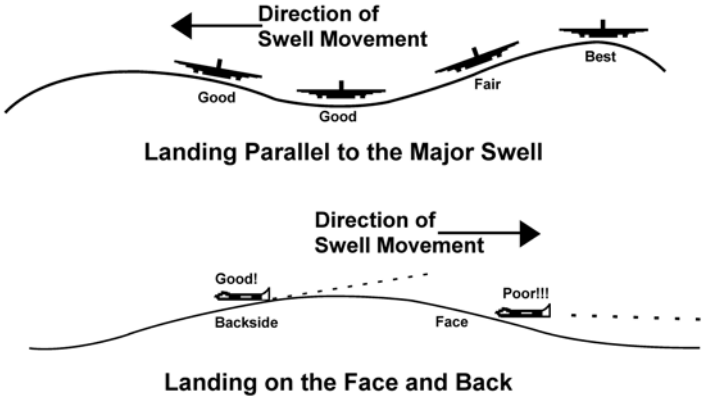


Figure 9-1
Ditching the Aircraft

C.4. Egress Route

The egress route should be planned in advance. A common theme that runs through all Coast Guard mishaps involving successful underwater egress is that survivors had an escape plan before the accident occurred. Regardless of seat location, always know where to go in an emergency, how to get there, and what the likely obstacles are.

C.5. Maintaining Orientation

Maintaining orientation within the aircraft is certainly the most important action that can be taken after ditching. Next to panic, disorientation is the biggest problem in accomplishing a successful egress. It should be remembered that by remaining strapped securely in the seat, orientation will be familiar although the aircraft may be upside down in the water. What is normally to the right is still to the right, and what is normally to the left is still to the left. Keep feet on the deck of the aircraft in order to remain oriented. Exit the aircraft promptly with survival gear.

C.6. Exiting the Ditched Aircraft

With all aircraft, there is a possibility that it will invert when it comes to rest in the water. During impact, crewmembers may become disoriented and not realize that the aircraft has inverted. All crewmembers should be trained to assume that the aircraft is in an inverted position and that it will be dark, so they will not be able to see. Most people are at least slightly positively buoyant. This means that, even if the aircraft is inverted, positive buoyancy will keep crewmembers in their seats when restraints are released. It is vital that at least one hand is always holding on to the aircraft (a reference point) in order to remain oriented. As soon as practical, exit the aircraft using a hand-over-hand method, one hand always in contact with the aircraft. Take along the raft and survival gear. All personal survival gear should be stowed in each crewmember's inflatable vest so that it comes out of the aircraft with the crewmember.

NOTE

DO NOT inflate the life vest (PFD) until clear of the aircraft.

C.7. Account for all Personnel

The aircraft should not be expected to float. Move away from the aircraft. Fuel, oil, or other hazardous materials (HAZMAT) could be floating on the water after the ditching. If possible, crew members should move upwind of the aircraft to prevent exposure to HAZMAT.

C.8. Outside of Ditched Aircraft

Keep calm; remember that a person will usually float. Since most people are at least slightly buoyant, they will float even higher in the relatively dense salt water of the sea than in fresh water. After swimming well clear of the aircraft, the PFD should be inflated. Pull the lanyard to inflate the life vest, but if the inflation system does not work, remember to use the manual oral inflation tubes of the life vest. When wearing an inflated life vest, it is easier to swim on your back. If also wearing exposure suits, their natural buoyancy will help to keep the survivors afloat until they inflate their vests. Once this stage has been reached, efforts should be made to find the life raft and get aboard. Do not remove shoes or clothing. Survivors should restrict their energy output to necessary tasks and restrict swimming to reaching the raft. A member of the crew should have taken the precaution of fastening the raft to their life vest by a lanyard before exiting the aircraft to prevent its loss in a stiff breeze.

Section D. Survival At Sea

Introduction	Specific personal and aircraft equipment are provided on Auxiliary flights for assistance in survival. It is important to learn, understand, and follow proper procedures for survival at sea.
D.1. Life Preservers	Pneumatic life preservers are safe, comfortable, easy to wear, and do not require inflation for fitting and adjusting. They are designed to provide sufficient buoyancy to support downed flight crew after they bail out or ditch into the water. These preservers are rapid inflation style with an auxiliary oral inflation device. Accessory survival items may or may not be attached, depending upon the type of preserver. If not attached, survival items should be carried in the pockets of the flight suits or in survival vests. All survival equipment should be attached to personnel or the raft with a lanyard. It is imperative that all crewmembers be familiar with the donning, fitting, care, and operation of the preserver that is used in the aircraft. Once aboard a raft, the preserver should be kept inflated in case the raft capsizes or is deflated.
D.2. Life Raft	A carbon dioxide cylinder inflates the raft when the lanyard is pulled. There is a valve for oral inflation that closes automatically by spring pressure when it is not held open. Handles or straps are provided as aids for boarding the raft.
D.2.a. Boarding a Life Raft	The best way to board a life raft is to grasp the boarding strap, and kick the feet vigorously while pulling elbows and life preserver over the raft tube, then grasp the boarding strap on the other side and roll into the raft. For the one-person raft, it is better to board over the small end than the side to lessen the possibility of the raft capsizing. Thrust your body over the small end of the raft face down, and then roll over to a face-up position. Extreme care should be taken by personnel boarding the raft to ensure that no sharp objects puncture the fabric of the life raft. A sea anchor is attached to the raft by a line. Deploy the sea anchor to stabilize the raft and to minimize your drift from the location of the ditching.
D.2.b. Life Raft Survival Equipment	The life raft normally available to Auxiliary flight crews typically contains little survival equipment and no water or rations. During the annual training sessions, the raft should be inflated and the crews should be made aware of what equipment is included and how to use it. It is essential that all of the signaling and survival equipment be attached to either each crewmember or the raft. Be constantly alert to the danger of puncturing the raft with sharp objects.
D.2.c. Multiple Rafts	If multiple rafts are used, they should be tied together. This creates a larger target that is more likely to be spotted by searching units.
D.3. Signaling	Signaling devices that are either carried on the person or in the life raft may be the only equipment that can be used to effect a quick rescue. All personnel should be trained in their use.

D.4. EPIRB

Type A and B Emergency Position Indicating Radio Beacons (EPIRBs) transmit a continuous signal on the distress frequencies of 121.500 MHz and/or 243.000 MHz. The newer type 1 and 2 EPIRBs transmit in the 406 MHz band. Starting on 1 February 2009, SAR satellites (SARSATS) will only receive the 406 MHz signals. SARSATS receive this signal and relay it to ground stations. After the crew are settled in the raft, the EPIRB or other rescue radio should be turned on and remain on until rescue units arrive.

Once received by the SARSAT, the distress location is passed to the appropriate rescue coordination center (RCC), which deploys suitable rescue forces.

D.5. Signaling Mirror

Next to the EPIRB, the signaling mirror is the most valuable signaling device available. Since it does not rely on batteries or pyrotechnics, it is also the most reliable. The military-issue mirror has a grid in the center of the rear face. Look through the hole in the center of the rear of the mirror and sight the object on which to direct the sun "flash." Do not look at the sun. Swivel the mirror until the grid around the hole lights up. This will indicate that the "flash" or solar reflection is directed toward the target. Use the signaling mirror to continually sweep the horizon. A flash from a signaling mirror can be seen more than 5 nautical miles away.

Mirrors without aiming grids (or any other highly reflective object) may also be used for signaling. To aim a mirror without a grid, hold two fingers so as to form a "V" at arms length. Position the "V" so that the target is between two fingers. Position the mirror such that the sun reflects on the "V" fingers, and flash the sun across them. This will direct the reflection of the sun toward the target.

D.6. Pyrotechnics

Red flares are for night use and orange smoke is for day use. These should not be expended unless search units are within sight and the signals have a reasonable chance of being observed. These generally will be a wasted resource if ignited when the search unit is moving away from your position.

When igniting pyrotechnics, hold them outboard over the downwind side of the raft while pointed downwind so any hot drippings will not damage the raft. Also, beware of any fuel which may be floating on the surface. If there is a fuel smell, do not use flares; as it may ignite the fuel. When using a pen-gun, it is imperative that the gun be cocked before the flare is screwed onto the end. This retracts the firing pin which should be in this safe mode as the flare is attached or the flare may ignite as it is screwed on. The launcher should be pointed overboard and away from any person as it is being loaded. When firing aerial flares they should be aimed downwind with a 45- to 60-degree elevation. This precludes the possibility of the flare falling back into the raft.

Do not fire aerial flares directly at an incoming rescue aircraft. During daytime, fire the flare (orange) across the flight path of the rescue aircraft. Many rescue pilots report the smoke trail from the flare is more visible than the flare itself during daylight conditions.

D.7. Dye Marker

Dye markers create a large florescent green cloud in the water around the survivor or raft and greatly enhances sightings from aircraft. The use of a dye marker must be planned as it takes approximately three minutes for the dye to fully spread and its effect lasts only 15 to 20 minutes depending on sea conditions. It is activated by opening the packet and moving it back and forth under water next to the raft to disperse the dye.

A surface marking device such as a SEE/RESCUE®[1] device is a superior alternative to a dye marker. The SEE/RESCUE® device is a long buoyant plastic banner, which when unrolled, floats on the surface. It is very easy to see and does not disperse from the action of the sea.

D.8. Pocket Strobe

The pocket strobe should be used only at night and when aircraft or vessels are seen or heard. The batteries on the pocket strobe have a limited effective life of about 10 hours. For best visibility, the strobe should be positioned as high as possible.

D.9. Whistle

Over the water, the sound of a whistle can be heard for a much greater distance than voice alone. Using the whistle also requires less effort and can be sustained for a longer period than can shouting.

D.10. Space Blanket

The orange side of any space blanket, typically provided in the survival pack, should be spread to enhance visibility when search units are seen or heard.

D.11. Exposure to Sun, Wind, and Salt Water

Exposure to sun, wind, and salt water should be reduced to the extent possible. Even in the tropics, all clothing should be saved and worn as a cover to protect you from the rays of the sun.

D.12. Hypothermia

Hypothermia is a danger even in relatively mild weather. In cold weather, survivors should huddle together under the raft cover, wearing dry clothing if possible. Use space blankets to retain body heat and to break the cooling effect of the wind. Try to keep the raft dry. Even when in the water, swimming is generally not recommended. The loss of body heat during swimming is considerably greater than remaining in the huddle position floating in a PFD.

Keep all clothing on including shoes or flight boots, since clothing helps to contain body heat. It is important to keep heads out of the water, as it is one of the areas of a person's body through which considerable heat can be lost. If a hat is available, it should be worn. Consider including some very large plastic garbage bags in the survival kit. If in the water, step into the bag and pull it up around the legs and torso. The bag will trap a boundary layer of water near the body. This will serve as another insulating barrier and will reduce heat loss to the open water.

[1] SEE/RESCUE is a registered trademark of Rescue Technologies Corporation.

D.13. Shark Defense

Shark attacks are rare, but there are certain things that may be done to minimize the probability of attracting sharks and to defend yourself should they appear. The best situation is to be in a raft. Keep all hands and feet inside the raft.

If floating in a life vest, make slow even movements. Jerky irregular movements attract sharks. If flying over waters frequented by sharks, include a very large plastic garbage bag in the survival kit. If not in a raft, open the bag and float inside (this can also help to keep warm). Scoop water into the bag so that it fills to its expanded shape. A small-inflated ring such as a large bicycle inner tube is ideal to hold the upper rim of the bag. The purpose of this arrangement is to retain body fluids which attract sharks, and present a large object with no projections to the shark.

If sharks do appear, attempt to continually face the nearest shark. If the shark attempts an attack, yell or blow a whistle. Wearing gloves or with hand wrapped, strike the shark soundly on its snout from the top. Sharks close their eyes as they attack, so if the shark attacks, attempt to move to one side.

D.14. Psychology

A person's worst enemy can be his/her own mind. Any tendency to give up even in the face of seemingly overwhelming odds against survival must be avoided. The shock created by an actual casualty, the immersion in cold and often rough water, and the realization of facing a true life-or-death situation increases psychological stress and impairs judgment.

Unless each crewmember gathers not only their resources, but also their wits and maintains a positive attitude no matter how desperate the situation may seem, chances of survival will be substantially decreased. Each person's chance of survival can be affected by the attitude or perspective of the other survivors. Keep in mind that a maximum rescue effort is being made, but everyone must do their part to remain rational and be ready to signal when the time is right.

D.15. Recovery by Helicopter

If in a raft, it will be necessary to abandon the raft and move away from it. Attempt to fill the raft with water and partially deflate it. Coast Guard helicopter pilots are trained to avoid floating objects, such as life rafts, due to the possibility of blowing the object into the rotor disk. As the helicopter approaches, down wash from the rotor will cause a wall of spray to be generated. Faces should be turned away from the aircraft whenever practical. When the basket is lowered, do not touch it until it contacts the water. There is considerable static electricity generated by the helicopter and prematurely touching the basket could cause a debilitating electrical shock.

After boarding the basket, signal when ready for hoisting with a "thumbs up" motion. Keep hands and feet inside the basket while being hoisted. Wait until the basket is brought completely inside the helicopter before attempting to exit the basket. A sudden movement in attempting to assist the hoisting crew could throw everyone off balance and jeopardize the whole evolution.

Section E. Survival on Land

Introduction	Land survival situations, though rare, may occur. Equipment usage and procedures for survival on land should be studied.
E.1. Primary Actions	When forced to land ashore, evacuate the aircraft immediately and take along all of the signaling equipment. Move upwind of the accident site to remain clear of fumes and other HAZMAT. Stay away from the aircraft until the engines have cooled and spilled gas has evaporated.
E.2. Injuries	Check injuries, give first aid, and make any injured survivors comfortable. Be careful in removing anyone from a crashed aircraft; they may have incurred back injuries or fractures.
E.3. Signals	Prepare signals that can be recognized from the air (see *Section F* of *Chapter 6*). Check to ensure that your aircraft's emergency locator transmitter (ELT) has been activated. If it was not activated by the crash landing, it may be possible to activate it manually. Round-up all resources, including signaling devices that could be set off when it is apparent that help is near. Keep calm and prepare to wait for help to arrive.
E.4. Changing Location	It is usually best to stay at the crash site as the crashed aircraft is usually easier to locate than an individual. If circumstances are such that crewmembers must move away from the crash site, be sure to leave a note with the date and time, and explain the intended route and destination.
E.5. Loss of Body Heat and Hypothermia	Loss of body heat and hypothermia can be minimized by the use of layered clothing. After the potential for a post crash fire has passed, the fuselage of the aircraft can be used for protection from the elements. The space blanket can be used as a windbreaker, as shelter, or wrapped around the body to contain body heat. It is important to remain as dry as practicable. Wet clothing accelerates heat loss.
E.6. Starting a Fire	The matches from the waterproof match case may be used to start a fire. If any fuel is left in the tanks, it may be used, with caution, to help start a fire. Shredding small branches from dead trees or bushes can create dry kindling. Although the outside of a branch may be wet from rain or other precipitation, the interior of a dead branch is usually dry. The fire also provides a signal for search units. Keep a supply of green branches handy. If search units are heard in the area, these can be put on the fire to increase the smoke output. Be careful not to smother the fire in the process. Rubber, oil, or plastic from the aircraft may also be used to create a smoky fire.

Section F. Survival Training

Introduction	Survival skills and training should be practiced regularly.
F.1. Survival Training Seminar	All Auxiliary pilots, air crew, and observers are required to participate in emergency egress and water survival training. All Auxiliary pilots and air crew are required to attend an annual aviation operations training seminar (observers should also attend). It is also recommended that Auxiliary flight crews obtain first aid and CPR training.
F.2. Equipment Familiarity	Emergency egress and water survival training should be developed on a local level to match the conditions unique to the aircraft being flown and to the expected operating environment. Flight crew members should be thoroughly familiar with the equipment they possess for survival. Outdated CO_2 cartridges may be used to inflate life vests during training. Entering the water with the vest deflated, then inflating the vest after coming to the surface can be done as part of a survival training exercise.
F.3. Training at Air Station	All Coast Guard air stations hold wet drills and survival training which may be available to Auxiliary flight crews with prior arrangement. Other training assistance may be provided to the Auxiliary by Coast Guard air stations. Use of the Shallow Water Egress Trainer (SWET) is encouraged.
F.4. PIC Responsibility	It is the responsibility of the PIC of each Auxiliary aircraft facility to ensure that all crew members are trained in the emergency and egress procedures for the particular aircraft being operated. This requirement is in addition to the general annual training and should be a part of each pre-flight brief.

Chapter 10
Maritime Domain Awareness and the Multi-Mission Environment

Introduction

Maritime Domain Awareness (MDA) is an important concept affecting virtually all missions flown by the Auxiliary. This chapter describes the Auxiliary flight crews' responsibilities in conducting patrols for a variety of missions in an MDA environment.

In this Chapter

This chapter contains the following sections:

Section A. Maritime Domain Awareness

Introduction

Maritime Domain Awareness (MDA) is a concept that underscores almost all AUXAIR missions. MDA principles and practices should always be kept in mind.

A.1. MDA Concept

MDA is an evolving concept that has emerged as the United States improves the safety and security of its citizens. The priority of MDA has increased in the wake of the terrorist attacks of September 11, 2001 (9/11). This manual provides additional information on the United States Coast Guard's response to these events and the potential contribution of the United States Coast Guard Auxiliary to MDA. President George W. Bush set the tone and direction of America's fight on terrorism in his speech to a Joint Session of Congress and the American people on September 20, 2001, "We will not tire, we will not falter, and we will not fail." Since 9/11, the Federal Government has been undergoing a massive reorganization and transformation to meet this challenge. Our world and the way we operate in it has forever changed. It is the policy of the United States to take all necessary measures to protect the homeland.

While many actions have been taken, both foreign and domestic, the one with greatest impact on the U.S. Coast Guard and the Auxiliary is the creation of the DHS and the inclusion of the Coast Guard in this department. Since the department was established, the U.S. Coast Guard has become engaged in an overarching transformation in which MDA issues have become a vital component of all Coast Guard missions in both operations and support. The challenge to secure U.S. transportation systems and borders is substantial—there are 5,525 miles of border with Canada, 1,989 miles with Mexico, as well as a maritime border that includes 95,000 miles of shoreline, 350 official ports of entry, and 3.4 million square miles of exclusive economic zone (EEZ).

The Auxiliary is involved in this transformation and is fully aligned with the active duty component.

A.2. MDA Definition

MDA is defined as "the effective understanding of anything associated with the global maritime environment that could impact the security, safety, economy or environment of the United States." (see *ALCOAST 160/04*)

A.3. MDA Security

MDA is the Coast Guard's overarching MARSEC program, and is guided by the recently established *Maritime Domain Awareness Directorate*, Commandant (CG-7M). The Directorate will coordinate its activities with other DHS agencies and with key outside agencies such as the Department of Defense and its components, so there is an effective, cohesive, and seamless MDA system for the nation.

A.4. Auxiliary and MDA

The Coast Guard's safety and security mission is paramount and bears upon all missions — as it does with the Auxiliary. One of the Auxiliary's key missions is to assist the Coast Guard in the performance of its safety and security missions. The Coast Guard has set the strategy for all of its components (Active Duty, Reserve, and Auxiliary). The Auxiliary must devise and execute supporting strategies, operations, and tactics.

A.5. Mission Activities

AUXAIR missions include MDA concepts by:

- Increasing vigilance on patrol in the maritime areas.
- Observing and reporting both normal and abnormal maritime situations.
- Maintaining a visible presence in and around critical infrastructure.
- Performing specific tasking from Coast Guard units.

Section B. Multi-Mission Environment

Introduction

A variety of missions can be assigned by the OIA to the Auxiliary and AUXAIR. These missions range from ice reconnaissance to logistics and passenger transport. Some basic mission categories are:

- Maritime Safety
- PWCS
- ATON and Chart Updating
- Ice Reconnaissance
- Waterways Management
- Training
- MS/MEP
- Law Enforcement Support
- Logistics Support
- Interagency Support

B.1. Multi-Mission Patrols

Virtually every patrol undertaken by AUXAIR occurs in a multi-mission environment. These missions may be concurrent or sequential in nature.

When flying the missions described in this manual, it will occur often that several different tasks may be carried out within the same time frame or during the same flight. For example, the following types of missions are often combined into one patrol:

- Maritime safety and area familiarization
- MEP and maritime safety
- PWCS, ATON, and ice reconnaissance

These missions can be combined in almost any combination, subject only to the capabilities of the aircraft and crew and the time involved for operation. These missions must be coordinated with the OIA and all persons involved must understand which mission is being performed and when.

B.2. Multi-Mission Diversion

Virtually all aviation missions should be thought of in the multi-mission context since, whether or not the patrol starts out with multiple tasks assigned; it is possible for aircraft to be diverted to other missions. It is then the responsibility of the pilot, working with the crew, to determine if the aircraft and crew are trained and equipped for the new mission and if the conditions for accepting the new mission are suitable. This will involve a review of the risk assessment matrix for the changed conditions. Things to be aware of when accepting a diversion:

- Fuel supply
- Crew fatigue
- Survival equipment suitable to the task and environmental conditions
- Communications capabilities
- Pilot and crew capabilities

Section C. Maritime Safety

Introduction

Maritime safety is a generic term for a class of missions flown with a focus on keeping the boating public safe. This mission usually involves one or more generalized sweeps of the sector while keeping a lookout for vessels in distress or unusual activity on the waterways. These missions consist of:

- Promoting safe boating.
- Providing SAR response when needed.
- Rendering assistance to distressed persons in the marine environment.

C.1. Surface/Air Team Efficiency

In many cases, the area covered is also being patrolled by Auxiliary or active duty surface vessels. Using aircraft in combination with surface craft is an effective way to increase the efficiency of the coverage since Auxiliary aircraft can cover a large area in a shorter time than a surface vessel. The aircraft and surface units act as parts of a team in which the aircraft detects incidents and targets, and may vector surface craft or helicopters to the scene.

C.2. Crew Briefing

The PIC should brief the crew on the area to be covered by the patrol, using both local marine and aeronautical charts. These charts should also be available in the aircraft during the flight to aid in navigation and communication with surface vessels. These patrols should be carefully planned and discussed with the crew, including details of specific mission objectives determined by the requesting Coast Guard authority.

C.3. Search and Rescue

Additional information about the planning and execution of the maritime safety mission, and in particular, SAR response, can be found in *Chapter 11*.

Section D. Ports, Waterways, and Coastal Security

Introduction

The objective of PWCS missions is to search for and report obstructions to navigation, fires or other disasters, and boaters in distress. It may also include specific tasking to search for or identify vessels near bridges, in shipping lanes, in the approaches to harbors or sensitive locations, and/or to photograph such events and vessels.

D.1. Homeland Security or Harbor Patrols

Some PWCS missions may have been described as homeland security patrols or harbor patrols. Occasionally these missions will contain specific instructions. The mission may include flights close to sensitive locations such as power plants, bridges, liquefied natural gas (LNG) terminals, inner harbors, and cruise ships. (see *Chapter 1*)

The Coast Guard's homeland security role includes:

- Protect ports, the flow of commerce, and the marine transportation system from terrorism.
- Maintain maritime border security against illegal drugs, illegal aliens, firearms, and weapons of mass destruction.
- Ensure the Coast Guard can rapidly deploy and resupply our military assets, both by keeping Coast Guard units at a high state of readiness, and by keeping marine transportation open for the transit assets and personnel from other branches of the armed forces.
- Protect against illegal fishing and indiscriminate destruction of living marine resources with prevention and response to oil and HAZMAT spills – both accidental and intentional.
- Coordinate efforts and intelligence with federal, state, and local agencies.

D.1.a. Understanding of Mission Confirmation

Care should be taken to ensure a full understanding of assigned tasks. Pre-mission communication with the tasking unit is required. It is important to know what information may be transmitted over the radio, both ATC and marine, and what should be reported by telephone.

D.1.b. Other Agency Involvement

The authorizing Coast Guard unit should confirm which other agencies (State Police, Harbor Master, etc.) are involved, and if they have or need to be advised by the pilot.

D.2. Coordination

For missions flying over sensitive infrastructure, it is advisable to coordinate flights with operating agencies, FAA, and other responsible authorities. This inter-agency coordination should be approved in advance by the agencies and by the OIA.

The Air-to-Surface Marking decal illustrated in the *Auxiliary Operations Policy Manual,* COMDTINST M16798.3 (series), *Chapter 3, Section D,* is intended to aid in recognition of Auxiliary aircraft from the ground, and may serve to identify an Auxiliary patrol. (see **Figure 10-1**)

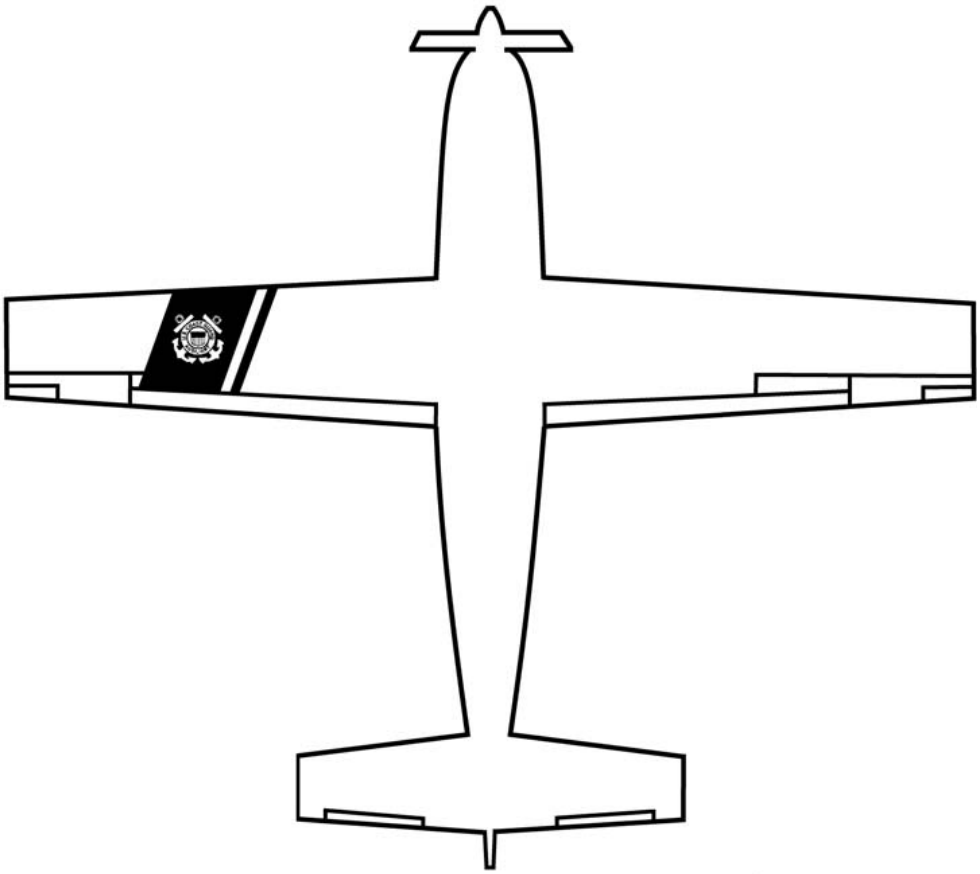


Figure 10-1
Auxiliary Aircraft Air-Surface Marking

D.3. AUXAIR Support of Area Maritime Security Plans

The Area MARSEC Plan for local Coast Guard forces will likely include patrols of numerous sensitive targets and security zones.

A plan for mission after-action reports should be developed, with clear reporting guidelines for any exceptions or unusual sightings. It is important that flight crews are trained to know how to make thorough reports and that, should anomalies be discovered, they know the appropriate reporting procedures. Flight crews must know when an immediate threat is perceived and how to report it via radio or landline as appropriate.

Section E. Marine Safety

Introduction

MS and MEP are two essential Coast Guard programs. The principal objectives of the MEP programs are to:

- Minimize damage caused by pollutants released into navigable waters.
- Overcome or reduce threats to the marine environment caused by potential spills of oil or other hazardous substances.
- Assist in national and international pollution response planning.

E.1. Marine Safety Offices

The Marine Safety Offices (MSOs) and Sectors located throughout the Coast Guard Districts are charged with the responsibility of facilitating maritime safety and MARSEC, safe marine commerce, protecting national security, and promoting environmental safety within their assigned zones. Marine Safety Detachments (MSD) are sub-units of an MSO or Sector office.

E.1.a. Aviation Facilities and Personnel Assistance

AUXAIR facilities and personnel can be of material assistance to the MSO and Sector offices when responding to the first two objectives above and should be included as potential assets in response planning.

Auxiliary Aviation Program managers should visit the MSO/MSD to meet and discuss MEP operations with unit personnel. A briefing on AUXAIR resources and how to request them through the air station may be appropriate. The MSO/MSD or Sector command should be provided with a description of the capabilities of the Auxiliary aircraft available in their AOR. Planned interactions between the MSO/MSD staff, the AUXAIR staff, and the cognizant air station will help to improve operations and support of the MSO missions.

E.1.b. Additional Training

Pollution response activities are managed using the Incident Command System (ICS). All Auxiliarists are encouraged to complete ICS training appropriate to their operational roles. Auxiliarists interested in assisting with pollution response and investigation activities should take the Auxiliary Introduction to Marine Safety and Environmental Protection (IMSEP) course. Advanced training as an Auxiliary Assistant Pollution Investigator (AUX-ED) or an Auxiliary Assistant Pollution Response Specialist (AUX-ET) may be available through the local MSO. Additionally, many MSOs offer internal training programs that may be open to Auxiliarists. Inquiries about the availability of AUX-ET, AUX-ED, and other training may be made through the MSO Auxiliary Liaison or District Staff officer for Marine Safety (DSO-MS).

E.2. Pollution Response

Fortunately, very large spills are infrequent. Nevertheless, numerous spills of all sizes occur daily. The damage caused by a spill is a function of many variables, such as the location of the spill, type and quantity of the material spilled, and prevailing weather and sea conditions, etc.

E.2.a. Notification

It is important to note that prompt detection and notification are key determinants of limiting the environmental damage associated with a spill. All means that shorten the lag time between the occurrence of a spill and notification of appropriate agencies are valuable in reducing subsequent environmental damages. Auxiliary aircraft are a useful observation platform for spill detection.

E.2.b. Auxiliary Aircraft Assistance

Auxiliary aircraft can help in this mission by responding to reported spills, monitoring cleanup operations, and/or patrolling harbors or other areas for unreported spills. The Auxiliary aircraft can provide the pollution response team with an important aviation resource.

Auxiliary aircraft may be deployed with an all-Auxiliary crew to report their sightings or be used to transport Coast Guard personnel or personnel from other federal or state agencies.

E.2.c. Training

The MEP program is among the more technical of the Coast Guard programs. Although Auxiliarists can be of assistance merely by reporting a previously unknown spill, it is preferable that the Auxiliarist be given as much training as possible. Even experienced observers occasionally have difficulty discriminating among the various spill appearance categories and/or between chemical or petroleum spills and certain natural phenomena.

E.3. Spill Reporting

The information requirements for spill reporting are somewhat technical, and may have other implications in the event of legal action initiated pursuant to federal or state statutes. Reporting procedures may differ somewhat among the Coast Guard Districts. It is best if AUXAIR personnel and program managers visit the particular MS unit being served to meet with the responsible personnel, get copies of specific reporting forms and procedures, and identify ways in which the Auxiliary can support the program.

E.3.a. Spill Characteristics

Spill characteristics may appear quite different under low light or strong wind conditions. Observations in a direction looking toward the sun are often difficult to interpret. New observers should be teamed with experienced observers in order to make the proper distinctions between oil types and to differentiate between oil spill and natural phenomena.

E.3.b. Reporting Information

Remember to save all notes, working papers, and other information related to the incident. Spill information should be radioed to the cognizant Coast Guard command, along with any information requested. Upon landing, the appropriate Coast Guard unit should be contacted by telephone and advised of any additional information.

The Auxiliarist should arrange with the cognizant Coast Guard authority for the original documentation (notes, flight/patrol logs, photographs, videotapes, etc.) to be conveyed to the unit, if requested. Do not discard any of the original documentation until authorized to do so, as these could be important evidence in any legal proceeding. Advise the MSO/MSD, or Sector office as soon as a spill is detected. Do not delay notification while obtaining the information listed above.

	The MSO/MSD or Sector will advise of any additional information or specific questions to be answered. The following information is needed for adequate spill reporting: • Source • Time • Location • Weather conditions • Extent • Density • Photographic evidence (when possible) An example report is as follows: "A heavy rainbow sheen with streaks of black oil extends 1 nautical mile x 100 yards south from the facility."
E.3.b.1. Source	Record the apparent source of the spill. Some caution is necessary in determining the actual source of a spill since oil from another location up current may hang around a moored vessel, dock, or other facility possibly confusing identification of the actual source. Always look for traces of oil up current of the suspected source. Often a point source will be evident on a leaking facility or vessel. Record any identification readily visible along with the source type (e.g., vessel, loading facility, wellhead, offshore platform, pipeline, or discharge pipe, etc.). If the apparent source is a vessel, record as much information as possible. Note the vessel name, hull number, type, color, location of superstructure, deck arrangement, colors on funnels, and get a digital image if possible, etc. Such information could be useful in the event that the vessel has departed prior to the arrival of Coast Guard personnel.
E.3.b.2. Time	Record the time of each sighting.
E.3.b.3. Location	Record the latitude, longitude, and body of water.
E.3.b.4. Weather Conditions	Record the following weather conditions: • Ceiling • Visibility • Wind direction and velocity • Seaside conditions, height, and direction of movement
E.3.b.5. Extent	Record the following extent of the spill: • Size • Direction of movement • Direction, width, and length from the source

E.3.b.6. Density	Describe the density of the oil sheen. The terms defined in **Table 10-1** below are used to describe the sightings. A combination of these terms is normally used since the center of a spill will tend to be thicker than the edges. These terms may be modified with light, medium, or heavy, and are ranked in order of increasing spill thickness.
E.3.c. Photographic Evidence	Whenever possible, it is desirable to gather photographic evidence to supplement written reports. Ideally, these should be oblique color photographs taken with a 35mm camera, high-quality digital or video camera, preferably one with a date/time stamp inserted on the images. Consult with your local MSO/MSD or coordinating unit for guidance on "chain of custody" procedures to be used for exposed film or videotape.
E.4. Additional Training/ References	"Open Water Oil Identification Job Aid for Aerial Observation" is an excellent job aid, which includes descriptions, as well as aerial photos. This reference is published by NOAA/HAZMAT and the U.S. Coast Guard MS Office Puget Sound, Port Operations Department, and can be obtained online at: http://response.restoration.noaa.gov/job_aid/jobaid.html

Table 10-1
Descriptions of Oil Sightings

Term	Description
Light Sheens	Light sheens are light, almost transparent layers of oil, which cause a glassy sheen on the surface of the water. No "rainbow" hues are visible. Some natural biological processes can also cause a sheen.
Silver Sheens	Silver sheens are slightly thicker layers of oil that impart a silvery or shimmery look to the sheen.
Rainbow Sheens	Rainbow sheens are rainbow-like reflections in the sheen.
Brown Oil	Brown oil is typically a 0.1-cm to 1.0-cm thick layer of water-in-oil emulsion. The thickness can vary widely depending on wind and current conditions.
Mousse	Mousse is a water-in-oil emulsion often formed as oil weathers (the lighter components have evaporated); colors can range from orange or tan to dark brown.
Black Oil	Black oil is an area of black-colored oil sometimes appearing with a latex texture. These areas are often confused with kelp beds and other natural phenomena. To confirm that oil is present, look for at least a slight rainbow sheen around the edges.
Mousse Streaks	Mousse streaks are lines or streaks of dark-colored oil with an obvious textured appearance. Brown oil and mousse can easily be confused with algae scum collecting in convergent lines, algae patches, or mats of kelp or fungus.
Tar Balls	Tar balls are heavy globules of weathered oil that have formed a pliable ball. Size may vary from pinhead to about 30 cm. Sheen may or may not be present. These are often found along a beach after a major spill of heavy oil.
Mats	Tar mats are non-floating mats of oily debris (usually sediments and/or plant matter) that are found on beaches or just offshore.
Pancakes	Pancakes are isolated patches of oil shaped in a mostly circular fashion. Pancakes can range in size from a few meters across to hundreds of meters in diameter. Sheen may or may not be present.

Section F. Aids to Navigation

Introduction

The Coast Guard ATON program helps to ensure the safety, security, and efficiency of the maritime transportation infrastructure by:

- Operating long-range electronic radio navigation aids (LORAN-C) as well as domestic radio beacons.
- Maintaining short-range ATON, such as lights, fog signals, buoys, day beacons, and radar transponders (RACONS).

AUXAIR assists in these operations through overflights of navigation aids and waterways, observation of aids and markings, reporting of discrepancies and changes, and transport of personnel and materiel.

F.1. Inventory

The inventory of federal ATON maintained by the Coast Guard consists of over 48,000 buoys, beacons, and other ATON. These ATON are distributed along the coastal and inland waters of the United States, its territories, and the Trust Territory of the Pacific. In addition, the Coast Guard regulates more than 45,000 private ATON.

F.2. Assistance

As with many other programs, the Coast Guard Auxiliary provides assistance to the Coast Guard and other concerned federal agencies, including reporting discrepant ATON, verifying private aids, and submitting chart corrections/updates.

The sight of Coast Guard small boats and buoy tenders examining and maintaining ATON is familiar to Auxiliarists and mariners alike. Given the care and diligence required in this activity (e.g., the use of horizontal sextant angles and precise electronic systems for determining whether or not a buoy is off station), it may seem odd to include this activity in a training text on air operations manual, where the observer may be limited to brief glimpses of such aids from a rapidly moving platform at altitudes of 1000 feet or more. Nonetheless, pilots and observers can make a substantial contribution to the ATON program. The relatively high speed of the typical Auxiliary aircraft permits a rapid search of an area to identify aids that may have discrepancies of one type or another. Potential problems with these aids can be confirmed by follow-up visits by surface craft or other assets.

F.3. Training

To be effective in most operational programs, Auxiliarists need specialized training and can benefit greatly from detailed local knowledge. The ATON program is no exception in this regard, and is particularly demanding of specialized expertise and detailed local knowledge. Pilots, air crew, and observers seeking to employ aircraft in support of the ATON and chart updating programs should be thoroughly familiar with applicable guidance documents and District policy.

F.4. Safety

Aerial surveying of ATON should be accomplished from a close enough distance to observe relevant objects, but not at the risk of causing alarm to persons on the ground or placing the aircraft and crew at risk.

F.5. ATON Aviation Missions	This section describes the ATON mission areas supported by AUXAIR personnel.
F.5.a. Area Familiarization	It is often helpful to provide area familiarization over-flights for ATON personnel. Flying a "pre-cruise" mission for the crew of buoy tenders provides them with a bird's eye view of the mission area. These flights are also useful when there is a change of command for a buoy tender in order to take the incoming and outgoing COs on an area familiarization flight.
F.5.b. Logistics Transport	Auxiliary aircraft may be utilized to transport parts for cutter or small boat support or a special item to repair an aid.
F.5.c. Passenger Transport	Auxiliary aircraft may be used to transport Coast Guard or other personnel to support ATON activities.
F.5.d. Latest Charts	The Coast Guard Auxiliary furnishes valuable information to the National Oceanic and Atmospheric Administration (NOAA) and the National Ocean Survey (NOS) for chart correction and updating of nautical and aeronautical charts. For general information, background, and a discussion of appropriate forms to use, refer to the latest edition of the *Aids to Navigation and Chart Updating Guide*. Auxiliarists on land and in surface vessels have gathered the necessary and appropriate data for this purpose for many years, and recently Auxiliary aircraft have also been utilized for this role.
F.5.e. Chart Updating	**Table 10-2** provides a capsule summary of the type of information useful for the chart updating mission together with the likelihood of aerial observation of the items. Aircraft may detect and identify changes in many of the objects (e.g., bridges, dikes and levees, jetties and breakwaters, marinas, dry docks, utility lines, docks, landmarks, towers, etc.) that should be reported, although technical details and measurements may need to be gathered by a ground follow-up survey. In these cases, aircraft observation is used to detect and identify items relevant for chart correction, but additional "ground truth" information is also needed. On a typical chart updating mission or multi-mission patrol, observers will annotate appropriate charts with the approximate location of items of interest for later reporting.

Table 10-2
Chart Correction/Updates

Object	Item to be Reported	Likelihood of Aerial Observation
Airports, landing strips	New or discontinued.	New airfields are relatively easy to identify. Abandoned fields or runways marked with an "X" are easy to detect.
Bridges	New, removed, under construction, or ruins. Give location, type, lights, and vertical and horizontal clearances.	Many of these items can be easily seen from an aircraft. Clearance data requires ground survey.
Cables	Over or under navigable waters. Give location, type, and clearances.	Pylons for overhead cables are relatively easy to detect. Clearance data requires a ground survey.
Channels	New or revised channels. Indicate centerline, controlling depth and width discrepancies for existing channels other than Corps of Engineers' project channels.	Changes in the flow pattern of a channel are often visible from the air. Depths and other information require ground based follow-up effort.
Coast Guard Station	New, discontinued, or change in facilities.	Best handled administratively rather than by aerial observation.
Cribs and water intakes	Visible or submerged. Give size and type of construction and depth if submerged.	General features visible. Ground follow-up necessary for technical and measurement data.
Dams	Type, position, lights, and other pertinent data.	New construction easily visible.
Dikes and levees	Type, height, and extent.	New construction easily visible.
Dolphin and other pilings	Visible or submerged.	Large objects are easy to detect.
Dry docks	New or discontinued.	Easily visible from the air. Observers need to be familiar with the appearance of a dry dock.
Duck blinds	Temporary or permanent structures.	Generally visible from the air. Likelihood of detection may vary with the season and lighting.

F.6. ATON Discrepancies

This section describes common discrepancies with ATON.

F.6.a. Navigation Discrepancies

Table 10-3 presents a brief list of common ATON discrepancies, partitioned into the conventional classifications of critical, urgent, and routine. For each discrepancy, a subjective (but informed and conservative) estimate of the POD from a typical Auxiliary aircraft is provided.

NOTE Night ATON flights are not authorized.

Table 10-3
ATON Discrepancies

Class and Action Required	Discrepancy	Remarks on Aircraft Detection
CRITICAL Federal aids only. Report discrepancies by radio.	1. Aid totally covered or shrouded in ice	POD likely to be high
	2. Light signal showing improper characteristics or rhythm	POD low
	3. Light signal obscured or extinguished	POD can be high, depending on circumstances
	4. Sinking or submerged or extinguished	POD likely to be high
	5. Buoy off station, adrift, missing, capsized, or stranded	POD likely to be high for buoys markedly off station, missing, capsized, or stranded
	6. Radio beacon off the air or giving improper characteristics	POD likely to be high if aircraft is equipped with proper ADF and current light list
	7. Vandalism of aids either in progress or the result of such action	Variable POD, depending on type and extent of vandalism
	8. Aids damaged by vessel collision	Variable POD, depending on nature and extent
	9. Collapsed bridge structures and fender systems	Variable POD, high for major damage

Table 10-3
ATON Discrepancies - Continued

Class and Action Required	Discrepancy	Remarks on Aircraft Detection
URGENT Federal aids only. Report by telephone or radio to Sector or Group.	1. Dayboard missing or damaged by causes other than vandalism	POD variable
	2. Sound signal failure; whistle, bell, gong	Detection impossible
	3. Radio beacon timing sequence incorrect	POD high if aircraft equipped with ADF and light list
	4. Light burning dimly or showing reduced intensity	POD low
	5. Light partly or totally obscured by dayboards	POD low
	6. Bridge light out, inoperative bridge	POD low
ROUTINE Federal and private aids. Report by mail or telephone.	1. Aid obscured by foliage or other objects that should be removed	POD low
	2. Faded dayboards	POD low
	3. Delaminated dayboards	POD low
	4. Leaning structures	POD low
	5. Bird nest on aids	POD low
	6. Improper dayboards	POD low

F.6.b. Examples

Several examples are furnished below to illustrate the use of **Table 10-3** and to provide amplifying remarks about certain judgments.

F.6.b.1. Sinking or Submerged Buoys

Sinking or submerged buoys (item 4 under critical discrepancies) are quite likely to be detected by trained and competent observers in an aircraft. This is particularly true in cases where the pilot or observer has substantial local knowledge, visibility is well above minimums for flight under VFR, and the location of the buoy is such that there are numerous landmarks to facilitate orientation/navigation. Detection of missing buoys in a well-identified harbor or marina entrance is relatively simple. Detection of a missing buoy may be more difficult for offshore buoys if the aircraft does not have a functioning LORAN-C or GPS receiver since the aircraft has to be certain of its position to determine that a buoy is missing or off station.

F.6.b.2. Buoys Off Station

Buoys off station, adrift, missing, capsized, or stranded are also judged to have a high POD. The fact that a buoy is only slightly off station may not be able to be determined from the air, because it is not possible to establish the actual location of the buoy. A buoy markedly off station is likely to be detected. Beached or capsized buoys are usually easily detected.

F.6.b.3. Radio Beacons	Radio beacons off the air or giving improper characteristics are likewise easily detected, provided the aircraft has an automatic direction finding (ADF) receiver and a light list to consult for details on frequency and characteristics.
F.6.b.4. Vandalism	Vandalism is a more difficult detection challenge. It is relatively easy to spot vessels tied up to buoys or other ATON structures and/or persons on such structures, but the detection of damage is difficult if the damage is only slight.
F.6.b.5. Aids Damaged by Vessel Collision	Aids damaged by vessel collision are judged to have a variable POD, depending on the extent of damage. It is difficult to distinguish the cause of damage (collision or vandalism) from air inspection.
F.6.b.6. Critical Discrepancy Identification	The ability to identify critical discrepancies and to cover large areas in a short time is particularly valuable for "after storm surveys" to assess the damage after major storms. In winter, over-flights can be useful in assessing damage to buoys and other aids resulting from ice.
F.7. ATON Training	The ATON mission is more specialized and technical than many other Auxiliary tasks. This places a premium on personnel trained as both observers and ATON mission aid verifiers. Although annual and other recurrent training such as the annual air operations workshop can be useful for this purpose, additional training may be necessary.
F.7.a. Pilots	It has been said that "sight is a faculty, seeing is an art." New pilots are often at a loss to see ground features pointed out by instructors, some as important as their own airport, because they have not acquired the necessary experience identifying things from the air. Over time, the new pilot gains this ability to detect and identify items from the air. In the same way, pilots and observers can be trained to identify objects of navigational interest from the air. The rate of learning is facilitated if pilots and observers are familiar with the appearance of objects of interest from the ground. It is obvious, for example, that aviation personnel will have trouble identifying dry docks and marine railways from the air if they do not know what they look like from the surface.
F.7.b. Coast Guard Sector, Group, or Station	ATON training is most effective if done in conjunction with your local Coast Guard Sector, Group, or Station. If active duty personnel are aboard ATON training flights, they will be able to assist in training personnel to recognize navigational aids discrepancies. At the same time, the station personnel will gain insight into exactly what Auxiliary aircraft can and cannot do. Auxiliarists accomplished in the Auxiliary ATON program would also be able to assist AUXAIR crews in this manner.

Section G. Ice Reconnaissance Missions

Introduction	Ice reconnaissance missions are conducted primarily to ensure shipping channels are safe and free of ice.
G.1. Protective Gear	The crew should dress in appropriate uniforms for the forecast weather conditions expected during the flight and the aircraft should be equipped with appropriate winter survival gear. Generally, the crew should wear layers of clothing to accommodate different temperatures at altitude or in sunlight. Should any portion of the flight be beyond gliding distance of shore, the appropriate equipment and clothing is utilized.
G.2. Pre-Flight Planning for Winter Operation	The following pre-flight planning is required for winter operation: • Check the full route of flight. • Check conditions of airports along the route (ice on runways, fuel availability, etc.). • Airports and terrain may appear different in winter conditions as runways ice up quickly. • Monitor for carbon monoxide. • Taxi carefully. • Run-up on dry areas and not on ice. • Use soft-field landing technique. • Check wheel pants for ice/snow. They should be removed for winter flights. • Check the aircraft surfaces, pitot, vents, and antennas for ice blockage or accumulation. • Check for moisture on control surfaces and hinge areas.
G.3. Ice Reporting	Ice reports are given as three-letter groups based on the ice characteristics as listed below, plus a number representing the percentage of ice coverage (e.g., “DFJ-75”).
G.3.a. Ice Types	F – Fast ice, broken or unbroken, which is attached to the shore or the bottom D – Drift floating ice
G.3.b. Ice Size	F – Field large bodies, 50 yards or more in width L – Floe medium size, 10-50 yards P – Pancake small patches, 1-10 yards wide (usually circular with raised edges) B – Brash small fragments, less than 1 yard wide S – Slush no hardness, accumulation of ice crystals

G.3.c. Surface Features	J – Jammed broken ice caught in restricted waters channels/harbors) H – Hummocked ice which has been pressed into a hard, solid mass R – Re-frozen small segments of re-frozen ice
G.3.d. Percent of Coverage	The amount of water covered by the ice is given in percent. It is often useful to note special features, such as "channel open".
G.3.e. Reporting Preferences	Some Sectors/MSOs may prefer plain language reports of ice conditions. Check with the OIA and/or the Sector/MSO prior to the mission. Digital photographs of ice conditions are invaluable to the Sector/MSO unit. AUXAIR crews are encouraged to carry digital cameras on all ice missions and multi-mission patrols.

Chapter 11
Search and Rescue Procedures

Introduction

Auxiliary aircraft may be called out by Coast Guard unit commanders for SAR missions, or diverted from other missions for emergency SAR. These sorties may be conducted in conjunction with other aircraft or surface vessels. This chapter describes the Auxiliary flight crew support and facility use in carrying out the SAR mission.

In this Chapter

This chapter contains the following sections:

Section A. Overview

Introduction

SAR is a critical mission for the Coast Guard and for the Auxiliary. The SAR mission may arise from a call-out, from a planned event as part of a multi-day or multi-mission search, or from the diversion of an aircraft from another mission already in progress. Since a SAR case may arise out of a completely different mission, it is especially important that the PIC and crew fully understand the requirements and procedures for SAR and be proficient and current on all flight procedures relating to SAR.

A.1. Auxiliary Aircraft Usage

For the Auxiliary aircraft, SAR response often takes the form of searching for a person or vessel on the waterways. The Auxiliary aircraft, in this scenario, functions as an observation and communications platform, following certain criteria in the search for the target.

A.2. Mission Priority

SAR generally takes priority over other missions, but it must be coordinated with the Coast Guard unit controlling the mission, and the pilot and crew must ensure that they have the skills and resources to complete a SAR before accepting the mission.

A.3. Surface/Air Team Coordination

For the SAR mission, the combined surface/air team provides the Coast Guard with a greatly increased capability. The use of aircraft can extend the search area by up to 20 times that covered by surface vessels alone. Moreover, with proper planning, surface vessels can be in an optimum position to reach the vessel or person in distress when the aircraft locates it. As time is often a critical factor in the successful performance of a SAR mission, the time saved through such coordinated operations will often have a major impact on the outcome of the mission.

A.4. Come-Upon SAR

It is vital, in the event of a diversion for SAR or in the case of a "come-upon" SAR event, that the OIA be notified and consent to any deviation from previously assigned missions.

Section B. National Search and Rescue Plan

Introduction

The National SAR Plan (see the *U.S. Coast Guard Addendum to the United States National Search and Rescue Supplement (NSS) to the International Aeronautical and Maritime Search and Rescue Manual (IAMSAR)*, COMDTINST M16130.2 (series)) is a document that provides a system for the overall control and coordination of available facilities in all types of SAR operations. A single federal agency, through an appropriate RCC, coordinates all operations in its area. SAR areas and assigned responsibilities are:

- Inland Area under the U.S. Air Force
- Maritime Area under the U.S. Coast Guard
- Overseas Areas under the various Unified Military Commanders

B.1. Federal Agency Responsibility

The federal agency for the area listed is responsible for organizing the existing agencies and their facilities, through a series of agreements, into a basic network for rendering assistance to both military and non-military persons and property in distress. The agency also has the responsibility for carrying out the obligations of the United States within the agency's respective SAR areas.

B.2. Statutory Authority to Conduct SAR

The Coast Guard has been given the specific statutory authority for developing, maintaining, and operating rescue facilities and for rendering aid to distressed persons and property (i.e., personnel, ships and aircraft, both military and civil) on, over, and under the high seas and waters subject to the jurisdiction of the United States. The Coast Guard may render aid to persons and property at any time or location in which Coast Guard facilities and personnel are available and can be effectively utilized. In carrying out its SAR function, the Coast Guard may utilize the facilities and personnel of the Coast Guard Auxiliary in prosecuting SAR cases.

B.3. Maritime Areas

The Commandant has divided the maritime area into the Atlantic Maritime area and the Pacific Maritime area. Each maritime area is made up of multiple SAR regions (SRR). Each region of the maritime area is served by an RCC, normally located at the headquarters of the designated SAR coordinator.

Section C. SAR Administration

Introduction

This section describes SAR administration within the Auxiliary Aviation Program.

C.1. SAR Coordinators

SAR coordinators carry out the following responsibilities and duties.

C.1.a. Responsibilities

Primary responsibilities for SAR coordinators are defined as follows:

- Prompt dissemination to interested commands of all information about distress incidents requiring SAR assistance.
- Prompt dispatch of appropriate and adequate rescue facilities.
- Thorough prosecution of SAR operations until rescue has been effected, assistance is no longer necessary, or operations are suspended when it is apparent that further effort would prove to be unsuccessful.

C.1.b. Duties

Auxiliarists and Auxiliary facilities involved in SAR follow procedures prescribed by SAR coordinators. This coordination is the responsibility of the District Commander. The duties of SAR coordinators include the following:

- Establish an RCC.
- Ensure that a SAR plan is prepared and distributed to appropriate activities.
- Establish, organize, and maintain communications facilities.
- Designate SMCs for specific SAR missions.

C.2. SAR Mission Coordinators

The SMC is an official designated by the SAR coordinator to coordinate and control a specific SAR mission. Each SAR mission has an SMC who may be either the SAR coordinator or a designated official who is directed to coordinate and control a particular SAR mission. Since the duties of the SMC require sophisticated and extensive communication capabilities, Auxiliary aircraft are usually not designated the SMC.

C.3. On-Scene Commander

The OSC controls SAR operations and communications at the scene of the SAR incident. In designating an OSC, it is important that adequate SAR facilities be continuously available so that the OSC may maintain direct control of on-scene operations and communications with assigned facilities. Frequent change of the OSC is not desirable. Seniority is not a basis for assuming OSC duties unless it becomes essential or is ordered by the SMC. If the OSC happens to be airborne, on-scene control shall be retained until relieved by the SMC or until relief becomes necessary and is accomplished by mutual agreement with another on-scene unit. Such would be the case when the airborne unit reaches its minimum safe fuel level. The SMC would be advised of that relief by means of a SITREP from the aircraft to the SMC.

C.3.a. OSC Designation

An OSC is not required for all missions, although the general rule is to designate an OSC anytime there are two or more SAR units in the area. The SMC may designate an OSC when better coordination at the scene is required and such coordination can be more properly effected at the scene. If an OSC has not been designated, the first Search and Rescue Unit (SRU) arriving on-scene assumes OSC responsibilities and advises the SMC of the situation.

C.4. Responsibility of SAR Participants

The assignment of differing degrees of SAR responsibility among various commands in no way affects the fundamental responsibility of any unit to initiate SAR operations as circumstances dictate. Independent action must, however, be reported immediately to the appropriate SAR coordinator through established communications channels.

Since Auxiliary air facilities and crews may be called upon to participate in a SAR operation at any time, all potential SAR participants should be familiar with standard procedures as set forth in this text and should be current and proficient on all SAR flight procedures.

C.5. Auxiliary Aircraft in SAR

The relatively slow speed of the typical Auxiliary aircraft facility ideally suits it for searches for small vessels or debris and persons in the water. The fuel usage permits such aircraft facilities to search a given area with less fuel consumption than Coast Guard aircraft. The use of Auxiliary aircraft facilities for selected search missions also conserves Coast Guard units for more hazardous or specialized missions which are not suitable for Auxiliary aircraft such as medical evacuation from ships or air delivery of de-watering pumps.

C.5.a. Single-Engine Auxiliary Aircraft

Studies by the Coast Guard show that 86% of the cases to which the Coast Guard responded occurred within 3 nautical miles of shore and that 95% of the cases occurred within 10 nautical miles of shore. Thus, the single-engine Auxiliary aircraft facility which is limited to 25 nautical miles from shore (unescorted) for its operations is in a position to provide support for a major portion of the Coast Guard's SAR mission requirements.

C.5.b. Fixed-Wing Auxiliary Aircraft

The typical Auxiliary aircraft facility is fixed-wing and is not capable of rescues at sea, a duty for which helicopters or surface vessels are far more suited. The fixed-wing Auxiliary aircraft facility is used primarily as a means of locating a source of distress, reporting it to the proper Sector, Group, Station, RCC, or SMC, and then guiding surface craft or rotary-wing aircraft to the scene. The typical Auxiliary aircraft is primarily an observation and communications platform, a role that fits its capabilities.

C.5.c. Scheduling

Scheduled weekend and holiday patrols during the boating season are one means by which Auxiliary flight crews can use their facilities to provide quick response to boating emergencies. In addition, many Auxiliary aircraft owners, observers, and a flight crew are available during the week in case of need for call-out.

C.6. Coordinated Search Efforts

One of the most effective areas of utilization of Auxiliary aircraft is in combination with surface vessels for team operations. As in any team operation, coordination is essential. Effective communications, good planning, and establishment and maintenance of proper practices are required to ensure this coordination. In this evolution, each facility will perform those functions for which it is best suited. The aircraft will provide the extended search or observation coverage desired along with increased communication range. The surface vessel will accomplish the detailed search, positive identification, and any actual direct assistance to the search subject. This combination may be applied to routine maritime safety missions, including SAR prosecution, or while patrolling special events such as marine parades or regattas.

C.7. Limitations

Although the aircraft facility is an extremely effective and versatile element of the Auxiliary, there are several limitations that must be understood and must be considered when assigning missions to aircraft. These limitations may be regulatory in nature, may involve issues of crew safety or performance, or may result from the nature or type of facility in use.

C.7.a. Pre-Mission Selection

Limitations of a particular aircraft and its crew should also be evaluated prior to starting a mission. Missions with difficult conditions should be assigned to more experienced, proficient, and current flight crews. Aircraft equipped with GPS or LORAN should be used for complex SAR activities. These decisions are the responsibility of the OIA. They should be kept informed by the cognizant Auxiliary Air Operations Staff Officer, generally an ADSO-AAC (Auxiliary Aviation Coordinator).

C.7.b. Federal Aviation Regulations

Even during SAR operations, all applicable FAR are adhered to, unless specifically exempted. For example, Auxiliary aircraft under the command of an aircraft commander or first pilot, while on an actual SAR sortie, are provided an exemption to FAR 91.119 (specifying minimum safe altitudes and clearances) by a special memorandum of understanding between the Coast Guard and the FAA.

In order to fall under the exemption, pilots are trained in low-level flight and maneuvering. This exemption applies only to SAR and even then is not a blanket authorization for low-level flight on SAR cases, but is intended to enable improved search assistance when necessary.

It is the pilot's responsibility to advise the SMC of any effect that these regulations may have on the mission. The PIC should never accept any mission that unnecessarily endangers his crew, himself, his aircraft, or anyone on the ground. It is the responsibility of the PIC, along with the crew, to continuously analyze and manage risk as the flight environment and mission change, especially before accepting a SAR assignment.

C.7.c. Fuel Endurance	Endurance on-scene is often a limitation. Light aircraft often do not have sufficient fuel capacity to stay on station as long as surface vessels. Most light aircraft carry fuel for at least three hours of flight with reserve. However, some Auxiliary aircraft may have flight time endurance of as much as eight hours. In the case of safety multi-mission patrols, a significant portion of the fuel may have been consumed before diversion to a SAR case or while searching. When this situation exists, the aircraft may not be able to loiter awaiting the arrival of surface assistance and may have to return to an airfield for refueling if time allows.
C.8. Proper Facility and Crew Usage	The DSO-AVs or their designees should work closely with the call-out authority, which is normally the Coast Guard air station, to ensure the proper usage of facilities and crews. A procedure should be set up using the chain of command that will ensure prompt response, using appropriate aircraft, to any requested call-out.

Section D. Initial Procedures

Introduction	This section describes the initial procedures Auxiliary flight crew teams should take when carrying out SAR missions.
D.1. Mission Assignment	A Coast Guard air station or other designated call-out authority will provide SAR assignments to Auxiliary aircraft facilities. In order to become qualified as a first pilot or aircraft commander, the Auxiliary pilot must have demonstrated proficiency in search patterns and other SAR operations. An Auxiliary flight check including SAR procedures is required of first pilots and aircraft commanders every two years.
D.1.a. Compliance with Directions	The directions of the SMC or the OSC should be followed provided they do not pose a hazard to the aircraft or crew. If the PIC is unwilling or unable to comply with them, the SMC must be immediately notified of that decision.
D.1.b. Local Knowledge	In many instances, Auxiliary pilots have accumulated local knowledge concerning patterns and geographical features which may affect the success of a search. This knowledge, plus the capabilities of the aircraft should be used to make recommendations to the Operational Commander.
D.1.c. Mission Planning and Organization	A search request may allow time for a ground briefing, which will clearly provide the best mechanism for mission planning and organization. The crew may, however, be asked to initiate a SAR case after becoming airborne, perhaps even while engaged in another type of mission. In this case, several considerations must be evaluated by the PIC before accepting the mission.
D.1.c.1. Evaluation of Flight Conditions	The pilot must be aware of and evaluate the following flight conditions: • Time aloft • Fuel remaining • Forecast weather • Crew fatigue Depending on these conditions or other circumstances, the pilot may decline the mission, may accept the mission, or may indicate that he will first have to refuel and then proceed.
D.1.c.2. Understanding the Flight Route	The flight route is important. Non-pilots requesting an Auxiliary aircraft response may not fully understand details of controlled airspace.

D.1.c.3. Terminology Familiarity and Information Collection

The flight crew must be familiar with the type of directions that will be given by the Coast Guard radio operator and be able to plot a commence search point (CSP) and corner points on a sectional and on VFR terminal area charts. Terms such as center point or central point may be used; bearings may be given in true or magnetic degrees. The assigned crew should write down the following:

- CSP
- Radius
- First turn
- Orientation
- Track space
- Numbers of legs
- Direction of creep
- Minor and major axis
- Type of search pattern

Some job aids may be available to assist with plotting and recording of details. These are examples of possible information received from the call-out authority in order to begin the SAR sortie.

D.1.c.4. Clarification of Instructions

When instructions are received that are not completely understood, clarification should be requested.

D.1.d. Operating in or near Controlled Airspace

When operating in or near controlled airspace, ATC should be notified that an operation is in progress. They should be informed of the search and the area expected to be covered. ATC may request a transponder squawk of 1277, which is the general SAR code. When on an actual, ordered SAR, the Auxiliary aircraft call sign used for ATC communications may be "Coast Guard AUXAIR RESCUE (tail number)."

D.2. Crew Briefing

Ample time should be allowed before takeoff for the crew briefing. The briefing is especially important for SAR prosecution, since, to the extent known, the briefing should cover details of the search and target along with standard briefing information. This briefing should cover items such as:

- Review of the Risk Assessment Matrix.
- Area of operation.
- Pilot/crew responsibilities including the specifically-assigned areas for each crewmember to search.
- Emergency procedures including ditching.
- Forced landing and emergency egress procedures.
- Emergency equipment usage.
- CRM issues.

The search aspect of the brief should include the CSP, the type of search pattern to fly, and a full description of what to look for. Other pertinent information includes details, such as:

- Search patterns including:
  - Track length (if applicable)
  - Sweep width
  - Creep direction (major and minor axis)
  - Corner points if applicable
  - Number of legs to fly
  - End point
  - Track space
  - First turn direction
  - Orientation (true or magnetic)
- Altitudes to be flown at various points in the search.
- Communication frequencies to be used and call signs of units to be contacted. It is important to know what other units, surface vessels, helicopters, etc., are involved, and the altitudes, separation requirements, and communications protocol.
- Location of other units involved in the search and traffic.

Section E. Types of Distress

Introduction

A distressed vessel may involve a large vessel still afloat but in need of assistance. Large vessels are good visual and radar targets and often are able to provide an accurate fix by radio. A drifting, disabled vessel is more difficult to detect than one underway, since its wake may not be visible. Small surface vessels may prove difficult to detect by either visual or electronic means especially under adverse conditions. Search aircraft in many instances have flown directly overhead small vessels without making visual contact.

E.1. Surface Craft Distress

If a distressed vessel has foundered before the arrival of rescue units, the most probable objects to look for will be lifeboats, rafts, debris, oil, and personnel in the water. Lifeboats may vary in size from 12 to 50 or more feet in length and be of any color. Rafts may also be of any color and are found in a variety of sizes and shapes ranging from 4 feet in diameter and box shaped to 20 feet in diameter and circular.

E.1.a. Debris

Initially, the scene of the disaster may be marked by debris and perhaps an oil slick. The debris will be found downwind of the oil slick and boats and rafts are typically downwind of the debris, since they are more affected by wind unless provided with drogues. Persons in the water are usually found in the area of the debris. Floating objects should be carefully examined for any evidence of persons clinging to those objects. Upwind areas should not be ignored since, if the vessel was abandoned some time before sinking, lifeboats, rafts, and personnel may have propelled themselves upwind of the point of foundering. Search units should search both upwind and downwind of the oil and debris area.

E.1.b. Small Craft

Small craft, such as yachts and fishing vessels, usually carry only small dinghies. Some have only balsa or pneumatic rafts, while others have only life jackets. Dinghies may be any color.

E.1.c. Distress Signals

Lifeboats from large vessels are normally equipped with ample pyrotechnic visual distress signals (VDS) and if more than one boat is launched, they can expect to be grouped or tied together, making sighting easier. Boats and rafts from small craft usually have a limited supply of VDSs, frequently no more than the minimum required by law.

E.2. Aircraft Distress

Aircraft distress searches take place over land or water areas.

E.2.a. Search Over Land Areas	If the search for a downed aircraft is partially over land areas, observers should be briefed to look for broken or scarred trees, bits of shiny metal beneath the trees, burned out areas which look fresh, and parachutes or visual ground signals which may have been set out by survivors. Although there is an altitude exemption for executing SAR cases, pilots should adhere to FAA altitude restrictions unless there is a specific reason to do otherwise, especially on searches over land. The PIC and crew must remain consistently cognizant of situational awareness and high obstructions.
E.2.b. Search Over Water	In a search over water for survivors of an aircraft accident, observers should be briefed to look for scattered wreckage; such as oxygen bottles, floor boards, pieces of debris, partial or whole rafts, or seat cushions. In some cases, there may be nothing other than an oil slick.

Section F. Visual Alert and Electronic Aids

Introduction

Survival equipment designed to signal rescue vessels and aircraft are divided into two general categories: visual and non-visual. All search personnel should therefore be familiar with the appearance and characteristics of the various visual and non-visual detection aids (VDAs) carried on boats, lifeboats, rafts, and as personal survival gear. These may include flags, mirrors, flares, smoke canisters, or something as simple as an orange life raft orange life vest.

Because of the difficulty of sighting a lifeboat or life raft from the air, the first sighting will often be made through the use of a visual aid such as the following:

- Pyrotechnics
- Dye markers
- Signal mirrors

However, typically the SAR platform identifies the general vicinity of the distressed vessel/person by use of electronic means, such as:

- ELT
- EPIRB
- PEPIRB
- Portable two-way radio

There may be times when a close check must be made of a vessel to determine if there is trouble. A small boat in deep water and showing no wake may be unable to anchor or use power. A close fly-by may allow observation of more details such as additional signals or sighting data which may indicate distress.

F.1. Raising Antennas

Survivors may use balloons and box kites for raising antennas of emergency radio sets. These may indicate the presence of a life raft but can be a hazard to search aircraft. Be alert for such hazards.

F.2. Signaling Mirrors

Signaling mirrors are one of the best daylight aids. When properly operated under ideal conditions, they are visible at distances of 5 nautical miles or more. In addition, these devices are reusable resources, and may be used indefinitely.

F.3. Canvas Protective Covers

The canvas protective covers used on life rafts are generally painted red, orange, or yellow and may be used for signaling. They can also be used for limited messages using the surface-to-air signals or Morse code.

F.4. Pyrotechnic Signals

Pyrotechnic signals are used as both day and night visual aids along with handheld or floating smoke signals, used in daytime. These emit a large volume of bright orange smoke that remains visible for several minutes. Under high wind conditions the smoke will dissipate rapidly making the signal less effective. Handheld flares, although better at night, may also be used as daytime signals. Coast Guard or SOLAS-approved marine-type flares are much brighter than the old fuse-type and are therefore much more visible from an aircraft.

F.5. Flare Pistols

A common pyrotechnic signal-launching device is the flare pistol. These come in various sizes including the "pen-gun", which is the size of a fountain pen and fits in the pocket. The flares are usually red in color. The meteor signal fireball can reach altitudes of 200 to 1,800 feet depending on the size and type.

F.6. Emergency Radio Sets

Emergency radio sets consist of transmitters or transceivers. The ELT, with which Auxiliary aviators are familiar, is also marketed in a marine version designated as an EPIRB.

Survivors may use balloons and box kites for raising antennas of emergency radio sets. These may indicate the presence of a life raft but can be a hazard to search aircraft. Be alert for such hazards.

F.6.a. Class A and B EPIRBs

The older Class A and B EPIRBs transmit a continuous warbling signal on 121.500 MHz and 243.000 MHz. These are the same frequencies used by the ELT in an aircraft. Some EPIRBs and ELTs also have capabilities for communication as well as the alert/locate signal.

F.6.b. Category 1 and 2 EPIRBs

A new class of EPIRBs, Category 1 and 2, transmit on 406.000 MHz and 121.500 MHz. Each Category 1 and 2 EPIRB has a serial number which is recorded when the purchasers send in their registration cards and identifies the vessel on which it is located. When the Category 1 or 2 EPIRB is activated, the serial number is transmitted as a data burst on 406.000 MHz to a satellite which relays the information and location of the transmitter to ground stations. Some of the newer EPIRBS are also equipped with a built-in GPS. A continuous signal on 121.500 MHz is also transmitted for tracking by direction finding equipment. Marine environment EPIRBs are designed to float and to transmit their signal while in the water.

F.6.c. Class C EPIRB

Another version of EPIRB, Class C, transmits on VHF-FM Channels 15 and 16. These Class C devices are required on certain commercial passenger vessels operating on the Great Lakes. The disadvantage of a Class C EPIRB is that the transmission is not continuous and is not relayed via satellite. As the distribution of EPIRBs increases, it becomes more important that flight crews be proficient in the ELT locating techniques discussed later in this chapter.

F.7. Other Alerts

An orange flag with a black ball and square is an accepted VDS as is the raising and lowering of both arms at the side. Neither of these signals is very effective when viewed from aircraft since they are not visible from more than several hundred yards, although binoculars may help to identify the signal from a greater distance.

F.8. Auxiliary Surface-to-Air Recognition

Auxiliary vessels are encouraged to display a special Surface-to-Air Recognition Banner. This banner consists of a black capital "A" in block lettering on an international orange background. The banner is normally displayed on the deck or top of the pilothouse with the base of the "A" facing the stern. The sign is approximately a 36-inch square. This banner is used to identify Auxiliary vessels on patrol from the air. (see *Auxiliary Operations Policy Manual*, COMDTINST M16798.3 (series))

Section G. Search Visibility

Introduction

This section describes the various factors of search visibility.

G.1. Maximum Detection Range

Maximum detection range is the distance at which an object can be seen and recognized from the height above ground or water at which the aircraft is flying. This is a critical factor in determining the characteristics of the search pattern as it limits the sweep width of the pattern. The maximum detection range is always less than the meteorological visibility. The sweep width (W) is usually selected to be considerably less than twice the search visibility in order to increase the probability of detecting the search target. (see **Figure 11-1**)

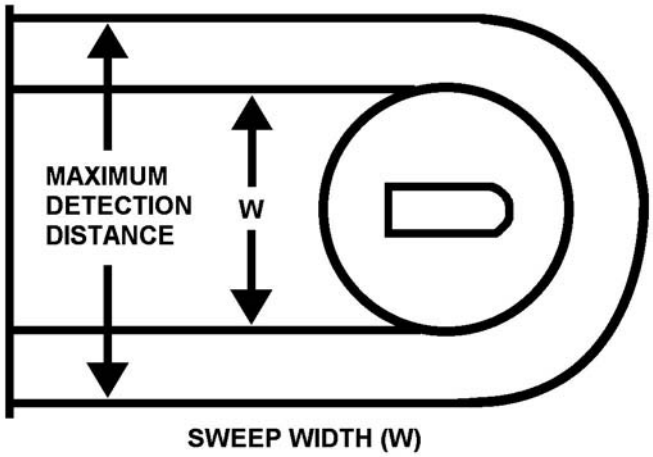


Figure 11-1
Sweep Width

G.2. Altitude

Depending on the search object, altitude should be appropriate to the mission. (see **Table 11-1**) There are always trade-offs between higher and lower altitudes in searches. Higher altitudes provide a greater margin of safety and potentially greater detection distance, but they may compromise search effectiveness when attempting to locate smaller objects. Smaller targets, such as persons in the water, will remain difficult to detect regardless of the altitude, although they may be easier to detect at lower altitudes. Lower altitudes require the pilot to be trained and current in the low-level flight regimen.

Table 11-1
Recommended Visual Search Altitudes

Search Target	Terrain	Altitude AGL
Person, Cars, Light Aircraft Crashes	Moderate	500
Trucks, Large Aircraft	Moderate	500-1000
Person, 1 Person Rafts, Surfboards, Light Aircraft Crashes	Water or Flat	500
Small to Medium Sized Boats, Life Rafts, Trucks, Aircraft	Water or Flat	1000-3000
Distress Signals	Night - all	1500-2000

G.3. Low Pass Verification

The chance of detecting a person in the water by air search is quite low. Obviously, a low pass for verification in the event a person or debris is sighted in the water might be in order. However, it is more prudent to take a latitude/longitude position and report the position to surface vessels. Risk-reward factors, generally speaking, are not favorable for small fixed-wing aircraft. As Auxiliary aviators we do not want to jeopardize our crew or aircraft and become part of the problem, rather than assisting in the solving of a SAR case.

Keep in mind that low altitude flights increase the risk factor and may be in violation of FAA regulations.

G.4. Sweep Width Variances

It is evident that the sweep width can vary for the same situation depending on the POD that is desired. For Auxiliary application, the SMC may provide a detailed calculation such as that shown in the *U.S. Coast Guard Addendum to the United States National Search and Rescue Supplement (NSS) to the International Aeronautical and Maritime Search and Rescue Manual (IAMSAR*), COMDTINST M16130.2 (series).

For simplicity, sweep widths based upon a single sweep POD can be used. When the meteorological visibility is from 3 to 5 nautical miles, the sweep widths given in **Table 11-2** should be reduced by two-thirds for large objects and one-half for small objects. In addition, the sweep widths must be reduced by 30 to 50% for small objects when the winds are in the 20- to 25-knot range and for large objects when the wind is in the 30- to 35- knot range.

The chance for detection of small targets decreases when the wind is above 25 knots and for detection of boats when the wind is above 35 knots. Winds above 35 knots create considerable turbulence at search altitudes causing rapid crew fatigue and generally make operations by light aircraft difficult. The turbulence associated with high wind velocities is generally less when operating over open water offshore.

Sweep width estimates for daylight detection aids are given in **Table 11-3**.

G.5. Uncorrected Sweep Widths

Table 11-2 presents uncorrected sweep width data for various types of targets for aircraft at various altitudes and visibility conditions. To determine the suggested sweep width, find the column for the appropriate altitude and visibility. Read down this column to the target type that most closely describes the search object. The value is the uncorrected sweep width, which should be interpolated as necessary.

G.5.a. Search Altitudes Below 500 Feet

For search altitudes up to 500 feet only, the values given for sweep width for a person in the water may be increased by a factor of four, if it is known that the person is wearing a PFD.

G.5.b. Search Altitudes Above 3000 Feet

Visual searches are seldom conducted from altitudes above 3000 feet; however, for altitudes up to 5000 feet, where visibility exceeds 3NM and target size exceeds 25 feet, the sweep widths given for 3000 feet remain applicable.

G.5.c. Surface Wind Above 25 Knots

Reduce sweep width by one-half when meteorological visibility is less than 10 nautical miles or when surface wind is above 25 knots.

G.6. Search Aircraft Speed

Table 11-4 provides values to calculate the sweep width correction based on search aircraft speed.

Select the aircraft's indicated airspeed, shown across the top of the table then read down the column to the search object line. This value is the correction to be applied to the uncorrected sweep width factor..

EXAMPLE: Airspeed is 120 knots, object raft – 1- to 4-man, correction factor is 0.9.

Uncorrected Sweep Width X 0.9 factor = correction to 90% of nominal sweep width value

Table 11-2
Uncorrected Visual Sweep Width

Fixed-Wing Searching For	Altitude 300 (FT) Visibility (NM)							Altitude 500 (FT) Visibility (NM)						
	1	3	5	10	15	20	30	1	3	5	10	15	20	30
Person in water	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1
Raft 1 person	0.3	0.7	0.9	1.2	1.3	1.3	1.3	0.3	0.7	0.9	1.2	1.4	1.4	1.4
Raft 4 person	0.4	0.9	1.3	1.7	2.0	2.2	2.2	0.4	1.0	1.3	1.8	2.0	2.2	2.2
Raft 6 person	0.4	1.1	1.5	2.1	2.5	2.7	2.7	0.4	1.1	1.5	2.2	2.5	2.8	2.8
Raft 8 person	0.4	1.2	1.6	2.3	2.6	2.9	2.9	0.4	1.2	1.6	2.3	2.7	2.9	2.9
Raft 10 person	0.4	1.2	1.7	2.4	2.9	3.2	3.2	0.4	1.2	1.7	2.5	2.9	3.2	3.2
Raft 15 person	0.5	1.3	1.9	2.7	3.2	3.5	4.0	0.5	1.3	1.9	2.7	3.3	3.6	4.0
Raft 20 person	0.5	1.4	2.1	3.1	3.7	4.2	4.8	0.5	1.5	2.1	3.2	3.8	4.2	4.8
Raft 25 person	0.5	1.5	2.2	3.4	4.1	4.6	5.2	0.5	1.6	2.3	3.4	4.1	4.6	5.3
Power boat < 15 ft	0.4	0.8	1.1	1.4	1.6	1.7	1.7	0.4	0.9	1.2	1.5	1.7	1.8	1.8
Power boat 15-25 ft	0.5	1.6	2.4	3.5	4.3	4.8	4.8	0.5	1.7	2.4	3.6	4.3	4.8	4.8
Power boat 25-40 ft	0.6	2.1	3.3	5.3	6.6	7.6	9.1	0.6	2.1	3.3	5.3	6.7	7.7	9.1
Power boat 40-65 ft	0.6	2.6	4.5	8.1	10.9	13.1	16.4	0.6	2.7	4.5	8.1	10.9	13.1	16.5
Power boat 65-90 ft	0.6	2.8	5.0	9.7	13.5	16.6	21.6	0.6	2.8	5.0	9.8	13.5	16.7	21.7
Sailboat 15 ft	0.5	1.5	2.2	3.2	3.8	4.3	4.3	0.5	1.6	2.2	3.2	3.9	4.3	4.3
Sailboat 20 ft	0.6	1.8	2.6	4.0	4.9	5.6	5.6	0.6	1.8	2.7	4.1	5.0	5.6	5.6
Sailboat 25 ft	0.6	2.0	3.1	4.8	6.0	6.9	6.9	0.6	2.0	3.1	4.9	6.1	7.0	7.0
Sailboat 30 ft	0.6	2.3	3.6	5.9	7.5	8.8	10.6	0.6	2.3	3.6	5.9	7.6	8.8	10.6
Sailboat 40 ft	0.6	2.6	4.3	7.5	10.0	11.9	14.8	0.6	2.6	4.3	7.6	10.0	11.9	14.8
Sailboat 50 ft	0.6	2.7	4.6	8.4	11.3	13.6	17.3	0.6	2.7	4.6	8.4	11.3	13.7	17.3
Sailboat 65-75 ft	0.6	2.8	4.9	9.3	12.7	15.5	20.0	0.6	2.8	4.9	9.3	12.7	15.5	20.0
Sailboat 75-90 ft	0.6	2.8	5.1	9.9	13.7	16.9	22.1	0.6	2.8	5.1	9.9	13.7	17.0	22.1
Ship 90-150 ft	0.6	2.9	5.4	11.1	15.9	20.0	26.9	0.6	2.9	5.4	11.1	15.9	20.1	26.9
Ship 150-300 ft	0.6	3.0	5.7	12.1	18.8	24.7	34.8	0.6	3.0	5.7	12.5	18.9	24.7	34.8
Ship > 300 ft	0.7	3.0	5.8	13.2	20.8	27.9	41.4	0.7	3.0	5.8	13.2	20.6	27.9	41.4

Table 11-2
Uncorrected Visual Sweep Width - Continued

Fixed-Wing Searching For	Altitude 750 (FT) Visibility (NM)							Altitude 1000 (FT) Visibility (NM)						
	1	3	5	10	15	20	30	1	3	5	10	15	20	30
Person in water	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1
Raft 1 person	0.3	0.7	0.9	1.2	1.4	1.4	1.4	0.3	0.7	0.9	1.2	1.4	1.4	1.4
Raft 4 person	0.4	1.0	1.3	1.8	2.1	2.2	2.2	0.3	1.0	1.3	1.8	2.1	2.3	2.3
Raft 6 person	0.4	1.1	1.6	2.2	2.6	2.8	2.8	0.4	1.1	1.6	2.2	2.6	2.8	2.8
Raft 8 person	0.4	1.2	1.7	2.3	2.7	3.0	3.0	0.4	1.2	1.7	2.4	2.8	3.0	3.0
Raft 10 person	0.4	1.3	1.8	2.5	3.0	3.3	3.3	0.4	1.3	1.8	2.6	3.0	3.3	3.3
Raft 15 person	0.4	1.4	1.9	2.8	3.3	3.7	4.1	0.4	1.4	2.0	2.8	3.4	3.7	4.2
Raft 20 person	0.5	1.5	2.2	3.2	3.8	4.3	4.9	0.4	1.5	2.2	3.2	3.9	4.3	4.9
Raft 25 person	0.5	1.6	2.3	3.5	4.2	4.7	5.4	0.4	1.6	2.3	3.5	4.2	4.7	5.4
Power boat < 15 ft	0.4	0.8	1.2	1.6	1.8	1.9	1.9	0.4	1.0	1.3	1.7	1.8	2.0	2.0
Power boat 15-25 ft	0.5	1.7	2.4	3.6	4.4	4.9	4.9	0.5	1.7	2.5	3.7	4.4	5.0	5.0
Power boat 25-40 ft	0.6	2.1	3.3	5.3	6.7	7.7	9.2	0.5	2.2	3.4	5.4	6.8	7.8	9.3
Power boat 40-65 ft	0.6	2.7	4.5	8.2	10.9	13.1	16.5	0.6	2.7	4.5	8.2	10.9	13.1	16.6
Power boat 65-90 ft	0.6	2.8	5.0	9.8	13.5	16.7	21.7	0.6	2.8	5.1	9.8	13.6	16.7	21.7
Sailboat 15 ft	0.5	1.6	2.3	3.3	3.9	4.4	4.4	0.5	1.6	2.3	3.3	4.0	4.4	4.4
Sailboat 20 ft	0.5	1.8	2.7	4.1	5.0	5.7	5.7	0.5	1.8	2.7	4.2	5.1	5.7	5.7
Sailboat 25 ft	0.6	2.1	3.1	5.0	6.2	7.0	7.0	0.5	2.1	3.2	5.0	6.2	7.1	7.1
Sailboat 30 ft	0.6	2.3	3.6	6.0	7.6	8.9	10.7	0.6	2.3	3.6	6.0	7.6	8.9	10.7
Sailboat 40 ft	0.6	2.6	4.3	7.6	10.0	11.9	14.9	0.6	2.6	4.3	7.6	10.9	12.0	14.9
Sailboat 50 ft	0.6	2.7	4.6	8.5	11.4	13.7	17.4	0.6	2.7	4.6	8.5	11.4	13.7	17.4
Sailboat 65-75 ft	0.6	2.8	4.9	9.3	12.7	15.6	20.0	0.6	2.8	4.9	9.3	12.8	15.6	20.1
Sailboat 75-90 ft	0.6	2.8	5.1	9.9	13.8	17.0	22.2	0.6	2.8	5.1	9.9	13.8	17.0	22.2
Ship 90-150 ft	0.6	2.9	5.4	11.1	15.9	20.1	27.0	0.6	2.9	5.4	11.1	15.9	20.1	27.0
Ship 150-300 ft	0.6	3.0	5.7	12.5	18.9	24.7	34.9	0.6	3.0	5.7	12.5	18.9	24.7	34.9
Ship > 300 ft	0.7	3.0	5.8	13.2	20.6	27.9	41.4	0.6	3.0	5.8	13.2	20.6	27.9	41.4

Table 11-2
Uncorrected Visual Sweep Width - Continued

Fixed-Wing Searching For	Altitude 1500 (FT) Visibility (NM)							Altitude 2000 (FT) Visibility (NM)						
	1	3	5	10	15	20	30	1	3	5	10	15	20	30
Person in water	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Raft 1 person	0.2	0.7	0.9	1.3	1.4	1.4	1.4	.01	0.6	0.9	1.2	1.4	1.4	1.4
Raft 4 person	0.3	1.0	1.3	1.8	2.1	2.3	2.3	.02	0.9	1.3	1.9	2.2	2.3	2.3
Raft 6 person	0.3	1.1	1.6	2.3	2.6	2.9	2.9	.02	1.1	1.6	2.3	2.7	2.9	2.9
Raft 8 person	0.3	1.2	1.7	2.4	2.8	3.1	3.1	.02	1.2	1.7	2.5	2.9	3.2	3.2
Raft 10 person	0.3	1.3	1.8	2.6	3.1	3.4	3.4	.02	1.2	1.8	2.7	3.1	3.5	3.5
Raft 15 person	0.3	1.4	2.0	2.9	3.4	3.8	4.3	0.2	1.4	2.0	3.0	3.5	3.9	4.4
Raft 20 person	0.4	1.5	2.2	3.3	4.0	4.4	5.1	0.3	1.5	2.2	3.4	4.0	4.5	5.1
Raft 25 person	0.4	1.6	2.4	3.6	4.3	4.8	5.6	0.3	1.6	2.4	3.6	4.4	4.9	5.7
Power boat < 15 ft	0.3	1.0	1.3	1.7	2.0	2.1	2.1	0.2	1.0	1.3	1.8	2.0	2.2	2.2
Power boat 15-25 ft	0.4	1.7	2.5	3.7	4.5	5.1	5.1	0.3	1.7	2.5	3.8	4.6	5.1	5.1
Power boat 25-40 ft	0.5	2.2	3.4	5.5	6.8	7.9	9.4	0.3	2.2	3.4	5.5	6.9	8.0	9.5
Power boat 40-65 ft	0.5	2.6	4.5	8.2	11.0	13.2	16.6	0.4	2.6	4.5	8.3	11.0	13.3	16.7
Power boat 65-90 ft	0.5	2.8	5.1	9.8	13.6	16.7	21.8	0.4	2.8	5.0	9.8	13.6	16.8	21.8
Sailboat 15 ft	0.4	1.6	2.3	3.4	4.1	4.5	4.5	0.3	1.6	2.3	3.5	4.1	4.6	4.6
Sailboat 20 ft	0.4	1.8	2.8	4.2	5.2	5.8	5.8	0.3	1.8	2.8	4.3	5.2	5.9	5.9
Sailboat 25 ft	0.5	2.1	3.2	5.1	6.3	7.2	7.2	0.3	2.1	3.3	5.2	6.4	7.3	7.3
Sailboat 30 ft	0.5	2.3	3.7	6.1	7.7	9.0	10.8	0.3	2.3	3.7	6.1	7.8	9.1	10.9
Sailboat 40 ft	0.5	2.6	4.3	7.6	10.1	12.0	14.9	0.4	2.6	4.3	7.7	10.1	12.1	15.0
Sailboat 50 ft	0.5	2.7	4.6	8.5	11.4	13.8	17.5	0.4	2.7	4.6	8.6	11.5	13.9	17.5
Sailboat 65-75 ft	0.5	2.8	4.9	9.4	12.8	15.7	20.2	0.4	2.7	4.9	9.4	12.9	15.7	20.2
Sailboat 75-90 ft	0.5	2.8	5.1	10.0	13.8	17.1	22.3	0.4	2.8	5.1	10.0	13.9	17.1	22.3
Ship 90-150 ft	0.5	2.9	5.4	11.1	16.0	20.1	27.0	0.4	2.9	5.4	11.1	16.0	20.1	27.1
Ship 150-300 ft	0.5	3.0	5.7	12.5	18.9	24.7	34.9	0.4	2.9	5.7	12.5	18.9	24.7	34.9
Ship > 300 ft	0.6	3.0	5.8	13.2	20.7	27.9	41.4	0.5	3.0	5.8	13.2	20.7	27.9	41.5

Table 11-2
Uncorrected Visual Sweep Width - Continued

Fixed-Wing Searching For	Altitude 2500 (FT) Visibility (NM)							Altitude 3000 (FT) Visibility (NM)						
	1	3	5	10	15	20	30	1	3	5	10	15	20	30
Person in water	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Raft 1 person	0.1	0.5	0.8	1.2	1.4	1.4	1.4	0.1	0.5	0.8	1.1	1.3	1.3	1.3
Raft 4 person	0.1	0.8	1.3	1.8	2.2	2.4	2.4	0.1	0.7	1.2	1.8	2.1	2.3	2.3
Raft 6 person	0.1	1.0	1.5	2.3	2.7	2.9	2.9	0.1	0.9	1.5	2.2	2.7	2.9	2.9
Raft 8 person	0.1	1.1	1.7	2.5	2.9	3.2	3.2	0.1	1.0	1.6	2.5	2.9	3.2	3.2
Raft 10 person	0.2	1.2	1.8	2.7	3.2	3.5	3.5	0.1	1.1	1.8	2.7	3.2	3.5	3.5
Raft 15 person	0.2	1.3	2.0	3.0	3.6	4.0	4.5	0.1	1.2	2.0	3.0	3.6	4.0	4.5
Raft 20 person	0.2	1.4	2.2	3.4	4.1	4.6	5.2	0.1	1.4	2.2	3.4	4.1	4.6	5.3
Raft 25 person	0.2	1.5	2.4	3.7	4.5	5.0	5.7	0.1	1.5	2.4	3.7	4.5	5.1	5.8
Power boat < 15 ft	0.1	0.9	1.3	1.8	2.1	2.2	2.2	0.1	0.8	1.3	1.8	2.1	2.3	2.3
Power boat 15-25 ft	0.2	1.6	2.5	3.8	4.6	5.2	5.2	0.1	1.6	2.5	3.9	4.7	5.3	5.3
Power boat 25-40 ft	0.2	2.1	3.4	5.6	7.0	8.1	9.6	0.2	2.1	3.4	5.6	7.1	8.1	9.7
Power boat 40-65 ft	0.3	2.6	4.5	8.3	11.3	13.3	16.7	0.2	2.5	4.5	8.3	11.1	13.4	16.8
Power boat 65-90 ft	0.3	2.7	5.0	9.8	13.6	16.8	21.9	0.2	2.7	5.0	9.9	13.7	16.8	21.9
Sailboat 15 ft	0.2	1.5	2.3	3.5	4.2	4.7	4.7	0.1	1.5	2.3	3.5	4.3	4.7	4.7
Sailboat 20 ft	0.2	1.8	2.8	4.3	5.3	6.0	6.0	0.1	1.7	2.8	4.4	5.3	6.0	6.0
Sailboat 25 ft	0.2	2.1	3.3	5.2	6.5	7.5	7.5	0.2	2.0	3.3	5.3	6.6	7.5	7.5
Sailboat 30 ft	0.2	2.2	3.7	6.1	7.8	9.1	11.0	0.2	2.2	3.7	6.2	7.9	9.2	11.1
Sailboat 40 ft	0.3	2.5	4.3	7.7	10.2	12.1	15.1	0.2	2.4	4.3	7.7	10.2	12.1	15.1
Sailboat 50 ft	0.3	2.6	4.8	8.6	11.5	13.9	17.6	0.2	2.6	4.6	8.6	11.6	14.0	17.7
Sailboat 65-75 ft	0.3	2.7	4.9	9.4	12.9	15.8	20.3	0.2	2.6	4.9	9.4	13.0	15.8	20.3
Sailboat 75-90 ft	0.3	2.8	5.1	10.0	13.9	17.2	22.4	0.2	2.7	5.1	10.0	14.0	17.2	22.5
Ship 90-150 ft	0.3	2.8	5.4	11.1	16.0	20.2	27.1	0.2	2.8	5.3	11.1	16.0	20.2	27.1
Ship 150-300 ft	0.3	2.9	5.6	12.5	18.9	24.8	35.0	0.2	2.8	5.6	12.5	18.9	24.8	35.0
Ship > 300 ft	0.3	2.9	5.7	13.2	20.7	27.9	41.5	0.2	2.9	5.7	13.2	20.7	27.9	41.5

Table 11-3
Visual Sweep Width Estimates for Daylight Detection Aids

Device	Estimated Sweep Width (NM)	SRU Type
Red/orange balloon	0.5	Air or surface
Orange flight suit	0.5	Air
Red hand flare (500 candlepower)	0.5	Air or surface
Day/night flare	0.5	Air or surface
Red pen gun flare	0.75	Air or surface
Red reflective paulin	2.0	Air or surface
Tracer bullets	2.0	Air or surface
Green dye marker*	2.0	Air
Red/orange flag (waving) (3 ft X 3 ft)	2.5	Air or surface
Sun signal mirror	5.0	Air or surface
White parachute	5.0	Air or surface
Red meteor (star) or parachute flare (10,000 candlepower)*	6.0	Air or surface
*Greatly reduced in heavy seas.		

Table 11-4
Search Aircraft Speed Correction Table for Sweep Width

Search Object	Aircraft Speed (Knots)			
	60	**90**	**120**	**140**
Person in Water	1.5	1.0	0.8	0.7
Raft – 1 to 4 Man	1.3	1.0	0.9	0.8
Raft – 6 to 25 Man	1.2	1.0	0.9	0.8
Power boat – 0 to 24 ft.	1.2	1.0	0.9	0.8
Power boat – 25 to 40 ft	1.1	1.0	0.9	0.9
Power boat – 40 to 65 ft	1.1	1.0	0.9	0.9
Power boat – 65 to 90 ft	1.1	1.0	1.0	0.9
Sailboat –1 to 26 ft	1.2	1.0	0.9	0.9
Sailboat – 26 to 52 ft	1.1	1.0	0.9	0.9
Sailboat – 52 to 90 ft	1.1	1.0	1.0	0.9
Ship > 90 ft	1.1	1.0	1.0	0.9

Section H. Methods of Navigation

Introduction

An essential factor in the successful implementation of a search is the ability of the Auxiliary flight crew to navigate and the accuracy of navigation. The following three navigation techniques, which may be combined, are normally available to the pilot or navigator:

- Pilotage
- Dead reckoning
- Electronically assisted navigation

H.1. Pilotage

Pilotage is the visual observance of surface features and their correlation with the symbols used to represent the features on a chart in order to determine aircraft location and course.

H.2. Dead Reckoning

Dead reckoning, as applied to flying, is the navigation of an airplane solely by means of computations based on airspeed, course, heading, wind direction, ground speed, and elapsed time.

H.3. Electronically Assisted Navigation

Unless nearby surface references are available, aircraft should not be used for SAR prosecution if they are not equipped with GPS or LORAN. Determining the exact position of the search aircraft relative to the selected search pattern and flying a prescribed course are the most difficult tasks in aircraft searches. These difficulties are magnified when searching over water where adequate visual references are not available. To help overcome these difficulties, electronic navigational aids should be employed.

H.3.a. Electronic Equipment

A variety of electronic equipment is available for use in aiding aircraft navigation. Most Auxiliary aircraft will have one or more of the following aids available:

- VOR receiver(s)
- ADF receiver
- DME receiver
- LORAN-C navigation computer
- GPS navigation computer

H.3.b. Radar Tracking

With the assistance of FAA or military surface equipment and personnel, the search aircraft may be tracked by surface radar and vectored by means of radio communications. Transponders should be installed on all Auxiliary facilities to facilitate vectoring and to permit the radar operator to work the aircraft at lower altitudes and at greater distances, and is required in many types of airspace. Since the Auxiliary zone of search operations is usually limited to within 25 nautical miles of shore, there are generally many civil and military installations with radar and many FAA navigational aids within the normal range of Auxiliary aircraft equipment.

Section I. Flying a Search Pattern

Introduction	This section provides a brief description of factors involved in flying search patterns.
I.1. Maneuvering	When flying search patterns, precise maneuvering of the aircraft is desired. Unless nearby surface references are available or accurate electronic-assisted navigation can be used, precise search patterns should be maintained through accurately timed turns and straight-track legs to ensure effective searches. To simplify the accomplishment of accurate turns, it is recommended that all turns during pattern flights (except with precise visual or electronic fixes) be standard rate turns (i.e., 3 degrees per second) as shown by the turn and bank indicator or turn coordinator. (see **Figure 11-2** and **Table 11-5**)
I.2. Cross Winds	The effects of cross winds must be taken into consideration for all elements of the search.
I.3. Lag Rate	The differing lag rates of LORAN and GPS receivers should be kept in mind. The crew should be briefed on how to interpret these units.
I.4. Airspeed	The search process is easier when flying at airspeeds that are easy to handle mathematically. For example, at 90 knots an aircraft will cover 1.5 nautical miles per minute on a straight leg and will cover 0.5 nautical mile in a 90-degree turn. (see **Table 11-5**)
I.5. Leg Length and Turn Point Advancement	Pilots should be aware of the effect of turns on the desired leg length in search patterns. When turning, the path covered in the turn radius must be taken into account when calculating the leg length desired, and the time calculated to the turning point must be advanced accordingly.

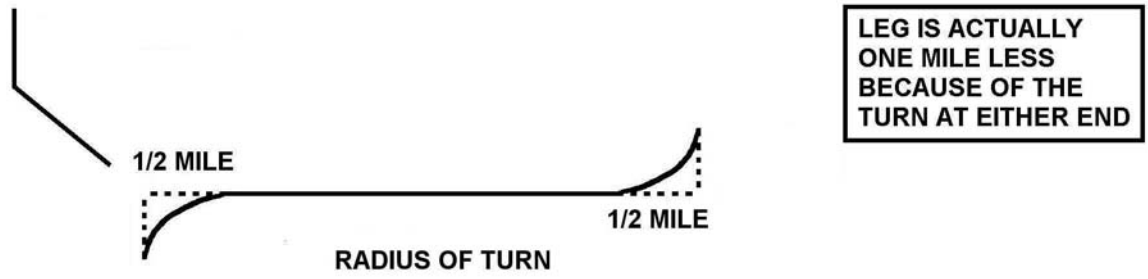


Figure 11-2
Radius of Turn

Table 11-5
Speed Table for Advancement of Turn Calculation

Time and distance for a 90-degree turn (see **Figure 11-2**)						
Distance	**Speed (Knots)**					
NM	**70**	**80**	**90**	**100**	**110**	**120**
0.5	0:26	0:22	0:20	0:18	0:16	0:15
1	0:51	0:45	0:40	0:36	0:33	0:30
2	1:42	1:30	1:20	1:12	1:05	1:00
3	2:34	2:15	2:00	1:48	1:37	1:30
4	3:25	3:00	2:40	2:24	2:11	2:00
5	4:17	3:45	3:20	3:00	2:43	2:30
6	5:08	4:30	4:00	3:36	3:16	3:00
7	6:00	5:15	4:40	4:12	3:48	3:30
8	6:51	6:00	5:20	4:48	4:22	4:00
9	7:43	6:45	6:00	5:24	4:54	4:30
10	8:34	7:30	6:40	6:00	5:27	5:00

Section J. Search Patterns

Introduction

Primary search patterns for use in SAR operations by Auxiliary aircraft fall into the following groups:

- Trackline Patterns (T)
- Parallel Track Patterns (P)
- Creeping Line Patterns (CS)
- Square Patterns (S)
- Sector Patterns (V)
- Contour Search (O)

Search patterns are further differentiated by whether individual or formation search is employed, whether an "Air-Surface Team" is used, or by the position of the entry and departure points of the search in the case of the trackline.

See *Section K* of this chapter for definitions of the search pattern terminology. The examples below are primarily described in single-unit (S) search terms.

J.1. Trackline (Route Search) Pattern

The single-unit trackline (TS) pattern (see **Figure 11-3**) is generally used where an aircraft or vessel is reported missing and the intended route of the missing craft is the only search lead and rapid coverage of the search object's proposed track is obtainable. A route search is usually the first physical search action taken since it is assumed that the distressed craft is on, or adjacent to its proposed route and that it will be easily discernible, or that there will be survivors capable of signaling when they hear or sight search aircraft. The track crawl consists of rapid and reasonably thorough coverage of the missing target's proposed route and of the immediately adjacent areas.

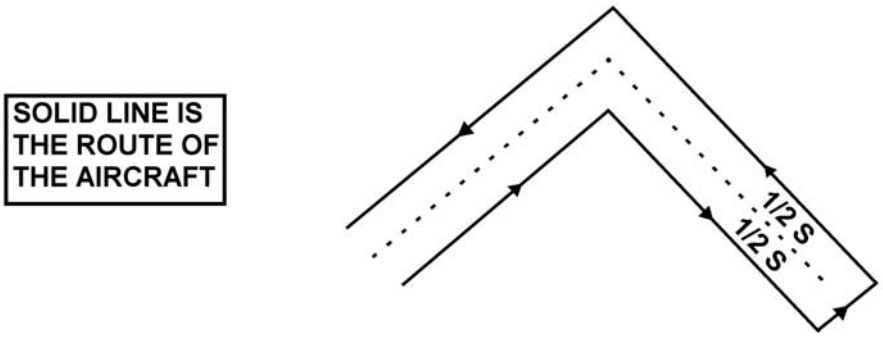


Figure 11-3
Trackline Search

J.2. Parallel Track Pattern

The single-unit parallel track (PS) pattern (see **Figure 11-4**) is normally used when there is a large uncertainty in the survivor's location, requiring a large area to be searched with uniform coverage. Information concerning the target is limited by knowledge of the approximate area, and there is equal probability that the target is located anywhere in this area. This pattern is best adapted to rectangular or square areas. For PS radio terminology, see *Section K* of this chapter.

The search legs are parallel to the long sides of the rectangle (if square pattern, "long side" is the major axis). The first leg starts at the CSP and runs parallel to the long side of the rectangle/square. Successive legs are maintained parallel to each other and at a distance of one track space (TS) apart. Remember, the CSP is always ½ the track space inside the search box from each of the 2 sides forming the corner.

To determine how "long" a search leg is, use the following:

Length minus TS = search leg length (i.e., length is 10 nautical miles, TS is 1 nautical mile, search leg is 9 nautical miles long)

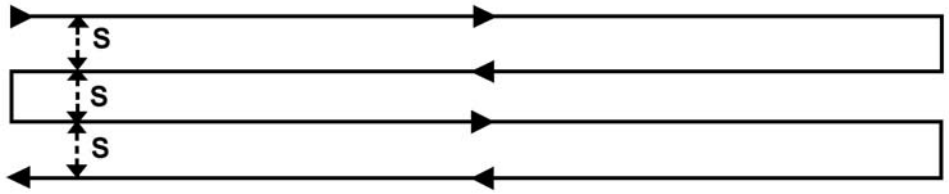


Figure 11-4
Parallel Track Pattern

J.3. Creeping Line Pattern

The single-unit creeping line (CS) pattern (see **Figure 11-5**) differs from the parallel track pattern only in that the search legs are parallel to the short axis of a rectangular area. They are generally selected when rapid advancement of successive search legs along a given track is desired. The most probable area is covered first. A CS is used when there is a higher probability the search object is at one end of the search area. This pattern is often chosen when information concerning the target is limited to an area between two points where the distress position may be on either side of the original track due to navigational error or drift. Like a PS, a CS still provides uniform coverage of the area. The search begins at one end of the search area and works in the same direction as the target's drift. For CS radio terminology, see *Section K* of this chapter.

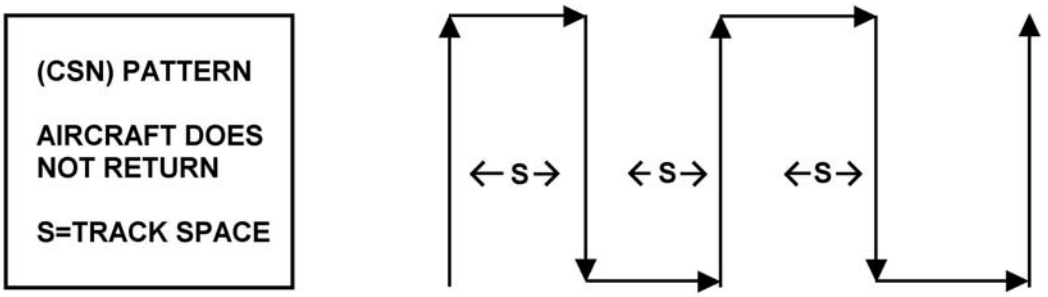


Figure 11-5
Creeping Line Pattern

J.4. Creeping Line Coordinated Pattern

With creeping line coordinated (CSC) pattern (see **Figure 11-6**), an aircraft and a surface vessel work together in a coordinated search. This will normally result in more accurate navigation and coverage within the search area. This coordinated search consists of the aircraft flying the creeping line pattern, flying tracks at right angles to the course of the surface search asset, while the boat is using a trackline pattern.

J.4.a. Aircraft Advancement

The length of the aircraft leg is laid out so that the advance of the aircraft equals that of the surface vessel, thus the aircraft passes over the boat on each leg.

J.4.b. Aircraft Speed

The speeds of the vessel and the aircraft must be coordinated to fit the speed limitations of both units. The aircraft should always remain within 10 nautical miles of the surface search asset.

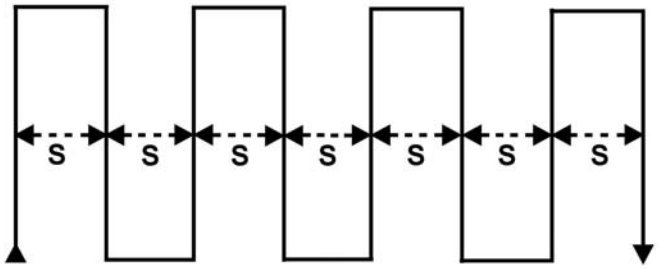


Figure 11-6
Creeping Line Coordinated Pattern

J.5. Expanding Square Pattern

The expanding square (SS) pattern (see **Figure 11-7**) is used for concentrated search of a small area where the probable position of survivors is known within close limits and the area to be searched is not extensive. In an SS pattern, the first two legs are 1 track spacing long, legs 3 and 4 are 2 track spacings long, etc.

J.5.a. Position Error

If an error in position is expected or if the target is moving, then the SS pattern may be modified to an expanding rectangle with long legs running in the direction of the probable movement of the target. This may occur in situations where bailout occurred; where aircraft are about to ditch; or ship, life rafts, or survivors in PFDs may be drifting or proceeding very slowly from the datum point.

J.5.b. Disadvantage

A disadvantage of the use of this pattern for aircraft is that it calls for 90-degree turns, particularly when close to the datum. This may hamper the flight crew's field of vision while the aircraft is in a banked altitude. A better search pattern for an aircraft might be the sector search.

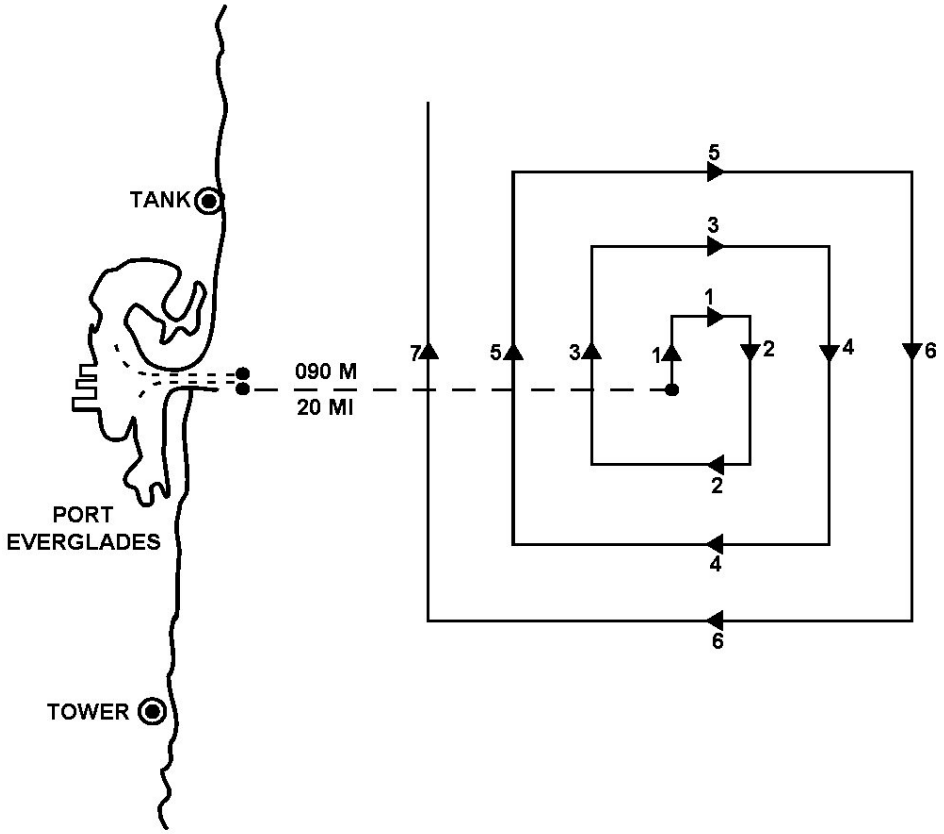


Figure 11-7
Expanding Square Pattern

J.6. Sector Search Pattern

The single-unit sector search (VS) pattern (see **Figure 11-8**) is used when the position of distress is known within close limits and the area to be searched is not extensive. It is simple to execute, provides for navigational accuracy, and is flexible. The track spacing is small near the center point of the search and larger at the extremities, resulting in an increased POD near the center of the search area, the most likely position of the distress. To determine the time required for a sector search pattern, refer to **Table 11-6**.

Due to aircraft speed, leg lengths in a sector search are typically at least 1 nautical mile..

Table 11-6
Sector Pattern Time Chart

Time in minutes per leg at 90 knots using 60 degrees between legs							
		3-NM Pattern			**5-NM Pattern**		
Leg #	**Heading**	**Distance**	**Time**	**Turn Time**	**Distance**	**Time**	**Turn Time**
1	360	2.5	1:40	:40	4.5	3:00	:40
2	120	2.0	1:20	:40	4.0	2:40	:40
3-4	240	5.0	3 :20	:40	9.0	6:00	:40
5	360	2.0	1:20	:40	4.0	2:40	:40
6-7	120	5.0	3:20	:40	9.0	6:00	:40
8	240	2.0	1:20	:40	4.0	2:40	:40
9	360	2.5	1:40	:40	4.5	3:00	:40

J.6.a. Datum Marker Interaction

The search unit passes through the datum many times, each time increasing the chance of finding the search object. (see **Figure 11-8**) If a drifting datum marker has been deployed, the datum point for the search may be re-oriented as the aircraft passes over the datum marker. This adjusts the search area for the drift of the target.

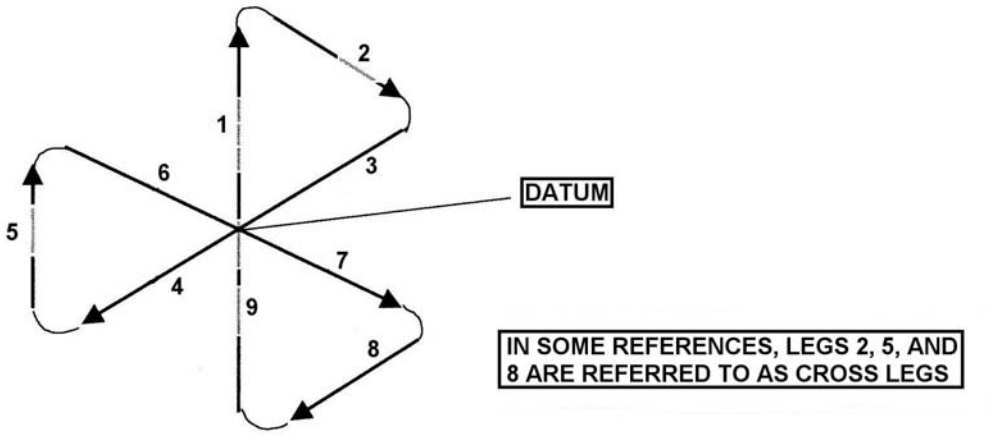


Figure 11-8
Sector Search Pattern

J.6.b. Proper Turns

GPS or LORAN should be used to mark the datum coordinates. The first leg is generally in the direction of the datum drift. All turns are 120 degrees to the right. All legs are equal to the search radius. In the sector search, it is imperative that the rules of turning point advancement be applied (see **Table 11-7**). The turn must be started early in order to intercept the proper cross leg. At 90 knots, start each turn 0.5 nautical mile before the end of the leg and complete the turn 0.5 nautical mile into the next leg.

EXAMPLE: 3-nautical mile radius at 90 knots:

1st leg hdg. 360 degrees for 2.5 nautical miles (start turn at 2.5 nautical mile)

2nd leg hdg. 120 degrees for 2.0 nautical miles (turning point time adjusted at each end)

3rd leg hdg. 240 degrees for 2.5 nautical miles (this brings you back to the datum)

Complete the pattern with 6 more legs.

Table 11-7
Turning Point Advancement Distances

Speed (knots)	Start Turn At (NM) Prior to Leg End
90	0.50
100	0.55
110	0.60
120	0.65

J.6.c. Increase Search Area

If after completion of a VS search, the target object has not been found, one method of increasing the detection probability is as follows:

- After the first search is completed, start a second search with the first outbound leg from datum offset by 30 degrees from the initial heading in the first search.

For example: If the first search started with the first outbound leg on a 090-degree heading the first outbound leg of the second search would be on a 120-degree heading.

J.7. Layered Search

There may be occasions where more than one aircraft is searching the same area at a different altitude. The Auxiliary aircraft may be working with a Coast Guard aircraft above or below their assigned search altitude. In these cases, it is imperative that assigned altitude be maintained within the search area. If a target is sighted that requires investigation, any descent must be coordinated with the other aircraft. Advise leaving an assigned altitude and advise upon return to the assigned altitude. Likewise, when ready to depart the search area, the pilot must coordinate the departure routes and altitudes.

J.8. ELT/EPIRB

The Coast Guard is often tasked to search for emergency beacons transmitting in coastal areas. The source may be an EPIRB or an ELT. Auxiliary aircraft are not usually equipped with the sophisticated equipment used for these searches. However, a method exists whereby they can search for VHF transmissions using the standard aircraft radio receivers. These signals are usually transmitted on 121.500 MHz.

J.8.a. Build and Fade Detection

The build and fade method may be used to estimate, by means of audio signal strength, the position of a transmission. Flying a sequence of tracks (see **Figure 11-9**), while monitoring 121.500 MHz, allows the crew to hone in on the source. The estimate is made by noting the trend of the signal strength. As the aircraft approaches the source, the signal gets louder and fades as the aircraft flies away.

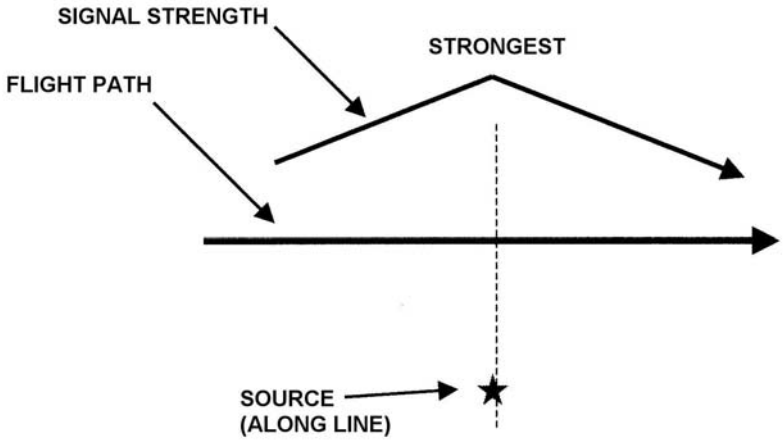


Figure 11-9
Build and Fade Detection

J.8.b. Procedure

The following steps should be followed for ELT/EPIRB searches when using the build and fade method (see **Figure 11-10**):

- When the ELT/EPIRB signal is heard, the receiver volume should be set as low as possible to more quickly detect the fade. Adjust the squelch control to just before the cutoff point. Once adjusted, DO NOT MODIFY THE SETTINGS. Note your position.
- If the signal is so strong that you cannot detect build or fade, try shifting to 121.550 or 121.450 MHz to reduce the signal strength.

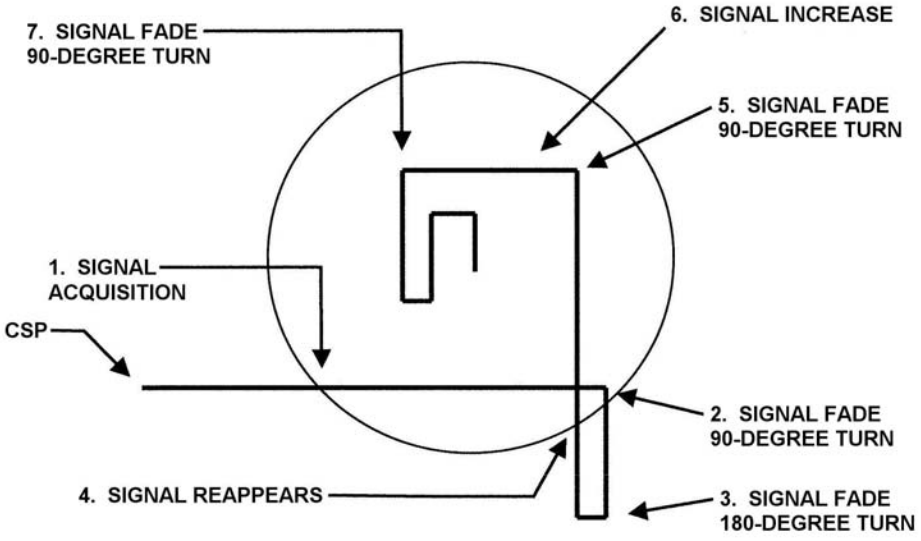


Figure 11-10
Build and Fade Search

Section K. Search Pattern Terminology

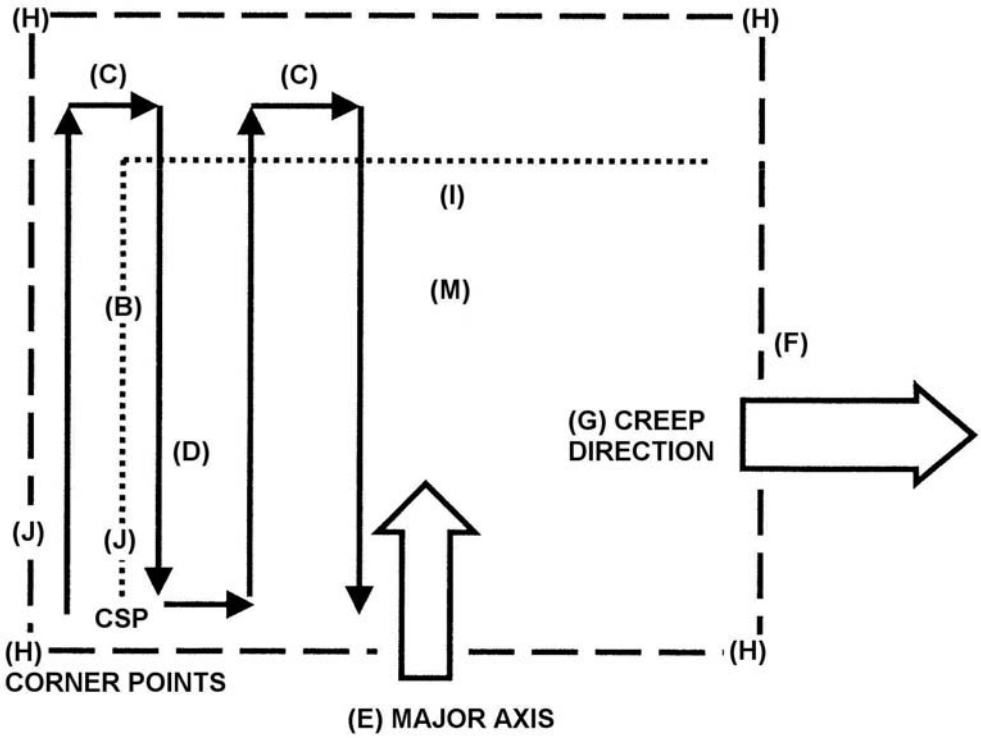
Introduction	This section provides search pattern terminology.
K.1. Search Pattern Types	Search pattern types are often referred to with a two- or three-letter acronym.
K.1.a. First Letter	The first letter represents the search pattern type as follows: • T – Trackline • P – Parallel • C – Creeping Line • S – Square • V – Sector • B – Barrier
K.1.b. Second Letter	The second letter represents the number of search units in the same search area as follows: • S – Single-Unit • M – Multi-Unit
K.1.c. Third Letter	The third letter represents amplifying/supplementary information as follows: • R – Radar or Return Search • C – Coordinated or Circle Search • L – LORAN • A – Arc • S – Spiral • N – Non-Return Search • D – Drift Compensated EXAMPLE: A “PSR” search would be a parallel search, using one unit, controlled by radar or with a return leg.

K.2. Search Pattern Terms

Search pattern terms are found in **Table 11-8**. Several of these terms are shown in usage in **Figure 11-11**.

Table 11-8
Search Pattern Terms

Letter	Term	Meaning
A	Commence Search Point (CSP)	Starting point of pattern
B	Search Leg	Long leg of any pattern
C	Cross Leg	Connecting leg
D	Track Spacing	Distance between two parallel legs
E	Major Axis	Longest leg of search pattern
F	Minor Axis	Shortest leg of search pattern
G	Creep Direction	Minor axis direction of movement
H	Corner Points	Defines the search area
I	Datum	Most probable location of target (corrected)
J	Sweep Width (w)	Distance on both sides of the SRU
K	Ground Speed	Speed across the ground
L	Probability of Detection (POD)	The probability that a target will be found
M	Center Point	Reference defining the center of the search area



CSP – Where the search commences

Solid Line – Aircraft track, both search legs and cross legs

Dotted Line – Search area

Figure 11-11
Search Pattern Terms

K.3. Creeping Line Radio Terms

Creeping line terms, which may be received on the radio, are explained in **Table 11-9**.

Table 11-9
Creeping Line Radio Terms

Term	Meaning
Length	Total direct distance to be covered from commence search point (CSP)
Width	Long legs of the box = oriented on Minor axis = size of search legs
Major Axis	Cross legs = short legs = size of the TS
Minor Axis	Direction/(opp direction) of search legs, length, “how the pattern is aligned”
Creep Direction	Corresponds with major axis
Number of Legs	May be plotted for clarity; should correspond with TS, length, and major axis

K.4. Parallel Search Radio Terms

Parallel search terms heard on the radio are explained in **Table 11-10**.

Table 11-10
Parallel Search Radio Terms

Term	Meaning
Length	Long legs/sides of the box = oriented on Major axis = size/length of search legs
Width	For airborne execution (does not apply)
Major Axis	Long sides/search legs
Minor Axis	Cross legs = short legs = size of the TS
Creep Direction	Corresponds with minor axis
Number of Legs	May be plotted for clarity; should correspond with TS, width, and minor axis

Section L. Multi-Aircraft Use

Introduction

This section describes multi-aircraft use pre-briefings and the responsibility of the OSC.

L.1. Pre-Brief

When multi-aircraft searches are anticipated, it is important to thoroughly pre-brief the mission so that all pilots understand:

- If an OSC has been assigned and who it is.
- The frequencies to be used for air-to-air, air-to-surface, and by the controlling unit or SMC. The primary and secondary frequencies should be known by all concerned.
- The exact boundaries of the assigned search areas.
- The altitude to use while in the assigned area. (This should be a different altitude from aircraft in the same and adjoining search areas to provide proper separation.) Adherence to assigned altitudes in a multi-aircraft search is vital to maintaining safe operations. Any required deviation from assigned altitude must be immediately reported to the OSC and/or SMC.
- The altitude to use enroute to and from the assigned search area. This will normally be above the altitudes being used by the aircraft within the search area.

L.2. On-Scene Commander

If an OSC has been assigned, it is the responsibility of the participating aircraft to maintain communications with the OSC and report all significant sightings. The OSC should be informed when searches in any area are near completion so that additional search areas can be assigned or other instructions given. It is the responsibility of the participating aircraft to comply with instructions given by the OSC unless the aircraft is unable to do so because of fuel, weather, or safety related issues or regulatory prohibition. Any inability to comply with instructions given by the OSC must be immediately and clearly communicated to the OSC.

Section M. Identification Pass

Introduction	This section describes the requirements for flying an identification pass.
M.1. Planning the Pass	When a low pass is required to identify a vessel, it must be done in such a way as to not cause concern to the persons on the vessel, and to maintain a margin of safety for the flight crew (see **Figure 11-12**). The flight crew should be briefed prior to the pass on what to look for and what to do in the event of an emergency.
M.2. Low-Level Flight	Low-level flight is inherently dangerous. As an implicit part of the Auxiliary Aviation Program policy, Auxiliary pilots should not operate in this regime unless qualified and current, and then only under orders for an actual SAR case. To do otherwise is not only dangerous, but may expose the Auxiliary pilot to FAA certificate action. Auxiliary pilots, therefore, do not normally operate below 500 feet AGL for any purpose other than takeoff and landing.
M.3. Pass Route	The letdown for the pass should be made some distance from the vessel and the altitude stabilized prior to passing the vessel. The pass should be made parallel to the vessel or across its stern at sufficient distance that the persons onboard do not feel threatened by the pass. It is preferable to have the vessel on the starboard side of the aircraft so the observer can make the necessary observations. The pilot's primary responsibility during the pass is to fly the aircraft. The pilot should not fly any lower or closer than is absolutely necessary to note the features needed for identification and should avoid passing directly over the vessel. Repeated passes should also be avoided.

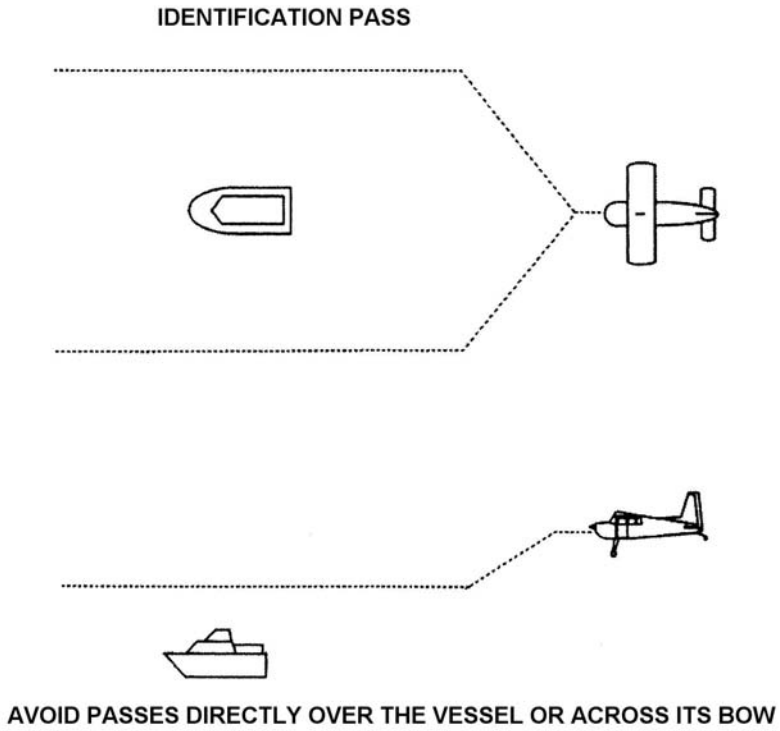


Figure 11-12
Identification Pass

M.4. Airspeed

The approach and pass should be made at a safe airspeed with the aircraft configured well above slow flight (minimum controllable airspeed) yet slow enough to assure confirmation of a sighting. At the minimum airspeed of an Auxiliary aircraft, the pass will occur quickly and thus only a cursory observation can be made. There is no need to endanger the aircraft and its crew and no practical advantage by flying too low and slow.

Chapter 12
Logistics Flights

Introduction

Logistics flights support the mission of transporting passengers or cargo and pre-positioning of aircraft for later missions.

In this Chapter

This chapter contains the following sections:

Section A. Passenger Transport

Introduction

The Auxiliary Aviation Program is often tasked with transport of personnel or equipment. Passenger transport and cargo transport are further separated into operational and non-operational flights. Passenger transport flights are considered operational missions, and thus require adherence to a set of specific mission environments.

A.1. Flight Requirements

For passenger transport missions, flights are conducted with the same requirements as any other operational mission, except that only one pilot and no crew are required for flights in daylight VMC.

For flight at night or in IMC, the requirements are also the same as other operational missions, with two IFR-rated pilots, and the PIC certified as an aircraft commander.

A.2. Flight Environment

Due to the changing nature of the flight environment, it is considered good practice to provide two IFR-rated pilots, with the PIC an aircraft commander, for most passenger transport, unless other conditions (such as weight and balance) make this impractical.

A.3. Passenger Briefing

A full passenger briefing should be provided prior to departure. This includes details of safety procedures, flight routes, and procedures. At this time it is also appropriate to notify passengers and crew of special procedures such as "sterile cockpit" or quiet times when contacting ATC or approaching for a landing. The PIC should ensure that the passengers understand appropriate entry and egress procedures for both normal and emergency situations.

A.4. Pre-Flight Information

A worksheet with the information listed in **Figure 12-1** should be prepared and distributed to all parties involved in the passenger transport mission, so that all concerned know exactly where and when the aircraft will depart and arrive for each leg of the flight, and contact information for any changes.

Date of mission:	**Date prepared:**
Aircraft assigned (N#):	**Pilot:**
Passenger(s) name and rank(s):	**Total number of passengers and crew:**
Departure: Airport/Fixed-Base Operator(FBO):	**Destination: Airport/FBO:**
Departure: Contact phone number:	**Destination: Coast Guard frequency/call sign & phone number:**
Departure: Auxiliary contact/phone number:	**Destination: Auxiliary contact/phone number:**
Estimated time of departure:	**Estimated time of arrival:**
Estimated time enroute:	**Distance to destination:**
Planned route of flight:	**Mission coordinator:**
Pilots member number:	**Pilot's signature:**

Figure 12-1
Worksheet for Passenger Transport

A.5. Passenger Arrival

For passenger transport, the aircraft should always arrive at the pickup point for the passenger before the pickup time. Preflight the aircraft and have it ready for departure when the passenger arrives. Stand at the aircraft when the passenger arrives and return a salute if one is rendered. When practical, the ranking officer should be the last to enter the aircraft and the first to disembark. As with all AUXAIR flights, a thorough preflight passenger briefing should be conducted.

A.6. Passenger Baggage

Be conscious of the weight and balance requirements for your aircraft. Find out before the flight the type of baggage the passenger intends to take with them. Do not hesitate to inform the passenger if the baggage is more than what is allowable for the aircraft in either weight or volume. If it is anticipated that aircraft weight and balance will be a possible limiting factor for the flight, it is recommended that, when possible, the passengers be contacted well ahead of the mission so that they can comfortably prepare their baggage, as well as advise the PIC of their approximate weight or any other special requests.

A.7. In-Flight operations

Always make maneuvers as smooth as possible. Make standard rate turns when possible. Avoid steep banking turns and abrupt transitions to descent. Make descents and approaches gradual. What may be normal for an aviator may terrify the passenger.

A.8. Reaching Destination

Arrival at the destination should be as close to the scheduled arrival time as possible, but not earlier, unless the reception personnel are notified well in advance. In most situations, the reception personnel will have radio communication capabilities. Keep them informed of progress. Notification should be made of any significant changes from the scheduled ETA.

Know before departure exactly which facility or FBO at the destination airfield will be the disembarkation point. Study the airfield diagram to effect a smooth taxi after landing. When feasible, stop the aircraft so that the door from which the passenger will exit is facing the reception personnel.

Whenever embarking or disembarking passengers or crewmembers, or any time a person leaves or enters the airplane cabin, the engine(s) should be shutdown (see *Auxiliary Operation Policy Manual,* COMDTINST 16798.3 (series), *Appendix I*)

A.9. Accompanying Passengers

When flying authorized logistic missions and passenger transport missions, AUXAIR members of the flight crew are not expected to accompany the passenger(s) once they arrive at their destination. Should the passenger(s) invite the crew to accompany them, the crew may do so. This does not imply that the crew should wear (or carry) any uniform other than the Auxiliary flight suit, unless otherwise instructed by the OIA.

Section B. Transiting Military Airfields

Introduction

A prerequisite for a no-hassle arrival at a military field is proper notification and coordination. The *IFR Supplement* should be used to determine which fields require a Prior Permission Required (PPR) number. It is preferable that the OIA contact the base operations at the destination and coordinate the visit even when a PPR number is not required. Even with a PPR number, a flight plan into a military field must be filed. In the remarks section, the crewmember should request that flight service notify the destination airfield of his/her arrival.

B.1. Filing a Flight Plan

Auxiliary flight crews file a Military Flight Plan (Form DD-175) with their base operations before departing a military field. Before filing the flight plan, a signed Flight Weather Brief (Form DD-175-1) is obtained from the forecaster at the field. This is also an opportune time to obtain current charts or books that may be needed. (see *Appendix A*)

B.2. Wearing Hats on the Flight Line

Unlike civilian fields, personnel may <u>not</u> wear ball caps or other hats on the flight line. The only exception to this is a flight helmet. This is to prevent the possible inadvertent loss of headgear in wind, or jet- or prop-wash, which could lead to an accident or incident if the headgear is then ingested into an engine intake.

B.3. Starting Procedures

Check with base operations prior to engine start for any required engine start or departure procedures. Many military airfields will require contact with the tower before starting the aircraft engine. Transient services may also be required to stand by with a fire extinguisher during engine start.

B.4. Transporting an O-6 or Higher

If required to transport an active duty O-6 (Captain/Colonel) or higher, advise the destination base operations. An unannounced arrival with an O-6 or higher is a breach of etiquette. Have the OIA contact base operations at the destination via landline approximately 1 hour before arrival to remind them that an O-6 or higher is onboard. On initial contact with the destination tower, advise that a high-ranking passenger is onboard. The code numbers to use are listed in *paragraph C.2* of this chapter.

EXAMPLE: “Navy Pensacola tower, this is Coast Guard AUXAIR Seven Three Four Uniform with one code 7 aboard, inbound for landing.”

B.5. Refueling at Military Fields

Most military fields no longer have aviation gasoline (AVGAS) available. Even when they do, Auxiliarists do not normally carry the government credit cards required. Flights will generally go much smoother if plans are made to refuel elsewhere. However, some military airfields have aero clubs and it may be possible to obtain fuel from these clubs. Most aero clubs normally accept cash or credit cards.

B.6. Military Field Frequency

Most military towers guard 126.200 MHz in addition to their UHF and/or VHF working frequencies. Use the *IFR Supplement* to confirm tower and ground frequencies. Normal JEPPESEN approach plates do not include the military fields. If expected to arrive on an IFR flight plan, have the OIA obtain the necessary DoD approach plates. Some Coast Guard air stations use an assigned marine VHF channel for local communications with incoming and departing taxiing aircraft in the vicinity of their operating ramps.

B.7. Landing

Upon landing, taxi to base operations for disembarking passengers and then to a transient parking area if expecting to remain for an extended period. Again, pre-planning will make the evolution occur smoothly. Expect to be directed by a "follow me" truck and be positioned by a taxi director. Always chock the aircraft before leaving it.

Section C. Rank/Honor Codes

Introduction

This section describes codes corresponding to ranks and honors for a given passenger.

C.1. Designator Letter – Service Category

Designator letter - service category:

- **A** - Air Force
- **C** - Coast Guard
- **M** - Marine Corps
- **R** - Army
- **V** - Navy

C.2. Code Numbers for VIPs

Code numbers for VIPs:

- **1** - President of the United States (not normally flown by Auxiliary)
- **2** - Vice President of the United States (not normally flown by Auxiliary)
  - Admirals of the fleet (5 stars)
  - Generals of the Army (5 stars)
- **3** - Commandant of the Coast Guard
  - Generals (4 stars)
  - Admirals (4 stars)
- **4** - Vice Commandant of the Coast Guard
  - Coast Guard Area Commanders
  - Vice Admirals (3 stars)
  - Lieutenant Generals (3 stars)
- **5** - Rear Admirals (2 stars)
  - Major Generals (2 stars)
- **6** - Rear Admirals (lower half) (1 star)
  - Brigadier Generals (1 star)
- **7** - Coast Guard and Navy Captains; Army, Air Force, and Marine Corps Colonels

C.3. Honor Code Letters

Honor code letters:

- **H -** Accord honors as appropriate
- **N -** Accord no honors; request informal visit with the commander
- **O -** Request nothing

EXAMPLE: C5H means VIP, Coast Guard Rear Admiral, accord honors

EXAMPLE: C7O means VIP, Coast Guard Captain, request nothing

Section D. Non-Operational Logistics Missions

Introduction	Logistics missions that are non-operational include cargo transport and pre-positioning of aircraft for a mission.
D.1. Cargo Transport	Normally, only a single pilot is needed for cargo transport, with no crew requirement unless specified by the OIA. These flights are only conducted in daylight VMC unless the two-pilot requirements are adhered to. All communications and reporting requirements apply to this mission.
D.2. Pre-Positioning	Pre-positioning of aircraft for later missions may be done by an aircraft commander operating single-pilot, so long as the aircraft commander meets the requirements for currency and recent experience as defined in the *Auxiliary Operations Policy Manual*, COMDTINST M16798.3 (series). If these requirements are met, the flight may by conducted day or night, VMC or IMC.

Appendix A
Coast Guard Forms

Introduction

This appendix provides a listing of and sample copies of forms referenced in this manual. These forms are current as of the printing of this manual, however they are constantly being changed and modified. These are only examples and should not be used for official business. The most up to date version of the forms can be found on the National Auxiliary Web Site or ordered from ANSC.

In this Appendix

This appendix contains the following information:

Patrol Order Number:	**Date**:
Facility:	**Patrol Type:**
Pilot:	**Sector:**
Observers:	**Area Patrolled**:
	POB:
Comms:	
Takeoff Time:	**Return Time:**:
Flight Hours	**Mission Hours**
Weather:	
Risk Assessment:	
Physical Assets Monitored:	
Vessel Observations:	
Law Enforcement Encountered:	
Summary:	

Figure A-1
AUXAIR Mission Report

Rev003

DEPARTMENT OF HOMELAND SECURITY
U.S.C.G. AUXILIARY
ANSC 7005 (1-05)

AUXILIARY AIRCRAFT FACILITY INSPECTION AND OFFER FOR USE

(See instructions and Privacy Act Statement on page 2)

TYPE OF REPORT
☐ INITIAL (NEW) REPORT
☐ REINSPECTION (REOFFER)
☐ CHANGE (UPDATE)
YEAR 2005

SECTION I - AIRCRAFT OWNER DATA - Completed by owner(s)

OWNER'S MEMBER ID NUMBER | OWNER'S LAST NAME, FIRST NAME, MIDDLE INITIAL

CO-OWNER'S MEMBER ID NUMBER | CO-OWNER'S LAST NAME, FIRST NAME, MIDDLE INITIAL

TYPE OF OWNERSHIP (Check one) All owners must sign Section V
☐ SOLE ☐ AUX UNIT ☐ GOV'T ☐ MULTIPLE ☐ CORPORATE

SECTION II - FACILITY DATA - Completed by owner

FAA REGISTRATION NUMBER | IF THIS FACILITY REPLACES ONE CURRENTLY RECORDED, LIST OLD FAA REGISTRATION NUMBER HERE

LOCATION OF AIRCRAFT (CITY/STATE/AIRPORT ID) | LATITUDE | LONGITUDE

TYPE OF AIRCRAFT | MANUFACTURER | MODEL | YEAR | TYPE CERTIFICATION

ENGINES | HP/ENGINE | ENGINE MFG. | ENGINE MODEL | WING COLOR | FUSELAGE COLOR

NO. SEATS | USEFUL LOAD (LBS) | FUEL LOAD (LBS) | CRUISE SPEED (KTS) | RANGE (N MILES) | MAX. ENDURANCE (HRS)

Radios With Required Frequencies: ☐ MF/HF SSB ☐ VHF-FM ☐ VHF-AM

☐ VOR ☐ ADF ☐ DME/TACAN ☐ RADAR / SFERICS ☐ GPS ☐ LORAN ☐ Instrument Flight Equipped

OTHER SPECIAL EQUIPMENT - REMARKS:

AIRFRAME VALUE | ENGINE VALUE | ELECTRONICS VALUE | OTHER VALUE | TOTAL VALUE

SECTION III - FACILITY INSPECTION CHECK LIST (COMDTINST M16798.3 Series) - Completed by examiner

OK	N/A	ITEM	OK	N/A	ITEM	OK	N/A	ITEM
		1. Airworthiness Certificate			10. Strobe Light			19. Inspector viewed Reg/Doc papers for ownership
		2. Annual Inspection in last 12 Mos.			11. Signal Mirror			20. Attached Assent & Authorization form for multiple owners
		3. Aircraft Registration Certificate			12. Life Raft			21. Attached info requirements for corp. owned facilities
		4. Aircraft Weight & Balance			13. Life Vests (Min 1 per seat)			22. Attached authorization for corporate offer for use
		5. Aircraft Operating Limitations			14. Pitot Static Check (within 24 Mos)			
		6. VHF-FM Radio or Suit. Ant. & Jack			15. Transponder Check (within 24 Mos.)			
		7. Shoulder Harness (Front Seat)			16. ELT Battery Date Current			
		8. First Aid Kit			17. EPIRB or Portable ELT			
		9. Day/Night Flares			18. Flight Helmet (Helicopter Only)			

SECTION IV - EXAMINER CERTIFICATION

I have inspected the aircraft above as an aircraft facility and certify that it meets all requirements as such.

FAC INSP DATE | EXAMINER LAST NAME, INITIALS | MEMBER ID NUMBER | SIGNATURE | DIST/DIV/FLOTILLA

SECTION V - OWNER STATEMENT, UNIT AND SIGNATURE - Completed by owner(s)

☐ 1. I have knowledge of the findings of the facility inspector as set forth above and agree to notify DIRAUX of any changes made to this aircraft or equipment. All sections of this form are correct and up-to-date.
☐ 2. The above facility is hereby offered for use until withdrawn in accordance with the provisions of applicable laws and regulations that are in effect at the time the facility is accepted, used, and released.

District Division Flotilla

SIGNATURE OF OWNER | DATE | SIGNATURE OF CO-OWNER | DATE

SECTION VI - DISTRICT STAFF OFFICER - AVIATION (DSO-AV) ENDORSEMENT

This report has been checked and has been filled out in accordance with current instructions.

DSO-AV SIGNATURE | DATE

SECTION VII - DIRAUX ENDORSEMENT

This facility is ☐ accepted ☐ rejected as an Aircraft Facility of the U.S. Coast Guard Auxiliary.

DIRAUX SIGNATURE | DATE | AUXDATA DATE:

Previous editions are obsolete

COPY 1 - MEMBER

5E5.05FB

Figure A-2
Auxiliary Aircraft Facility and Offer For Use (ANSC-7005)

ANSC-7005 (1-05) Page 2 of 2 **INSTRUCTIONS**

PRIVACY ACT STATEMENT

1. Authority:	14 USC 826 and 827
2. Principal Purpose:	To provide a means of selection and acceptance of vessels as U.S. Coast Guard operational facilities.
3. Routine use:	Retained by directors of Auxiliary and cognizant USCG group commanders as a record of which vessels have been accepted by the director as U.S. Coast Guard operational facilities.
4. Disclosure:	Voluntary, however, the detailed information requested on this form enables the Coast Guard to select qualified vessels as Coast Guard facilities. Failure by the member to provide all or part of the information will prevent the acceptance of the vessel as a Coast Guard facility,

Make sure your letters and numbers are printed like this:

1 2 3 4 5 6 7 8 9 0 A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

AUXILIARY AIRCRAFT FACILITY INSPECTION AND OFFER FOR USE

This form is used to report an aircraft facility inspection and offer for use well as to report changes in the status of a facility. If you sell or trade your facility and acquire a new one, this form is used to remove the old facility and enter the new one into the database.

INSTRUCTIONS

In the upper right corner of the form, check TYPE OF REPORT, Initial (new), Reinspection (reoffer), or Change (update). Also enter the year.

Section I - Aircraft Owner Data: Self explanatory.

Section II – Facility Data: (Completed by owner)

FAA Registration Number and previous FAA Number: Enter current number and previous number if this aircraft replaces one previously offered for use.
Location of Aircraft: Enter City, State and Airport ID
Latitude/Longitude: Enter Latitude and Longitude to nearest 1/10 min. of aircraft location.
Type of Aircraft:: Insert appropriate code: **AMP-**Amphibious, **FLT-**Float, **FXGR**-Fixed Gear, **HELI-**Helicopter, **RTGR-**Retractable Gear, **SKI-**Ski.
Manufacturer: Enter name of manufacturer of the aircraft.
Model: Enter model of aircraft.
Year: Enter the year the aircraft was built.
Type Certification: Enter type of FAA certification (Normal, Utility, etc.)
Number of Engines: Enter number of engines.
HP/Engine: Enter horsepower of each engine.
Engine MFG.: Enter engine manufacturer.
Engine Model.: Enter engine model.
Wing Color: Enter paint color(s) of wing.
Fuselage Color: Enter paint color(s) of fuselage.
No. Seats: Enter number of seats, including pilot's seat.
Useful Load (Pounds): Enter the maximum weight (pounds) the aircraft can take off with when caring a full load of fuel.
Fuel Load (Pounds): Enter the weight of full fuel load (pounds).
Cruise Speed (KTS): Enter cruising speed in knots.
Range (N Miles): Enter maximum safe distance (Nautical Miles) at cruising speed without refueling including normal reserves at landing.
Max. Endurance (HRS): Enter maximum safe time in hours the aircraft can remain airborne without refueling, including normal reserves at landing.
Radios/Navigation Equipment: Check box next to item if present.
Other Special Equipment - Remarks: Note any equipment carried not listed elsewhere on this form.
Values: Enter the valuation in dollars of the various categories for airframe and equipment. NOTE: Total Value must equal sum of individual values.

Section III-IV – Facility Inspection Check List and Certification:

This section will be completed by the examiner who must be a specially designated Aircraft Commander or Flight Examiner. Equipment listed may either be aboard the aircraft, or to be supplied for patrol use from district resources, in which case "yes" may be checked.

Section V – Owner Statement, Unit and Signature:

Ensure you understand the statements contained in this section prior to checking the statements which describe your intentions of Offer for Use. Any questions should be answered to owner's satisfaction prior to signing and dating form. If the facility is corporate-owned, the official corporate representative is to sign as primary owner. Before a corporate-owned facility can be accepted for use, the appropriate authorizations must be completed and submitted with this form. See Section III, numbers 21 & 22.

Section VI – District Staff Officer- Aviation (DSO-AV) Endorsement

DSO-AV will review this report for accuracy and ensure any supporting documentation is included, and sign and date.

Section V – DIRAUX Endorsement

DIRAUX will indicate acceptance or rejection, sign, and date. Enter date data is entered into AUXDATA.

Figure A-2
Auxiliary Aircraft Facility and Offer For Use (ANSC-7005) - Continued

Rev001

DEPARTMENT OF HOMELAND SECURITY U.S. COAST GUARD ANSC 7015 (1-05)	U.S. COAST GUARD AUXILIARY **PILOT/AIR CREW QUALIFICATION**	TYPE OF REPORT ☐ ANNUAL REPORT ☐ UPGRADE (CHANGE) ☐ NEW (INITIAL) YEAR_____

SECTION I - PILOT / AIR CREW DATA (IAW FAR 61.56, 57) Completed by member

MEMBER NUMBER	MEMBER'S LAST NAME, FIRST NAME, MIDDLE INITIAL				MEMBER UNIT
PILOTS:	CERTIFICATE NUMBER	ISSUE DATE	FAA PILOT TYPE	FAA RATING	FAA FLT REVIEW DATE
MED CLASS	FAA MED EXP DATE	PIC HRS	FAA CURRENCIES: ☐ INSTRUMENT ☐ PASSENGER ☐ NIGHT		☐ CERT. FLIGHT INSTRUCTOR
AIRCREW:	MEDICAL SCREEN EXP DATE				
ALL:	MEMBER SIGNATURE				

SECTION II - ANNUAL AIR PROGRAM REQUIREMENTS (COMDTINST M16798 SERIES)

PILOTS:	☐ 24 PIC HOURS/12 MONTHS	☐MIN. MISSION FLIGHT HOURS	
ALL:	AV SAFETY WKSHP DATE	EGRESS TRAINING DATE	WATER SURVIVAL DATE

SECTION III - BIANNUAL AIR PROGRAM REQUIREMENTS (COMDTINST M16798 SERIES)

PILOTS:	FLIGHT/SAR CHECK DATE	

SECTION IV - INITIAL OR UPGRADE REQUIREMENTS (COMDTINST M16798 SERIES)

OBSERVER:	☐10 MISSION FLIGHT HOURS	☐NAVIGATION	☐COMMUNICATIONS	
AIR CREW:	☐TRAINING SYLLABUS OR PILOT LICENSE		AIR OPS EXAM (B) DATE	
PILOT:	☐INITIAL FLIGHT HOUR REQUIREMENT ☐2 MISSIONS AS TRAINEE	FLIGHT/SAR CHECK DATE	AIR OPS EXAM (B) DATE	
ALL:	AIR OPS (A) DATE	AREA FAM. DATE	OPCON	

SECTION V - EXAMINER'S CERTIFICATION

This member has completed or maintained all necessary requirements and is recommended for the qualification checked:
☐ Observer ☐ Aircrew ☐Co-Pilot ☐ First Pilot ☐ Aircraft Commander

EXAMINER NAME	SIGNATURE	MEMBER NUMBER	UNIT	DATE

SECTION VI - DISTRICT STAFF OFFICER - AVIATION (DSO-AV) ENDORSEMENT

This report has been has been completed in accordance with current program policy.

DSO-AV NAME	SIGNATURE	DATE	

SECTION VII - DIRAUX ENDORSEMENT

MEMBER IS DESIGNATED:
☐ Observer-O ☐ Air Crew-C ☐Co-Pilot-CP ☐ First Pilot-FP ☐ Aircraft Commander-AC

DIRAUX NAME	SIGNATURE	DATE	AUXDATA DATE

REMARKS

_____
_____
_____
_____

5E5.05F

COPY 1 - MEMBER

Figure A-3
Pilot/Air Crew Qualification Form (ANSC-7015)

ANSC-7015 (1-05) Page 2 of 2 INSTRUCTIONS

Make sure your letters and numbers are printed like this:

1 2 3 4 5 6 7 8 9 0 A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

PILOT/AIR CREW QUALIFICATION

The Air Operations Program requires annual renewal of Co-Pilot, First Pilot, and Aircraft Commander Qualifications. That check list is part of this form.

In the upper right hand corner of the form, check TYPE OF REPORT (annual, new (initial), or upgrade). Note the year.

SECTION I - PILOT / AIR CREW DATA (IAW FAR 61.56, 57) Completed by member

MEMBER NUMBER - Enter the reporting member's number.

MEMBER'S LAST NAME, FIRST NAME, AND MIDDLE INITIAL - Enter the reporting member's last name, first name and middle initial.

UNIT - Enter member's two-digit division and two-digit flotilla numbers.

PILOTS:

PILOT'S CERTIFICATE NUMBER - Enter the Pilots Certificate Number.
ISSUE DATE - Enter the issue date of the Pilot Certificate
FAA PILOT TYPE - Enter pilot certificate type, **ATP** Air Transport Pilot, **COMM** Commercial Pilot, or **PRIV** Private Pilot.
FAA RATING - Enter ratings on Pilot Certificate - **INST** Instrument **RC** Rotor Craft, **MEL** Multi-Engine Land, **SEL** Single Engine Land, **MES** Multi-Engine Sea, **SES** Single Engine Sea
FAA FLT REVIEW DATE - Enter date of most recent Flight Review IAW FARs
MED CLASS - Enter class of FAA Airman Medical Certificate held.
FAA MED DATE - Enter date current FAA Airman Medical Certificate is invalid for use in lowest applicable class.
PIC HRS - Enter total Pilot in Command hours to date.
FAA CURRENCIES - Check applicable box if current per FARs.
CERT. FLIGHT INSTRUCTOR - Check if a CFI.

AIRCREW:

MEDICAL SCREENING DATE - Enter date of most recent Aircrew Medical Screening

ALL - Sign form.

SECTION II ANNUAL AIR PROGRAM REQUIREMENTS (COMDTINST M16798 SERIES)

This section will be completed by the Inspector. The Inspector must be an specifically appointed Aircraft Commander.

PILOTS - Check applicable boxes if current IAW COMDTINST M16798

ALL - Enter Dates for AV SAFETY Workshop, Egress Training, and Water Survival Training

SECTION III - BIANNUAL AIR PROGRAM REQUIREMENTS (COMDTINST M16798 SERIES)

Pilots - Enter Flight/SAR Check Date

SECTION IV - UPGRADE REQUIREMENTS (COMDTINST M16798 SERIES)

OBSERVERS - Check applicable boxes if requirements are met.

AIR CREW

TRAINING SYLLABUS OR PILOT LICENSE - Check box if training syllabus has been completed, or if applicant holds an FAA pilot certificate. Enter Certificate Number in PILOT area of Section I.
AIR OPS EXAM (B) DATE - Enter date Air Ops Training Test (B) was passed.

PILOT

INITIAL FLIGHT HOUR AND 2 MISSIONS AS TRAINEE - Check boxes if requirements have been met.
FLIGHT/SAR CHECK DATE - Enter date of Flight/SAR check.
AIR OPS EXAM (B) DATE - Enter date Air Ops Training Test (B) was passed.

ALL

AIR OPS TNG TEST DATE - Enter date Air Ops Training Test (A) was passed.
AREA FAMILIARIZATION DATE - Enter date Area Familiarization was completed.
OPCON - Enter area in which familiarization flight was conducted

SECTION V - EXAMINER'S CERTIFICATION

Examiner shall check applicable box. Examiner enters examiner's own name, signature, member number, unit and date.

SECTION VI - DISTRICT STAFF OFFICER - AVIATION (DSO-AV) ENDORSEMENT

The DSO-AV signs, dates, and forwards this form to the Director of Auxiliary in member's district or region.

SECTION VII - DIRAUX ENDORSEMENT

This section to be completed by the Director of Auxiliary.

REMARKS

Enter any remarks or comments.

Figure A-3
Pilot/Air Crew Qualification Form (ANSC-7015) - Continued

Aircraft Emergency Procedures for Attracting Surface Craft

The Following Procedures Performed in Sequence are Employed by Aircraft to Direct a Surface Craft Towards an Aircraft or Surface Craft in Distress.

1. Circling the surface craft at least once.
2. Crossing the projected course of the vessel close ahead at a low altitude, rocking the wings or opening and closing the throttle or changing the propeller pitch.
3. Heading in the direction in which the surface craft is to be directed.
4. Repeating if necessary.

When assistance of the surface craft to which the signal is directed is no longer required, aircraft performs following procedure.

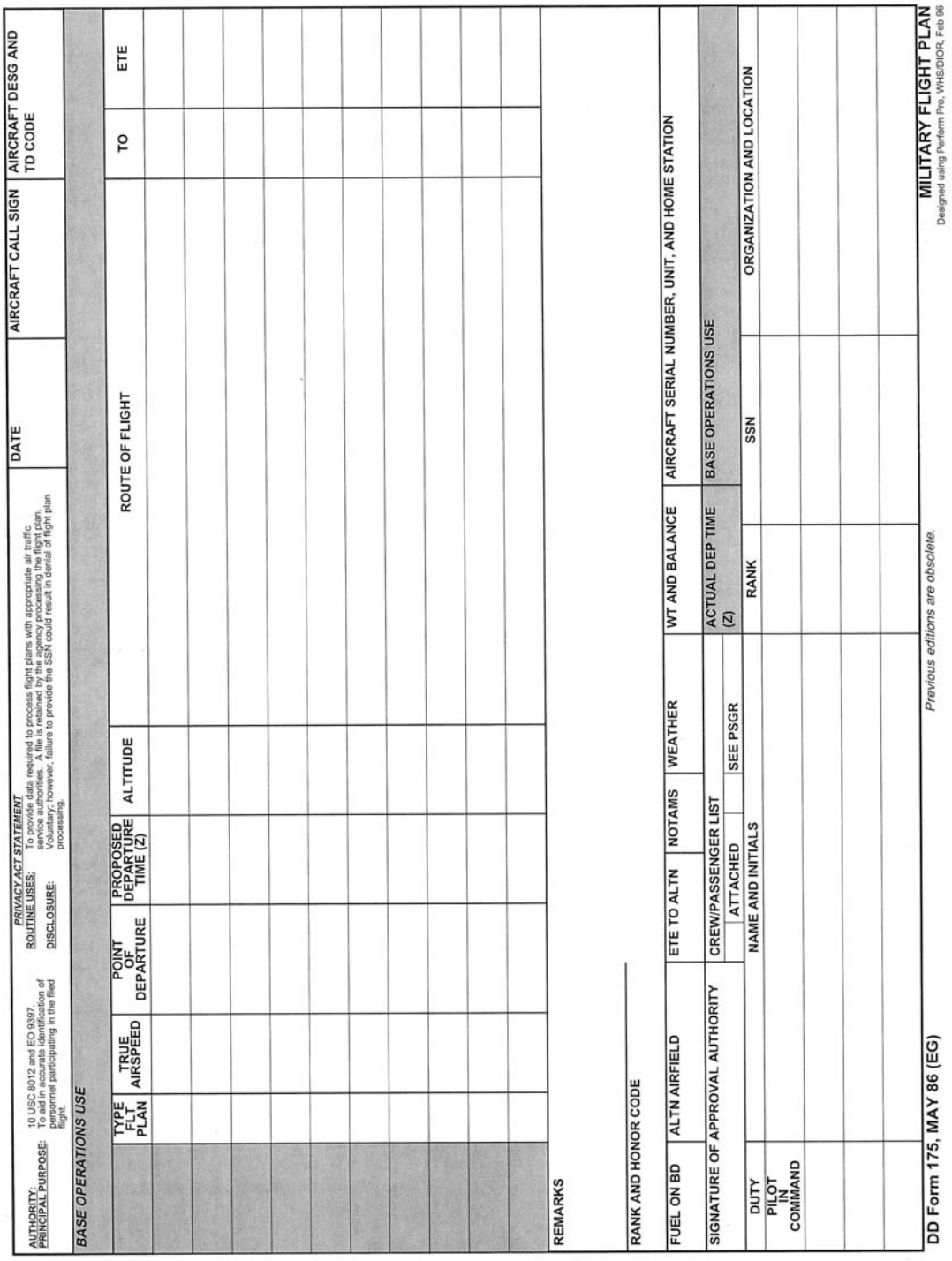
1. Crossing the wake of the vessel close astern at a low altitude, rocking the wings or opening and closing the throttle or changing the propeller pitch.

Normally, a change of heading will be made by the surface craft as an acknowledgement that the direction has been received and will be complied with. If the surface craft is unable to comply, it will so indicate by hoisting the international flag "N" or by other visual or radio means.

****** To be posted at Conning Station******

Sample of USCG, Form CG-3488

Figure A-4
Aircraft Emergency Procedures for Attracting Surface Craft (CG-3488)



AUTHORITY:
PRINCIPAL PURPOSE: 10 USC 8012 and EO 9397. To aid in accurate identification of personnel participating in the filed flight.

PRIVACY ACT STATEMENT
ROUTINE USES: To provide data required to process flight plans with appropriate air traffic control agencies. May be released to law enforcement agencies concerning the flight plan.
DISCLOSURE: Voluntary; however, failure to provide the SSN could result in denial of flight plan processing.

DATE | AIRCRAFT CALL SIGN | AIRCRAFT DESG AND TD CODE

BASE OPERATIONS USE

	TYPE FLT PLAN	TRUE AIRSPEED	POINT OF DEPARTURE	PROPOSED DEPARTURE TIME (Z)	ALTITUDE	ROUTE OF FLIGHT	TO	ETE

REMARKS

RANK AND HONOR CODE

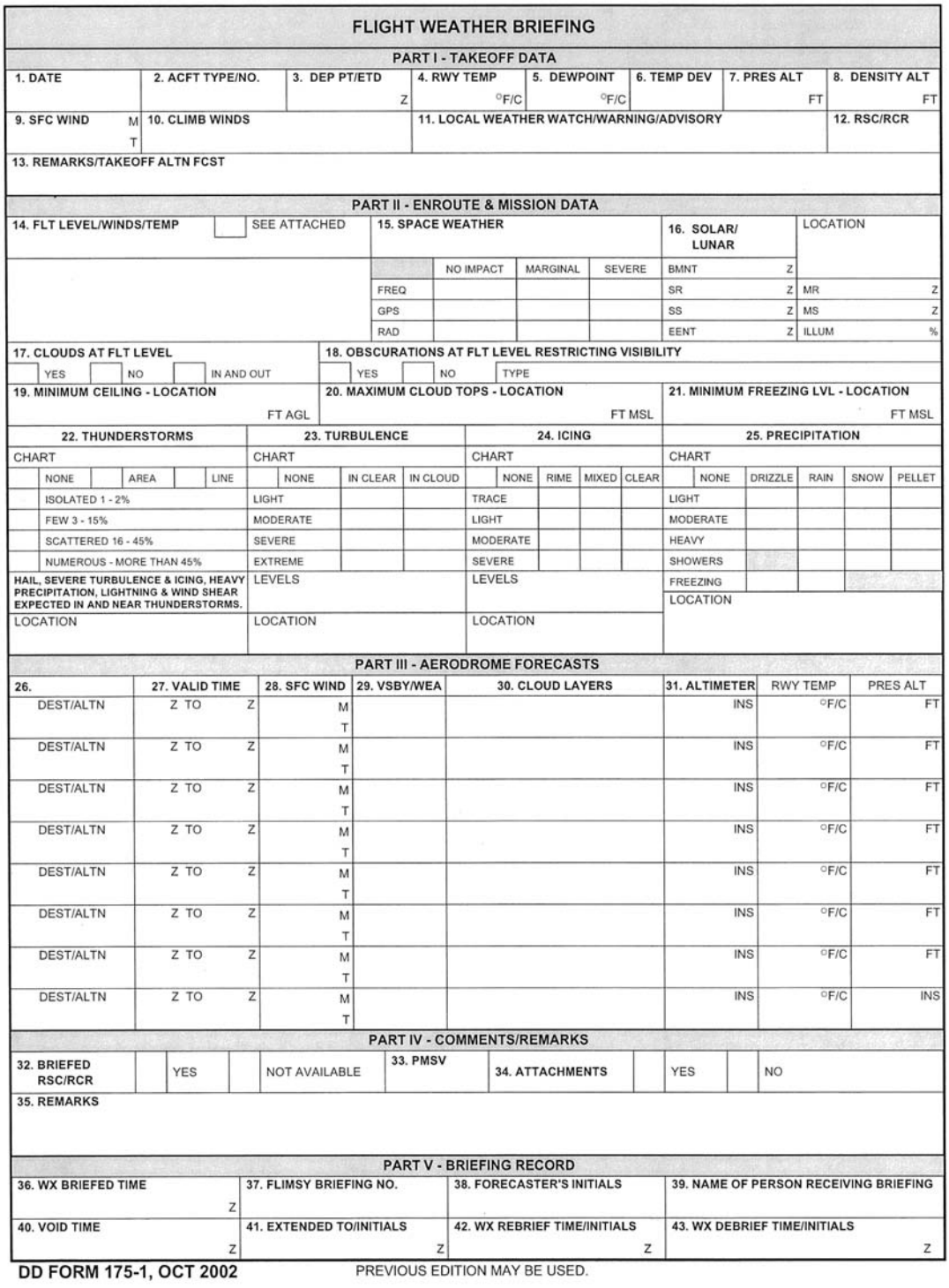
FUEL ON BD | ALTN AIRFIELD | ETE TO ALTN | NOTAMS | WEATHER | WT AND BALANCE | AIRCRAFT SERIAL NUMBER, UNIT, AND HOME STATION

SIGNATURE OF APPROVAL AUTHORITY | CREW/PASSENGER LIST: ATTACHED / SEE PSGR | ACTUAL DEP TIME (Z) | BASE OPERATIONS USE

DUTY	NAME AND INITIALS	RANK	SSN	ORGANIZATION AND LOCATION
PILOT IN COMMAND				

DD Form 175, MAY 86 (EG) *Previous editions are obsolete.* MILITARY FLIGHT PLAN
Designed using Perform Pro, WHS/DIOR, Feb 96

Figure A-5
Military Flight Plan Form (DD-175)



FLIGHT WEATHER BRIEFING

PART I - TAKEOFF DATA

1. DATE	2. ACFT TYPE/NO.	3. DEP PT/ETD Z	4. RWY TEMP °F/C	5. DEWPOINT °F/C	6. TEMP DEV	7. PRES ALT FT	8. DENSITY ALT FT

9. SFC WIND M T	10. CLIMB WINDS	11. LOCAL WEATHER WATCH/WARNING/ADVISORY	12. RSC/RCR

13. REMARKS/TAKEOFF ALTN FCST

PART II - ENROUTE & MISSION DATA

14. FLT LEVEL/WINDS/TEMP ☐ SEE ATTACHED	15. SPACE WEATHER				16. SOLAR/ LUNAR		LOCATION	
		NO IMPACT	MARGINAL	SEVERE	BMNT	Z		
	FREQ				SR	Z	MR	Z
	GPS				SS	Z	MS	Z
	RAD				EENT	Z	ILLUM	%

17. CLOUDS AT FLT LEVEL	18. OBSCURATIONS AT FLT LEVEL RESTRICTING VISIBILITY
☐ YES ☐ NO ☐ IN AND OUT	☐ YES ☐ NO TYPE

19. MINIMUM CEILING - LOCATION FT AGL	20. MAXIMUM CLOUD TOPS - LOCATION FT MSL	21. MINIMUM FREEZING LVL - LOCATION FT MSL

22. THUNDERSTORMS	23. TURBULENCE			24. ICING				25. PRECIPITATION					
CHART	CHART			CHART				CHART					
☐ NONE ☐ AREA ☐ LINE	☐ NONE	IN CLEAR	IN CLOUD	☐ NONE	RIME	MIXED	CLEAR	☐ NONE	DRIZZLE	RAIN	SNOW	PELLET
☐ ISOLATED 1 - 2%	LIGHT			TRACE				LIGHT				
☐ FEW 3 - 15%	MODERATE			LIGHT				MODERATE				
☐ SCATTERED 16 - 45%	SEVERE			MODERATE				HEAVY				
☐ NUMEROUS - MORE THAN 45%	EXTREME			SEVERE				SHOWERS				
HAIL, SEVERE TURBULENCE & ICING, HEAVY PRECIPITATION, LIGHTNING & WIND SHEAR EXPECTED IN AND NEAR THUNDERSTORMS.	LEVELS			LEVELS				FREEZING				
LOCATION	LOCATION			LOCATION				LOCATION					

PART III - AERODROME FORECASTS

26.	27. VALID TIME	28. SFC WIND	29. VSBY/WEA	30. CLOUD LAYERS	31. ALTIMETER	RWY TEMP	PRES ALT
DEST/ALTN	Z TO Z	M T			INS	°F/C	FT
DEST/ALTN	Z TO Z	M T			INS	°F/C	FT
DEST/ALTN	Z TO Z	M T			INS	°F/C	FT
DEST/ALTN	Z TO Z	M T			INS	°F/C	FT
DEST/ALTN	Z TO Z	M T			INS	°F/C	FT
DEST/ALTN	Z TO Z	M T			INS	°F/C	FT
DEST/ALTN	Z TO Z	M T			INS	°F/C	FT
DEST/ALTN	Z TO Z	M T			INS	°F/C	INS

PART IV - COMMENTS/REMARKS

32. BRIEFED RSC/RCR	☐ YES	☐ NOT AVAILABLE	33. PMSV	34. ATTACHMENTS	☐ YES	☐ NO

35. REMARKS

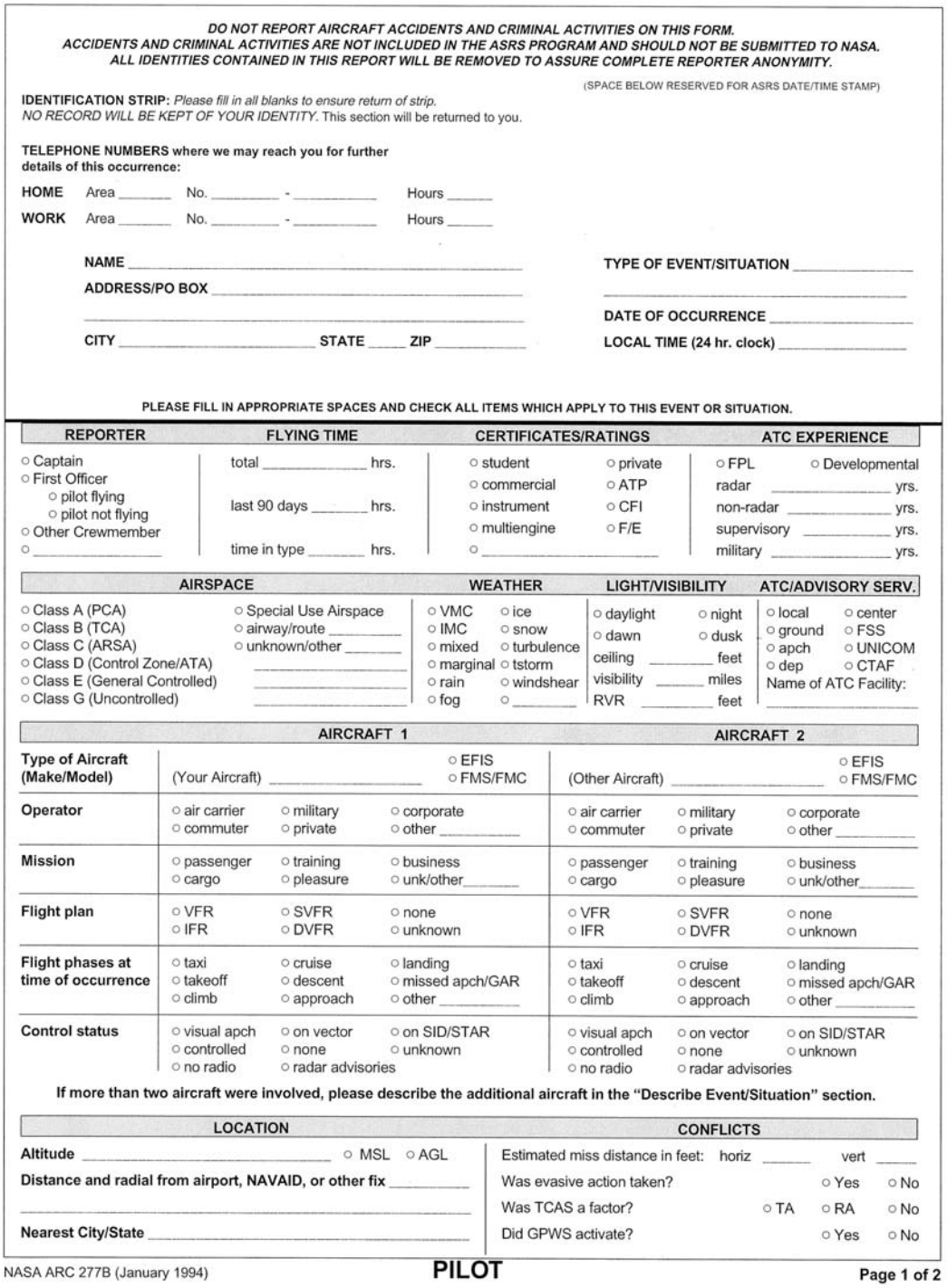
PART V - BRIEFING RECORD

36. WX BRIEFED TIME Z	37. FLIMSY BRIEFING NO.	38. FORECASTER'S INITIALS	39. NAME OF PERSON RECEIVING BRIEFING

40. VOID TIME Z	41. EXTENDED TO/INITIALS Z	42. WX REBRIEF TIME/INITIALS Z	43. WX DEBRIEF TIME/INITIALS Z

DD FORM 175-1, OCT 2002 PREVIOUS EDITION MAY BE USED.

Figure A-6
Flight Weather Plan Form (DD-175-1)



DO NOT REPORT AIRCRAFT ACCIDENTS AND CRIMINAL ACTIVITIES ON THIS FORM.
ACCIDENTS AND CRIMINAL ACTIVITIES ARE NOT INCLUDED IN THE ASRS PROGRAM AND SHOULD NOT BE SUBMITTED TO NASA.
ALL IDENTITIES CONTAINED IN THIS REPORT WILL BE REMOVED TO ASSURE COMPLETE REPORTER ANONYMITY.

(SPACE BELOW RESERVED FOR ASRS DATE/TIME STAMP)

IDENTIFICATION STRIP: *Please fill in all blanks to ensure return of strip.*
NO RECORD WILL BE KEPT OF YOUR IDENTITY. This section will be returned to you.

TELEPHONE NUMBERS where we may reach you for further details of this occurrence:

HOME Area _____ No. _____ - _____ Hours _____

WORK Area _____ No. _____ - _____ Hours _____

NAME _____

ADDRESS/PO BOX _____

_____

CITY _____ **STATE** _____ **ZIP** _____

TYPE OF EVENT/SITUATION _____

_____

DATE OF OCCURRENCE _____

LOCAL TIME (24 hr. clock) _____

PLEASE FILL IN APPROPRIATE SPACES AND CHECK ALL ITEMS WHICH APPLY TO THIS EVENT OR SITUATION.

REPORTER
- ○ Captain
- ○ First Officer
  - ○ pilot flying
  - ○ pilot not flying
- ○ Other Crewmember
- ○ _____

FLYING TIME
- total _____ hrs.
- last 90 days _____ hrs.
- time in type _____ hrs.

CERTIFICATES/RATINGS
- ○ student ○ private
- ○ commercial ○ ATP
- ○ instrument ○ CFI
- ○ multiengine ○ F/E
- ○ _____

ATC EXPERIENCE
- ○ FPL ○ Developmental
- radar _____ yrs.
- non-radar _____ yrs.
- supervisory _____ yrs.
- military _____ yrs.

AIRSPACE
- ○ Class A (PCA)
- ○ Class B (TCA)
- ○ Class C (ARSA)
- ○ Class D (Control Zone/ATA)
- ○ Class E (General Controlled)
- ○ Class G (Uncontrolled)
- ○ Special Use Airspace
- ○ airway/route _____
- ○ unknown/other _____

WEATHER
- ○ VMC ○ ice
- ○ IMC ○ snow
- ○ mixed ○ turbulence
- ○ marginal ○ tstorm
- ○ rain ○ windshear
- ○ fog ○ _____

LIGHT/VISIBILITY
- ○ daylight ○ night
- ○ dawn ○ dusk
- ceiling _____ feet
- visibility _____ miles
- RVR _____ feet

ATC/ADVISORY SERV.
- ○ local ○ center
- ○ ground ○ FSS
- ○ apch ○ UNICOM
- ○ dep ○ CTAF
- Name of ATC Facility: _____

	AIRCRAFT 1	AIRCRAFT 2
Type of Aircraft (Make/Model)	(Your Aircraft) _____ ○ EFIS ○ FMS/FMC	(Other Aircraft) _____ ○ EFIS ○ FMS/FMC
Operator	○ air carrier ○ military ○ corporate ○ commuter ○ private ○ other _____	○ air carrier ○ military ○ corporate ○ commuter ○ private ○ other _____
Mission	○ passenger ○ training ○ business ○ cargo ○ pleasure ○ unk/other_____	○ passenger ○ training ○ business ○ cargo ○ pleasure ○ unk/other_____
Flight plan	○ VFR ○ SVFR ○ none ○ IFR ○ DVFR ○ unknown	○ VFR ○ SVFR ○ none ○ IFR ○ DVFR ○ unknown
Flight phases at time of occurrence	○ taxi ○ cruise ○ landing ○ takeoff ○ descent ○ missed apch/GAR ○ climb ○ approach ○ other _____	○ taxi ○ cruise ○ landing ○ takeoff ○ descent ○ missed apch/GAR ○ climb ○ approach ○ other _____
Control status	○ visual apch ○ on vector ○ on SID/STAR ○ controlled ○ none ○ unknown ○ no radio ○ radar advisories	○ visual apch ○ on vector ○ on SID/STAR ○ controlled ○ none ○ unknown ○ no radio ○ radar advisories

If more than two aircraft were involved, please describe the additional aircraft in the "Describe Event/Situation" section.

LOCATION

Altitude _____ ○ MSL ○ AGL

Distance and radial from airport, NAVAID, or other fix _____

_____

Nearest City/State _____

CONFLICTS

Estimated miss distance in feet: horiz _____ vert _____

Was evasive action taken? ○ Yes ○ No

Was TCAS a factor? ○ TA ○ RA ○ No

Did GPWS activate? ○ Yes ○ No

NASA ARC 277B (January 1994) **PILOT** **Page 1 of 2**

Figure A-7
NASA ARC (Form 227B)

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

NASA has established an Aviation Safety Reporting System (ASRS) to identify issues in the aviation system which need to be addressed. The program of which this system is a part is described in detail in FAA Advisory Circular 00-46C. Your assistance in informing us about such issues is essential to the success of the program. Please fill out this form as completely as possible, enclose in an sealed envelope, affix proper postage, and and send it directly to us.

The information you provide on the identity strip will be used only if NASA determines that it is necessary to contact you for further information. THIS IDENTITY STRIP WILL BE RETURNED DIRECTLY TO YOU. The return of the identity strip assures your anonymity.

AVIATION SAFETY REPORTING SYSTEM

Section 91.25 of the Federal Aviation Regulations (14 CFR 91.25) prohibits reports filed with NASA from being used for FAA enforcement purposes. This report will not be made available to the FAA for civil penalty or certificate actions for violations of the Federal Air Regulations. Your identity strip, stamped by NASA, is proof that you have submitted a report to the Aviation Safety Reporting System. We can only return the strip to you, however, if you have provided a mailing address. Equally important, we can often obtain additional useful information if our safety analysts can talk with you directly by telephone. For this reason, we have requested telephone numbers where we may reach you.

Thank you for your contribution to aviation safety.

NOTE: *AIRCRAFT ACCIDENTS SHOULD NOT BE REPORTED ON THIS FORM. SUCH EVENTS SHOULD BE FILED WITH THE NATIONAL TRANSPORTATION SAFETY BOARD AS REQUIRED BY NTSB Regulation 830.5 (49CFR830.5).*

Please fold both pages (and additional pages if required), enclose in a sealed, stamped envelope, and mail to:

NASA AVIATION SAFETY REPORTING SYSTEM
POST OFFICE BOX 189
MOFFETT FIELD, CALIFORNIA 94035-0189

DESCRIBE EVENT/SITUATION

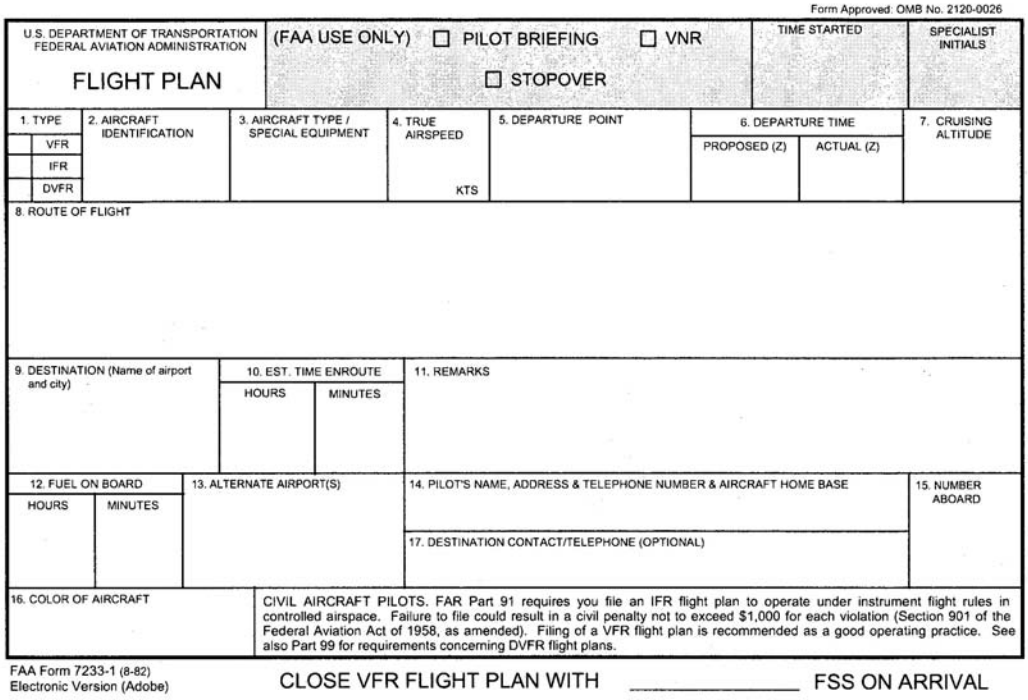
Keeping in mind the topics shown below, discuss those which you feel are relevant and anything else you think is important. Include what you believe really caused the problem, and what can be done to prevent a recurrence, or correct the situation. (USE ADDITIONAL PAPER IF NEEDED)

CHAIN OF EVENTS
- How the problem arose
- How it was discovered
- Contributing factors
- Corrective actions

Page 2 of 2

HUMAN PERFORMANCE CONSIDERATIONS
- Perceptions, judgments, decisions
- Actions or inactions
- Factors affecting the quality of human performance

Figure A-7
NASA ARC Form 227B - Continued



Form Approved: OMB No. 2120-0026

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

FLIGHT PLAN

(FAA USE ONLY) ☐ PILOT BRIEFING ☐ VNR ☐ STOPOVER

TIME STARTED | SPECIALIST INITIALS

1. TYPE	2. AIRCRAFT IDENTIFICATION	3. AIRCRAFT TYPE / SPECIAL EQUIPMENT	4. TRUE AIRSPEED	5. DEPARTURE POINT	6. DEPARTURE TIME		7. CRUISING ALTITUDE
☐ VFR ☐ IFR ☐ DVFR			KTS		PROPOSED (Z)	ACTUAL (Z)	

8. ROUTE OF FLIGHT

9. DESTINATION (Name of airport and city)	10. EST. TIME ENROUTE		11. REMARKS
	HOURS	MINUTES	

12. FUEL ON BOARD		13. ALTERNATE AIRPORT(S)	14. PILOT'S NAME, ADDRESS & TELEPHONE NUMBER & AIRCRAFT HOME BASE	15. NUMBER ABOARD
HOURS	MINUTES			
			17. DESTINATION CONTACT/TELEPHONE (OPTIONAL)	

16. COLOR OF AIRCRAFT

CIVIL AIRCRAFT PILOTS. FAR Part 91 requires you file an IFR flight plan to operate under instrument flight rules in controlled airspace. Failure to file could result in a civil penalty not to exceed $1,000 for each violation (Section 901 of the Federal Aviation Act of 1958, as amended). Filing of a VFR flight plan is recommended as a good operating practice. See also Part 99 for requirements concerning DVFR flight plans.

FAA Form 7233-1 (8-82)
Electronic Version (Adobe)

CLOSE VFR FLIGHT PLAN WITH _____ FSS ON ARRIVAL

MILITARY STOPOVER (FAA USE ONLY)

TYPE	AIRCRAFT IDENTIFICATION	AIRCRAFT TYPE/SPECIAL EQUIPMENT	REMARKS
☐ IFR ☐ VFR			

DEPARTURE POINT	DESTINATION	ETA

TAS	DEP. PT	ETD	ALTITUDE	ROUTE OF FLIGHT	DESTINATION	ETE	REMARKS
KTS							
KTS							
KTS							
KTS							

REMARKS | INITIALS

FAA Form 7233-1 (8-82) Electronic Version (Adobe)

Figure A-8
FAA Flight Plan (Form 7233-1)

Appendix B
Quick Reference

Introduction This appendix provides a listing of useful source references.

In this Appendix This appendix contains the following information:

Web Sites

ANSC	www.uscgaux.org/~forms/forms.html
Auxiliary National*	www.cgaux.org
Boat Force Home	www.uscg.mil/hq/g-o/g-ocs/g-ocs.htm
Chief Director, Auxiliary*	www.uscg.mil/hq/g-o/cgaux
Coast Guard Home Page	www.uscg.mil/uscg.shtm
Coast Guard Office of Search and Rescue	www.uscg.mil/hq/g-o/g-opr/sar.htm
Department of Homeland Security	www.dhs.gov/dhspublic
Uniform Distribution Center	www.uscg.mil/hq/g-w/g-wp/udc/index.htm

LEGEND: * - Indicates AUXDATA is accessible from web site

Commandant Instructions

COMDTINST 3500.3 (series)	*Operational Risk Management*
COMDTINST M16130.2 (series)	*U.S. Coast Guard Addendum to the United States National Search and Rescue Supplement (NSS) to the International Aeronautical and Maritime Search and Rescue Manual (IAMSAR)*
COMDTINST M16790.1 (series)	*Auxiliary Manual*
COMDTINST 16798.1 (series)	*Auxiliary Aviation Program*
COMDTINST 16798.2 (series)	*Auxiliary Air Crew Qualification Program*
COMDTINST M16798.3 (series)	*Auxiliary Operations Policy Manual*
COMDTINST M16798.5 (series)	*Coast Guard Auxiliary Air Operations Training Manual*

Appendix C
Glossary

Introduction

This appendix contains a list of terms used throughout this manual and their definitions. For consistency, this manual uses the terms contained in this appendix where there are multiple terms for similar positions or functions.

In this Appendix

This appendix contains the following information:

TERM	DEFINITION
Air Crew	Air crew are Auxiliarists trained and qualified in the aviation program as air crew. Air crew is an upgraded qualification level for observers who successfully complete a series of tasks consisting of advanced observer duties and pilot and crew knowledge.
Annual Requirement	Unless defined differently for a particular currency requirement, an annual requirement remain current by completing the requirement during any part of the previous calendar year. For example, the requirement to attend an annual workshop means that to be current for calendar year 2, the mandatory workshop was attended sometime between January 1 and December 31 of calendar year 1. This satisfies the requirement for currency during the entire calendar year 2 from January 1 to December 31. This sequence must be repeated in year 2 in order to remain current for year 3, etc.
Crewmember	A crewmember is a general term for an Auxiliarist certified to be part of a surface or air facility crew assigned to duty. This term includes the operator.
Director (Chief Director of Auxiliary)	A Director is an officer serving in the District operation's staff who is a direct representative of the District Commander with the responsibility to promote and manage the Auxiliary program. The Director receives program policy direction from the Chief Director of Auxiliary (G-OCX).
Districts	District is an inclusive term used to identify both districts and regions of the Coast Guard and Auxiliary.
Facility	When "facility" is used within this manual, it refers to a privately-owned or Auxiliary unit vessel, aircraft, fixed land or land mobile radio station, or fixed land RDF station offered for use and accepted by the Director as an operational facility.
Flight Crew	Flight crew is a term referring to all members of the aircraft crew: pilot, air crew, and observers.
Logistical Mission	A logistical mission is a mission that is non-operational in nature to include cargo transport, pre-positioning for a later mission, or a rendezvous with a safety pilot for a night/IMC operational mission.
Mission	A mission is a specific task or assignment, undertaken by individuals, that is determined to be within the scope of their training and qualification.
Night	Night is the period after civil twilight following sunset and prior to civil twilight preceding sunrise.
Observer	An observer is an Auxiliarist trained and qualified in the aviation program as an air observer.

TERM	DEFINITION
Offshore	Offshore is the distance beyond gliding or the autorotative distance from shore.
Operational Commander	An Operational Commander is an active duty Coast Guard command responsible for certain Coast Guard operations in a given geographic area. Operational Commanders include Sector commanders, Group commanders, Activity commanders, Air Station COs, MSO COs, and station COs/Officers-in-charge (OICs).
Operational Flight	An operational flight is a flight that is operational in nature, i.e., patrol, air intercept, MDA, etc., including passenger transport flights.
Operator	An operator is a general term for an Auxiliarist in charge of a facility or special purpose facility assigned to duty (e.g., coxswain, personal watercraft (PWC) operator, radio operator, or PIC).
"Ops Normal" Reports	"Ops Normal" reports are position and status reports transmitted on a regular basis. These reports give the current location and status of the facility, which may be "Ops Normal", or may be some other status, such as "Conducting the Search".
Order-Issuing Authority	An OIA is an active duty entity authorized to issue operational orders. This responsibility shall not be delegated to the Auxiliary. Unit commanders and directors may act as OIAs (also known as call-out authorities).
Orders	Orders are written or verbal and are issued by an OIA to direct an Auxiliarist(s) or any Auxiliary resource(s) to conduct authorized missions.
Patrol	A patrol is movement of an operational facility under orders. It is expected that one or more missions will be accomplished during that patrol.
Shore	Shore is land that is suitable for an emergency landing with a reasonable expectation of landing without injury to persons onboard the aircraft.
Special Mission	A special mission is a non-routine or unscheduled mission that falls outside the normal profile of training, logistics, passenger transport, or patrol, and has a higher than normal level of risk.
Vessel(s)	A vessel is a general term used by itself throughout this manual where differentiation between types of surface facilities is not necessary.

Appendix D
List of Acronyms

Introduction This appendix contains a list of acronyms used by the Auxiliary.

In this Appendix This appendix contains the following information:

ACRONYM	DEFINITION
AAC	Auxiliary Air Coordinator
ADF	Automatic Direction Finder
ADIZ	Air Defense Identification Zone
ADSO	Assistant District Staff Officer
ADSO-AAC	Assistant District Staff Officer – Auxiliary Aviation Coordinator
ADSO-AV	Assistant District Staff Officer – Aviation
ADSO-AVT	Assistant District Staff Officer – Aviation Training
AFSS	Automated Flight Service Station
AGL	Above Ground Level
AIS	Automatic Identification System
ANB	Aids to Navigation Boat
ANSC	Auxiliary National Supply Center
AOR	Area of Responsibility
ARTCC	Air Route Traffic Control Center
ASCO	Air Station Commanding Officer
ASOS	Automated Surface Observation Service
ASRS	Aviation Safety Reporting System
ATC	Air Traffic Control
ATIS	Automatic Terminal Information Service
ATON	Aids to Navigation
AUXAIR	Auxiliary Aviation
AUX-ED	Auxiliary Assistant Pollution Investigator
AUX-ET	Auxiliary Assistant Pollution Response Specialist
AUXSAR	Search and Rescue Student Text
AVGAS	Aviation Gasoline
AWOS	Automated Weather Observation Service
BC-OAA	Branch Chief – Air Flight Surgeon
BC-OAC	Branch Chief – Aviation Capabilities
BC-OAF	Branch Chief – Standards
BC-OAH	Branch Chief – Homeland Security Flight Operations
BC-OAM	Branch Chief – Aviation Management

ACRONYM	DEFINITION
BC-OAP	Branch Chief – Special Projects
BC-OAR	Branch Chief – Aviation Recruitment
BC-OAS	Branch Chief – Flight Safety
BC-OAT	Branch Chief – Aviation Training
BQ	Basically Qualified
BUSL	Buoy Utility Stern Loading
CO	Commanding Officer
CRM	Crew Resource Management
CS	Creeping Line Search
CSC	Creeping Line Coordinated Search
CSP	Commence Search Point
DF	Direction Finder
DFSO	District Flight Safety Officer
DH	Decision Height
DHS	Department of Homeland Security
DIRAUX	Director of Auxiliary
DME	Distance Measuring Equipment
DPB	Deployable Pursuit Boat
DSO-AV	District Staff Officer – Aviation
DSO-MS	District Staff Officer – Marine Safety
DUAT	Direct User's Access Terminal
DVC-OA	Division Chief – Air Operations
ELT	Emergency Locator Transmitter
ELT	Enforcement of Laws and Treaties
EPIRB	Emergency Position Indicating Radio Beacon
ETA	Estimated Time of Arrival
FAA	Federal Aviation Administration
FAF	Final Approach Fix
FAR	Federal Aviation Regulations
FBO	Fixed-Base Operator (airport operation)
FC	Flotilla Commander

ACRONYM	DEFINITION
FD	Winds Aloft
FSO	Flotilla Staff Officer
FSO-MA	Flotilla Staff Officer – Materials
FSS	Flight Service Station
GPS	Global Positioning System
HAZMAT	Hazardous Material
IAMSAR	International Aeronautical and Maritime Search and Rescue Manual
ICS	Incident Command System
IFR	Instrument Flight Rules
ILS	Instrument Landing System
IMC	Instrument Meteorological Condition
IMSEP	Introduction to Marine Safety and Environmental Protection
JEPPESEN	Commercial provider of instrument aviation charts and procedures
LOFT	Line Oriented Flight Training
LORAN	Long-Range Aid to Navigation
LNG	Liquefied Natural Gas
LPG	Liquid Petroleum Gas
MA	Materials Officer
MAP	Missed Approach Point (in instrument flight)
MARSEC	Maritime Security
MDA	Maritime Domain Awareness
MDA	Minimum Descent Altitude (in instrument flight)
MEA	Minimum Enroute Altitude
MEP	Marine Environmental Protection
METAR	Aviation Routine Weather Report
MLB	Motor Lifeboat
MOA	Military Operating Area
MS	Marine Safety
MSB	Motor Surf Boat
MSD	Marine Safety Detachment
MSO	Marine Safety Office

ACRONYM	DEFINITION
NASA	National Aeronautics and Space and Administration
NM	Nautical Mile
NOAA	National Oceanic and Atmospheric Administration
NOS	National Ocean Survey
NOTAMS	Notice to Airmen
NTSB	National Transportation Safety Board
OIA	Order-Issuing Authority
OIC	Officer-in-charge
OPSEC	Operational Security
ORM	Operational Risk Management
OSC	On-Scene Commander
PF	Pilot Flying
PFD	Personal Flotation Device
PIC	Pilot-in-Command
PNF	Pilot Not Flying
POD	Probability of Detection
PPE	Personal Protective Equipment
PPR	Prior Permission Required
PS	Parallel Track Search
PWC	Personal Watercraft
PWCS	Ports, Waterways, and Coastal Security
RACON	RADAR Transponder
RB	Response Boat
RCC	Rescue Coordination Center
RHIB	Rigid Hull Inflatable Boat
SARSAT	Search and Rescue Satellite
SITREPS	Situation Reports
SAR	Search and Rescue
SMC	SAR Mission Coordinator
SOLAS	Safety of Life at Sea
SRR	Search and Rescue Region

ACRONYM	DEFINITION
SRU	Search and Rescue Unit
SS	Expanding Square Pattern
SWET	Shallow Water Egress Trainer
TAC	Tactical Air Navigation System
TAF	Aerodrome Forecast
TPSB	Transportable Port Security Boat
TS	Single-Unit Trackline Pattern
UHF	Ultra High Frequency
UTB	Utility Boat
VDA	Visual Detection Aid
VDS	Visual Distress Signal
VFR	Visual Flight Rules
VHF	Very High Frequency
VMC	Visual Meteorological Condition
VOR	Very High Frequency Omni Range
VORTAC	Very High Frequency Omni Range Tactical Air Navigation System
WAGB	Inland Icebreaker
WHEC	High Endurance Cutter
WIX	Training Barque Eagle
WLB	Seagoing Buoy Tender
WLI	Inland Buoy Tender
WLM	Coastal Buoy Tender
WLR	River Buoy Tender
WMEC	Medium Endurance Cutter
WPB	Patrol Boat
WPC	Patrol Coastal
WTGB	Icebreaking Tug
WYTL	Small Harbor Tug

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