Chapter 11

11. Visual Search Patterns

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Because of the accuracy and reliability of the present Global Positioning System and GPS receivers, aircrews are now able to navigate and fly search patterns with unprecedented effectiveness and ease. The GPS has become the primary instrument for air missions, and it is vital that pilots and observers know how to use the GPS to fly these patterns.

However, observers must also be familiar with the other navigational instruments onboard aircraft. These instruments complement the GPS and serve as backups in case of GPS receiver problems.

Note that this section deals with navigational instruments as a *mission* tool and is not concerned with the FAA rules and restrictions on GPS use under the Federal Aviation Regulations. Under these rules, GPS receivers are for VFR use only and are not certified for instrument flight; the FAA certified navigational instruments are the ADF, VOR, and DME. It is the responsibility of the pilot-in-command to adhere to all applicable FAA rules and regulations pertaining to the use of these instruments.

OBJECTIVES:

1. Plan and describe how to fly a route search.
2. Plan and describe how to fly a parallel search.
3. Plan and describe how to fly a creeping line search.
4. Plan and describe how to fly an expanding square search.
5. Discuss how to plan and fly a sector search.
6. Discuss how to plan and fly a basic contour search.

NOTE: Scanners need a basic knowledge of the search patterns.

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11.1 Planning Search Patterns

Before missions are launched, the briefing officer provides pilots and crewmembers with information designating the routes to and from the search area, and the types of search patterns to be used upon entering the search area. Mission observers, in their role as mission commander, should be able to plan and perform each type of search pattern: besides becoming proficient as a mission commander, this allows the observer to better assist the mission pilot and help ensure the success of the mission.

The following descriptions are directed primarily toward a single aircraft search, and will cover track line, parallel, creeping line, expanding square, sector and contour search patterns.

The majority of search aircraft are Cessna 180/182/185/205/206s that only carry three crewmembers, so *we assume that the crew consists of a pilot, an observer in the right front seat, and a single scanner in the rear seat*. We assume that the observer will be looking out the right side of the aircraft while the scanner covers the left side; therefore the observer's primary duty during the search is to be a scanner. If a larger aircraft is used there may be two scanners in the rear seat.

The pilot must be aware of how many scanners will be on board in order to assign which side of the aircraft they should scan. *Planning and executing a search pattern with only one scanner on board is quite different from one where you have two scanners*. Likewise, having an observer and two scanners on board will allow the observer to spend more time assisting the pilot without seriously decreasing search effectiveness.

When you are planning and flying search patterns, always perform a ***stupid check*** -- as in "Hey! Wait a minute. This is stupid." Use this to see if your headings, waypoint positions, lat/long coordinates and distances look sensible. At a minimum, perform this check after you finish planning, when you start your pattern, and periodically thereafter. For example, you've just entered a set of lat/long coordinates into the GPS and turned to the heading shown on the GPS. You know the coordinates represent a lake southwest of your position, so check the heading indicator to see you're actually traveling in a southwesterly direction. Or, you know the lake is approximately 25 nm away; check the distance indicated on the GPS! You'd be surprised how many mistakes this method will catch.

In the following discussions of the parallel line, creeping line and expanding square search patterns, examples (worksheets) are given to aid in pre-planning each pattern. The examples are designed for aircraft using the older (non-moving map) GPS units, but the information you will need to set up the search pattern in the GX55 is included on the worksheets.

In both cases (old versus new GPS), *pre-planning (plotting) your search pattern results in the most effective search*. Pre-planning sets the details of the sortie in your mind and makes entering your data (correctly) into the GPS much easier. This allows the pilot and observer to concentrate on their primary task by minimizing NAVAID setup time and reducing confusion.

11.2 Track crawl (route) search

The planner will normally use the track line (route) search pattern when an aircraft has disappeared without a trace. This search pattern is based on the assumption that the missing aircraft has crashed or made a forced landing on or near its intended track (route). It is assumed that detection may be aided by survivor signals or by electronic means. The track line pattern is also used for night searches (in suitable weather). A search aircraft using the track line pattern flies a rapid and reasonably thorough coverage on either side of the missing aircraft's intended track.

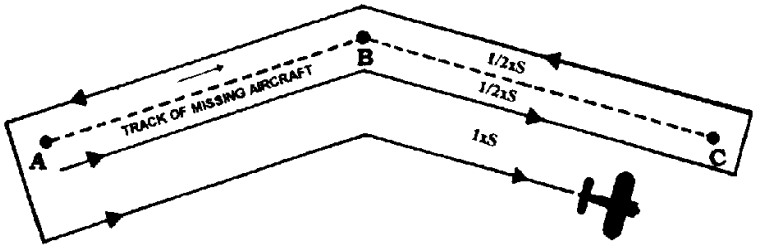


Figure 11-1

Figure 11-1 illustrates the track crawl search pattern. Search altitude for the track line pattern usually ranges from 1000 feet above ground level (AGL) to 2000 feet AGL for day searches, while night searches range 2000 to 3000 feet AGL (either depending upon light conditions and visibility). Lat/long coordinates for turns are determined and then entered into the GPS as waypoints, which may then be compiled into a flight plan.

The search crew begins by flying parallel to the missing aircraft's intended course line, using the track spacing (labeled “S” in Figure 11-1) determined by the incident commander or planner. On the first pass, recommended spacing may be one-half that to be flown on successive passes. Flying one-half “S” track spacing in the area where the search objective is most likely to be found can increase search coverage. You may use a worksheet to draw the route and to log coordinates and distinctive features.

The GX55 has a function called "parallel track offset" that is very handy for route searches. This function allows you to create a parallel course that is offset to the left or right (up to 20 nm) of your current flight plan. This function can also be useful on when you wish to search a 'corridor' of airspace.

11.3 Parallel track or parallel sweep

The parallel track (sweep) procedure is normally used when one or more of the following conditions exist:

- The search area is large and fairly level.
- Only the approximate location of the target is known.
- Uniform coverage is desired.

The aircraft proceeds to a corner of the search area and flies at the assigned altitude, sweeping the area maintaining parallel tracks. The first track is at a

distance equal to one-half (1/2) track spacing (S) from the side of the area (Figure 11-2). [Note: In the example the aircraft makes all turns inside the grid; if the briefer and circumstances allow (no aircraft in adjacent girds), turns should be made outside the grid in order to give the scanners short breaks.]

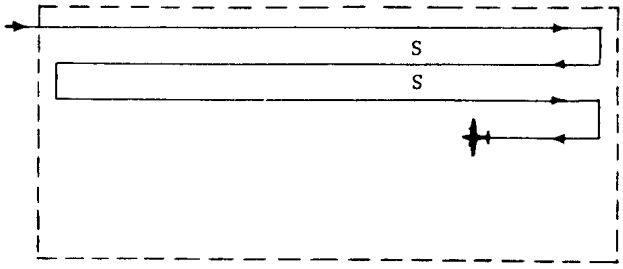


Figure 11-2

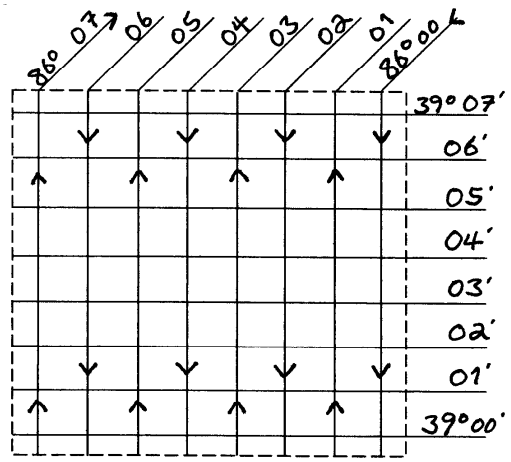
This type of search is used to search a grid. A worksheet (Figure 11-3) may be used to plan the search. You can use this to enter the latitudes and longitudes that define the entry point and bound the grid (or generate a flight plan).

Grid Coordinates

SECTIONAL: STL (N) S GRID # 104 A B C (D)

ENTRY POINT: N 39°07.5' W 86°00'

EXIT POINT: N 39°07.5' W 86°07'



NAVIGATIONAL AIDS

	IDENTIFIER	FREQUENCY	RADIAL
1.	OOM	110.2	090°
2.	ABB	112.4	330°

Figure 11-3

In the example, you will be searching STL Grid #104-D, which is a quarter-grid measuring 7.5' x 7.5'. Plot the grid's coordinates and draw the pattern starting at the entry point (northeast corner); include track spacing (one nm) and the direction of the legs (north/south). You will enter the entry point coordinates as a waypoint (N 39º 07´ W 86º 00´; northeast corner). As you fly to the entry point, set up at search altitude and speed about 3-5 miles out. Then fly the pattern using the GPS' continuous latitude/longitude display (e.g., present position). Remember, latitude increases as you go north; longitude increases as you go west.

Even though you are using the GPS lat/long display, it's still helpful to note your headings for the legs (in the example, north and south). Once you have flown a couple of legs you will have two headings that you can shoot for that will correct for any wind; it's easier to use the heading indicator as your primary indicator and check your accuracy with the GPS. [Note: if you're not using your VOR heads, set the top OBS with one heading (e.g., north) and the lower OBS to the other heading -- use all available equipment.]

Also, always enter relevant VOR cross-radials onto your worksheet; use them as a backup and to verify important positions.

Latitude, Longitude, and Distance

For training purposes, we assume that "one minute = one nautical mile."

In the continental U.S., one minute of latitude is equivalent to 1.0018 nm; for our purposes you can assume that if you fly one minute of latitude (north/south) you are covering one nm -- very handy for flying 1-nm east/west track spacing with 'present position' displayed on the GPS.

Longitude isn't so clean: in Washington state one minute of longitude may be equivalent to 0.6572 nm, in the central parts of the country its 0.7695 nm, and in Florida it may be 0.9152 nm. This means that to fly a north/south 1-nm leg means flying anywhere from 1.5 to 1.1 minutes of longitude, depending on where you are in the country. This isn't hard to do, but for training we fly one-minute longitudinal legs even though it means flying less than 1-nm north/south track spacing). [To find the latitude/longitude/distance relationship for your area, go to http://jan.ucc.nau.edu/~cvm/latlongdist.php]

In the example above (Figure 11-3) you are flying a quarter-grid with north/south legs and one-mile track spacing. The aircraft enters the grid at the northeast corner and flies a constant longitude (W 86º 00´) southbound until the pilot sees the latitude decrease to where she will begin her turn to the east (e.g., N 39º 00´). When she completes the 180º turn she should be flying a constant longitude northbound, offset one mile east of the first leg (W 86º 01´; remember, for training we are using "one minute = one nautical mile"). The pilot will continue up this longitude line, watching the latitude increase until it is time to begin the next turn to the east (e.g., N 39º 07´). This process will be repeated until the search is completed.

Note: The turns in the example above will take the aircraft out of the grid north and south; make sure no other aircraft are assigned to the grids north or south of yours. If aircraft are assigned to adjacent grids, make sure you complete your turns *inside* your grid.

GX-55

All the data you need set up this search pattern in the GX55 is on the worksheet:

- Type of Grid and Sectional (US grid, STL).

- Type of pattern (Parallel Line).
- Grid (104D2, where '2' indicates entering the northeast corner of D quadrant *).
- Spacing (1 nm).
- Direction of Travel (N/S).

* The GX-55 identifies the corners of quadrants by numbers: 1 = enter the NW corner; 2 = NE corner; 3 = SE corner; and 4 = SW corner. In our example you would enter "104D*2*."

Note: If you wish, record this data separately (e.g., a list or table) to make it even easier to enter into the GX-55. The example, above, and the other examples that follow are listed in the sequence that you enter them into the GX-55.

11.4 Creeping line search

The creeping line search pattern is similar to the parallel patterns. The parallel pattern search legs are aligned with the major, or longer, axis of the rectangular search areas, whereas the search legs of the creeping line pattern are aligned with the minor or shorter axis of rectangular search areas. Figure 11-4 shows the layout of this search pattern. The planner uses the creeping line pattern when:

- The search area is narrow, long, and fairly level.
- The probable location of the target is thought to be on either side of the search track within two points.
- There is a need for immediate coverage of one end of the search area.

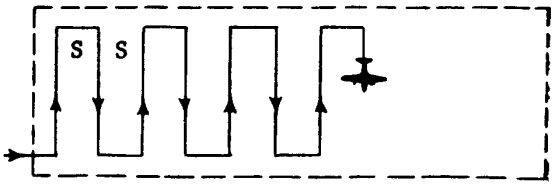


Figure 11-4

This coverage is followed immediately by rapid advancement of successive search legs along the line. Rectangular and elongated are the two forms of the creeping line pattern. For each form, the starting point is located one-half search track spacing inside the corner of the search area.

Successive long search legs use track spacing assigned by the incident commander or planner, while the short legs may be flown to within one-half that spacing of the search area's edge.

A worksheet (Figure 11-4a) may be used to plan the search. Assume you will be searching along Highway 31 between Columbus and Seymour, starting at the intersection with Highway 9 and ending at the intersection with Highway 50 (just east of Seymour). Draw the pattern starting at the entry point (intersection of Hwy 31/9, Columbus); include track spacing (one nm) and make each leg extend three nm east and west of the highway. You will enter the entry point coordinates as a waypoint (N 39º 10´ W 85º 53´). As you fly to the entry point, set up search

altitude and airspeed three to five miles out, then fly the pattern using the GPS' continuous lat/long display. In this example, you will initially fly a constant latitude line of N 39º 10´ until you reach W 85º 47´ where you will turn right 180º and stabilize on a constant latitude line of N 39º 09´; repeat this process until the search is completed. [Note: You may also create a flight plan for the pattern.]

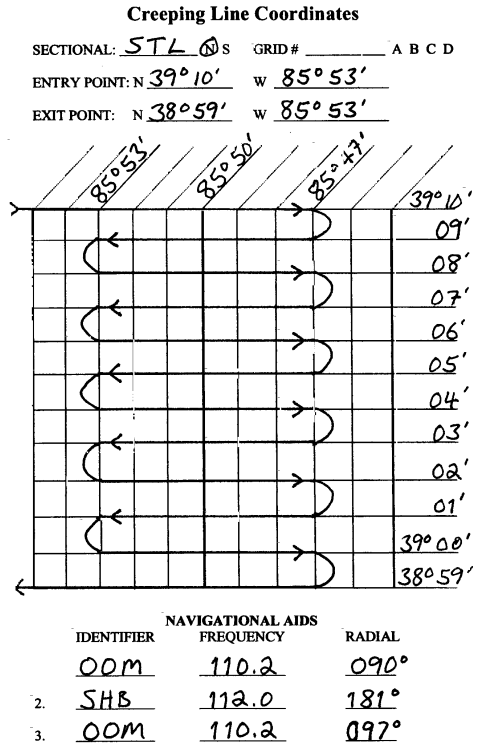


Figure 11-4a

If the route is along a cardinal heading such as the highway in Figure 11-4a, then the pilot will simply fly the creeping line using continuously displayed latitude and longitude. However, when the route is not a straight line aligned with a cardinal heading, another method may be used to fly a creeping line search pattern (Figure 11-4b).

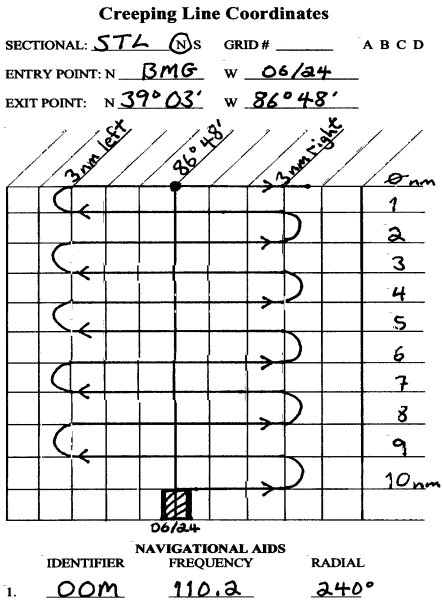


Figure 11-4b

Assume that the aircraft will be flying a creeping line for ten miles southwest along an (imaginary) extended runway centerline (06/24 at BMG), and it is desired to fly three miles to either side of the extended runway centerline with one-mile track spacing. Draw the pattern starting at the entry point (Runway 06, BMG); include track spacing (one nm) and make each leg extend three miles either side of the extended centerline. In the right column enter the distance from the waypoint for each leg, starting at ten miles and counting down. Enter the exit point's lat/long (N 39º 03´ W 86º 48´; ten miles southwest of the end of runway 06) in the GPS as a waypoint.

Enter the airport (BMG) as a destination and fly to it. Set the aircraft up at search altitude and airspeed three to five miles from the airport. Select the waypoint you created as your new destination.

When you fly over the end of Runway 06, zero (reset) the CDI display on the GPS. This sets up a *route* in the GPS that represents a direct line between the entry (end of runway 06) and exit points. The GPS should show ten miles to the destination, and the CDI will be centered.

Use the distance to the destination to establish and maintain one-mile track spacing; use the CDI deviation indication to indicate when you have gone three miles to either side of the line.

The pilot begins his first turn, for example to the right. By maintaining the distance from the destination constant (e.g., ten miles) the aircraft will be flying *almost* perpendicular to the extended runway centerline. Watch the CDI, which will begin showing that the aircraft is deviating from the intended route to the right. When the aircraft has deviated by almost three miles (the length of your right leg) the pilot will begin a turn to the left. The turn will be completed so that the aircraft will now be flying in the opposite direction at a distance of nine miles from the destination (the one-mile track spacing).

Now watch the CDI begin to return to center while maintaining a constant nine-mile distance from the destination. Continue as the CDI begins to deviate to

the left, and the next turn (to the right) will begin as you approach a three-mile deviation. Continue this pattern until you have completed your search.

Note: By using this technique you will actually be flying arcs instead of the usual squared (rectangular) legs. This is of little concern since the purpose is to cover the entire search area in a methodical manner.

This method is very handy when you are assigned a creeping line while airborne. It's easy to plan, set up and perform once you have mastered the technique.

You can also fly this pattern along a Victor airway. You can fly a similar pattern using the DME; it will be like flying a series of DME arcs.

This method can also be used along a winding river or a road, but the pilot must plan a line that roughly bisects the winding route and then vary the length of the legs as conditions warrant on the ground below.

GX-55

The creeping line is similar to the parallel line pattern, but the starting point is a selected waypoint rather than a grid. The pattern will straddle the center of your flight plan.

All the data you need set up this search pattern in the GX-55 is on the worksheet:

- Type of Grid and Sectional (US grid, STL).
- Type of pattern (Creeping Line).
- Starting Waypoint (the airport, BMG).
- Spacing (1 nm).
- Direction of Travel (the runway heading, 060º).
- Leg Length (3 nm *).
- Start Side (Right).

* 9.9 nm is the longest leg length you can select on the GX-55.

11.5 Expanding square search

The planner normally uses the expanding square search pattern when the search area is small (normally, areas less than 20 miles square), and the position of the survivors is known within close limits. This pattern begins at an initially reported position and expands outward in concentric squares. If error is expected in locating the reported position, or if the target were moving, the square pattern may be modified to an expanding rectangle with the longer legs running in the direction of the target's reported, or probable, movement.

If the results of the first square search of an area are negative, the search unit can use the same pattern to cover the area more thoroughly. The second search of the area should begin at the same point as the first search; however, the first leg of the second search is flown diagonally to the first leg of the first search. Consequently, the entire second search diagonally overlays the first one. The bold, unbroken line in Figure 11-5 illustrates the first search, while the dashed line represents the second search. Track spacing indicated in Figure 11-5 is "cumulative," showing the total width of the search pattern at a given point on that leg. Actual distance on a given leg from the preceding leg on the same side of the pattern is still only one "S," the value determined by the incident commander or planner.

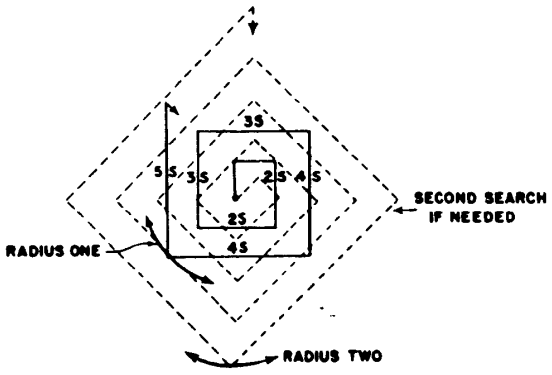


Figure 11-5

The GPS is used because this pattern requires precise navigation and is affected by wind drift. Even using the GPS, it is helpful to orient the expanding square pattern along the cardinal headings to reduce confusion during turns.

[Or, you can enter the pattern as a flight plan and it will direct your turns.]

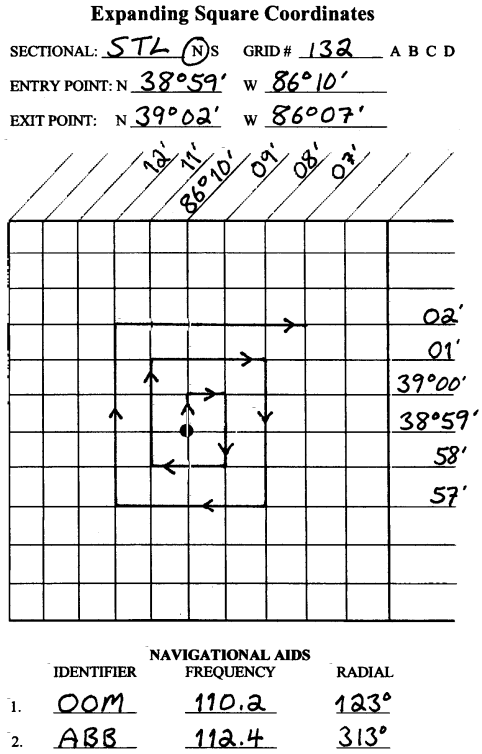


Figure 11-5a

Fill the worksheet (Figure 11-5a) with the lat/longs that describe the expanding square. Starting at the entry point (a 483´ AGL tower approximately eight nm west of Seymour), draw the square by going one mile north, then one mile east, then two miles south, and so on. You set it up this way because it is

best to fly the square by first flying due north and then making all subsequent turns to the right; right turns are used because they allow the observer and scanner(s) to see the ground during the turns. You use cardinal headings because they are easiest for the pilot to fly. Length and width of the pattern may be modified to suit the requirements and conditions of the individual search.

Enter the lat/long of the starting point (N 38º 59´ W 86º 10´) into the GPS and save it as a waypoint. Select the waypoint and fly to it, maneuvering to approach from the south at about three to five miles out. Set altitude and airspeed so the aircraft is stable and the pilot will be ready to concentrate on flying the pattern precisely. Fly the pattern using the heading indicator and continuously displayed latitude and longitude on the GPS.

Note: If the aircraft doesn't have an operable GPS the first leg should be flown directly into or directly with the wind. Every other leg will thus be affected by the wind in a relatively consistent manner.

GX-55

The expanding square will radiate from a starting waypoint according to the spacing between lines and at an angle selected by you.

All the data you need set up this search pattern in the GX-55 is on the worksheet:

- Type of Grid and Sectional (US grid, STL).
- Type of pattern (Expanding Square).
- Starting Waypoint (483´ AGL tower approximately eight nm west of Seymour, N 38º 59´ W 86º 10´).
- Spacing (1 nm).
- Direction of Travel (due north, 000º).

11.6 Sector search

The sector search is another visual search pattern that can be used after the approximate location of the target is known. This pattern should be planned on the ground because it involves multiple headings and precise leg lengths. The pilot will fly over the suspected location and out far enough to make a turn, fly a leg that is equal to the maximum track spacing, then turn back to fly over the point again. This pattern continues until the point has been crossed from all the angles as shown in Figure 11-6.

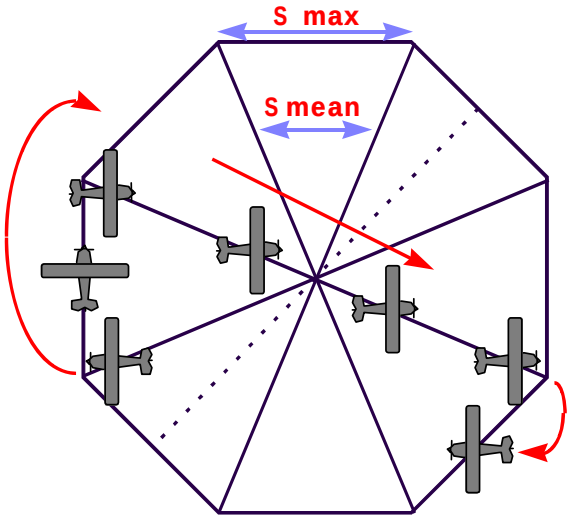


Figure 11-6

The sector search has several advantages:

- It provides concentrated coverage near the center of the search area
- It is easier to fly than the expanding square pattern
- It provides the opportunity to view the suspected area from many angles, so terrain and lighting problems can be minimized.

11.7 Contour search

As previously discussed, flying in mountainous terrain requires special training (i.e., *Mountain Fury*). This search pattern (Figure 11-7) is presented for information only, but it may be effectively used for hills and other similar terrain that is not considered high altitude terrain.

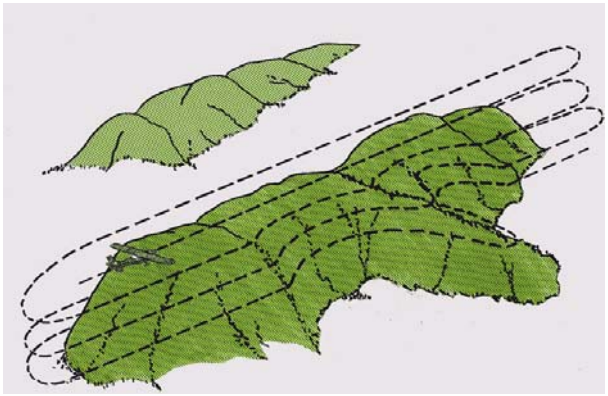


Figure 11-7

The contour search pattern is best adapted to searches over mountainous or hilly terrain. When using this pattern, the pilot initiates the search at the highest peak over the terrain. As in the case of mountains, the pilot flies the aircraft around the highest peak "tucked in" closely to the mountainside. As each contour

circuit is completed the pilot lowers the search altitude, usually by 500 feet. While descending to a lower altitude, the pilot turns the aircraft 360º in the direction opposite to the search pattern.

As you may have already gathered, the contour search pattern can be dangerous. The following must be keep in mind before and during a contour search:

- First and foremost, the pilot and crew must be qualified for mountain flying *and proficient*.
- The crew should be experienced in flying contour searches, well briefed on the mission procedures, and have accurate, large-scale maps indicating the contour lines of the terrain.
- Weather conditions should be good with respect to visibility.
- Wind gusts should be minimal to nonexistent.
- The search aircraft should be maneuverable with a steep climbing rate and capable of making small turning circles.
- The search should be started above the highest peak of the terrain.

Valleys and canyons also pose problems during contour searches. The search crew should highlight or mark all valleys on their maps that pose possible hazards to contour searching. If the search aircraft cannot turn around or climb out of a certain valley or canyon, the crew should mark the area and exercise extreme caution during the search. If required to fly down narrow canyons, fly down the canyon with the mouth always yielding a safe way out.

As an observer on a contour search mission you should keep an accurate record of the areas searched. Since some areas will be shrouded in fog or clouds, you will have to search those areas when weather conditions permit. One method of keeping records during contour searches is to shade searched areas on the map. The areas that you leave unshaded are the areas that you have not searched.

Valleys or canyons can also pose hazards during contour searches. If any crew member senses that further flight may put the search airplane in a situation where it can neither turn around nor climb out of a valley or canyon, the aircraft must not proceed any further. The crew should exercise extreme caution, mark the area on the chart, and report the problem to the planner or debriefing officer. If required to fly through canyons, fly *down* the canyon with the canyon mouth always yielding a safe way out.

The search crew should also highlight or mark all valleys on their maps that pose possible hazards to a contour search. Crewmembers must stay alert for wires and power lines that may cross a canyon or valley significantly above its floor. The observer will later report the hazards to the mission debriefer, so that he or she may brief other crews of the hazards.

11.8 Other SAR-related GPS Features

There is no substitute for thoroughly studying your GPS users guide. However, we will highlight some features of the GPS (both the old type and the GX-55) that are important to our missions (GX-55 SAR operations are covered in Attachment 2).

User guides can often be found on the manufacturer's web site. For example, the GX-55 user's guide is located at www.upsat.com/dwnlds/gxdoc/gx-user-r3a.pdf.

11.8.1 Display Current Position

Select the AUX (Auxiliary) page.

GX-55

From the NAV (Navigation) screen, turn the large knob until "GPS Position" is displayed. [Note: PDOP (Position Dilution of Precision) is also displayed, and it is based on the geometry of the satellites used in the position solution. A lower number is a better value than a large one; that is, a PDOP of 3 indicates a more reliable position fix than a value of 7.]

11.8.2 Create a User Waypoint

In the WPT (Waypoint) mode turn to "Add User Waypoint" and press ENT. Enter an identifier and press ENT, then enter the latitude and longitude and press ENT.

GX-55

From the DB (Database) screen, turn the large knob until "Create User Waypoint by Lat/Lon" is displayed and press ENTER. Use the large and small knobs to enter the desired latitude and longitude. [Note: the large knob moves the flashing cursor forwards or backwards; the small knob selects individual characters or numbers at the flashing cursor.] Press ENTER to accept and save the user waypoint (or you can press NAV to abort the procedure).

You can also create a user waypoint set to a US Grid coordinate, which allows you to fly directly to the corner of a grid or quadrant (or use it in a flight plan). From the DB screen, turn the large knob until "Create User Waypoint by US Grid" is displayed and press ENTER. Use the large and small knobs to enter the desired grid identifier. Press ENTER to accept and save the waypoint

11.8.3 Save Current Position as a User Waypoint

Press the HLD pushbutton captures present lat/long and stores it in the user waypoint memory under the name "HLDxx," where 'xx' is a number between 00 and 99. You can then rename the waypoint. [Note: Under some settings you must push the HLD pushbutton twice to store the waypoint.]

GX-55

From the DB (Database) screen, turn the large knob until "Create User Waypoint by Lat/Lon" is displayed and press ENTER. The position (lat/long) of the GPS at the moment you push ENTER is set as a user waypoint.

From the SAR Map page, pressing the "Mark" smart key saves present position and brings up the user waypoint screen; you can change the name and the Lat/Long using the large and small knobs. Pressing ENTER will save the waypoint. [The very first time this feature is used, the position is assigned a default number, "SAR000". Subsequent saves are automatically given sequential numbers (e.g., SAR001 and SAR002); they can be recalled, edited and deleted but not overwritten.]

11.8.4 Recall a User Waypoint

User waypoints can be recalled from the Navigation or Flight Plan modes. They can also be called up to compile a flight plan.

GX-55

From the DB (Database) screen, turn the large knob until the "Access Database" screen is displayed and press ENTER. Turn the small knob until USER is displayed, and then use the large and small knobs to enter characters of the user waypoint.

Chapter 12

12. Mission Pilot

OBJECTIVES:

1. State mission pilot duties and responsibilities.
2. Discuss safety matters related to mission activities.
3. Identify where to find the rules on transportation flights.
4. Discuss special precautions for flying missions at night.
5. Discuss special precautions for flying missions in IMC.
6. Discuss the special considerations for video imaging missions, and discuss the typical video imaging flight profile.
7. Discuss proficiency.
8. Discuss security and airspace restrictions.
9. Describe the three phases of an aircraft interception, your actions when intercepted, and discuss visual intercepting/intercepted signals.
10. Describe the types of items that should be kept in the aircraft mission kit.
11. Discuss aircraft paperwork, documents and minimum equipment, W&B fuel assumptions and reserve, loading and pre-start.
12. Discuss startup checks, leaning the engine, and taxi.
13. State the crosswind limitation, and discuss takeoff, climb and departure.
14. Discuss transit to the search area, in the search area, and departing the search area.
15. Discuss approach, descent and landing.
16. Discuss after-landing, shutdown and post-flight.
17. Discuss those items you can control to improve POD.
18. State the normal, assumed number of aircrew needed for a mission.
19. Discuss how you must alter normal search patterns if you only have one scanner onboard.
20. Discuss special considerations for flying search patterns.
21. Discuss "go/no go" decision-making.

12.1 Mission Pilot duties and responsibilities

The first and foremost duty of a mission pilot is to fly the aircraft in a safe and proficient manner, following all applicable FAA rules and regulations.

The second most important duty of a mission pilot is to remember that he or she is the pilot -- not a scanner. You are the Pilot-in-Command (PIC) and you must never forget that.

The mission pilot is responsible for incorporating Operational Risk Management and Crew Resource Management principles and practices into each mission. The pilot flight time and crew duty limitations must be followed.

In addition to the normal duties of PIC, mission pilots must also perform all the duties of the Observer if no qualified observer is on board (refer to 1.2).

The mission pilot is responsible for getting proper briefings and for planning the sortie. A good mission pilot always includes the observer during these activities. Remember, you may be the aircraft commander but you are not always the mission commander; an experienced observer should serve as mission commander whenever possible.

In addition to PIC duties, the mission pilot must:

- Adhere to WAC 468-200 requirements and restrictions.
- Thoroughly brief the crew before the flight.
- Thoroughly brief the crew on their responsibilities during all phases of the flight.
- Obtain a flight release.
- Enforce sterile cockpit rules.
- Fly search patterns as completely and precisely as possible. Report any deviations from the prescribed patterns during debriefing.
- Monitor the observer and ensure all events, sightings and reports are recorded and reported.
- Fill out all forms accurately, completely and legibly.

12.2 Safety

Emergency Services flying involves several unique aspects and practices that may impact safety.

12.2.1 Flying Into and Taxiing on Unfamiliar Airports

WSDOT missions require flying into small, non-towered and unlighted airports. The mission pilot needs to quickly obtain information about these airfields. Of particular importance:

- Runways. Determine length, width, markings and lighting. Is runway alignment compatible with predicted wind direction and strength? If not, what is your alternative?
- Taxiways. Are there any, or will you have to back taxi? Are the taxiways marked and/or lighted?

  If you will be arriving in low visibility conditions or at night, taxi SLOWLY and use a wing walker if necessary. If you can't see the turnoff to the taxiway or the taxiway itself -- STOP.
- Obstacles. Note all near the airport and its approaches.
- Services. Fuel and oil, phone, tie downs, and maintenance. Will they be open when you arrive? Is there a phone number to call after normal hours? If in doubt, call ahead -- most FBO's are glad to assist.
- Local NOTAMS.

WSDOT missions require flying into large, busy airports. Of particular importance:

- Airspace and obstacles. Review airspace layout and restrictions, and note all relevant frequencies (including ATIS, AWOS or ASOS).
- Taxiways. Make sure you have a taxiway diagram, and review it before you land. Brief the crew so they can assist you.
- Local NOTAMS.

WSDOT missions require taxiing around and near a large number of aircraft:

- Follow the taxi plan that is in the Operations Plan, if applicable.
- Follow all signals given by flight line personnel. However, use common sense as some of the flight line marshals may have little or no experience. If it looks too close -- STOP.

Pilot aids such as the *Airport/Facility Directory* or commercial products such as the *Flight Guide* (Airguide Publications, Inc.) are invaluable tools for the mission pilot. One should be carried in the aircraft at all times, and kept *current*. Also, several web sites (e.g., *AOPA*) have very detailed airport layouts available for downloading.

Another often-overlooked safety measure is reconnoitering the terrain around unfamiliar airports to determine your actions in the event the engine quits on takeoff. Get in the habit of flying a circuit around the airport upon arrival to look for emergency landing areas off the ends of each runway. Ask local pilots for the best actions to take if you lose an engine on takeoff (from each runway). Also, suggest that mission staff include this information in the general briefing, if necessary.

In a related matter, keeping the aircraft windows clean and having a well-stocked cleaning kit in the aircraft is vital. How many of you have arrived at the airport for a night flight and found that the last pilot had flown through a bug convention and neglected to clean the windscreen? And, as if this isn't enough of a delay in launching the mission, you can't find anything to clean the windscreen!

12.2.2 Fuel management

WSDOT missions often require flying long distances to mission bases, and the missions themselves involve flying several sorties a day. Mission aircrews often carry a lot of luggage and equipment. Missions are flown in widely varying weather conditions. Therefore mission pilots must carefully plan, check and manage their fuel.

Per WAC 468-200, the PIC is responsible for maintaining a sufficient fuel supply to ensure landing with one hour of fuel remaining (computed at normal POH/AFM cruise fuel consumption). If it becomes evident the aircraft will not have that amount of fuel at its intended destination, the PIC will divert the aircraft to an airport that will ensure the requirement is met.

- Weight & Balance computations *must* be accurate. Do you include the weight of the permanent equipment stowed in the aircraft? Do you change your W&B from the standard FAA 170 pounds when a crewmember that doesn't meet the Air Force weight standards shows up? Do you have a scale available at your headquarters to weigh luggage and equipment?
- If you do not fill the aircraft fuel tanks to the top or a tab, do you have a means to accurately determine fuel on board? Each aircraft that is routinely filled to a level less than full should have a calibrated fuel-measuring device on board. Remember that these devices are specific to the particular aircraft!
- Long cross-country flights, or a series of legs in a flight, or a series of mission sorties require careful planning. Make sure you note your assumptions (e.g., distance, power setting, and predicted wind direction and speed) so that you can compare them against actual conditions in flight.

  Brief your crew, especially the observer, on these assumptions so they can assist you in managing the fuel. The pilot or observer should ask about fuel status at least once an hour, or before departing on each leg or sortie. Are the winds as predicted, or are you facing a stronger-than-expected headwind? Is your power set at economy cruise, as you planned, or have you gone to full power because you're running late? Did the last leg take as long as you had planned, or did ATC put you in the north forty for 30 minutes for "traffic separation"?

How do you describe a pilot who stretches his fuel to save the 20-30 minutes it takes to land and refuel, or a pilot who lands and refuels just because she wasn't comfortable with her fuel situation? The first is an incompetent pilot who's willing to risk himself, his passengers and the aircraft for some perceived "macho" image of a daring pilot. The second is a WASAR Mission SAR/DR Pilot.

- If in doubt, *land and refuel!* Just in case, *land and refuel!*

12.2.3 Unfamiliar Aircraft Equipment

WASAR member aircraft are not equipped uniformly. If you are assigned to another aircraft than the one you usually fly, check the equipment.

- If you don't know how to set up and operate the aircraft's GPS, you won't be able to use it correctly; if you try to learn "on the fly" you will spend too much time with your head inside the aircraft instead of looking outside. The same reasoning applies to the Audio Panel, FM radio, and DF unit.
- Even something as simple as an unfamiliar NAVAID can affect safety. In most cases, just spending some time sitting in the aircraft and going over an unfamiliar Comm radio or transponder will suffice. But if you've never used an HSI before, this isn't the time to learn.
- What does the equipment in the baggage areas weigh? You need to know this for an accurate weight and balance.
- *Whatever you do, don't try to bluff your way through*. Tell someone and ask for assistance. Another pilot can help you, or mission staff may assign another pilot or experienced observer to your crew who knows how to operate the equipment.

12.2.4 Unfamiliar terrain and weather

WSDOT missions often require you to fly to a different part of the state, or to a different state altogether. While you will be flying the same type of search patterns and using many of the same techniques, the terrain may differ considerably from you local terrain. Different terrain often is accompanied by different weather patterns and conditions.

Mission staff will brief you on local conditions, and may even give you training specific to their area. But you need to arrive as prepared as possible. In particular, you need to ensure you have the proper clothing, equipment, and survival gear for both the terrain you are crossing and the terrain in which you will be operating. What is required for one area can differ considerably from what you need in another clime.

12.2.5 Trainees and inexperienced crewmembers

Aircrew members may be trainees, or simply inexperienced. You must take the time to ascertain the qualifications and experience level of any crewmember assigned to you.

- If a crewmember is a trainee, spend extra time on briefings and be very specific as to duties and responsibilities. If the trainee is a scanner, listen in on the observer's briefing to make sure he does the same. Make sure trainees understand that, while you will teach them as much and as often as possible, you (and the observer) have duties that must not be interfered with.
- Check each trainee's Air SAR Card.
- If a crewmember is newly qualified or has not flown in some time, make allowances. You may have to assume some of their normal duties (e.g., setting up and operating NAVAID’s or radios) in certain situations, so be

sure to brief them so there is no confusion. For example, you may brief that you will handle all ATC communications while in Class C airspace while the inexperienced observer will handle all other communications.

12.2.6 Low and/or slow

Mission search patterns often require you to fly below 1000 AGL and at speeds at or below 90 knots. Proficiency and planning are critical.

- Ensure that "low and slow" is an integral part of your proficiency program.
- Strictly enforce sterile cockpit rules under these conditions, and make sure your crew is briefed on all obstacles in the search area.
- Flying at low altitude often means losing radar and communications with ATC and mission base. Don't hesitate to climb back up to an altitude where you can make your "ops normal" reports.
- Maintain situational awareness and continually ask yourself, "If the engine quits now, where will I land?"
- WSDOT requires pilots to maintain a minimum of 500 feet above the ground, water during daylight hours and a minimum of 2000' AGL at night (except for takeoff/landing or when under ATC control). For SAR/DR reconnaissance, the pilot will maintain at least 800 AGL. Pilots may descend below the designated search altitude to attempt to positively identify the target (but never below 500 AGL); once the target has been identified the pilot will return to 800' AGL or higher.
- Minimum airspeed will be no lower than the aircraft's published best rate-of-climb speed (except for takeoff, landing, go-arounds, practice stalls, slow flight training and evaluation, and glider towing).
- Practice of in-flight emergency procedures and maneuvers will be conducted during daylight VMC at an altitude high enough to allow recovery from an inadvertent stall/spin entry and complete a recovery at no lower than 1500' AGL or the aircraft manufacturer, FAA approved training syllabi recommended altitude, whichever is higher. Simulated forced landings will be discontinued prior to descending below 500' AGL, unless you intend to land.

As PIC, the mission pilot must take current flight conditions into consideration (e.g., gross weight, turbulence, and terrain) and perhaps add a margin of safety to the assigned search altitude and airspeed. We don't need another aircraft to look for, so always put safety first. When you get back from your sortie you can debrief what you did and why, and the planner will factor that into the results and modify his or her plans accordingly.

12.3 Types of Flights

12.3.1 Night Flights

Typical sorties flown at night are transport sorties, route searches, and DF searches (it seems these are always flown at late at night). WSDOT regulations require pilots to maintain a minimum of 2000' AGL at night (except for takeoff/landing or when under ATC control). During night over-water missions, both front-seat crewmembers must be qualified mission pilots and both will be instrument qualified and current (the right-seat pilot need not be qualified in the specific aircraft).

As a minimum, the PIC should be night-current in the aircraft (category, class and type) you're going to fly and assure the required one-hour fuel reserve required by WAC 468-200. When performing night searches it is preferable to have an experienced crew accompanying the pilot to assist in situational awareness and search procedures. Pay particular attention to organizing the cabin.

Night time route searches will only be successful if the downed aircraft or missing person has the capability to signal the aircraft or if an ELT has been activated. Usually, ground team searches near the LKP or intended airport stand a better chance of success. No crewmember may use night vision devices during any flight operations.

The most important item when planning night sorties is the PIC. Flying at night requires more attention to preflight planning and preparation. In particular, a careful check of the weather is essential; probably the most significant problem that can occur at night is flying into weather you cannot see. Also, pay attention to the dew point spread as a predictor of fog. During the flight, maintain situational awareness and always know where you can land in an emergency.

Before you accept the mission, ask yourself a few questions:

- If all the night flying you have had in the last 90 days are your three takeoffs and landings, are you really proficient?
- How long has it been since you've done a night cross-country?
- How long has it been since you've done a night ELT search?
- If you are Instrument rated, how many approaches have you done at night lately?
- How familiar are you with the terrain and obstacles along the route?
- Since landing lights only fail at night, when was the last time you practiced landing without the landing light? Other nighttime emergencies?
- Have you included all your flashlights in the weight-and-balance?

Remember that confidence is gained by experience, so you should include night flying in your proficiency regimen. You should also include periodic DF training at night (see 12.2.5).

Nighttime Illusions

Many different illusions can be experienced in flight; some can lead to spatial disorientation while others can lead to landing errors. Illusions rank among the most common factors cited as contributing to fatal airplane accidents (e.g., JFK, Jr.). Various complex motions and forces and certain visual scenes encountered in flight can create illusions of motion and position. Spatial disorientation from these illusions can be prevented only by visual reference to reliable, fixed points on the ground or to flight instruments.

When you enter a bank too slowly to stimulate the motion-sensing system of the middle ear and then apply a correction to the bank, this can create the illusion of banking in the opposite direction. The disoriented pilot will roll the airplane back to its original dangerous attitude or, if level flight is maintained, will feel compelled to lean in the perceived vertical plane until this illusion subsides. This phenomenon is usually referred to as the "leans" and the following illusions fall under this category:

- ***Coriolis Illusion***. When you are in a prolonged constant-rate turn that has ceased stimulating the motion-sensing system and you make an abrupt head movement, this can create the illusion of rotation or movement on an entirely different axis. The disoriented pilot will maneuver the airplane into a dangerous attitude in an attempt to stop this illusion of rotation. This most overwhelming of all illusions may be prevented by not making sudden, extreme head movements, particularly while making prolonged constant-rate turns under IFR conditions (e.g., dropping you pen and quickly reaching down for it).
- ***Graveyard spin***. A proper recovery from a spin that has ceased stimulating the motion-sensing system can create the illusion of spinning in the opposite direction. The disoriented pilot will return the airplane to its original spin.
- ***Graveyard spiral***. An observed loss of altitude during a coordinated constant-rate turn that has ceased stimulating the motion-sensing system can create the illusion of being in a descent with the wings level. In this case, the disoriented pilot will pull back on the controls, tightening the spiral and increasing the normal load factor on the airplane.
- ***Inversion Illusion***. An abrupt change from climb to straight-and-level flight can create the illusion of tumbling backwards. The disoriented pilot will push the airplane abruptly into a nose low attitude, possibly intensifying this illusion.
- ***Elevator Illusion***. An abrupt upward vertical acceleration, usually caused by an updraft, can create the illusion of being in a climb. The disoriented pilot will push the airplane into a nose low attitude. [An abrupt downward vertical acceleration (downdraft) has the opposite effect.]
- ***False Horizon***. Sloping cloud formations, an obscured horizon, a dark scene spread with ground lights and stars, and certain geometric patterns of ground light can create illusions of not being aligned correctly with the horizon. The disoriented pilot will place the airplane in a dangerous attitude.

- ***Autokinesis*.** In the dark, a static light will appear to move about when stared at for many seconds. The disoriented pilot will lose control of the airplane in attempting to align it with the light. [At night, a bright light with no other lights around it is particularly disorienting.]

Various surface features and atmospheric conditions encountered during landing can create illusions of incorrect height above and distance away from the runway threshold. Landing errors from these illusions can be prevented by: anticipating them during approaches; aerial visual inspection of unfamiliar airports before landing (e.g., use a 'standard' pattern entry); using an electronic glide slope or visual approach slope indicator (VASI) system when available; and maintaining optimum proficiency in landing procedures. The following illusions apply to this category:

- ***Runway Width Illusion***. A narrower than usual runway can create the illusion that the airplane is at a higher altitude than it actually is. The pilot who does not recognize this illusion will tend to fly a lower approach, with the risk of striking objects along the approach path, or land short. [A wider than normal runway can have the opposite effect, with the risk of flaring high and landing hard or overshooting the runway.]
- ***Runway and Terrain Slopes Illusion***. An up-sloping runway, up-sloping terrain, or both, can create the illusion that the airplane is at a higher altitude than it actually is. The pilot who does not recognize this illusion will fly a lower approach. A down-slope can cause the opposite effect.
- ***Featureless Terrain Illusion***. An absence of ground features, as when landing over water, darkened areas and terrain made featureless by snow, can create the illusion that the airplane is at a higher altitude than it actually is. The pilot who does not recognize this illusion will tend to fly a lower approach. [The best remedy is to fly a 'standard' approach to landing.]
- ***Atmospheric Illusion***. Rain on the windshield can create an illusion of greater height, and a greater distance from the runway. The pilot who does not recognize this illusion will tend to fly a lower approach. Penetration of fog can create the illusion of pitching up. The pilot who does not recognize this illusion will steepen the approach, often quite abruptly.
- ***Ground Lighting Illusions***. Lights along a straight path, such as a road, and even lights on trains can be mistaken for runway and approach lights. Bright runway and approach lighting systems, especially where few lights illuminate the surrounding terrain, may create the illusion of less distance to the runway. The pilot who does not recognize this illusion will tend to fly a higher approach. Conversely, the pilot flying over terrain which has few lights to provide height cues may make a lower than normal approach.

12.3.2 IFR Flights

Sorties are very seldom flown in IMC. The most common reason for an IFR flight is to transport personnel to a search area or mission base.

However, it is possible to conduct a route search in IMC. If an aircraft was lost while on an IFR flight plan, a sortie may be launched along the same route with the hope of picking up an ELT signal. This approach may also be taken, with

careful planning and close coordination with ATC, for aircraft lost outside prescribed IFR routes.

It is also possible to DF in IMC, but this can be dangerous and is not to be undertaken lightly.

IFR flights will not depart unless the weather is at or above landing minimums at the departure airport.

In any case, a few extra precautions are in order:

- The PIC must meet FAA instrument flight proficiency requirements.
- The PIC should be proficient in instrument flight in the aircraft to be used.
- For any flight other than a simple IFR transportation flight, it is highly recommended that another current and proficient Instrument-rated pilot be in the right seat. *Never* fly a search alone in IMC.
- Never fly an instrument search when ground teams are appropriate and available for the search.

12.3.3 Video Imaging

More and more, we are performing aerial reconnaissance for our partner agencies. We primarily take still photos (digital and 35mm) and video (analog and digital), and may use Slow Scan video. The mission pilot must know how to fly these missions. As SAR missions decline and the phase-out of 121.5 MHz ELTs begins, video imaging will become one of WSDOT's most valuable assets.

Emergency response planners expect more timely information about developing situations. These planners recognize real-time and near real-time images as an invaluable tool.

Regardless of the type of video imaging mission, there are some basics that everyone involved in the mission need to know to ensure success. The following presents the extra essentials needed for a video mission briefing:

- Make sure each crewmember knows what the target is and what types of images are needed. For example, a sortie may require a digital still shot of the target area for orientation, followed by a recorded video to detail egress points.
- Ensure the target location is identified so that you can find it.
- Thoroughly brief the route to and from the target, and the flight patterns within the target area. Mark them on the appropriate sectional chart and maps (e.g., road or topographical).
- Ensure minimum altitudes are established, both for the routes to and from the target and in the target area.
- Ensure all communications frequencies are well understood. This is particularly important for Slow Scan sorties.
- Define the duties of the PIC and the photographer when in the target area. The photographer will actually be in command of the mission and will give directions to the pilot, but the PIC retains responsibility for the safe operation of the aircraft.
- Ensure video equipment batteries are fully charged and that extra batteries are available.

- Clean the aircraft windows. If the video will be shot from the front right seat (normal), remove the window latch screw and put it in a safe place.
- For Slow Scan sorties, make sure the equipment is secured and properly connected. Make a test transmission before you leave the ramp.

The customer sometimes defines video imaging flight profiles, but a typical profile is shown (Figure 12-1) and discussed below.

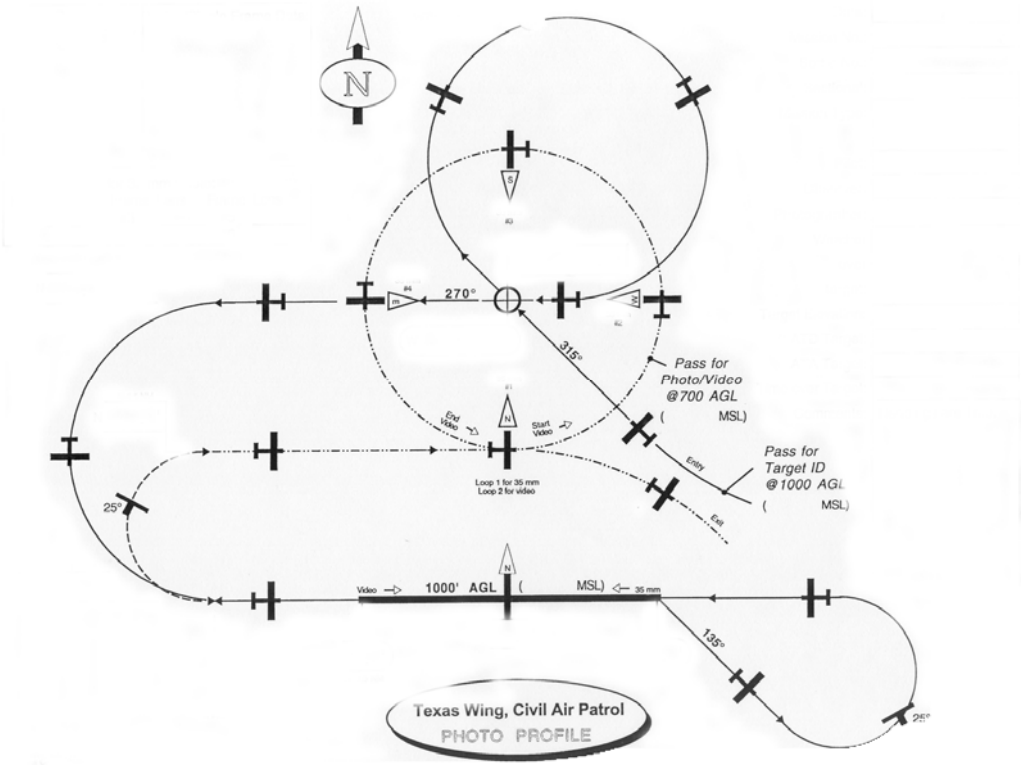


Figure 12-1

As the aircraft approaches the target the photographer should alert the pilot and prepare to begin photographing the target. You may need to over-fly the target first for positive identification. Assume the photographer is in the right front seat.

The first step is to take an identification photo, usually one mile south of the target from an altitude of 1000' AGL. The photographer will begin shooting as soon as the aircraft is established on this easterly route. If another pass is needed, the pilot will circle around to repeat the route.

Next the pilot will turn toward the target, descend to 500' AGL and establish a 1/2 nm circuit around the target. The photographer will be taking shots at the cardinal points of the circle, or continuously if using video. This circuit may be enlarged to fit the target area or if it is important to identify entrance and egress routes near the disaster area.

During slow-scan sorties it may be necessary to climb to a higher altitude to transmit each image.

NOTE: Never hesitate to make another pass or move to a better position if necessary to ensure the success of the sortie. Film (especially digital) is cheap

and flight time is expensive; it is better to make another pass or reposition the aircraft at the scene than it is to send another aircraft back to repeat the mission.

12.3.4 Proficiency Flights

Pilots are encouraged to maintain currency and proficiency by accomplishing a self-conducted proficiency flight at least once every 90 days

As the demands on the mission pilot increase, the need to maintain and improve your mission skills becomes more important. Besides the guidance given in the AIM, you should also practice:

- Search patterns. Use the GPS as your primary tool but also practice planning and flying the different patterns using VORs and pilotage.
- Night proficiency. Practice search patterns at night (particularly the ELT search).
- Landings with one brake failed.

As part of your cross-country proficiency, practice with the GPS:

- Maintain a constant track over ground.
- Select/display a destination: Airport, VOR and User Waypoint.
- Determine heading, time and distance to a waypoint.
- Save lat/long coordinates as a User Waypoint.
- Save your present position as a user waypoint.
- Enter and use flight plans.
- Exercise the nearest airport and nearest VOR features.
- Practice navigating with present position displayed (constant lat/long display).

Always try to take someone along with you on your proficiency flights. This will provide excellent practice for scanners and observers, helps improve CRM and teamwork, and makes the flights more enjoyable. [Remember, if you are going to be practicing instrument approaches you must use a safety pilot. It is also preferred to have one during your night practice, although a qualified non-pilot observer will serve just as well.]

12.4 Security Concerns and Airspace Restrictions

The September 11th terrorist attack brought about heightened security concerns and the potential for airspace restrictions.

12.4.1 Security

WSDOT resources should be considered security assets. In times of emergency you should take special security precautions to protect the aircraft and crew. Some examples are:

- Hangar the aircraft whenever possible. You may place small pieces of clear tape on fuel caps, the cowling and/or doors that will break if someone tampers with vital areas.
- Pay particular attention during preflight inspections. Look for signs of tampering and carefully inspect the fuel for contamination.
- Be aware of your surroundings at all times. If you see something or someone that is suspicious, don't ignore it. Report your suspicions to your supervisor and/or law enforcement.

12.4.2 Airspace Restrictions

The FAA may issue Temporary Flight Restrictions at any time, so it is vitally important to ask for FDC NOTAMs before each flight (and before each leg of a flight) and to monitor ATC for changes while in flight. TFRs were issued to establish enhanced Class B airspace, protect airspace around nuclear facilities, and protect airspace around large gatherings of people. [Note: A good review of operational restrictions can be found at www.aopa.org/asf.]

Even with TFRs lifted, you should not loiter around or circle critical facilities (e.g., nuclear power plants, large stadiums or gatherings, air shows, and dams or reservoirs). If you have to circle critical facilities (e.g., for planning or actual mission purposes) make sure you coordinate with the facility's manager and ATC.

Another development is the establishment of an Air Defense Identification Zone (ADIZ) over Washington, D.C. and vicinity during times of heightened alert. This tactic may spread, so review Section 6 of the AIM before flying into or near an ADIZ.

12.4.3 In-flight Intercept

If your aircraft accidentally approaches or encroaches restricted airspace military aircraft may intercept you; it is important to know how to respond. The following covers the important points; details can be found in AIM 5-6-2.

An intercept to identify your aircraft has three phases:

- Approach phase. A flight leader and wingman will coordinate their individual positions in conjunction with the ground-controlling agency.
- Identification phase. The intercepted aircraft should expect to visually acquire the lead interceptor and possibly the wingman during this phase. The wingman will assume a surveillance position while the flight leader approaches your aircraft. The flight leader will then initiate a gentle closure toward the your aircraft, stopping at a distance no closer than absolutely necessary to obtain the information needed. The interceptor aircraft will use every possible precaution to avoid startling you.
- Post-intercept phase. After you have been identified, the flight leader will turn away. The wingman will remain well clear and rejoin the leader.

If you are intercepted you should immediately:

- Follow the instructions given by the intercepting aircraft, interpreting and responding to the visual signals (see Table 12-1 below).
- Notify ATC if possible.

- Attempt to communicate with the intercepting aircraft and/or ATC on the emergency frequency 121.5 MHz, giving the identity and position of your aircraft and the nature of the flight.
- If equipped with a transponder, squawk 7700 unless otherwise instructed by ATC. If any instructions received by radio from any sources conflict with those given by the intercepting aircraft by visual or radio signals, request clarification while continuing to comply with the instructions given by the intercepting aircraft.

Table 12-1

Intercepting aircraft signal	Meaning	Intercepted aircraft response	Meaning
Rocks wings. After acknowledgement initiates a slow level turn, normally to the left, onto desired heading.	You have been intercepted. Follow me.	Rocks wings and follows.	I understand and will comply.
(At night, the pilot will also flash the navigational lights at irregular intervals.)		*(At night, the pilot will also flash the navigational lights at irregular intervals.)*	
Performs an abrupt breakaway maneuver consisting of a climbing 90º turn without crossing the intercepted aircraft's flight path.	You may proceed.	Rocks wings.	I understand and will comply.
Circles airport, lowers landing gear, and over-flies runway in the direction of landing.	Land at this airport.	Lowers landing gear, follows the intercepting aircraft and lands if the runway is considered safe.	I understand and will comply.
(At night, the pilot will also put the landing lights on.)		*(At night, the pilot will also put the landing lights on.)*	
Raises landing gear while flying over runway between 1,000' and 2,000', and continues to circle the airport.	This airport is inadequate.	If the intercepted aircraft is requested to go to an alternate airport, the intercepting aircraft raises its landing gear and uses the intercept procedures (listed above).	Understood, follow me.

(At night, the pilot of the intercepted aircraft will also flash landing lights while passing over the runway.)		To release the intercepted aircraft, the intercepting aircraft will perform the breakaway maneuver listed above.	Understood, you may proceed.
The pilot switches on and off all available lights at regular intervals.	Cannot comply.	Performs the breakaway maneuver listed above.	Understood.
The pilot switches on and off all available lights at irregular intervals.	In distress.	Performs the breakaway maneuver listed above.	Understood.

12.5 Phases of Flight

We will now look at the various phases of flight from a mission pilot's point of view. In all cases, follow the Aircraft Checklists: the observer should read each item to you, and then you will perform the item and repeat back performance of the item (challenge-response method).

Before we start, lets look at one of the most overlooked assets you have in the aircraft -- the glove box. This area is ideal for items such as small, laminated sheets for the crew and passenger briefing, crosswind chart, public relations cards (like those from the CD program), FM radio frequencies and call signs, ELT deactivation stickers, and a GPS cheat-sheet. Other items could include a small cleaning rag (like for glasses) to clean the GPS display and a backup flashlight. Check the glove box periodically and purge unnecessary stuff.

Besides the items in the glove box, each crew should carry aids (e.g., the Flight Guide) for infrequent or important evolutions such as emergency signals, air-to-ground signals, and intercept procedures.

Note: Many of these items are repeated in Chapter 13 for the benefit of scanners and observers (CRM). An abbreviated mission checklist is provided in Attachment 2, *Flight Guide*.

12.5.1 Preflight

Perform a Weight & Balance and determine fuel assumptions and reserve. Verify any outstanding discrepancies during your aircraft preflight. If new discrepancies are discovered, log them and ensure the aircraft is still airworthy and mission ready.

Documents and Minimum Equipment

The following are taken from FAR 91 Subpart C (Minimum Operable Equipment).

Certificates and Documents

- Airworthiness certificate
- Registration certificate
- Operating limitations (placards and instrument markings)
- Check all passengers' credentials before you obtain the flight release.

Minimum operable equipment, VFR Day:

- Airspeed indicator
- Altimeter
- Magnetic direction indicator
- Tachometer
- Oil pressure gauge
- Oil temperature gauge
- Manifold pressure gauge
- Fuel gauge for each fuel tank
- Landing gear position indicator
- Aviation red or white anti-collision light system (aircraft certificated after March 11, 1996)
- Safety belt for each occupant
- Shoulder harness for each front seat (aircraft certificated after July 18, 1978)
- Shoulder harness for each seat (aircraft certificated after December 12, 1986)
- ELT

***Minimum operable equipment, VFR Night*:**

- All required for VFR Day
- Position lights (i.e., red, green and white steady-burning lights)
- Aviation red or white anti-collision light system (e.g., flashing or rotating lights)
- An adequate source of electrical energy for all installed electrical and radio equipment
- One spare set of fuses, or three separate fuses of each kind required, that are accessible to the pilot in flight.

***Minimum operable equipment, IFR*:**

- All required for VFR Day and/or Night, as applicable
- 2-way radio Comm system and navigational equipment appropriate to the ground facilities to be used.
- Sensitive altimeter adjustable for barometric pressure
- Clock displaying hours, minutes and seconds with a sweep-second pointer or digital presentation.
- Generator or alternator of adequate capacity
- Slip-skid indicator

- Gyroscopic rate-of-turn indicator
- Gyroscopic pitch and bank indicator (artificial horizon)
- Gyroscopic direction indicator (directional gyro or equivalent)

[In order to determine whether you can take off with inoperative instruments or equipment, refer to FAR 91.213.]

Review of the logbooks (mid-cycle oil change, 100 hour/Annual, 24-month transponder inspection, 24-month pitot-static system inspection, 24-month altimeter calibration, ELT inspection and battery replacement date, 30-day VOR check, AD compliance list)

Weight & Balance data

Fire extinguisher

Carbon monoxide detector (12- to 18-month disposable)

Cargo tie-down or cargo net (recommended)

Chocks and tie-downs

Survival kit

Loading the Aircraft

During loading, ensure that all supplies and equipment correspond to what you used in your Weight & Balance.

Ensure your aeronautical charts are current and cover all assigned areas. Also ensure you have all necessary maps and gridded charts to carry out the mission, and that the crew has markers for their charts/maps and a clipboard to write on.

Ensure that the windshield and windows are clean, and that the chocks, tie-downs, and Pitot tube covers/engine plugs are stowed. If this will be a video imaging mission, remove the window holding screw and stow it in a safe location.

Check and test special equipment such as an airborne repeater, a camcorder or slow-scan gear (including the spare batteries).

Make sure the parking area is clear of obstacles; arrange for a wing-walker if one will be needed to clear obstacles.

Before Engine Start

Perform the passenger briefing and review the emergency egress procedure.

Brief the crew on your fuel management plan and assumptions, and assign responsibility for inquiring about fuel status once an hour.

Brief the crew on the taxi plan and taxiway diagram, and assign crew responsibilities for taxi. Go over the crew assignments for takeoff and departure and make sure each crewmember knows in which direction they should be looking during each.

Enter settings into GPS (e.g., destination or flight plan, entry and waypoints). Turning off all radios and navigation equipment separately before turning on the Avionics Master switch reduces the load on the battery sufficiently for you to program your settings into the GPS.

Once everyone is settled in, organize the cockpit and review the "Engine Fire on Start" procedure.

12.5.2 Engine Startup and Taxi

Always use the checklists in aircraft. Whenever possible, have the right-seat crewmember read the checklist items to you while you check the items and repeat back accomplishment of each item (i.e., the challenge-response method).

Make sure you or the right-seat crewmember keeps the checklist close at hand so that it can quickly be opened to confirm and complete emergency items. Brief the right-seat crewmember on how to use the emergency checklists (e.g., read the bold face items first and then continue with the rest of the items when directed).

All crewmembers must wear their seat belts at all times. All crewmembers should wear their shoulder harness at all times unless other duties require their removal (e.g., observer taking photos).

Place the Rotating Beacon Switch in the 'ON' position and signal the Marshaller before starting the engine.

Startup

Be sure and include the DF unit's Alarm light self-test in your scan during startup. The light should blink for several seconds; if it doesn't your unit may be inoperative.

For the typical Cessna, lean the engine immediately after starting when density altitude is >3000' DA (lean to rough and then richen two or three turns).

Ensure that the DF and FM Radio are properly set. If this is the first flight of the day, perform an FM radio check with mission base. Select initial VOR radial(s) and GPS setting (destination or flight plan, entry point or waypoint).

Obtain ATIS and Clearance (read back all clearances and hold-short instructions). Then verify you are within the Crosswind Limitation. For VFR in Class G airspace, you must have 3 statute miles visibility (unless you are current IFR; if this is an IFR flight, verify weather is at or above landing minimums and check that a VOR check was performed within the last 30 days).

Signal the Marshaller before you begin to taxi (turn on Pulselite or flash taxi/landing light). Remember to check your brakes as you begin your roll.

Taxi

Collision avoidance! Investigations reveal that pilots are: straying from designated taxi routes, not allowing adequate clearance, not considering the tail and wings during turns, taxiing too fast for conditions, taxiing with obscured visibility, distracted by cockpit duties, and not using other crewmembers to ensure clearance.

Once you begin taxiing *the sterile cockpit rules begin; all unnecessary talk is suspended and collision avoidance becomes the priority of each crewmember.* Sterile cockpit rules focus each crewmember on the duties at hand, namely concentrating on looking outside the aircraft for obstacles and other aircraft. The

rules will *always* be used during the taxi, takeoff, departure, approach, and landing phases of flight; but the pilot or observer may declare these rules in effect whenever they are needed to minimize distractions.

Follow the Marshaller's directions, but remember they may be trainees (make sure their directions make sense and conform to the taxi plan).

Follow requirements for taxi operations (taxi no faster than a slow walk when within 10 feet of obstacles; and maintain at least 50' behind light single-engine aircraft, 100' behind small multi-engine and jet aircraft, and 500' behind heavies and taxiing helicopters). Remember to read back all clearances and hold-short instructions.

Remind the crew that midair collisions are most likely to occur in daylight VFR conditions within five miles of an airport at or below 3,000' AGL! This means that most midair collisions occur in the traffic pattern. Since the pilot has only one set of eyes, this (and aircraft design) leaves several 'blind spots' that the observer and scanner must cover -- particularly between your 4 and 8 o'clock positions.

When taxiing with a quartering headwind, the wing on the upwind side will tend to be lifted unless the upwind wing's aileron control is held in the UP position. The corresponding downward deflection of the downwind aileron produces a small amount of lift that further reduces the tendency of the upwind wing to rise. The elevator should be NEUTRAL.

When taxiing with a quartering tailwind, the wing affected by the wind and the tail will tend to be lifted. The elevator should be held in the DOWN position and the wing affected by the wind held in the DOWN direction (e.g., "dive" away from the wind). These positions reduce the tendency of the wind to get under the tail and the wing and to nose the airplane over.

During high density altitude conditions (e.g., >3000' DA) lean the engine for maximum power before takeoff.

12.5.3 Takeoff, Climb and Departure

Takeoff

Ensure you are within crosswind limits of the aircraft's POH

CROSSWIND CHART

WIND SPEED (Kts)	DEGREES OFF RUNWAY HEADING								
	10	20	30	40	50	60	70	80	90
8	1	3	4	5	6	7	8	8	8
9	2	3	4	6	7	8	8	9	9
10	2	3	5	6	8	9	9	10	10
11	2	4	5	7	8	10	10	11	11
12	2	4	6	8	9	10	11	12	12
13	2	4	6	8	10	11	12	13	13
14	2	5	7	9	11	12	13	14	14
15	3	5	7	10	11	13	14	15	15
16	3	5	8	10	12	14	15		
17	3	6	8	11	13	15			
18	3	6	9	12	14				
19	3	6	9	12	15				
20	3	7	10	13	15				
21	4	7	10	13					
22	4	8	11	14					
23	4	8	11	15					
24	4	8	12	15					
25	4	9	12						
26	5	9	13						

Figure 12-1

Always look for landing traffic before taking the active runway!

Log (time and Hobbs) and report "Wheels Up."

The FAA's "operation lights on" encourages pilots to keep aircraft lights on when operating within 10 miles of an airport, or wherever flocks of birds may be expected.

Climb

Make shallow S-turns and lift your wing before turns when climbing to increase your chances of spotting conflicting aircraft.

The most common engine leaning technique, especially for aircraft without an EGT gauge, is to lean until the engine just starts to run roughly, then richen until it is smooth again, then further richen 1 1/2 turns on the large knob. This is a good technique because it can be accomplished by hearing and feel, leaving the eyes free to look outside.

If an EGT gauge is available: For max continuous power, lean to peak EGT then richen 100 degrees rich-of-peak; for a reduced power (economy) setting, lean to peak EGT then richen 50 degrees rich-of-peak.

But guess what? The common technique (hearing and feel) will give almost the same setting as the EGT gauge. Try it sometime and compare the results.

Remember, in all cases the objective is to burn gas, not valves. Gas is cheaper than engine overhauls. Please take good care of our engines -- they keep us in the air.

Keep your emergency checklist close at hand and open to the Emergency Procedures section.

Departure

Collision avoidance! Maintain sterile cockpit until well clear of traffic and obstacles. Keep your crew apprised of conflicting aircraft and obstacles. Using flight following gives you another pair of 'eyes' to watch for traffic (but remember that ATC traffic advisories during flight following are given on a 'time-permitting' basis, and they can't see aircraft that don't have operating transponders).

When above 1000' AGL the crewmembers can remove their shoulder harnesses but it is best to leave them fastened unless it interferes with a task (e.g., video imaging sortie).

12.5.4 The Search Area

Transit

You can remove the sterile cockpit rules once clear of the approach/departure area (unless the airspace is still congested or multiple obstacles are present).

If no cruising altitude is assigned, avoid flying at 1,500', 2,000' and 2,500' AGL as these tend to be more crowded than other altitudes below 3,000' AGL. Also fly to the right or left of VORs, as the airspace over these can be busy (the same goes for approach fixes or holding points). When crossing military training routes, cross at a perpendicular angle to minimize the time you spend in the route. Also, if you spot one fighter aircraft look for the wingman -- they tend to travel in pairs.

Take this time to double-check the navigational settings that will be used in the search area, and review search area terrain and obstacles. Also review methods to reduce crew fatigue during the search or to combat high altitude effects.

Update in-flight weather and file PIREP's. You may also use this time to review in-flight emergency procedures with the crew.

Approaching the Search Area

Review search assignments and double-check radio, audio panel and navigational settings. Check navigational equipment against each other (detect abnormalities or failures).

Stabilize the aircraft at the assigned search heading, altitude and airspeed (not < Vy) at least two miles before you enter the search area.

Turn sufficient aircraft exterior lights on to maximize your visibility, so others can "see and avoid".

In the Search Area

Log (time and Hobbs) and report "In the Search Area."

Note any deviations from the assigned search parameters (e.g., altitude, direction, or areas omitted).

Perform hourly updates of the altimeter (closest source) and fuel assumptions. Report "Operations Normal" at assigned intervals.

Periodically check navigational equipment against each other to detect abnormalities or failures.

Limit the time you spend below 800' AGL (no lower than 500' AGL during daylight; maintain at least 2000' AGL during nighttime). Never let your airspeed

drop below Vy. Monitor yourself and your crew for fatigue or the effects of high altitude.

Departing the Search Area

Log (time and Hobbs) and report "Out of the Search Area."

Double-check your heading and altitude with what was assigned for transit to the next search area or return to base.

Reorganize the cockpit in preparation for landing.

12.5.5 Approach, Descent and Landing

Approach

Now is the time to obtain ATIS (or AWOS) and contact approach control. Review the taxi plan and airport taxi diagram with the crew, and make crew assignments for approach, landing and taxi. Make sure each crewmember knows in which direction they should be looking during each. *Remind the crew that midair collisions are most likely to occur in daylight VFR conditions within five miles of an airport* (especially non-towered airports) *at or below 3,000' AGL*! This means that most midair collisions occur in the traffic pattern, particularly on final approach. Since the pilot has only one set of eyes, this (and aircraft design) leaves several 'blind spots' that the observer and scanner must cover -- particularly between your 4 and 8 o'clock positions. *Sterile cockpit rules are now in effect*.

The FAA's "operation lights on" encourages pilots to keep aircraft lights on when operating within 10 miles of an airport. Use standard entry patterns when landing at non-towered airports, and broadcast your aircraft type and position frequently over Unicom/CTAF.

Read back all clearances and hold-short instructions.

Descent

Enhance collision avoidance by making shallow S-turns and lifting your wing before turns during descent to check for traffic.

Probably the most common error with leaning is forgetting to richen the fuel mixture during descents. There is a descent checklist, remember? And “Mixture Rich” is on the checklist. One more item during descent: don't shock-cool the engine! A well planned, partial power, mixture rich, cowl flaps closed descent is best.

Landing

Apply grease and depart the runway with dignity. [Note: It is recommended practice not to use the brakes during normal landings; a well-executed approach and landing allows you to roll out and taxi off the runway without the need for braking. Save the brakes for short-field landings and emergencies.]

Read back all clearances and hold-short instructions.

Defer the after-landing check until the airplane is brought to a complete stop clear of the active runway (minimizes distractions). [Note: An exception to this

rule is when the manufacture recommends otherwise, as when retracting flaps during a short-field landing to improve braking.]

Taxi back per the taxi plan and look for Marshaller's (remember they may be trainees, so make sure their directions make sense and conform to the taxi plan). Upon engine shutdown you may have to show the Marshaller the aircraft keys to let them know its safe to approach the aircraft and install chocks. Once the chocks are installed, release the Parking Brake.

12.5.6 After Landing, Shutdown and Post-flight

Fill in all remaining information on the aircraft flight log. Double-check entries for mission symbol, mission number, crew names, and FRO name.

Enter any new problems into the Discrepancy log. If an item needs to be entered, make a clear and complete entry. Record any information pertinent to the discrepancy that would help a technician to duplicate the problem (this aids in troubleshooting); feel free to speculate on the cause. If it is *clearly* a danger to further flight, call the aircraft custodian and have the aircraft grounded.

It this was the last flight of the day install chocks, tie-downs, Avionics/control lock, and Pitot tube covers/engine plugs. [Note: Tie-down chains shall not be used directly from aircraft mooring points to an anchor point because of excessive impact loads on wing spars.

Check that the Master Switch and Parking Brake is OFF (leaving the parking brake on for more than one hour may cause damage to the braking system; it also makes it impossible to tow the aircraft) and that the Fuel Selector Switch is in the 'Right' or 'Left' position for refueling. Remove any trash and personal or special equipment from the aircraft (be sure to check any borrowed equipment in with logistics). Lock the aircraft windows, doors and baggage compartment.

Check the general condition of the aircraft, check the oil, and refuel. Clean the leading edges and the windshield and windows and replenish cleaning supplies, if necessary.

12.6 The Mission Pilot and POD

We discussed in Chapter 9 how the mission staff estimates the Probability of Detection (POD). Lets look at some factors affecting POD that you can control:

- Ask questions during briefings to ensure you *really* understand your assignment.
- Take the time to plan the flight thoroughly and make sure you are prepared to fly it before leaving mission base. This knowledge enables you to concentrate on the mission and "stay ahead of the aircraft," thus increasing search effectiveness.
- Maintain optimum altitude and airspeed. If you have to decrease power on a southbound leg and increase power when you turn northbound in order to maintain a constant 90 knots, then do it.
- Accuracy of navigation: Use the GPS! However, you should be ready to complete the search using other navigational methods should the GPS fail.

- Avoid turbulence whenever possible, avoid steep or abrupt turns, and ensure the mission commander is scheduling breaks and monitoring the scanners (and yourself) for fatigue or dehydration.
- Give a thorough debriefing and be brutally honest about your effectiveness.
- Stay proficient in your flying skills. Flying the aircraft and operating its equipment should be second nature, leaving you free to concentrate on accomplishing mission objectives safely.

12.7 Flying the Mission

Before missions are launched, the briefing officer provides you with information designating the routes to and from the search area, and the types of search patterns to be used upon entering the search area. Your planning should involve the observer, as they are familiar with each type of search pattern and can assist you in planning and navigation. While the observer should be scanning while you fly the pattern, they can assist you if things become confused (hey, it can happen). The mechanics of planning and executing search patterns are covered in Chapters 10 and 11.

12.7.1 Number of Scanners on board

Search planning, probability of detection, and search pattern effectiveness depends upon some underlying assumptions; the most important as far as the aircrew is concerned is the *assumption that there is one crewmember dedicated to scanning out the right side of the aircraft and another on the left side*.

Since the majority of WASAR aircraft are Cessna's that only carry three crewmembers, we will assume that the crew consists of a pilot, an observer in the right front seat, and a single scanner in the rear seat. We assume that the observer will be scanning out the right side of the aircraft while the scanner covers the left side. If a larger aircraft is used there may be two scanners in the rear seat; this will allow the observer to spend more time assisting you without seriously decreasing search effectiveness.

Mission pilots must remember that they are *not* scanners. A mission pilot who tries to fly the aircraft and scan the search area at the same time is doing neither job effectively or safely. The mission pilot is responsible for placing the scanners' eyes over the search area so they can do their job; your job is to fly the pattern precisely and effectively and for ensuring the safety of the aircraft.

Planning and executing a search pattern *with only one scanner on board* is different from one where you have two scanners. You will only be able to scan out one side of the aircraft (usually the right side); this means that you must keep the right side of the aircraft towards the search area at all times, which can have a significant effect on search time and aircraft hours. For example, single-scanner sorties would require careful planning and flying for a grid search since you will have to modify your leg entries/tracks to ensure the scanner scans the entire gird (no inverted flight, please).

Additionally, this cannot help but decrease search effectiveness due to fact that you lose the "double coverage" or overlap you get with two scanners looking out opposite sides of the aircraft. Scanner fatigue also becomes more of a factor, and search times need to be reduced to account for this.

For these reasons, performing parallel track or creeping line searches with a single scanner is not recommended. Likewise, searching any but open/flat terrain with a single scanner significantly reduces your chances of success.

12.7.2 Flying a search pattern

The mission pilot's contribution to a successful search is his ability to fly the search pattern precisely while maintaining altitude and airspeed. This must be done while performing the duties of a Pilot-in-Command; in the search area the most important of these duties is to "see and avoid" obstacles and other aircraft.

Another special consideration in flying search patterns is the possibility of engine trouble or failure at low altitude. The mission pilot must always be aware of where she is, the wind direction, the nature of the terrain, and where she will land if the engine fails *now*. This also underscores the importance of a thorough preflight inspection.

Like the rest of the aircrew, the mission pilot must continuously and honestly critique her performance during the sortie. If you're not set up properly when you enter the search area, exit and start again. If you are off by half a mile on a leg, fly the leg again. If winds and/or turbulence caused you to fly the legs erratically, emphasize this during the debriefing.

12.7.3 To Go or Not to Go

The Incident Commander has authorized your flight, you have obtained a proper briefing and flight release, you have filed your flight plan, you have completed a thorough preflight of the aircraft, and your crew is briefed and ready to go. *A Mission Pilot may accomplish all of this and still not be safe to fly the mission*.

How can this be? All of the regulations and safety precautions have been followed to the letter. You have been extensively trained and have demonstrated proficiency by successfully completing a Form 91 check ride.

It all comes down to the individual pilot and the circumstances. How long has it been since you've taken off in a 14-knot crosswind? Have you ever taken off or landed on an icy runway? When is the last time you've flown cross-country at night? You're signed off for instrument privileges, but how long has it been since you've flown in actual IMC?

Pilots, by their nature, are confident in their abilities. Sometimes over-confident. Mix in overconfidence, unusual circumstances, and the need to put all those hours of training to the test. Now add the desire to help others who are in immediate danger and you have all the ingredients for a dangerous situation.

The most effective way to break this potential accident chain is for Mission Pilots to be brutally honest about their abilities under the present conditions. Mission Pilots (as Pilot-in-Command) must have enough courage and integrity to decline a mission that they don't feel *comfortable* doing.

- You're transporting a K-9 team to another airport. You are instrument qualified and current. Weather at the destination airport is above the published minimums. However, the ceiling and visibility at the destination airport are below your *personal* minimums. Do you go or not?
- You've been assigned a nighttime route search for an overdue aircraft. It's been 91 days since you've done three takeoffs and landings to a full stop at night. Do you go or not?
- You've been assigned a nighttime ELT search. Your crew consists of a newly qualified, non-pilot Mission Scanner. The DF is inoperable, so you will be using the wing null procedure to locate the ELT. PIREP'S are reporting moderate turbulence in the search area, and clouds are reported as 3000 overcast. The last time you practiced the wing null procedure was during your Form 91 checkride thirteen months ago. Do you go or not?
- You are the only qualified Mission Pilot available for an ELT search. You have an experienced crew and the aircraft and instruments are in perfect condition. The weather is CAVU. However, you have just started taking a prescription allergy medicine (no one, not even your FAA physician, knows this). Do you go or not?
- A large mission is underway to search for a missing aircraft. The search area is heavily forested with no landmarks. You have been assigned to fly a quarter-grid. There will be aircraft in each of the quarter-grids surrounding yours. It's been over five months since you have practiced flying with the GPS. Do you go or not?
- A mission is underway and you have every reason to believe the victims are alive. You are tracking the ELT signal when you begin to observe the overcast becoming lower and lower. Do you continue? If so, how will you set your "its time to execute a 180° turn" minimums?

These are just a few examples of the decisions that Mission Pilots may face. In each of these examples there is a high likelihood that nothing would stop you from going.

It is up to you to decline a mission that you don't feel comfortable with. You are responsible for the safety of yourself, your crew, and a valuable aircraft. It will not help the people in distress if you have an accident while searching for them.

So, just as it is important for SAR/DR crewmembers to be honest about what they see and don't see during a mission, it is vitally important that the Mission Pilot be very honest about their capabilities in a given situation. *No one, especially the crewmembers who depend upon you for their safety, will think less of you if you decline a particular mission for valid reasons*.

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Chapter

13

13. Step Through a Typical Mission

The purpose of this chapter is to walk and aircrew through the steps of a typical mission, starting when you leave home for mission base and ending when you arrive back home after the mission. Consider it a "mission checklist" and discussion

OBJECTIVES:

1. Discuss the items you should check before leaving on a mission:
   a. Personal and aircraft items.
   b. State the flight time and crew duty limitations.
   c. "IMSAFE" and the flight release.
   d. Preflight and loading.
   e. Departure.
2. Discuss the approach and landing, and your actions upon arrival at mission base including the general briefing.
3. Discuss the six steps of ORM and the four principles involved.
4. Discuss the aircrew briefing.
5. Describe the information contained in and how to fill out the front of the ICS 220A.
6. Discuss the items checked and actions taken before leaving on a sortie:
   a. Release and preparation.
   b. Preflight and departure.
   c. State when the "sterile cockpit" starts and ends.
7. Discuss duties during the sortie, including:
   a. Preparations prior to entering the search area.
   b. Required radio reports.
   c. State when the "sterile cockpit" starts and ends.
8. Discuss your actions upon arrival back at mission base.
9. Discuss the aircrew debriefing.
10. Discuss your actions upon arrival back home, including:
    a. What to do with the aircraft.
    b. What to do if you observe signs of post-traumatic stress.
    c. When the mission is officially over for you and your crew.

13.1 Leaving Home Base for Mission Base

What's the Rush?

Why do we go to so much trouble to train mission aircrew members and encourage members to spend the time it takes to stay proficient? The primary reason is that **time is such a critical factor in missing person or aircraft crash searches. You must treat every minute after you've been alerted as critical to the survival chances of the victims.**

Some statistics concerning aircraft crashes are informative (all percentages are approximate and times are average). Of the 29% who survive a crash, 81% will die if not located within 24 hours after the crash (94% within 48 hours). Of the 40% uninjured, 50% will die if not located within 24 hours after the crash; survival chances diminish rapidly after 72 hours. So, the time factor is a critical element in SAR.

The average time it takes for family, friends or authorities to notify AFRCC of a missing or overdue aircraft varies widely. If the pilot did not file any flight plan it averages 15.6 hours until AFRCC notification; if a VFR flight plan was filed the time goes down to 3.9 hours; its 1.1 hours if an IFR flight plan was filed. Next AFRCC has to notify WSDOT - Aviation and WASAR has to activate its resources and begin the search.

The average time from the aircraft's being reported missing to actually locating and recovering the victims are: 62.6 hours if no flight plan was filed; 18.2 hours with a VFR flight plan; and 11.5 hours with an IFR flight plan. [Remember these are average times, so 50% of the response times are faster while the other half is slower.]

What do all these statistics tell us? They tell us to *take each mission seriously,* and that we should *strive to do everything better, smarter, and faster!* Training, practice, and pre-planning help us accomplish these goals. [They also tell pilots to always file a flight plan!]

You should have a mission "ready" bag containing all your essential mission equipment. Inventory and re-stock it after each mission.

The urgency of events, coupled with a hasty call-out, may leave you and other crewmembers feeling rushed as you prepare to leave for a mission. This is where a good pre-mission checklist comes in handy. As a minimum, the crew should check for the following:

- Required credentials (the PIC is responsible for certifying the eligibility of any proposed passenger to the FRO prior to obtaining a flight release). This includes an FAA-approved photo ID card (e.g., state driver license)
- Personal supplies (e.g., civilian clothing, headset, charts, maps, plotter, log, checklists, drinking fluids and snacks) and survival equipment.
- Sufficient money for the trip (e.g., credit cards and some cash; it's a good idea to keep a $50 or $100 traveler's check in you kit, as some FBO's don't take credit cards especially late at night). Also, change for drink and food machines is good to have.
- Cell phone (including spare battery and charger).

- Current charts for the entire trip. [It is also a good idea to keep gridded sectionals in the aircraft. These sectionals should cover the areas you normally search, and should be labeled if they are not current (e.g., "Obsolete - For Training Purposes Only").]
- Maps for the mission area (e.g., road atlas and Topo), markers for the charts/maps and a clipboard to write on.

Also check the:

- Weight & Balance (reflecting the crew, special equipment and baggage).
- Status of the Carbon Monoxide Detector and Fire Extinguisher.
- Discrepancy Log and make sure the aircraft is airworthy and mission ready.
- Fuel assumptions (e.g., fuel burn, winds, power setting, and distance).
- Tie-downs, chocks, Pitot tube cover and engine plugs.
- Other equipment such as flashlights (including spare batteries), fuel tester (with screwdriver heads), binoculars, multi-tool and "sick sacks."
- Cleaning supplies.
- Survival kit (gear applicable to trip and mission area terrain).

Obtain a briefing (ask for FDC and Local NOTAMs) and file your FAA Flight Plan. Verify you'll meet flight time and duty limitations. An FAA Flight Plan shall be filed for all for cross-country flights of more than 50 nm, except those flights where an ICS 220A is required.

Form Approved OMB NO. 2120-0026

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION **FLIGHT PLAN**	(FAA USE ONLY) ☐ PILOT ☐ 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	CPF 4239		KTS		PROPOSED (Z)	ACTUAL (Z)	

8. ROUTE OF FLIGHT

9. DESTINATION (Name of airport and city)	10. EST. TIME ENROUTE		11. REMARKS N99545, CAP Flight 4239
	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) CLOSE VFR FLIGHT PLAN WITH _____FSS ON ARRIVAL

Figure 13-1

Also fill out your "Inbound" ICS 220A (covered later). After reviewing the "IMSAFE" checklist the PIC will get a release from a Flight Release Officer (FRO); leave a copy of the front of the form where the FRO can get to it, if necessary.

During the crew briefing, pay particular attention to fuel management, fuel reserve and refueling stops, Special Use Airspaces, FDC and Local NOTAMS, and refueling and destination airport airspace and runway/taxiway layout. The mission pilot should obtain flight following for the trip.

Preflight the Aircraft

During loading, ensure that all supplies and equipment correspond to what was used in the Weight & Balance. Ensure aeronautical charts are current and cover all assigned areas. Also ensure you have all necessary maps.

Ensure that the windshield and windows are clean, and that the chocks, tie-downs, and Pitot tube covers/engine plugs are stowed.

Check and test special equipment such as an airborne repeater, a camcorder or slow-scan gear (including the spare batteries). You don't want to arrive at mission base with important equipment inoperable.

Make sure the parking area is clear of obstacles; arrange for a wing-walker if one will be needed to clear obstacles.

Enter destination or flight plan settings into the GPS. Turning off all radios and navigation equipment separately before turning on the Avionics Master switch reduces the load on the battery sufficiently for you to program your settings into the GPS.

The mission pilot will perform the passenger briefing and review the emergency egress procedure. The pilot should also brief the crew on the fuel management plan and assumptions, and assign responsibility for inquiring about fuel status once an hour. Then the pilot will review the taxi plan and taxiway diagram, and assign crew responsibilities for taxi.

Once everyone is settled in, organize the cockpit and review the "Engine Fire on Start" procedure.

Departure

Always use the checklists in aircraft. Whenever possible, the observer reads the checklist items to the pilot, the pilot checks the item and repeats back accomplishment of the item (i.e., the challenge-response method). The checklist should remain close at hand so that it can quickly be opened to confirm and complete emergency items. The pilot should brief the observer on how to use the emergency checklists (e.g., read the bold face items first and then continue with the rest of the items when directed).

All crewmembers must wear their seat belts at all times. All crewmembers should wear their shoulder harness at all times unless other duties require their removal (e.g., observer taking photos).

The greatest concern during taxiing is collision avoidance. Investigations reveal that pilots are: straying from designated taxi routes, not allowing adequate clearance, not considering the tail and wings during turns, taxiing too fast for conditions, taxiing with obscured visibility, distracted by cockpit duties, and not using other crewmembers to ensure clearance.

Review requirements for ground and taxi operations (taxi no faster than a slow walk when within 10 feet of obstacles; and maintain at least 50' behind light single-engine aircraft, 100' behind small multi-engine and jet aircraft, and 500'

behind heavies and taxiing helicopters). Go over the crew assignments for taxi, takeoff and departure.

Go over the crew assignments for takeoff and departure and make sure each crewmember knows in which direction they should be looking during each. *Remind the crew that midair collisions are most likely to occur in daylight VFR conditions within five miles of an airport at or below 3,000' AGL*! This means that most midair collisions occur in or near the traffic pattern. Since the pilot has only one set of eyes, this (and aircraft design) leaves several 'blind spots' that the observer and scanner must cover -- particularly between your 4 and 8 o'clock positions.

Be sure and include the DF unit's Alarm light self-test in your scan during startup. The light should blink for several seconds; if it doesn't your unit may be inoperative. Also ensure that the DF, Audio Panel and FM radio are set up properly. If this is the first flight of the day, perform an FM radio check. Select your initial VOR radial(s) and GPS setting (e.g., destination or flight plan).

Obtain ATIS and Clearance (read back all clearances and hold-short instructions), and then verify the crosswind limitation. Set up the navigational instruments (e.g., VOR radials and GPS destination, entry points and waypoints).

Once you begin taxiing *the sterile cockpit rules begin; all unnecessary talk is suspended and collision avoidance becomes the priority of each crewmember.* Sterile cockpit rules focus each crewmember on the duties at hand, namely concentrating on looking outside the aircraft for obstacles and other aircraft. The rules will always be used during the taxi, takeoff, departure, approach, and landing phases of flight; but the pilot or observer may declare these rules in effect whenever they are needed to minimize distractions.

Keep the emergency checklist close at hand and open to the emergency procedure section.

At takeoff, start the Observer Log with the time and Hobbs for "Wheels Up." The FAA's "operation lights on" encourages pilots to keep aircraft lights on when operating within 10 miles of an airport, or wherever flocks of birds may be expected.

While departing the airport environs practice collision avoidance and maintain the sterile cockpit until well clear of traffic and obstacles. Use shallow S-turns and lift your wing before turns to check for traffic. The crew must keep each other appraised of conflicting aircraft and obstacles.

When above 1000' AGL the crewmembers can remove their shoulder harnesses, but it is best to leave them fastened unless it interferes with a task (e.g., video imaging sortie). Once clear of the approach/departure airspace the crew can relax the sterile cockpit rules.

13.2 Arrival at Mission Base

Approach and Landing

Obtain ATIS (or AWOS) as soon as possible before contacting approach control. You may be able to reach mission base on the FM radio; if so, report your ETA.

The pilot should review the taxi plan and airport taxi diagram with the crew, and make crew assignments for approach, landing and taxi. Make sure each crewmember knows in which direction they should be looking during each. *Remind the crew that midair collisions are most likely to occur in daylight VFR conditions within five miles of an airport at or below 3,000' AGL*! This means that most midair collisions occur in the traffic pattern, with over half occurring on final approach. Since the pilot has only one set of eyes, this (and aircraft design) leaves several 'blind spots' that the observer and scanner must cover -- particularly between your 4 and 8 o'clock positions.

Sterile cockpit rules are now in effect. Practice collision avoidance by turning the aircraft exterior lights on when within 10 miles of the airport. The pilot should use shallow S-turns and lift a wing before turns to check for traffic. Read back all clearances and hold-short instructions.

Defer the after-landing check until the airplane is brought to a complete stop clear of the active runway (minimizes distractions). Log and report "Wheels Down."

Arrival

As you taxi to parking, watch for Marshaller's and follow their directions. Signal the Marshaller when you have shut down the engine and taken the Ignition Switch to OFF, and they should then chock the aircraft. Once parked, secure the aircraft (i.e., tie-downs, chocks, avionics/control lock, Pitot cover and engine plugs installed, windows, doors and baggage door locked, fuel selector switch in 'Right' or 'Left,' and the Parking Brake OFF). Remove personal belongings and special equipment. Check the oil, arrange for refueling, and then clean the aircraft (particularly the windows

Next you must close your flight plans with the FAA and your FRO. Then you present your credentials and sign into the mission; make sure that you sign in personally, and that the aircraft is signed in as well. Complete and turn in your 'Inbound' ICS220 (keep a copy).

The mission staff will probably show you around mission base and inform you of transportation, lodging and meal arrangements. They will also tell you when to report for duty, normally by telling you when the general briefing will be held.

13.3 Operational Risk Management Overview

Operational Risk Management (ORM) is a practical way to accomplish the mission with the least possible risk. It is more than just common sense (although plain common sense is very important) and more than just a safety program. It can be used to identify and assess anything that might have a negative impact on a mission.

ORM is a method of getting the job done by identifying the areas that present the highest risk, then taking action to eliminate, reduce or control the risks. It can be very flexible and can take from a few seconds to a few hours or days.

ORM cannot be mandated, but it must become a part of the ES culture. We are willing to take educated (informed) risks, but we do not like to gamble. Therefore ORM should be embraced both by individual members and mission planners and supervisors.

The Air Force uses a six-step "building block" approach:

1. Identify the hazards.
2. Assess the risks.
3. Analyze risk control measures.
4. Make control decisions.
5. Implement risk controls.
6. Supervise and review.

13.3.1 ORM Principles

***Accept no unnecessary risks*.** Unnecessary risk comes without a commensurate return in terms of real benefits or available opportunities. All missions and our daily routines involve risk. The most logical choices for accomplishing a mission are those that meet all mission requirements with the minimum acceptable risk.

***Make risk decisions at the appropriate level*.** Making risk decisions at the appropriate level establishes clear accountability. Those accountable for the success or failure of the mission *must* be included in the risk decision process. The appropriate level for risk decisions is the one that can allocate the resources to reduce the risk or eliminate the hazard and implement controls. Levels include the incident commander, aircraft or mission commander, ground team leader, or individual responsible for executing the mission or task.

***Accept risk when the benefits outweigh the costs*.** All identified benefits should be compared to all identified costs. The process of weighing risks against opportunities and benefits helps to maximize unit capability. Even high-risk endeavors may be undertaken when there is clear knowledge that the sum of the benefits exceeds the sum of the costs. Balancing costs and benefits may be a subjective process and open to interpretation. Ultimately, the balance may have to be determined by the appropriate decision authority.

***Integrate ORM into practices, procedures and planning at all levels*.** Risks are more easily assessed and managed in the planning stages of an operation (this includes planning for a sortie). Integrating risk management into planning as early as possible provides the decision maker the greatest opportunity to apply ORM principles. Additionally, feedback (lessons learned) must be provided to benefit future missions/activities.

13.3.2 ORM and the Aircrew

There are many aspects of a typical mission or sortie (training or actual) that contain risks, and the aircrew needs to acknowledge those risks in order to eliminate or mitigate them. As you move through the steps of a typical mission, take time to look for the risks involved and think about the regulations, practices and procedures that are in place to eliminate or reduce the risks.

Each WASAR member is responsible to look for risks: at the local airport, in vehicles and aircraft used for WSDOT missions and activities, on flight lines, and at mission base. If you see a risk, don't ignore it! Take steps to eliminate or reduce the risks, and bring the risk (and your actions) to the attention of the person responsible.

The Pilot-in-Command has the ultimate authority and responsibility to deal with risks during flight operations. With this comes the responsibility to inform his or her crew of the risks involved in each flight, and to listen to and address crewmember's concerns about risks.

A powerful tool used to eliminate or reduce risks during a sortie is Crew Resource Management, discussed in Chapter 14. Also, an ORM Matrix can be used to determine levels of risks.

13.4 General Briefing

The urgency of events, especially at the beginning of a SAR mission, may lead to a sense of confusion about the process. There is a lot of person-to-person talk, and two-way radio chatter adds to the din. But instead of confusion, what you hear is everyone trying to “get the picture” - get the information they need to do their jobs in a short amount of time. It is a deliberate process.

Soon after sufficient data have been assembled and the mission base is functioning, there will be an initial general mission briefing that everyone must attend. The incident commander (or designee) introduces the staff and covers mission base and safety procedures. The IC then summarizes the situation, including a description of the search objective. A map may be displayed, and the areas to be searched (or the object or area to be assessed) will be outlined on the map.

Other items covered include current and forecast weather conditions (for scanners and observers, the current and predicted visibility is especially important), plans (e.g., safety, communications, flight line, and taxi), the location of status boards (for updates), and logistics and supply. The briefer should emphasize safety and the need to incorporate ORM in decision-making. You may be handed a sortie packet at this time, or the Briefing Officer may make assignments individually.

Thereafter, the general briefing is normally given each morning (or at the beginning of each operational period). Updates are given (or posted) regularly or after a significant development.

13.5 Aircrew Briefing

A detailed briefing will be given to each aircrew (and ground team) prior to each sortie. This will include all the information necessary to plan the sortie and complete the front of the ICS 220A (below). Additionally, the briefer should tell you about ground resources, where they will be, how to contact them, and when to contact them.

Depending on the circumstances, the mission pilot may receive the briefing or the entire aircrew may be briefed together. It is important that you pay attention and ask questions. In this briefing, there are no stupid questions.

Aircrew briefing kits should contain:

- ICS 220A, *Mission Flight Plan/Briefing*.
- WAC 468-200, *Conduct and Management of Emergency Air Operations*.
- Airport layout, taxi plan/procedures, emergency-landing areas.
- Appropriately gridded aeronautical sectional charts (should be prepared on a permanent basis).
- Current sectional charts must be used for navigation and obstruction clearance. These charts need not be gridded.
- Specialized briefing checklists (as applicable).

13.6 The Mission Flight Plan / Briefing Form

A mission flight plan and a sortie briefing form are required for each sortie flown by your aircrew. The front of the ICS220A (Figure 13-2) serves both purposes.

13.6.1 Mission Flight Plan

The top of the front of the ICS220A serves as the Mission Flight Plan. It lists details of your aircraft, your intended route of flight, anticipated flight time, fuel available versus fuel you intend to use (plus reserve), and souls on board -- all meant to let the mission staff know where you are going and when you should return and to facilitate rescue efforts in case of an emergency.

The mission pilot is responsible for planning and filling out the flight plan, and the observer should assist the pilot whenever possible. The scanner may observe the planning if there is room, but can be briefed separately after the planning is completed

Several important planning factors to consider are:

- Assigned Inbound/Outbound altitudes
- Once you have planned the route and have a time estimate, add some time to drop down and verify sightings (normally 15 minutes to descend to 500' AGL, circle, and return to 1000' AGL)
- If flying grids and no aircraft will be in the adjacent grids, plan your turns outside the grid for breaks
- Once you have your estimated time enroute, add in your fuel reserve and determine if you'll need a refueling stop

Since one of the primary purposes of this plan is to let mission staff know where your aircraft is going and when it will return, the "Route of Flight" is one of the most important blocks. The "Estimated Time Enroute" is also very important; if a sortie isn't back within **ten minuets** time past this estimated time of return, mission base will attempt to contact you and a search may be started.

Double-check your "Estimated Time Enroute" against your "Fuel Onboard." If the time enroute exceeds your fuel load *minus reserve* (e.g., a "round robin" sortie or extended sortie where you plan to refuel), ensure your "Route of Flight" thoroughly explains your intentions and lists your fuel stop.

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NOTE: *The two most common entries overlooked* when completing the flight plan are "*ATD*" (actual time of departure) and "*Actual LDG Time*."

13.6.2 Mission Briefing Form

The midsection of the ICS220A serves as the sortie briefing form. It lists mission objectives, describes the search area or route, defines terrain and ground cover, gives details of the search pattern to be used, lists hazards to flight, defines current and forecast weather (local and in the search area), and lists other mission details. Ensure you get enough information to fill out the ICS220A.

Be thorough and thoughtful as you fill out this form: it is very important. When complete, gather your marked-up charts and notes and review them for accuracy and legibility. Put them in your flight case so you won't forget them.

No doubt your aircrew will hold an informal group briefing as you complete this form. Crew resource management demands prior agreement on details of the search.

MISSION FLIGHT PLAN / BRIEFING FORM

Incident Name/Number:	Incident Base:	Date:	Sortie #

FLIGHT PLAN SECTION

Pilot:	Pilot Qualifications: ☐ Mountain
Observer:	☐ Night
Observer:	☐ AC Type
Observer:	☐ Instrument

Aircraft Equipment

☐ RADIO SAR	☐ TRANSPONDER
☐ RADIO CAP	☐ ADF
☐ RADIO Amateur	☐ MESSAGE DROPS
☐ GPS	☐ SIGNAL PANELS
☐ DIGITAL CAMERA	☐ SIGNAL FLARES
☐ VIDEO CAMERA	☐ FIRST AID KIT
☐ DIRECTION FINDER	☐ FIRE EXTINGUISHER
☐ IFR FLIGHT	☐ ELT
☐ VOR	☐ SURVIVAL KIT

Mission Kit? ☐	Weather? ☐	NOTAM's? ☐	Wt & Bal? ☐	MOA's? ☐	Airspace? ☐	Crew Rest? ☐

1. Flt Plan ☐ VFR ☐ IFR ☐ Mission	2. Acft ID:	3. Acft Type	4. TAS:	5. Depart. Point:	6. ETD:	7. Cruise Alt:	8. Time Enroute:

9. Route:

10. Dest:	11. ETA:	12. Remarks	13. Fuel on board:
14. Alternate:	15. Color Acft:	Crew Cell or Pager number:	

Current and Forecasted Weather:

BRIEFING SECTION

Mission objective:

Grid Assignment:

Base Frequencies: ☐123.1 ☐148.15 ☐155.16 ☐156.135	Air to Ground Frequencies: ☐ 123.1 ☐ 148.15 ☐ 148.125 ☐ 155.160	High Bird Frequencies: ☐123.1 ☐122.9 ☐ 122.75 ☐148.15
Base Call Sign:	Base Telephone#:	**Code Words: Find: Recall:**
Pilots Signature:	**Briefer Signature:**	**Ops Planner / FRO Signature:**

DEBRIEFING SECTION

Search Data

Search Visibility_____

Search Speed: _____KIAS

Track Spacing: _____ NM

Track Altitude: _____ AGL

Pattern used: _____

Weather in area:
_____

Terrain / Ground cover:
_____

GPS used: Yes / No

Diagram sightings and major landmarks

Sighting 1:
Lat:
_____N
Long:
_____W

Sighting 2:
Lat:
_____N
Long:
_____W

Sighting 3:
Lat:
_____N
Long:
_____W

Use Degrees, Mins, Decimal
(N47 29.50 / W122 34.06)
WGS 84 Datum

Flight Time	Takeoff:	IN Grid/Route/Area	OUT Grid/Route/Area	Landing:	Total:

Pilots Signature:	Debriefer's Signature:	Ops Planner Signature:

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Figure 13-2

13.7 Preparing to Leave on a Sortie

Once you have been briefed and the front of the ICS 220A is complete and signed by the mission pilot, the briefing officer will sign the ICS 220A and direct the pilot to air operations. Here, the chief or director will inform the crew of any changes and release the flight by signing the ICS 220A. Normally they keep the original and you take a copy with you.

Now is the time for final preparations for the flight. The mission commander will have you check your equipment and supplies (e.g., headset, charts, maps, plotter, log, checklists, camera, fluids and snacks) and review flight line rules and the taxi plan. The final visit to the restroom is made.

When more than one flight is accomplished by the same crew during the day, subsequent briefings are not required to be so detailed but must, at a minimum, highlight differences and changes from the original briefing.

If this is the first sortie of the day the observer will perform a radio check with mission base; you may also perform a DF functional check if this is an ELT search. Other special equipment should also be tested before the first sortie.

Enter sortie settings into the GPS (e.g., destination or flight plan, entry points and waypoints). Turning off all radios and navigation equipment separately before turning on the Avionics Master switch reduces the load on the battery sufficiently for you to program your settings into the GPS.

Startup and taxi were covered in 13.1. If there are flight line Marshaller's, they will expect you to turn on your rotating beacon and signal the impending engine start. You are also expected to signal before beginning to taxi (e.g., turn on your Pulse-lite or flash your taxi/landing light).

Takeoff, climb and departure were covered in 13.1.

13.8 During the Sortie

Once clear of the airport/controlled airspace environs the crew settles into the transit phase. Depending on circumstances (e.g., the airspace is still congested or multiple obstacles are present) the sterile cockpit rules are normally suspended at this time. *The aircrew maintains situational awareness at all times during the flight*.

Take this time to double-check the navigational settings that will be used in the search area, and review search area terrain and obstacles. Also review methods to reduce crew fatigue during the search or to combat high altitude effects.

Update in-flight weather and file PIREP's. Periodically check navigational equipment against each other to detect abnormalities or failures.

As you approach the search area, review search assignments and double-check radio, audio panel and navigational settings. Check navigational equipment against each other (detect abnormalities or failures).

The pilot should stabilize the aircraft at the assigned search heading; altitude and airspeed at least two miles before you enter the search area, and turn sufficient aircraft exterior lights on to maximize visibility (so others can "see and avoid").

When the aircraft enters its search area, the observer notes the time and the Hobbs reading and reports, "Entering the Search Area" to mission base. *At this time the observer's primary duty shifts to that of a scanner*.

If necessary, the observer provides periodic "Operations Normal" reports to mission base and/or high bird. The observer should also inquire about fuel status at least once an hour, which will prompt the pilot to think about fuel burn assumptions versus actual conditions. Update the altimeter hourly from the closest source.

During the actual search or assessment, the aircrew must be completely honest with each other concerning their own condition and other factors affecting search effectiveness. If you missed something, or think you saw something, say so. If you have a question, ask.

As PIC, the mission pilot must take current flight conditions into consideration (e.g., gross weight, turbulence, and terrain) and perhaps add a margin of safety to the assigned search altitude and airspeed. Log these deviations from the assigned search parameters; when you get back from your sortie you can debrief what you did and why.

If you spot the target, the most important thing to do is *notify mission base immediately*; the recovery must be started as soon as possible. Also remember to log all "negative result" sightings (e.g., a trash pile or abandoned car).

The observer should monitor the crew for fatigue or the effects of high altitude and schedule breaks as necessary. She should also ensure that all crewmembers drink plenty of fluids to prevent dehydration.

13.9 Return from the Sortie

When the aircraft completes its mission and leaves the search area, the observer notes the time and the Hobbs reading and reports "Leaving the search area" to mission base. Double-check your heading and altitude with what was assigned for transit to the next search area or return to base. Reorganize the cockpit in preparation for approach and landing. Perform the applicable steps for approach, landing and arrival (covered in section 13.2).

After a short break the crew will assemble to complete the ICS 220A and prepare for debriefing.

13.10 The Mission Debriefing Form

The bottom of the ICS 220A (Figure 13-2) contains your observations and comments regarding your search and your assessment of search effectiveness.

Most of the information required on the reverse of the debriefing form is self-explanatory and serves to emphasize the need to take good notes during the sortie (e.g., the observer log). The "Time of Day" section requires you to enter the

time you were in the search area; this helps debriefers and planners to determine if the weather or the sun's position affected search effectiveness. The "Flying Time" section requires you to insert transit time [(Enroute (to/from grid)], the time you spent actually searching or assessing [Search Time (in grid)], and the "Total" time. These times are easily determined if you noted your takeoff, in search area, out of search area, and landing times and Hobbs readings in your log. The total time should correspond to the Hobbs time that is recorded in your aircraft flight log (e.g., a Hobbs time of 2.4 corresponds to 2 hours and 24 minutes).

Two items are of utmost importance -- "Crew Comments about Effectiveness" and "Crew Remarks of SAR Effectiveness":

- The first involves a quantitative assessment (excellent, good, fair or poor) of how well you accomplished your mission. Factors affecting search visibility (e.g., visibility, lighting, and sun position) and the crew (e.g., turbulence, fatigue, and how well the pilot covered the area) must be considered. Planners take these comments into consideration when determining POD, so *it is vital that you give the mission staff your honest input*!
- The second gives the crew a chance to comment on the effectiveness of the sortie in general. Were north/south tracks appropriate, or would east/west be better? Was one-mile track spacing adequate, or was the terrain so broken that half-mile spacing would be better? Were you at the optimal search altitude? Did the terrain you were briefed to expect match what you saw? Was the sortie too long or too short, and should a rest break have been included in the flight planning? These are just a few of the things that aircrews can comment upon. Planners use this feedback to improve POD, so *it is vital that you give the mission staff your honest input*.

Finally, there is a large blank section labeled "NOTE" for you to insert drawings, sketches and other supporting information. If necessary, you can also use this space for additional comments. If you are attaching a drawing or other information to the ICS 220A, enter a comment such as "drawing attached." Be sure to label the attachment so it can be related to the ICS 220A if it accidentally becomes separated (e.g., mission and sortie number).

Finally, check that you entered your actual time of departure (ATD) and actual landing time on the front of the ICS 220A. Any drawings or markings made on charts or maps should be transferred onto the ICS 220A or attached to it. Make sure everything is clear and legible.

13.11 Aircrew Debriefing

During the briefing everything that is known about the mission was passed along to the air and ground teams. In the debriefing, the reverse is true. Each search team (air and ground) tells how it did its job and what it saw. This type of information is given in detail and is in the form of answers to specific questions asked by the debriefer. The information is then passed on the planning section for analysis, and the information may then be passed on, in turn, to departing search crews.

An aircrew or ground team cannot search and have "negative results". Even if the objective is not located, important information can be obtained, such as weather, turbulence, ground cover, and false clues.

The debriefer uses the information you filled in on the reverse side of the **ICS 220A** as a starting point for the debriefing. For example, more information on search area and weather conditions may be needed, and you should be ready to volunteer your observations. Perhaps you noticed an increase in cloud shadows. Perhaps visibility seemed to deteriorate because of the haze that developed after you arrived in the search area. Perhaps turbulence developed during the last one-third of your grid search. Any number of weather or personal factors could have changed during your sortie. To make the best contribution to the debriefing requires that you remember these changes and be prepared to tell the debriefer about them.

Did you make any changes to the planned search procedure? The debriefer's primary concern is to determine adequate search coverage. If, for example, you diverted frequently to examine clues, there is a good possibility that search coverage was not adequate and that another sorties is justified. If you become excessively tired and rested your eyes frequently, tell the debriefer. Everyone understands the degree of fatigue a scanner can experience. But, frequent rest-eye periods will reduce the level of good scanning coverage, and also could be justification for another sortie. Did the pilot decide to change search airspeed and/or altitude? If so, you must provide details to the debriefer.

What types of clues did you investigate? Perhaps a clue seemed to be insignificant and you decided not to pursue it. Describe any clues that were investigated and found to be false. This information becomes part of the briefing for other aircrews because it can keep them from pursuing the same false clues.

Debriefing results are provided to the operations staff and incident commander, periodically or whenever significant items are evident. At the end of each operational period, the incident commander and staff will review the debriefing forms to develop the complete search picture, compute probabilities of detection and cumulative POD, and then determine priorities and make plans for the next operational period.

When the debriefer is satisfied that pertinent information has been discussed and explained, you will be dismissed. Now what should you do? Obviously, you will need rest. If you are scheduled for another sortie, find someplace to rest. Close your eyes; you may even want to take a nap if there is time and a place to do so. Also, take in some refreshment to give you sufficient energy for the next sortie.

The mission will be closed when the search objective is located or when suspended by higher authority. At this time mission personnel will return home. If the search objective has not been found and the mission is suspended, it may be reopened if additional clues are received.

13.12 End of the Mission and the Return Home

If you will be flying more sorties, the process begins again. However, if the mission is complete (or suspended) you must prepare to depart the mission base and return to your home base.

It is important to realize that SAR personnel can experience post-traumatic stress. Look for signs of stress in yourself and in your team members. Specialized counselors are often available upon request to help your team members with their emotional needs.

Turn in any equipment that you may have been issued (make sure the person you give the equipment or supplies to marks the items as turned in). Make sure that you have settled all outstanding fuel, food and lodging bills. Ensure that you have all the records that you may need for local or personal reasons, such as fuel tickets (for the AD Form 108) and copies of your ICS220s (front & back).

The pilot will plan the trip home and file a FAA Flight Plan. You must complete an "Outbound" ICS 220A and obtain a flight release, either from the mission staff and/or your local FRO.

When you leave mission base it is important to maintain crew discipline. You may be tempted to "let your guard down" now that the mission is over, but this is a mistake. Crew duties should still be assigned and understood, and the sterile cockpit rules should still be enforced where appropriate.

When you arrive at home base, secure and fuel the aircraft, close your FAA Flight Plan, call your FRO (if appropriate), and complete the outbound ICS 220A. Make sure that you have removed all personal items from the aircraft. You should clean the aircraft (especially the windows) so that it will be ready for the next flight.

The only thing left to complete is the AD Form 108. Before dismissing the crew, the person responsible for filing for reimbursement must make sure they have all the information and paperwork they need.

Remember that the mission isn't over until all crewmembers have arrived at their own homes safely! Normally, the pilot is responsible for calling mission base with the time (Hobbs) from the outbound ICS 220A; this should not be done until he knows that everyone is home.

Finally, the crew should brief their crewmembers on the lessons learned from the mission at the next opportunity. This provides valuable information to your fellow aircrew members and is an excellent opportunity to get in some quality "hangar talk."

13.13 Conduct Local Drills and Exercises

As you have learned during this course, your ability to perform at a high level depends upon knowledge, skill and proficiency. Therefore, you must practice and then practice some more.

WSDOT – Aviation conducts several practice exercises each year, but any individual can usually only attend one or two of these. What can you do to maintain and improve your *mission* skills?

One answer is to stage un-funded drills and exercises at the district level. These can range in scope from a simple "table-top" exercise to a coordinated exercise involving two or three aircraft, a couple of ground teams, radio operators and a basic mission staff.

Another benefit to local drills and exercises is that *the training is concentrated*. By this we mean that you can quickly and easily design a lot of tasks into a single sortie, thus increasing efficiency and holding down costs. This allows you to minimize transit times and perform multiple tasks for several people in an hour's time.

For example, a simple practice beacon search allows an aircrew to DF to the beacon, coordinate with a ground (or urban DF) team to lead them to the beacon, and lets the ground team DF to the beacon. While the ground team is working, the aircrew can then practice other DF methods and and/or work on other tasks such as video imaging. Mission staff members also accomplish tasks, particularly radio operators, flight line personnel, safety officer, and planning and operations staff.

It is important to run these drills and exercises like you would an actual mission. Checks credentials and uniforms and use all required forms; this way, members maintain familiarity with required paperwork, regulations and procedures.

It is also important that trainers and evaluators are certified to sign off students.

It is important that you go through your district coordinator prior to the time you want to host a local exercise. WSDOT and District coordinators need to know you have plans for their resources and personnel, even if it's just to get it onto the training calendar. The first drill or exercise you host will be a learning experience, so plan for this and learn from your mistakes. After your have it down, invite others (you don't want to keep all the fun to yourselves)!

Intentionally blank

Chapter 14

14. Crew Resource Management

Many professional studies have proven that properly trained team members can collectively perform complex tasks better and make more accurate decisions than the single best performer on the team. Conversely, the untrained team's overall performance can be significantly worse than the performance of its weakest single member. This chapter will cover aspects and attitudes of teamwork and communication among team members.

Crew Resource Management (CRM) was developed by the airlines and later adopted by the U.S. Air Force. Over the years it has gone through several different names and stages. The airlines saw drops in incidents and better crew coordination saw better handling of potential emergencies. The Air Force has recognized this safety concept and over the past several years, aggressively started building programs to protect crewmembers and aircraft.

CRM has evolved to a concept in training and action to get all persons and agencies involved in aviation to help thwart possible accidents. Even now, as CRM is engrained in almost every aspect of aviation, it grows and evolves, becoming better as we make advances.

Unlike the airlines, where everyone in the cockpit is a rated pilot, WASAR has members in the plane who are not pilots. The Air Force is in a similar situation with their crews made up of pilots, engineers, navigators, and loadmasters.

Having scanners and observers who are also pilots is a different situation, as the pilots may want to compete over who is flying the aircraft. They *really* need to work together during flights.

It is essential that everyone in the aircraft feel free to speak up and provide input and ideas; even the crewmember that has only flown once may have the critical idea that could save an entire plane. But remember that the pilot is the final authority for safe operation of the aircraft and will make the final decision.

OBJECTIVES:

1. Discuss failures and the error chain.
2. Discuss situational awareness.
3. Discuss how to regain SA once lost.
4. Describe barriers to communication.
5. Define and discuss task saturation.
6. Discuss assignments and coordination of duties.

14.1 Statistics

CAP	1996	1997	1998	1999	2000
Aircraft accidents	9	5	6	3	1
Per 100,000 hours	7.79	4.16	4.76	2.34	0.94
Aircraft flight incidents	28	27	19	12	16
Aircraft ground incidents	7	8	3	6	8
Fatalities	7	2	3	2	0

While the overall aircraft accidents (as defined by dollar and injury loss) have decreased, the number of flight and ground incidents is up over last year.

Statistics only mean how they are interpreted. We use statistics to show us where we are having problems, which will hopefully help correct those problems. Where do we need to focus our attention? Lets look at some other statistics.

MISHAP	1998	1999	2000
Taxi	9	4	9
Ground	4	6	3
Landing	8	8	10
Other	4	3	2

Taxi mishaps are mishaps where a crewmember was in the aircraft and moving it under aircraft power. All of these are a result of colliding with something, or going off the paved surface into a ditch. Many occurred when more than one pilot was onboard. Here we need to have everyone looking outside whenever the aircraft is moving.

Ground mishaps were due to moving the aircraft with human power, such as pushing or pulling the aircraft in and out of the hangar. Five of these totals were a result of opening or closing a hangar door and hitting the aircraft. These could be avoided with basic situational awareness and teamwork. While moving aircraft by hand or under aircraft power in close proximity to any objects, use wing walkers.

Landing mishaps (constantly high numbers). Due to the phase of flight, these have a potential for great damages to aircraft and injury to personnel.

A critical concept that needs to be enhanced is that, if any crewmember sees a problem or doesn't like the landing situation, they need to call "GO-AROUND." The pilot should then immediately perform a go-around (unless a higher emergency exists). *Every crewmember, pilot or not, has the right and the responsibility to keep themselves alive*. Maybe the scanner in back notices that

the main tire is flat -- tell the pilot! Everyone MUST speak out, and the pilot MUST act on it.

Other mishaps. Two of these occurred when two separate crews flew the aircraft out of fuel and crashed. The others were mishaps that were caused in flight by stalling the aircraft for some reason, or reasons that have not been determined by the NTSB.

14.2 Failures and the Error Chain

Failures are those of parts and physical objects or how people have failed in their actions or products.

- Mechanical failures involve every possible type of mechanical, part, or environmental failure. Examples are aircraft parts, runway surfaces, lighting, radios, and ATC.
- Human failures occur when people fail to perform the required actions. When an aircraft part fails because the person making the part didn't do it right, that is a human factors failure. Other examples are failures on the part of the pilot, observer, scanner, and ATC.

Error Chain. A series of event links that, when all considered together, cause a mishap. *Should any one of the links be "broken" then the mishap will not occur*. Here is an example of an error chain:

- A mechanic does not properly fix aircraft instrumentation during annual,
- The pilot gets alerted to fly and, in a rush, gets a poor weather briefing,
- The crew misses indications of broken instrument during the preflight inspection,
- The pilot enters unexpected (to him) weather and transitions to instrument flying,
- Flight instruments give the pilot bad information and he begins to get disoriented,
- The disorientation leads to a stall and subsequent spin,
- The pilot is unable to recover from the spin and impacts the ground.

All of these are links in the chain. If any one of them could have been stopped or the link broken, the accident would not have happened. *It is up to everyone on a crew to recognize an accident link and break the chain.*

14.3 Situational Awareness

Simply put, situational awareness (SA) is "knowing what is going on around you at all times." SA is not restricted to just pilots -- everyone must exhibit SA at all times. Each crewmember must have their SA at peak levels while flying because it takes everyone's awareness to keep the plane safe in flight. Scanners and observers have their own unique positions and functions that require full attention, so their SA is essential to the safe operation of any WSDOT flight.

Examples of good SA attitudes are:

- Good mental health, where each crewmember is clear and focused.
- Good physical health. This includes fatigue, sickness, hydration, and stress factors.
- Attentiveness. Keep your attention on the task at hand.
- Inquisitiveness. Always asking questions, challenging ideas, and asking for input.

Examples of SA skills:

- Professional skills developed through training, practice and experience.
- Personal skills such as good communication skills. This is necessary to effectively get your point across, or receive valid input. Interpersonal skills such the basic courtesies factor greatly into how a crew will get along, and this will greatly impact crew effectiveness and performance.

To help prevent a loss of SA, use the IMSAFE guidelines. This checklist was developed for the FAA as a quick memory guide for aviators to run through and make self-determination as to their fitness to fly. If a crewmember says yes to any of these, they really shouldn't fly.

Situational awareness may be lost for many reasons. Five of the more common reasons are:

- Strength of an idea. Someone has an idea so strong and ingrained that they won't listen to anything else. They find it difficult to alter the idea, even with new or conflicting information. The antidote to this is to ask questions or revert to training.
- Hidden agenda. Someone has a personal agenda, but keeps it hidden. Fail to tell others of their intentions. The antidote is to be honest, and to express ideas and intentions.
- Complacency. Someone has done a certain task so often that they forget about the risk. "I've done this a hundred times," or "It won't happen to me." The antidote is to revert to training, and realize that even if you've done it a hundred times before, the one hundred and first can still hurt you.
- Accommodation. Repeated exposure to threats or stress situations will decrease alertness or awareness, which leads to a form of complacency.
- Sudden Loss of Judgment. Something quickly distracts a person and gets their full attention. Whatever they were doing or should be doing is now gone.

Symptoms of loss of SA vary, but a few are:

- Fixation.
- Ambiguity.
- Complacency.
- Euphoria.
- Confusion.
- Distraction.

- Overload.
- Improper performance of tasks or procedures.

Also, look for *hazardous attitudes*:

- Anti-authority (Don't tell me!). The antidote is to follow the rules.
- Impulsiveness (Do something NOW!). The antidote is to slow down and think first.
- Invulnerability (It won't happen to me!). The antidote is to realize that, yes, it can happen to me.
- Macho (**I** can do it!). The antidote is to realize that this attitude can hurt others beside you. This attitude can really be detrimental when there is an experience pilot in both the left and right seat! In this case, it is very important that the two pilots agree on who's flying the aircraft.
- Resignation (What's the use?). The antidote is to realize that you can make a difference, and to ask for help.
- Get There It-us (I've *got* to be home by 5!). Its better to be late than to be dead.

14.4 Overcoming Loss of SA

There are a number of standardized tools that can help improve CRM and overcome a loss of situational awareness. When a crew loses SA it is critical to reduce workload and threats:

- Suspend the mission. [Remember to "Aviate, Navigate and Communicate."]
- Get away from the ground and other obstacles (e.g., climb to a safe altitude).
- Establish a stable flight profile where you can safely analyze the situation.

Once we have lost situational awareness, or recognized the loss in another crewmember, how do we get it back? A few methods are to:

- Listen to your gut feelings. If it acts like an idiot and talks like an idiot, then its probably an idiot.
- ***Use terms like "Time Out" or "Abort" or "This is Stupid."*** Once terms like these are called, the pilot should terminate the task or maneuver, climb away from the ground if necessary, establish straight-and-level flight and then discuss the problem. [The term you use should be agreed upon before the flight.]

  A good example comes from a CAP training mission departing a controlled airport. As the aircraft was climbing out the scanner spotted traffic and said "Pilot, traffic at three o'clock." The pilot was talking to departure and replied "Quiet, I'm on the radio." The scanner repeated his sighting, and the pilot repeated his reply. The scanner shut up and the pilot finally saw the traffic.

What happened? The pilot ignored a serious safety input from a crewmember. His action alienated the scanner and established a climate not conducive to safety. [Coincidently, the scanner was a commercial pilot and USAF T-37 instructor with more flying experience than the rest of the crew combined.]

Be aware that lack of individual respect can cause alienation, which is a serious barrier to communication (see next section) and can shatter teamwork. If an individual is insulted or ignored when making comments they will shut down and stop working with the crew. When this happens the aircrew must solicit input in order to pull the alienated crewmember back into the mission.

- ***Keep the cockpit sterile*** -- keep talk to the minimum necessary for safety, particularly during taxi, takeoff, departure, low-level flying, approach, and landing. This helps remove distractions and keep everyone focused on the important things.

14.5 Barriers to Communication

This section is concerned with the human factors that may act as barriers to effective communication between team members, adversely affecting mission performance. Rank, gender, experience level, age, personality, and general attitudes can all cause barriers to communication. You may occasionally be hesitant to offer an idea for fear of looking foolish or inexperienced. You may also be tempted to disregard ideas that come from individuals that have a lower experience level. If you are committed to teamwork and good crew coordination, you must look through such emotions and try to constructively and sensitively adapt to each personality involved.

You can deal best with personalities by continually showing personal and professional respect and courtesy to your teammates. Criticism will only serve to build yet another barrier to good communication. Nothing breaks down a team effort faster than hostility and resentment. Always offer opinions or ideas respectfully and constructively. Instead of telling the pilot, "You're wrong," tell him what you *think* is wrong, such as "I think that new frequency was 127.5, not 127.9."

Personal factors, including individual proficiency and stress, may also create barriers to good communication. Skills and knowledge retention decrease over time, and that is why regular training is necessary. If you don't practice regularly, you very likely will spend a disproportionate amount of time on normal tasks, at the expense of communication and other tasks. FAA, commercial airlines, and the military services all require certain minimum levels of periodic training for the sole purpose of maintaining proficiency.

Stress can have a very significant, negative effect on cockpit communication. An individual's preoccupation with personal, family, or job-related problems distracts him or her from paying complete attention to mission tasks and communication, depending upon the level and source of stress. The flight itself, personalities of the individuals, distractions, flight conditions, and individual performance can all be sources of communication-limiting stress. When stress

reaches very high levels, it becomes an effective barrier to communication and job performance. Many fliers and medical specialists advocate refraining from flying or other complex tasks until the stress is removed.

In an emergency, there will likely be much more stress with which each crewmember must cope. Since very few emergencies result in immediate or rapid loss of an airplane, most experienced aviators recommend making a conscious effort to remain calm, taking the amount of time necessary to properly assess the situation, and only then taking the appropriate corrective action.

Part of your job is also to recognize when others are not communicating and not contributing to the collective decision-making process. Occasionally, other crewmembers may need to be actively brought back into the communication process. This can often be done with a simple "What do you think about that?" In a non-threatening way, this invites the teammate back into the communication circle, and, in most cases, he or she will rejoin the information loop.

14.6 Task Saturation

At times, crews or individual members may be confronted with too much information to manage, or too many tasks to accomplish in the available time. This condition is referred to as *task saturation*. This will most likely happen when a crewmember is confronted with a new or different situation such as an emergency, bad weather, or motion sickness. Preoccupation with the different situation may then lead to a condition of "tunnel vision," where the individual can lose track of many other important conditions. In an advanced state, comprehension is so far gone that partial or complete *situational awareness* is lost. When individuals are task saturated to this extent, communication and information flow usually ceases.

Everyone needs some workload to stay mentally active and alert. The amount of work that any member can handle is directly related to experience level. Each crewmember must try to keep his or her workload at an acceptable level. If you begin to feel overwhelmed by information or the sheer number of things to do, it's time to evaluate each task and do only those tasks that are most important. If you ever feel over-tasked, you have an obligation to tell the other crewmembers *before* becoming task-saturated and losing your situational awareness. If others know your performance is suffering, they may assume some of the workload, if they are able. Once the most important tasks are accomplished and as time permits, you can start to take back some of those tasks that were neglected earlier. Allocation of time and establishing priorities is known as *time management*.

Most people can recognize task saturation and understand how it can affect performance. However, you should also watch for these symptoms in other members of your crew and take over some of their responsibilities if you have the qualifications and can do so without placing your own duties at risk.

The pilot's job is to safely fly the aircraft, and you should be very concerned if he or she becomes task saturated, or spends an excessive amount of his time with tasks other than flying the airplane. No crewmember should ever allow the work management situation to deteriorate to such an extent as to adversely affect

the pilot's ability to continue to safely operate the aircraft. Many preventable accidents have resulted from crews' entire involvement in other areas or problems, while the airplane literally flew into the ground. If any crewmember suspects pilot task saturation to be the case, nonessential discussion should cease, and the crew as a whole should discontinue low-priority aspects of the job, and even return to the mission base if necessary.

14.7 Identification of Resources

External resources can be people, equipment, or simply information. Internal resources are primarily training and experience. Resources are needed for the successful accomplishment of the mission.

Each crewmember must be able to identify the resources available to him or her, determine where the resources can be located when needed, and effectively incorporate those resources into the mission.

14.8 Assignment and Coordination of Duties

All flight-related duties are conducted under the supervision of the aircraft commander. Mission-related duties may also be conducted under the supervision of the aircraft commander. The key is that positive delegation of monitoring duties is as important as positive delegation of flying duties.

As previously discussed, it is very important for each crewmember to know what they are supposed to be doing at all times and under all conditions. Aircraft safety duties vary with the start up, taxi, takeoff, departure, transit, approach and landing phases of flight. Mission duties are related to the mission objective, primarily to fly the aircraft safely and precisely (the pilot) and to scan effectively (scanners and observers).

Until recently, the study of crew coordination principles was limited to studying flight crew performance. However, over the last decade, the number of preventable operator-caused errors leading to accidents has caused both the military and commercial aviation communities to expand the study focus. Airline and military crew resource training now includes special emphasis and encouragement that, when making decisions, the pilot or aircraft commander should include *all* assets and sources of information in the decision-making process. The general assumption or theory is that as more information becomes available, the likelihood of more accurate decisions will increase and operator errors will be reduced.

The same general principles of crew coordination and resource management apply to all the members of the aircrew team. Incident commanders, planners, operations section chiefs, SAR/DR pilots, mission observers, scanners, air traffic controllers, and flight service station personnel should all be considered sources for appropriate information by the aircrew team.

In order for any information to be used, it must be effectively communicated. The effective communication process that leads to good crew coordination

actually starts well before a flight begins. Each member must pay close attention during the incident commander briefing to every detail presented. Clear understanding of the "big picture," search objective, altitudes, area assignments, and search patterns to be used *prior* to departure will preclude questions and debate in flight, when other tasks should take higher priority. Crewmembers having questions are encouraged to ask them at this time. The incident commander or air operations officer will normally establish certain safety-related rules for conducting that particular mission.

Decisions and search assignments are normally clearly stated to the crews, and crewmembers are encouraged to offer their own ideas. Planning and briefing officers should answer each question openly and non-defensively, and you should also make every effort to seek complete understanding of each situation.

In developing the actual mission operational plan workload management and task distribution are very important. An over-tasked crewmember may not develop a complete grasp of mission aspects that later may affect his or her performance. Remain alert for over-tasking in other crewmembers, and offer help if possible. If you find yourself over-tasked, do not hesitate to ask another qualified member for help. Each team member must continually think “teamwork.”

Close attention should be paid during the pilot’s briefing. The pilot will establish flight-specific safety "bottom lines" at this time, such as emergency duties and division of responsibilities. Each individual must again clearly understand his specific assigned duties and responsibilities before proceeding to the aircraft.

Other phases of the flight also require that distractions be kept to a minimum. Recent air transport industry statistics show that 67% of airline accidents during a particular survey period happened during only 17% of the flight time -- the taxi, takeoff, departure, approach and landing phases. The FAA has designated these phases of flight as critical, and has ruled that the cockpit environment *must* be free of extraneous activity and distractions during these phases to the maximum extent possible (the sterile cockpit).

In assigning scanning responsibilities to the scanners, mission observers must be receptive to questions and suggestions from the scanners. Carefully consider suggestions and understand that suggestions are almost always offered constructively, and are not intended to be critical. Answer questions thoroughly and openly, and don’t become defensive. All doubts or questions that you can’t answer should be resolved as soon as possible. It is critical to remember that CRM encourages the flow of ideas, but the Mission Pilot must make the final decision based on the crew's input.

Attachment 1

GRIDDING

(Appendix E, *United States National Search and Rescue Supplement to the International Aeronautical and Maritime Search and Rescue Manual*, May 2000)

1. The standard sectional aeronautical chart and the following grid identifications system is used by WSDOT when coordinating missions with the AFRCC and other agencies. WSDOT does not preclude the use of local procedures where they are deemed necessary or more practicable. Many missions are "local" in nature, and local procedures may be highly efficient and effective in the management of SAR resources within a defined geographical boundary.

2. Standardized Sectional Aeronautical Chart Grid and Identification System

3. The Sectional Aeronautical Chart (scale: 1-500,000) is divided into 30-minute intervals. Consider both the north and south sides of a sectional chart as one unit. Identify the northern and southern most latitude limits, and the western and eastern most longitude limits from Table E-1. The rectangular area thus formed is the area to be gridded. Line off each 15-minutes of latitude and longitude within this area.

4. Start with the first full 15-minute quadrangle in the northwest corner of the chart as number one (1) and number in sequence from west to east. Continue in this manner until reaching the southeast corner of the gridded area, which serves as the last full 15-minute quadrangle. The number of quadrangles in each respective chart is scheduled in column 7, Table E-1.

5. The basic 15-minute quadrangle (grid) is further broken down into quarter sections. The northwest quarter is labeled "A"; the northeast "B"; the southwest "C"; and the southeast "D". This breakdown is used when concentrated search is required and as a means of identifying 7.5 minute quadrangles, they need not be annotated on the charts but should be understood to exist and used in mission assignment and reporting.

6. Where charts overlap (the same grid is located on two or more charts) the grids on all charts will be assigned the number and identifier of the primary chart (the most westerly chart will be designated as the primary chart).

7. Chart identifiers are listed in Table E-1.

8. On charts with inserts over oceanic areas, number consecutively through the insert just as would be accomplished were the insert not published.

9. Grids and numbering for the Sectional Aeronautical Charts listed in Table E-1 are depicted in Figures E-1 through E-37.

Chart	*Identifier*	*North Grid Limit*	*South Grid Limit*	*West Grid Limit*	*East Grid Limit*	*Total Grids*
Seattle	SEA	49-00N	44-30N	125-00W	117-00W	576
Great Falls	GTF	49-00N	44-30N	117-00W	109-00W	576
Billings	BIL	49-00N	44-30N	109-00W	101-00W	576
Twin Cities	MSP	49-00N	44-30N	101-00W	93-00W	576
Green Bay	GRB	48-15N	44-00N	93-00W	85-00W	544
Lake Huron	LHN	48-00N	44-00N	85-00W	77-00W	512
Montreal	MON	48-00N	44-00N	77-00W	69-00W	512
Halifax	HFX	48-00N	44-00N	69-00W	61-00W	512
Klamath Falls	LMT	44-30N	40-00N	125-00W	117-00W	576
Salt Lake City	SLC	44-30N	40-00N	117-00W	109-00W	576
Cheyenne	CYS	44-30N	40-00N	109-00W	101-00W	576
Omaha	OMA	44-30N	40-00N	101-00W	93-00W	576
Chicago	ORD	44-00N	40-00N	93-00W	85-00W	512
Detroit	DET	44-00N	40-00N	85-00W	77-00W	512
New York	NYC	44-00N	40-00N	77-00W	69-00W	512
San Francisco	SFO	40-00N	36-00N	125-00W	118-00W	448
Las Vegas	LAS	40-00N	35-45N	118-00W	111-00W	476
Denver	DEN	40-00N	35-45N	111-00W	104-00W	476
Wichita	ICT	40-00N	36-00N	104-00W	97-00W	448
Kansas City	MKC	40-00N	36-00N	97-00W	90-00W	448
St. Louis	STL	40-00N	36-00N	91-00W	84-00W	448
Cincinnati	LUK	40-00N	36-00N	85-00W	78-00W	448
Washington	DCA	40-00N	36-00N	79-00W	72-00W	448
Los Angeles	LAX	36-00N	32-00N	121-30W	115-00W	416
Phoenix	PHX	35-45N	31-15N	116-00W	109-00W	504
Albuquerque	ABQ	36-00N	32-00N	109-00W	102-00W	448
Dallas - Ft. Worth	GSW	36-00N	32-00N	102-00W	95-00W	448
Memphis	MEM	36-00N	32-00N	95-00W	88-00W	448
Atlanta	ATL	36-00N	32-00N	88-00W	81-00W	448
Charlotte	CLT	36-00N	32-00N	81-00W	75-00W	384
El Paso	ELP	32-00N	28-00N	109-00W	103-00W	384
San Antonio	SAT	32-00N	28-00N	103-00W	97-00W	384
Houston	HOU	32-00N	28-00N	97-00W	91-00W	384
New Orleans	MSY	32-00N	28-00N	91-00W	85-00W	384
Jacksonville	JAX	32-00N	28-00N	85-00W	79-00W	384
Brownsville	BRO	28-00N	24-00N	103-00W	97-00W	384
Miami	MIA	28-00N	24-00N	83-00W	77-00W	384

Table E-1. Sectional Aeronautical Chart Grids

49 N	125W				124W				123W				122W				121W				120W				119W				118W			117W	49 N
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	
	33	31	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	
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	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	
46	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	46
N	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	N
	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	
	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	
45	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	45
N	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	N
	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	
	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	
	125W				124W				123W				122W				121W				120W				119W				118W			117W	

Figure E-33. Seattle Chart Grid

40N	091W			KANSAS CITY	090W				089W				088W				087W				086W				085W			084W	40N
	25	26	27	28	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	
	53	54	55	56	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	
	81	82	83	84	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	
39N	109	110	111	112	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	39N
	137	138	139	140	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	
	165	166	167	168	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	
	193	194	195	196	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	
38N	221	222	223	224	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	38N
	249	250	251	252	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	
	277	278	279	280	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	
	305	306	307	308	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	
37N	333	334	335	336	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	37N
	361	362	363	364	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	
	389	390	391	392	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	
	417	418	419	420	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	
36N	445	446	447	448	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	36N
	091W				090W				089W				088W				087W				086W				085W			084W	

Figure E-34. St. Louis Chart Grid

Attachment 2

Attachment 2

WASHINGTON STATE LAW

Washington Administrative Code 468-200

Chapter 468-200 WAC
CONDUCT AND MANAGEMENT OF EMERGENCY AIR OPERATIONS
AIR SEARCH & RESCUE/DISASTER RELIEF

Last Update: 1/13/97

WAC

WAC 468-200-020
Purpose and intent.

The purpose of this chapter is to adopt rules pertaining to the use, classes, scope, conditions of duty and training of emergency workers involved in air search and rescue or air disaster relief missions. Any emergency situation most likely requires multi-agency contact and coordination. To insure a timely and effective response nothing in this chapter is intended to preclude local law enforcement from taking immediate and constructive action. The aviation division will insure that each county sheriff's department is briefed on potential emergencies underway in their jurisdiction. The intent of these rules is to clearly delineate the responsibilities of authorized officials and emergency workers before, during, and after emergencies, disasters, and other specific missions conducted under the authority of the Washington state department of transportation, aviation division.

[Statutory Authority: Chapter 47.68 RCW. 96-02-067 (Order 160), § 468-200-020, filed 1/3/96, effective 2/3/96.]

WAC 468-200-040
Scope.

This chapter is applicable for emergency activities as outlined in chapter 47.68 RCW, Washington state emergency management comprehensive plan, state and regional disaster airlift plan, or other official state of Washington or political subdivision emergency plans for:

(1) Multi-jurisdictional or major emergencies, disasters, and related incidents that are determined by appropriate state or local authorities to require the use of aircraft, airships, and crews at the disposal of and trained by the aviation division or its designees and the emergency workers required to crew and support such air operations. Nothing shall preclude local authorities from utilizing local resources to meet local emergencies. At the request of local authorities, even for localized emergencies, the aviation division will coordinate and acquire aviation resources as needed.

(2) Search and rescue missions for aircraft in distress, missing, or presumed down that are conducted under the authority of chapter 47.68 RCW. This does not include air operations conducted for search and rescue purposes under the authority of chapter 38.52 RCW.

(3) Training events authorized by the department of transportation, aviation division.

[Statutory Authority: Chapter 47.68 RCW. 96-02-067 (Order 160), § 468-200-040, filed 1/3/96, effective 2/3/96.]

WAC 468-200-060
Definitions.

(1) "**Air search & rescue**" means the conduct and management of all aerial search and rescue operations involving downed or missing aircraft. This includes aircraft and airships used in search and rescue operations requested through the aviation division.

The aviation division is also responsible for search and rescue activities involving electronic signaling devices such as emergency locator transmitters (ELT's) and emergency position indicating radio beacons (EPIRB's). This does not include operations conducted for search and rescue purposes under the authority of chapter 38.52 RCW.

(2) "**Disaster relief air operations**" means the utilization of aircraft, airships, and crews in the assessment, search & rescue, or mitigation of a disaster.

(3) "**Authorized official**" means the director of aviation of the department of transportation or designee.

(4) "**Authorized organization**," means the department of transportation, aviation division, Washington state military department, emergency management division, local emergency management agencies, or law enforcement agencies of political subdivisions.

(5) "**Aviation division**" means the department of transportation, aviation division.

(6) "**Incident**" means an occurrence or event, either human caused or natural phenomena, that requires action by emergency services personnel to prevent or minimize loss of life or damage to property and/or the environment.

(7) "**Mission**" means a distinct assignment of personnel and equipment to achieve a set of tasks related to an incident, emergency, disasters or search and rescue operation that occurs under the direction and control of an authorized official.

(8) "**Training event**" means a planned, non-emergency activity for the development, maintenance, or upgrading of emergency worker skills.

(9) "**Remote/isolated area**" means an area lacking in amenities, paved roads, or public services, most often heavy vegetation and hilly terrain. Also defined as an area in which development is essentially nonexistent except for roads, railroads, power lines, and similar transportation facilities. Anyone leaving a recognized, road network will be considered to be in a remote/isolated area.

(10) "**SARDA**" means state and regional disaster airlift, a plan that is adopted by the state of Washington, as an integral part of the Washington state comprehensive emergency management plan. SARDA establishes the procedures for the control, conduct, and utilization of aviation during times of major disaster.

[Statutory Authority: Chapter 47.68 RCW. 96-02-067 (Order 160), § 468-200-060, filed 1/3/96, effective 2/3/96.]

WAC 468-200-080
Registration.

Registration is a prerequisite for emergency workers involved in the conduct of air search & rescue/disaster relief missions conducted under the authority of this chapter or chapter 47.68 RCW.

(1) Aircraft pilots and observers shall register with the aviation division by completing and filing a form as designated by the aviation division.

(2) Main base support personnel, assigned and working at the aviation division designated incident command post must also be registered with the aviation division.

(3) Ground personnel engaging in search and rescue field activities in remote or isolated locations must be registered emergency workers having complied with the registration requirements of chapter 38.52 RCW and chapter 118-04 WAC.

(4) **Information provided with registration may be used by authorized officials to conduct criminal history, flying record, driving record, and background checks**.

(5) Failure to truthfully respond to statements set forth on the registration form may result in the denial of registration or revocation of registration.

(6) Registration required under chapter 47.68 RCW and this chapter shall be accomplished by the aviation division on a form supplied or approved by the aviation division. Registration shall be completed upon the successful completion of the required training program as approved by the aviation division.

(a) An employee of the state or of a political subdivision of the state who is required to perform emergency duties as a normal part of their job shall not be required to register.

(b) When such individuals are outside the jurisdiction of their employment during a disaster, emergency, mission or incident, except when acting under the provisions of a mutual aid agreement, they should report to the on-scene authorized official and announce their capabilities and willingness to serve as a volunteer during the emergency or disaster. The on-scene authorized official shall register the individual as a temporary worker.

(c) Employees of the National Park Service, U.S. Forest Service, Bureau of Land Management performing their normal assigned duties in jurisdictions under their control shall not be required to register.

(d) Members of active duty, reserve, or National Guard components of the Department of Defense performing duties while in a "paid duty" status shall not be required to register.

(e) Members of active duty or reserve components of the U.S. Coast Guard performing duties while in a "paid duty" status shall not be required to register.

(f) Temporary registration may be authorized in those emergency situations requiring

immediate or on-scene recruiting of volunteers to assist in time-critical or life threatening situations.

[Statutory Authority: Chapter 47.68 RCW. 97-03-064 (Order 167), § 468-200-080, filed 1/13/97, effective 2/13/97; 96-02-067 (Order 160), § 468-200-080, filed 1/3/96, effective 2/3/96.]

468-200-100
Classes of Emergency Workers

The following classes of emergency workers and the scope of duties of each class are hereby established.

(1) **Administration** personnel include, but are not limited to, technical, administrative, and clerical services and may involve recruiting, coordinating, and directing any emergency support activities. Workers under this class will normally not perform their duty functions in isolated or remote locations. They are normally assigned to the incident command post, staging areas, or outlying airports.

(2) **Pilots** include duties performed by pilots licensed by the Federal Aviation Administration, operating Federal Aviation Administration approved aircraft, in support of emergency management activities. Pilots will be required to complete a mission training program conducted or approved by the aviation division.

(3) **Observers** include those individuals completing an approved training program to perform duties as an aerial observer on emergency missions.

(4) **Communications** shall include individuals who support airborne emergency response with air-to-air, air to ground, or ground-to-ground communications. Individuals in this class who are registered in accordance with chapter 38.52 RCW and chapter 118-04 WAC shall be deemed registered for the purposes of this chapter.

(5) **General** includes, but is not limited to, duties which can be performed by persons without permanent specific emergency assignment. These emergency workers may include personnel who do not have any specific training or qualifications, but whose participation is essential to a specific emergency operation.

(6) **Transportation** includes, but is not limited to, the planning, organizing, maintaining, operating, and coordination of available means of transportation for the movement of supplies, evacuees, personnel, and equipment.

(7) **ELT- DF** (emergency locator transmitter/emergency position indicating radio beacon) or other electronic transmitting device personnel shall include those personnel who respond by various ground and air modes of transportation to locate and silence electronic distress beacons***. Personnel who will be working in isolated or remote areas must be registered and qualified in accordance with chapter 38.52 RCW and chapter 118-04 WAC.***

(8) **Aircrew** (other) consists of crewmembers conducting airborne communications, aircraft crew chiefs, and airborne controllers.

[Statutory Authority: Chapter 47.68 RCW. 96-02-067 (Order 160), § 468-200-100, filed 1/3/96, effective 2/3/96.]

WAC 468-200-110
Conduct of training.

Organizations wishing to conduct training to meet the requirements of this chapter will submit the following information for consideration and approval prior to conducting training:

(1) A letter requesting to conduct approved training outlining the subject matter for which authorization is sought.

(2) A course outline listing the subject matter to be taught, class objectives, equipment, and audio/visual material to be used.

(3) Copies of all hand out material, student work books, and other items that will be distributed.

(4) Written notice of date, location or locations where course is to be taught.

(5) A resume of the instructor's background and qualifications.

(6) Such other material as may be instrumental in the aviation division reviewing the proposed training opportunities to insure consistency with the state program. Applications for instructor/course authorization must be received at least thirty days prior to the course offering. The aviation division will have final approval authority over course content and instructor utilization. The aviation division will prepare, and supply on request, information and guidelines for the selection of instructors, preparation of courses and conduct of training.

[Statutory Authority: Chapter 47.68 RCW. 96-02-067 (Order 160), § 468-200-110, filed 1/3/96, effective 2/3/96.]

WAC 468-200-120
Qualifications of search and rescue emergency workers.

Personnel will complete training administered or approved by the aviation division prior to engagement in any search and rescue activities conducted in accordance with chapter 47.68 RCW, this chapter, the state comprehensive emergency management plan (regarding air operations) or the state and regional disaster airlift plan (SARDA).

(1) **The following are the basic qualifications for administrative support search and rescue emergency workers*:***

(a) Be physically and mentally fit for the position assigned.

(b) Possess knowledge and the skills required of air search and rescue support workers.

(c) Possess knowledge of the incident command system and how the system works.

(d) Possess knowledge of the records and forms necessary to administer a major air search operation, including all forms used to identify the mission, track personnel, equipment, and assignments.

(e) Possess knowledge of the various state laws, plans, and procedures used in the conduct of emergency air operations.

(f) Possess knowledge of the requirements utilized in briefing search participants.

(g) Possess knowledge of the requirements and procedures utilized to select and dispatch emergency workers.

(h) Possess knowledge of dealing with the media, news releases, and information flow.

(i) Possess basic knowledge of the various types of maps used in air search and airborne disaster relief.

(j) Possess knowledge and training in dealing with family members of individuals in distressed situations.

(k) Possess knowledge in specific incident command system job descriptions that the individual is assigned to perform.

(2) **The following are the basic qualifications for communications personnel**:

(a) Be physically and mentally fit for the position assigned.

(b) Possess the knowledge and skills required of air search and rescue support workers.

(c) Possess knowledge of the incident command system and how the system works.

(d) Possess knowledge of the various forms used in the incident command system with particular skills in those forms having to deal with communications.

(e) Possess knowledge of the various state laws, plans, and procedures used in the conduct of emergency air operations.

(f) Possess a Federal Communications Commission radio license for the class and type of equipment operated when the operation of a radio requires an operator license.

(g) For remote or isolated assignments be registered and qualified as an emergency worker in accordance with chapter 118-04 WAC or chapter 38.52 RCW.

(h) Possess knowledge in specific incident command system job descriptions that the individual is assigned to perform.

(3) **The following are the basic qualifications for pilots and observers**.

(a) Be physically and mentally fit for the position assigned.

(b) Possess the knowledge and skills required of air search and rescue support workers.

(c) Possess knowledge of the incident command system and how the system works.

(d) Possess knowledge of the various forms used in the incident command system with particular skills in those forms having to deal with air operations.

(e) Possess knowledge of the various state laws, plans, and procedures used in the conduct of emergency air operations.

(f) Possess knowledge in specific incident command system job descriptions that the individual is assigned to perform.

(g) Possess knowledge and have training in the following aircrew specific items:

1. Search patterns & electronic search
2. Universal map system (UMS)
3. Navigation & position determination
4. Aircrew coordination
5. Communications procedures
6. Coordination with ground teams
7. Flight line operations
8. Weather
9. High altitude & terrain considerations
10. Mountain flying
11. Scanning techniques
12. Sighting characteristics
13. In-flight emergencies
14. Off-field landings
15. Survival, first aid, & safety
16. Flight plans
17. Incident Forms
18. State & regional disaster airlift (SARDA) & disaster relief plans
19. Reimbursement procedures
20. Dealing with the family and the press.

***(4)* In addition to the knowledge and skill requirements of 3 above, pilots must meet the following qualifications and skill levels.**

(a) Hold a private pilots license or above issued by Federal Aviation Administration.

(b) Hold a current and valid medical certificate issued by a Federal Aviation Administration authorized Airman Medical Examiner (AME).

(c) Meet all recurrency/currency of flight and other restrictions imposed by the Federal Aviation Administration.

(d) Have logged at least two hundred hours of total flight time for flat land (altitudes below five thousand feet) search pilot operations. Have logged at least five hundred hours of total flight time for all other search and rescue assignments.

(e) Have completed flight training with a search pilot instructor appointed or approved by the aviation division.

***(5)* ELT – DF (emergency locator transmitters & emergency position indicating radio beacon) direction finding personnel will receive training and demonstrate proficiency in the principles of emergency beacon transmitters, proper procedures for direction finding (DF) and legal responsibilities. The training shall consist of at least the following:**

(a) Principles of transmission, causes of distortion, interference, and blockage of signals.

(b) DF principles involving hand-held direction finders as well as working with only radio receivers.

(c) Interferometer method of DF.
(d) Map reading and interpretation.
(e) Legal responsibilities and restrictions upon finding a transmitter.
(f) When required be qualified and registered in accordance with chapter 118-04 WAC.

[Statutory Authority: Chapter 47.68 RCW. 96-02-067 (Order 160), § 468-200-120, filed 1/3/96, effective 2/3/96.]

WAC 468-200-160
Establishment of state standards.

Additional state standards may be established for classes of individual emergency workers involved in air search and rescue and air responses to disaster situations. Upon establishment of any such state standards, training programs within the state shall, at a minimum, comply with these standards.

[Statutory Authority: Chapter 47.68 RCW. 97-03-064 (Order 167), § 468-200-160, filed 1/13/97, effective 2/13/97; 96-02-067 (Order 160), § 468-200-160, filed 1/3/96, effective 2/3/96.]

WAC 468-200-180
Responsibilities of authorized officials using emergency workers.

(1) Authorized officials using emergency workers have the responsibility to ensure those emergency workers meet basic qualifications as stated in these rules. Authorized officials organizing and using emergency workers are responsible for assembling the proper combination of emergency workers with the skills and abilities to accomplish the mission being undertaken. It is acknowledged that authorized officials must use judgment and experience in assessing the scene and the requirements for the missions.

(2) Authorized officials may also require emergency workers to demonstrate proficiency in the skills required to carry out their assignments.
(3) Authorized officials shall ensure that all emergency workers are aware of their duty to comply with the personal responsibilities contained in WAC 468-200-200. This shall be accomplished at the time of registration with the aviation division and should be reemphasized to the worker at periodic intervals.

(4) The state recognizes that many situations to which emergency workers are asked to respond are inherently hazardous. It is incumbent upon authorized officials utilizing emergency workers to ensure that workers are not needlessly endangered in mission activities or training events. The emergency worker must also recognize potentially hazardous operations and not accept the assignment unless the worker is confident that

heir training and skill level will allow the task to be accomplished safely.

(5) All prudent and reasonable safety procedures, techniques, equipment, and expertise shall be used to ensure the safety of emergency workers at all times while going to, preparing for, performing, recovering from, and returning from, missions or training events.

[Statutory Authority: Chapter 47.68 RCW. 96-02-067 (Order 160), § 468-200-180, filed 1/3/96, effective 2/3/96.]

WAC 468-200-200
Personal responsibilities of Emergency Workers.

(1) Emergency workers shall be responsible to certify to the authorized officials registering them and using their services that they are aware of and will comply with all applicable responsibilities and requirements set forth in these rules.

(a) Emergency workers have the responsibility to notify the on-scene authorized official if they have been using any medical prescription or other drug that has the potential to render them impaired, unfit, or unable to carry out their emergency assignment.

(b) Participation by emergency workers in any mission, training event, or other authorized activity while under the influence of or while using narcotics or any illegal controlled substance is prohibited.

(c) Participation by emergency workers in any mission, training event, or other authorized activity while under the influence of alcohol is prohibited.

(d) Emergency workers participating in any mission, training event, or other authorized activity shall possess a valid operator's license if they are assigned to operate vehicles, vessels, or aircraft during the mission unless specifically directed otherwise by an authorized official in accordance with RCW 38.52.180. All emergency workers driving vehicles to or from a mission must possess a valid driver's license and required insurance.

(e) Use of private vehicles by emergency workers in any mission, training event, or other authorized activity without liability insurance required by chapter 46.29 RCW is prohibited unless specifically directed otherwise by an authorized official in accordance with RCW 38.52.180.

(f) Emergency workers shall adhere to all applicable traffic regulations during any mission, training event, or other authorized activity. This provision does not apply to individuals who have completed the emergency vehicles operator course or the emergency vehicle accident prevention course and are duly authorized under state law to use special driving skills and equipment and who do so at the direction of an authorized official.

(2) Emergency workers have the responsibility to comply with all other requirements as determined by the authorized official using their services.

(3) When reporting to the scene, emergency workers have the responsibility to inform the on-scene authorized official whether they are mentally and physically fit for their assigned duties. Emergency workers reporting as not fit for currently assigned duties may request a less demanding assignment that is appropriate to their current capabilities.

(4) Emergency workers have the responsibility to check in with the appropriate on-scene official and to complete all required record keeping and reporting.

[Statutory Authority: Chapter 47.68 RCW. 96-02-067 (Order 160), § 468-200-200, filed 1/3/96, effective 2/3/96.]

WAC 468-200-220
Conduct of training by Aviation Division.

All training will be conducted by the aviation division utilizing employees of the aviation division or volunteer instructors approved by the aviation division. Courses taught for qualification under this chapter will be those courses prepared or approved by the aviation division. Personnel seeking qualification under chapter 118-04 WAC will comply with the requirements established by chapter 118-04 WAC and imposed by the county of registration if registered in accordance with chapter 38.52 RCW. Organizations which desire to establish separate training programs for training that exceeds the requirements of this regulation are free to do so. Only the training required by this regulation shall be under the control of the aviation division. Course material, curriculum, and instructors will be those approved by the aviation division. The aviation division will prepare, and supply on request, information and guidelines for the selection of instructors, preparation of courses and conduct of training.

[Statutory Authority: Chapter 47.68 RCW. 96-02-067 (Order 160), § 468-200-220, filed 1/3/96, effective 2/3/96.]

WAC 468-200-230
Selection of resources -- Mission.

The selection of resources for a mission shall reside solely with the appointed incident commander. The aviation division receives information about a potential mission or airborne disaster relief response from a variety of sources. The incident commander will review the known information and assess the type of response which is appropriate for the mission. The incident commander will, after reviewing the information at hand decide whether the mission calls for a limited or full response. Limited response type missions include, but are not limited to:

(1) Electronic beacons (EPIRBS, ELTS, etc.).

(2) Reported sightings of a possible downed aircraft or aircraft in distress.

(3) Searches where evidence indicates the missing aircraft is confined to a limited search area.

(4) A multi-state search where the search area under the responsibility of the state of Washington is a limited geographical area.

(5) The mission is one of transporting limited personnel or supplies.

(6) The flight is a damage assessment flight of a limited area. This does not preclude the local authorities from using local resources to conduct damage assessment.

(7) Weather or flight conditions make it unsafe or unwise to place more than a limited number of aircraft in the search area.

(8) Any condition where in the opinion of the incident commander it would be unwise to commit additional aircraft.

In the case of limited response missions the incident commander shall select those individuals or organizations needed to support the mission. With the large number of qualified search and rescue volunteers and organizations in the state, not everyone will get called to support a limited specific mission. After review of the information or at anytime during the execution of a mission, the incident commander may deem it necessary to go beyond a limited mission and in fact make it a major mission. At that time the incident commander, utilizing the call out and alert system established by the aviation division, will request the support and participation of additional registered volunteers and organizations.

[Statutory Authority: Chapter 47.68 RCW. 96-02-067 (Order 160), § 468-200-230, filed 1/3/96, effective 2/3/96.]

WAC 468-200-240
Staffing and conduct of the mission.

The state of Washington, and the department of transportation have adopted the incident command system (ICS) of emergency response missions. All training and actual missions operated under the authority of chapter 47.68 RCW and this chapter shall be conducted using the incident command system (ICS) of mission management. The incident commander for any mission will be appointed by the director of the aviation division or his/her designee. The incident commander will appoint mission staff from the ranks of individuals who are qualified to staff those positions. The assignment of incident command system positions will be done without regard to membership in any organization.

[Statutory Authority: Chapter 47.68 RCW. 96-02-067 (Order 160), § 468-200-240, filed 1/3/96, effective 2/3/96.]

WAC 468-200-250
Mission number requests.

The incident commander, after making a decision on what resources are required, will seek an appropriate mission number assignment required by the responding organization. For the support of those emergency workers covered under chapter 38.52 RCW or chapter 118-04 WAC the incident commander will contact the Washington state military department, emergency management division, to obtain a state of Washington mission number. For missions where a Federal Mission Number is required, DOD (active duty, reserve, & Guard components) Federal non-DOD (FCC, Customs, etc.) and Civil Air Patrol, the incident commander will contact the United States Air Force Rescue Coordination Center for issuance of a mission number.

[Statutory Authority: Chapter 47.68 RCW. 96-02-067 (Order 160), § 468-200-250, filed 1/3/96, effective 2/3/96.]

WAC 468-200-260
Participation in training and operational missions.

The conduct of aerial search and rescue and airborne disaster relief operations is a difficult and demanding task. In order to facilitate effective and efficient operations it is necessary that the incident commander has the full support and cooperation of all individuals participating. To that end the incident commander shall have the sole authority to determine whether or not an individual may participate in a mission. The incident commander may remove an individual or otherwise exclude an individual for any of the following reasons:

(1) Individual does not meet the established criteria, training, or knowledge requirements of this regulation.

(2) Individual is not mentally or physically fit to perform assigned duties.

(3) Individual refuses to comply with instructions from appointed ICS authorities.

(4) Individual is disruptive to the order of the mission.

(5) Individual is not checked in on the mission and is a non-participant.

[Statutory Authority: Chapter 47.68 RCW. 96-02-067 (Order 160), § 468-200-260, filed 1/3/96, effective 2/3/96.]

WAC 468-200-280
Unauthorized conduct of search and rescue missions.

Any individual or organization that falls under the authority of chapter 47.68 RCW or this chapter that conducts search and rescue operations without the authority or direction of the incident commander shall have their registration rescinded and shall be prohibited from future participation in search and rescue and airborne disaster relief operations for a period not to exceed one year. The time shall be determined by the director of aviation.

[Statutory Authority: Chapter 47.68 RCW. 96-02-067 (Order 160), § 468-200-280, filed 1/3/96, effective 2/3/96.]

WAC 468-200-300
Records requirements.

Air search and rescue operations conducted under the authority of chapter 47.68 RCW and this chapter are the sole responsibility of the aviation division. All administrative record keeping, dispatch records, assignment sheets, action plans, and all other documents generated in the search, training event, or airborne response to a disaster will meet the following requirements:

(1) All forms used shall be forms provided by and authorized by the aviation division. These forms will comply with the tenets of the incident command system with modifications as authorized by the aviation division;

(2) All personnel, regardless of agency or organization shall check in and be placed on rosters provided and controlled by the aviation division;

(3) All assignments, plans, information, logs, etc., shall be on the forms as supplied by the aviation division;

(4) Organizations or personnel wishing to use their own forms for organization record keeping may. However the official forms of the mission are those which are supplied by the aviation division and those forms will be used by all who participate.

(5) Personnel responding to support a local jurisdiction mission (conducted in accordance with chapter 38.52 RCW and chapter 118-04 WAC) shall also check in on forms being maintained by the local authority.

[Statutory Authority: Chapter 47.68 RCW. 96-02-067 (Order 160), § 468-200-300, filed 1/3/96, effective 2/3/96.]

WAC 468-200-320
Records repository and retention.

Air search and rescue conducted under chapter 47.68 RCW and airborne disaster relief efforts conducted under the state comprehensive emergency management plan, the department of transportation emergency response plan, or the state and regional disaster airlift plan are the statutory responsibility of the aviation division. All records, reports, rosters, dispatch records, notes, logs, lead sheets, or any other written documents of the air search or airborne disaster relief are the property of the state of Washington. All said records will be submitted to the aviation division prior to or at the close of the mission. The aviation division shall maintain said records at the principle offices of the aviation division. The aviation division will make copies of any and all records needed by any participating organization. Records will be reproduced within five working days of the close of a mission and mailed to any participating organization requesting same.

[Statutory Authority: Chapter 47.68 RCW. 96-02-067 (Order 160), § 468-200-320, filed 1/3/96, effective 2/3/96.]

WAC 468-200-340
Memorandum of understanding agreements.

The director of aviation may enter into memorandum of understanding (MOU) agreements or other written documents amplifying or clarifying responsibilities and procedures. These written agreements may be entered into with agencies of the federal government, other state agencies, agencies of political subdivisions of the state of Washington or with support or volunteer organizations. Nothing in those agreements shall change the rules adopted by this chapter.

[Statutory Authority: Chapter 47.68 RCW. 96-02-067 (Order 160), § 468-200-340, filed 1/3/96, effective 2/3/96.]

WAC 468-200-350
Appeal procedure.

Any individual who or organization which feels that the provisions of this chapter have not been fairly or equitably administered may appeal, in writing, to the director of aviation. The director will review the complaint and respond within thirty days. Appeals generally will be limited to training, certification, and registration matters. Due to the nature of emergency response the decision of the appointed incident commander on any emergency response mission shall be final. Organizations and individuals may seek a meeting with the director of aviation after the incident for future review and clarification.

[Statutory Authority: Chapter 47.68 RCW. 97-03-064 (Order 167), § 468-200-350, filed 1/13/97, effective 2/13/97; 96-02-067 (Order 160), § 468-200-350, filed 1/3/96, effective 2/3/96.]

WAC 468-200-360
Severability.

If any provisions of this chapter is held invalid, the remainder of the rule is not affected.

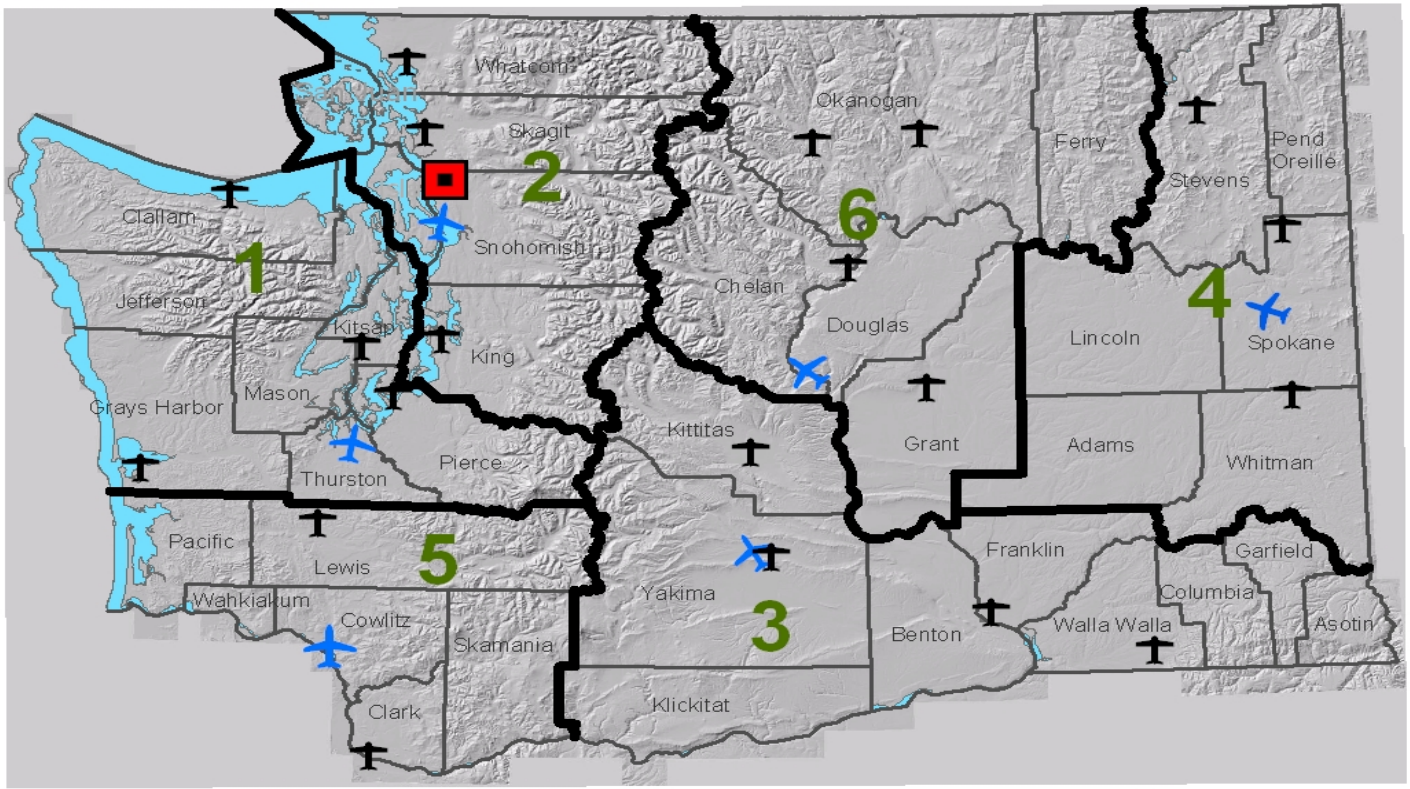
[Statutory Authority: Chapter 47.68 RCW. 96-02-067 (Order 160), § 468-200-360, filed 1/3/96, effective 2/3/96.]

Attachment 3

Attachment 3

Emergency Operations Districts

WSDOT - Aviation
Emergency Operations Districts



Aviation EOC

SARDA Control Airports

Fuel Center

7 Emergency Services District

Districts

1 - Olympic
2 - Northwest
3 - South Central
4 - Eastern
5 - Southwest
6 - North Central

Attachment 4

WSDOT Aviation Forms

1. Reimbursement Form
2. Mission Flight Plan / Briefing Form
3. Personnel Register
4. Vehicle Register
5. Aircraft Register
6. Aviation Emergency Services Worker Card

WSDOT - Aviation

PO Box 3367
Arlington, WA 98223
360-651-6300 / 800-552-0666 Fax 360-651-6319

Date:

Reimbursement Claim

Volunteer

Name _____ SSN* _____
Address _____ Phone # _____
City, State, Zip _____ Card # _____

Vehicle Data

Lic # _____
Make _____

Aircraft Data

Tail # _____
Model: _____

Date	Mission	Location				Auto Fuel	Av Fuel	Av Oil	Misc.	TOTAL

Claims must be postmarked no later than 10 days after mission closing or they will be uneligible for payment!

Sub Total

ATTACH ALL ORIGINAL RECEIPTS TOTAL
Maintain a copy for your records

*We must have your SSN or taxpayer ID number to process your claim

Volunteer's Signature

I hereby certify under penalty of perjury that this is an and accurate and true claim for expenses that I am eligible for under WAC 468-200 and that no payment has been received by me on account thereof.

June 2005 Version

Reimbursement Form AD-108

MISSION FLIGHT PLAN / BRIEFING FORM

Incident Name/Number:	Incident Base:	Date:	Sortie #

FLIGHT PLAN SECTION

Pilot:

Observer:

Observer:

Observer:

Pilot Qualifications:
- ☐ Mountain
- ☐ Night
- ☐ AC Type
- ☐ Instrument

Aircraft Equipment

- ☐ RADIO SAR
- ☐ RADIO CAP
- ☐ RADIO Amateur
- ☐ GPS
- ☐ DIGITAL CAMERA
- ☐ VIDEO CAMERA
- ☐ DIRECTION FINDER
- ☐ IFR FLIGHT
- ☐ VOR
- ☐ TRANSPONDER
- ☐ ADF
- ☐ MESSAGE DROPS
- ☐ SIGNAL PANELS
- ☐ SIGNAL FLARES
- ☐ FIRST AID KIT
- ☐ FIRE EXTINGUISHER
- ☐ ELT
- ☐ SURVIVAL KIT

Mission Kit?	Weather?	NOTAM's?	Wt & Bal?	MOA's?	Airspace?	Crew Rest?
☐	☐	☐	☐	☐	☐	☐

1. Flt Plan	2. Acft ID:	3. Acft Type	4. TAS:	5. Depart. Point:	6. ETD:	7. Cruise Alt:	8. Time Enroute:
☐ VFR ☐ IFR ☐ Mission							

9. Route:

10. Dest:	11. ETA:	12. Remarks	13. Fuel on board:
14. Alternate:	15. Color Acft:	Crew Cell or Pager number:	

Current and Forecasted Weather:

BRIEFING SECTION

Mission objective:	Tracker Number	Camera Number	Grid Assignment:

Base Frequencies:	Air to Ground Frequencies:	High Bird Frequencies:
☐123.1 ☐148.15 ☐155.16 ☐156.135	☐123.1 ☐148.15 ☐148.125 ☐155.160	☐123.1 ☐122.9 ☐122.75 ☐148.15

Base Call Sign:	Base Telephone#:	Code Words: Find: Recall:
Pilots Signature:	Briefer Signature:	Ops Planner / FRO Signature:

DEBRIEFING SECTION

Search Data

Search Visibility_____

Search Speed: _____KIAS

Track Spacing: _____NM

Track Altitude: _____AGL

Pattern used: _____

Weather in area:

_____

Terrain / Ground cover:

_____

GPS used: Yes / No

Diagram sightings and major landmarks

Sighting 1:
Lat:
_____N
Long:
_____W

Sighting 2:
Lat:
_____N
Long:
_____W

Sighting 3:
Lat:
_____N
Long:
_____W

Use Degrees, Mins, Decimal
(N47 29.50 / W122 34.06)
WGS 84 Datum

Flight Time	Takeoff:	IN Grid/Route/Area	OUT Grid/Route/Area	Landing:	Total:

Pilots Signature:	Debriefer's Signature:	Ops Planner Signature:

ICS 220B Washington State Dept. Transportation - Aviation Division April 2005

ICS-220A Mission Flight Plan

PERSONNEL REGISTER

Incident Name/Number:	Date:		Location / Base:			Page of	
NAME Last, First M. (CAP include ID#)	Organization	Check-In Time	Emergency Contact (Name and Phone Number)	Card #	Duty This Incident	Check-Out Time	Hours 0+00
ICS 211P	Washington State Department of Transportation - Aviation Division				June 2005	Total Hours	

ICS-211 Personnel Register Form

AIRCRAFT REGISTER

INCIDENT NAME/NUMBER:	LOCATION / BASE:	DATE:	PAGE of

AIRCRAFT TAIL #	AIRCRAFT TYPE	CREW	AIRCRAFT EQUIPMENT			ORGANIZATION And HOME BASE
		PILOT: OBS: OBS: OBS:	☐ Radio SAR Freq. ☐ Radio CAP Freq. ☐ Amateur Radio ☐ GPS ☐ Digital Camera ☐ Video Camera	☐ Direction Finder ☐ IFR ☐ VOR ☐ ADF ☐ Transponder ☐ Message Drops	☐ Signal Panels ☐ Signal Flares ☐ First Aid Kit ☐ Fire Ext ☐ ELT ☐ Survival Kit	
		PILOT: OBS: OBS: OBS:	☐ Radio SAR Freq. ☐ Radio CAP Freq. ☐ Amateur Radio ☐ GPS ☐ Digital Camera ☐ Video Camera	☐ Direction Finder ☐ IFR ☐ VOR ☐ ADF ☐ Transponder ☐ Message Drops	☐ Signal Panels ☐ Signal Flares ☐ First Aid Kit ☐ Fire Ext ☐ ELT ☐ Survival Kit	
		PILOT: OBS: OBS: OBS:	☐ Radio SAR Freq. ☐ Radio CAP Freq. ☐ Amateur Radio ☐ GPS ☐ Digital Camera ☐ Video Camera	☐ Direction Finder ☐ IFR ☐ VOR ☐ ADF ☐ Transponder ☐ Message Drops	☐ Signal Panels ☐ Signal Flares ☐ First Aid Kit ☐ Fire Ext ☐ ELT ☐ Survival Kit	
		PILOT: OBS: OBS: OBS:	☐ Radio SAR Freq. ☐ Radio CAP Freq. ☐ Amateur Radio ☐ GPS ☐ Digital Camera ☐ Video Camera	☐ Direction Finder ☐ IFR ☐ VOR ☐ ADF ☐ Transponder ☐ Message Drops	☐ Signal Panels ☐ Signal Flares ☐ First Aid Kit ☐ Fire Ext ☐ ELT ☐ Survival Kit	
		PILOT: OBS: OBS: OBS:	☐ Radio SAR Freq. ☐ Radio CAP Freq. ☐ Amateur Radio ☐ GPS ☐ Digital Camera ☐ Video Camera	☐ Direction Finder ☐ IFR ☐ VOR ☐ ADF ☐ Transponder ☐ Message Drops	☐ Signal Panels ☐ Signal Flares ☐ First Aid Kit ☐ Fire Ext ☐ ELT ☐ Survival Kit	
		PILOT: OBS: OBS: OBS:	☐ Radio SAR Freq. ☐ Radio CAP Freq. ☐ Amateur Radio ☐ GPS ☐ Digital Camera ☐ Video Camera	☐ Direction Finder ☐ IFR ☐ VOR ☐ ADF ☐ Transponder ☐ Message Drops	☐ Signal Panels ☐ Signal Flares ☐ First Aid Kit ☐ Fire Ext ☐ ELT ☐ Survival Kit	
		PILOT: OBS: OBS: OBS:	☐ Radio SAR Freq. ☐ Radio CAP Freq. ☐ Amateur Radio ☐ GPS ☐ Digital Camera ☐ Video Camera	☐ Direction Finder ☐ IFR ☐ VOR ☐ ADF ☐ Transponder ☐ Message Drops	☐ Signal Panels ☐ Signal Flares ☐ First Aid Kit ☐ Fire Ext ☐ ELT ☐ Survival Kit	
		PILOT: OBS: OBS: OBS:	☐ Radio SAR Freq. ☐ Radio CAP Freq. ☐ Amateur Radio ☐ GPS ☐ Digital Camera ☐ Video Camera	☐ Direction Finder ☐ IFR ☐ VOR ☐ ADF ☐ Transponder ☐ Message Drops	☐ Signal Panels ☐ Signal Flares ☐ First Aid Kit ☐ Fire Ext ☐ ELT ☐ Survival Kit	

ICS 211A Washington State Department of Transportation - Aviation Division June 2005

ICS 211A – Aircraft Register

VEHICLE REGISTER

INCIDENT NAME/NUMBER:	LOCATION / BASE:	DATE:	PAGE of

Vehicle operator attests that this vehicle has been safety inspected, properly insured, and that all passengers will wear seatbelts.

DRIVER	Plate #	Year	Color	Make	Status	Organization
					☐ Mission Vehicle ☐ Transportation Only	
					☐ Mission Vehicle ☐ Transportation Only	
					☐ Mission Vehicle ☐ Transportation Only	
					☐ Mission Vehicle ☐ Transportation Only	
					☐ Mission Vehicle ☐ Transportation Only	
					☐ Mission Vehicle ☐ Transportation Only	
					☐ Mission Vehicle ☐ Transportation Only	
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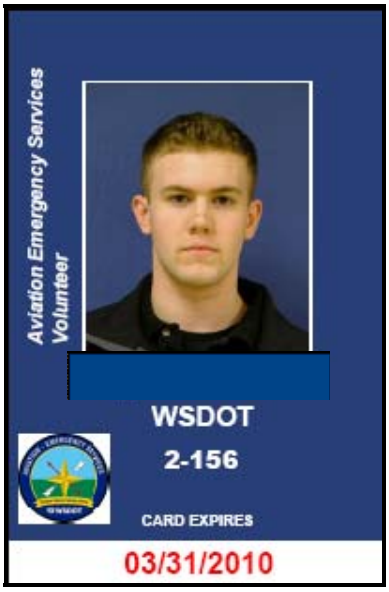
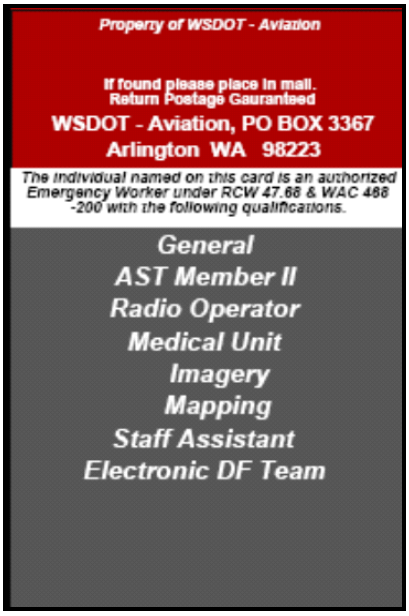
					☐ Mission Vehicle ☐ Transportation Only	

ICS 211V Washington Department of Transportation - Aviation Division June 2005

ICS 211V – Vehicle Register



Front



Back

Washington State Aviation
Emergency Services Worker Card