FLIGHT GUIDE

APPENDIX 2 OF THE
MISSION AIRCREW REFERENCE TEXT
REVISION 1, FEBRUARY 2008

Intentionally blank

TABLE OF CONTENTS

1. Mission Checklist
2. Documents and Minimum Equipment
3. Operational Risk Management Matrix
4. Density Altitude
5. Crosswind Data Sheet
6. Weight & Balance Work Sheet
7. FAA Flight Plan
8. Basic VFR Traffic Pattern (Uncontrolled Field)
9. VFR Flight Information
   a. VFR Airspace Classifications
   b. Basic VFR Weather Minimums
10. Emergency Egress
11. Flightline Hand Signals
12. Pilot Guide to Airport Signs and Markings (including Light Gun Signals)
13. Surface Movement Guidance and Control System
14. PMA7000MS Audio Panel Operations Guide
15. NAT NPX-138 VHF FM Radio Operations Guide
16. TDFM-136 Digital/Analog VHF FM Radio Operations Guide
17. CAP FM Radio information
   a. National Standard Channelization Plan (frequencies 1- 4)
   b. Other Important Frequencies and Phone numbers
   c. Required FM Radio Reports
18. Prowords and Aircraft Clock Positions
19. Visual Signals
   a. Paulin
   b. Emergency Distress
   c. Ground-to-Air Body
   d. In-Flight Intercept Procedures
   e. Air-to-Ground - No Comm
   f. Air-to-Ground Team Coordination
20. Airdrop Procedures
21. Aircrew Survival Basics and Urgent Care/First Aid

TABLE OF CONTENTS (CON'T)

22. POD Charts (Mission and Cumulative)

23. Visual Search Patterns

24. Apollo GX-55 GPS - SAR Operations Guide

25. U.S. Grid Chart Table

26. DF Search Patterns
    a. Metered
    b. Audible
    c. Wing Null

27. ELT Reception Distances

28. L-Tronics DF Functional Checks

29. Becker SAR DF-517 Operations Guide

30. Basic Ground ELT Search Procedures
    a. Hand-held DF Procedures
    b. Silencing an ELT
    c. Legal Issues

31. Forms
    a. ELT Search Information Required by AFRCC
    b. Observer Log and Instructions
    c. Observer/Scanner Search Area Work Sheet
    d. Mission Pilot Search Area Work Sheet
    e. High Bird Work Sheet
    f. High Bird Transmission Log
    g. CAP Photo/Recon Log
    h. Standardized Latitude/Longitude Grid System
    i. Standard 15' x 15' Grid Coordinates
    j. Standard 7.5' x 7.5' Grid Coordinates xxA
    k. Standard 7.5' x 7.5' Grid Coordinates xxB
    l. Standard 7.5' x 7.5' Grid Coordinates xxC
    m. Standard 7.5' x 7.5' Grid Coordinates xxD
    n. CAP Grid Coordinates Work Sheet
    o. CAP Quarter Grid Coordinates 'A'
    p. CAP Quarter Grid Coordinates 'B'
    q. CAP Quarter Grid Coordinates 'C'
    r. CAP Quarter Grid Coordinates 'D'
    s. Route Coordinates Work Sheet
    t. Creeping Line Coordinates
    u. Expanding Square Coordinates
    v. Circling Imaging Pattern
    w. 4-Square Imaging Pattern (using Port Window)
    x. 4-Square Imaging Pattern (using Starboard Window)
    y. Bird’s Eye Imaging Pattern
    z. 45° Angle to Target Imaging Pattern

PRINT ONLY WHAT YOU NEED

MISSION CHECKLIST

1. Leaving Home for Mission Base

A. Proper uniforms (CAPM 39-1) and credentials
   1) CAP Membership
   2) CAP Motor Vehicle Operator
   3) ROA
   4) 101/SQTR (note experience and tasks to be accomplished)
   5) Pilot currency (including a Photo ID)
   6) For passengers, PIC review CAPR 60-1 Attachment 2 (CAP Missions & Pilot Limitations)

B. Check personal equipment
   1) Clothing sufficient and suitable for the entire trip
   2) Personal supplies (civilian clothing, headset, charts, maps, plotter, log, checklists, fluids and snacks)
   3) Personal survival equipment (in addition to the aircraft kit) suitable for the entire trip
   4) Sufficient money for the trip (credit cards, some cash or traveler's checks, and coin)
   5) Cell phone (including spare battery and charger)

C. Check aircraft equipment
   1) Current Aeronautical Charts for the entire trip and gridded charts for the mission area
   2) Maps for the mission area (e.g., road atlas, county maps, topo maps), plus clipboard and markers
   3) Tie-downs, chocks, Pitot tube cover and engine plugs, fuel tester, sick sacks, and cleaning gear
   4) Survival kit (fits trip and mission area terrain), headsets, flashlight, binoculars and multitool

D. Review the Aircraft Logs
   1) Note the date and the starting Tach and Hobbs times to ensure you won't exceed:
      a) Mid-cycle oil change (40-60 hours, not to exceed six months)
      b) 100-hour/Annual
      c) 24-month checks (Transponder, Pitot-Static system, Altimeter and ELT/battery replacement date)
      d) 30-day VOR Check for IFR flight and AD compliance list.
   2) Check the status of the Carbon Monoxide Detector and Fire Extinguisher
   3) Review the Discrepancy Log and make sure the aircraft is airworthy and mission ready

E. FAA Weather Briefing and CAP Flight Release
   1) Perform Weight & Balance (reflecting weights for the crew, special equipment and baggage)
      a) Include fuel assumptions (fuel burn, winds, power setting, distance, and fuel stop)
      b) Ensure fuel reserve (plan to land with one hour's fuel, computed at normal cruise)
   2) Verify within flight time and duty limitations (CAPR 60-1, Chapter 2)
   3) Obtain FAA briefing (ask for FDC and Local NOTAMs and SUA status) and file FAA Flight Plan
      a) Enter 'CPF XXXX' in the Aircraft Identification section
      b) Put the 'N' and 'Cap Flight' numbers in the Remarks section
   4) Fill out Inbound CAPF 104 (leave copy for FRO)
   5) Brief the crew on your fuel management plan (assumptions, refueling stops and reserve), FDC and Local NOTAMs, and Special Use Airspaces
   6) Review "IMSAFE" and obtain CAP Flight Release (release by mission base for AFAMs)
   7) Request Flight Following

F. Preflight
   1) Ensure proper entries in the Flight Log (e.g., mission number & symbol, crew & FRO names)
   2) Check starting Tach and Hobbs times to ensure you won't exceed limits (e.g., oil change)
   3) Review the Discrepancy Log and make sure the aircraft is airworthy and mission ready
   4) While preflighting, verify any outstanding discrepancies. If new discrepancies discovered, log them and ensure the aircraft is still airworthy and mission ready. [Be extra thorough on unfamiliar aircraft.]
   5) Verify load is per your Weight & Balance (baggage, survival kit, extra equipment and luggage)
   6) Double-check aeronautical charts, maps and gridded charts (also clipboard and markers)
   7) Ensure required aids onboard (Flight Guide, distress and air-to-ground signals, fuel tester, tools)
   8) Windshield and windows clean, and chocks, tie-downs, Pitot tube covers and engine plugs stowed
   9) Right Window holding screw removed (video imaging mission) and stored
   10) Check and test special equipment (cameras, camcorder, slow-scan, repeater), including spare batteries
   11) Parking area clear of obstacles (arrange for a wing-walker if one will be needed to clear obstacles)
   12) Perform passenger briefing and review emergency egress procedure
   13) Review taxi plan/diagram and brief crew assignments for taxi, takeoff and departure
   14) Remind crew that most midair collisions occur in or near the traffic pattern
   15) Enter settings into GPS (e.g., destination or flight plan, entry points and waypoints)
   16) Organize the cockpit

MISSION CHECKLIST (CON'T)

G. Startup and Taxi
   1) Brief checklist method to be used (e.g., challenge-response)
   2) Seat belts at all times; shoulder harness at or below 1000' AGL
   3) Double-check Intercom, Audio Panel and Comm Radio settings
   4) Rotating Beacon Switch ON and signal marshaller before starting engine; lean for taxi
   5) Ensure DF and FM Radio are operable and set properly (FM radio check if first flight)
   6) Select initial VOR radial(s) and GPS setting
   7) Obtain ATIS and Clearance (read back all clearances and hold-short instructions)
   8) Compute crosswind and verify within Crosswind Limitation
   9) Verify 3 statute miles visibility (VFR in Class G - unless PIC is current IFR)
   10) If IFR, verify weather at or above landing minimums and date of last VOR check
   11) Begin sterile cockpit
   12) Signal marshaller before taxiing; check brakes at beginning of roll
   13) Turn on the navigation, position, Pulselite, and anti-collision lights (be considerate of others at night)
   14) Taxi no faster than a slow walk when within 10 feet of obstacles
      a) Maintain at least 50' behind light single-engine aircraft; 100' behind small multi-engine and jet aircraft, and 500' behind heavies and taxiing helicopters

H. Takeoff, Climb and Departure
   1) Double-check assigned departure heading and altitude
   2) Lean engine for full power (> 3000' DA or POH)
   3) Look for landing traffic before taking the active runway; landing light ON when rolling
   4) Keep lights on within 10 miles of the airport and when birds reported nearby
   5) Begin Observer Log with takeoff (time and Hobbs) and report "Wheels Up"
   6) Use shallow S-turns and lift your wing before turns during climbing to check for traffic
   7) Keep shoulder harnesses buckled (never remove at or below 1000' AGL)
   8) Keep crew apprised of conflicting aircraft and obstacle positions
   9) Keep checklists close at hand and open to Emergency Procedures

I Enroute
   1) Maintain situational awareness
   2) Lean engine for economy cruise
   3) Update fuel assumptions and set altimeter to closest source at least hourly

J Approach, Descent and Landing
   1) Plan approach and descent (remember fuel mixture and cooling)
   2) Double-check radio and navigational settings
   3) Obtain ATIS/AWOS and contact approach control
   4) Review taxi plan/diagram and brief crew assignments for approach, landing and taxi
   5) Remind crew that most midair collisions occur in or near the traffic pattern, especially on final
   6) Begin sterile cockpit
   7) Turn lights on within 10 miles of the airport
   8) Double-check assigned approach heading and altitude
   9) Use shallow S-turns and lift your wing before turns during descent to check for traffic
   10) Read back all clearances and hold-short instructions
   11) Log (time and Hobbs) and report "Wheels Down"

2. Arrival at Mission Base:

A. Park and Secure Aircraft
   1) Look for marshallers, follow taxi plan, signal marshaller that ignition is OFF
   2) Double-check Master Switch OFF
   3) Fuel Selector Switch to Right or Left (refueling)
   4) Avionics/control Lock and Pitot tube covers/engine plugs installed
   5) Complete the Flight Log and enter squawks in Discrepancy Log
   6) Chocks and Tie-downs installed and Parking Brake OFF
   7) Remove trash and personal supplies/equipment
   8) Lock the windows, doors and baggage compartment
   9) Check oil and arrange for refueling
   10) Clean leading edges, windshield, and windows
   11) Replenish cleaning kit

MISSION CHECKLIST (CON'T)

B. Check in with Flight Line Supervisor and Safety Officer
C. Close FAA and CAP Flight Plans and call local FRO
D. Sign personnel and aircraft into the mission (Administration)
E. Complete and submit Inbound CAPF 104 (keep a copy)
F. Report any special equipment to Logistics (e.g., cameras, camcorder, slow-scan, or repeater)
G. Inquire about fuel billing, lodging, transportation and meals
H. Note time to report for duty and ask for sortie assignment (get briefing packet)

3. General Briefing

A. Mandatory attendance
B. Normally at beginning of each operational period, updated via status boards and announcements
C. Summary of situation and objectives
D. Mission base orientation (status boards, logistics, supply, facilities)
E. Current and forecast weather
F. Plans (safety, communications, flight line and taxi) and time hack

4. Aircrew Assignment / Briefing

A. Detailed briefing prior to each sortie; pay attention and ask questions
B. Include entire aircrew, if space allows
C. Ensure you get enough information to fill out the left front of the CAPF 104
   1) Objectives and Search Area/Route
   2) Terrain/Ground cover
   3) Direction of tracks, track spacing, search altitude and airspeed
   4) Hazards to flight and military routes (local and search area)
   5) Aircraft separation
   6) Weather (local and search area)
   7) Communications call signs, frequencies and procedures
   8) Actions to be taken if target sighted
   9) Estimated time of departure and time enroute
   10) Inbound and Outbound headings and altitudes
   11) Whether using Local (preferred) or Zulu time
   12) Type and location of ground assets, and how to contact them and when
D. Ensure you have the (operable) equipment to accomplish the objective
E. Briefing kit
   1) CAPF 104 and CAPR 60-1
   2) Airport diagram, taxi plan/procedures, emergency-landing areas
   3) Current and Gridded sectionals (if gridded sectionals are not current, mark "Not for Navigation")
   4) Maps (road atlas, county maps, topo maps)
   5) Checklists
F. Aircrew Plans the Sortie: Observer assists the Pilot while the Scanner listens (may be briefed later)
   1) Consider Inbound/Outbound headings and altitudes
   2) 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)
   3) If flying grids and no aircraft will be in the adjacent grids, plan your turns outside the grid for breaks
   4) Once you have your estimated time enroute, add in your fuel reserve (CAPR 60-1) and determine if you'll need a refueling stop
G. Complete the CAP Flight Plan (right front of CAPF 104)
   1) Ensure your 'Route of Flight' clearly describes your intentions; include any fuel or rest stops
   2) Double-check your estimated time enroute, fuel reserve and estimated fuel burn
   3) Write your Capflight number on the front of the CAPF 104 (aids air operations)
   4) Review your planning aids (marked-up charts and notes) for accuracy and legibility
   5) After reviewing the plan with the crew, the pilot signs the form

5. Check in with Briefing Officer

A. Include entire aircrew, if space allows. Show completed CAPF 104 and discuss.
B. Obtain briefing officer's signature

MISSION CHECKLIST (CON'T)

6. Check in with Air Operations

A. Mission pilot is informed of any changes, chief or director reviews and signs the form and releases your flight
B. Normally you leave the original with air ops and make a copy to take with you
C. Aircraft and Mission commanders give final briefings and checks personal equipment and supplies
D. Final restroom visit

7. Flightline

A. Show the CAPF 104 to the Flightline Supervisor (final release)
B. Preflight the aircraft per applicable steps of #1.F
C. Startup and taxi per #1.G
D. Takeoff, climb and departure per #1.H

8. Fly Sortie

A. Transit to the Search Area
   1) Relax sterile cockpit rules
   2) Maintain situational awareness
   3) Double-check navigational settings to be used in the search area
   4) Review search area terrain and obstacles
   5) Update in-flight weather and file PIREP
   6) Review methods to reduce fatigue or combat high altitude effects during the search

B. Approaching the Search Area
   1) Exterior lights on (maximize your visibility so others can "see and avoid")
   2) Review search objectives
   3) Double-check radio, audio panel and navigational settings
   4) Check navigational equipment against each other (detect abnormalities or failures)
   5) Stabilize at search heading, altitude and airspeed (not < Vx) at least two miles out; sterile cockpit
   6) Evaluate the scene (situational awareness) for conflicting traffic

C. In the Search Area
   1) Log (time and Hobbs) and report "In the Search Area"
   2) Enter deviations from assigned search parameters in Observer Log
   3) Hourly Updates - Altimeter setting (closest source) and fuel assumptions
   4) Report "Operations Normal" at assigned intervals
   5) Limit time spent below 1000' AGL (no lower than 500' AGL) during daylight
   6) Maintain at least 2000' AGL during nighttime
   7) Monitor for crew fatigue and high altitude effects
   8) If you sight the objective, notify mission base at once
   9) Log all "negative result" sightings

D. Departing the Search Area
   1) Log (time and Hobbs) and report "Out of the Search Area"
   2) Double-check heading and altitude assigned for transit to next search area or return to base

9. Return to Base

A. Approach, descent, and landing per #1.J
B. When parked, complete appropriate steps per #2.A

10. Debrief

A. Take a short break and then meet to complete the CAPF 104
   1) Fill in 'ATD' and 'Actual Landing Time' on the front of the form
   2) "Time of Day" section means the time you were in the search area
   3) "Crew Comments about Effectiveness" involves a quantitative assessment (excellent, good, fair, or poor) of how well you accomplished the mission
   4) "Crew Remarks of SAR Effectiveness" gives the crew a chance to comment on the effectiveness of the sortie in general

MISSION CHECKLIST (CON'T)

5) The "Note" section is for drawings, sketches and other supporting information or additional comments. If you are attaching a drawing write, "drawing attached" (label the attachment so it can be related to the CAPF 104 if it becomes separated)
6) Ensure the 'Enroute' and 'Search Time' entries equal the 'Total' (Hobbs) hours entry
7) Ensure all entries and sketches/drawings are clear and legible

B. Check in with Debriefing Officer
1) Tell how you did your job and what you saw
2) Usually starts with a review of the information you entered on the reverse of the CAPF 104
3) Answer all questions as best you can, and be very honest about conditions and your actions
4) 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.

11. **Next Sortie:** Repeat steps 4 through 10 (check flight time and duty limitations)

12. **Return Home** (check flight time and duty limitations)

A. Turn in any issued equipment and settle bills (hotel, meals and fuel; retain copies)
B. Complete 'Outbound' CAPF 104 and get a flight release (record the phone number of the mission base person you will call to close the CAP flight plan and report your Hobbs time)
C. Ensure you have copies (front and back) of all CAPF 104s accomplished during the mission
D. Sign out of mission base
E. Preflight the aircraft per #1.F
F. Startup and taxi per #1.G
G. Takeoff, climb and departure per #1.H
H. Enroute per #1.I
I. Approach, descent, and landing per #1.J

13. **Arriving Back Home:**

A. When parked, complete appropriate steps per #2.A. Make sure you return or stow any borrowed equipment.
B. *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 CAPF 104; this should not be done until he or she knows that everyone is home safely.
C. Complete and mail the CAPF 108 as soon as possible.
D. You should brief your squadron 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 "hanger talk."

Intentionally blank

DOCUMENTS AND MINIMUM EQUIPMENT

FAR 91 Subpart C, 91.203 & .205

Certificates and Documents
Airworthiness certificate
Registration certificate
Operating limitations (placards and instrument markings)
PIC checks all passengers' credentials before obtaining a 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.]

Other Documents and Equipment required by CAP (from CAPR 66-1 and CAPF 71):
Restrictive placards: "Not for Hire," "Max Crosswind Component," and "Seat Slip Warning"
Pulselite
Avionics/Control lock
Weight & Balance data
Fire extinguisher (appropriate for aircraft with a gauge indicating serviceability)
Carbon monoxide detector (12- to 18-month disposable)
Cargo tie-down or cargo net (recommended)
Chocks and tie-downs
Survival kit (as determined by Wing)

OPERATIONAL RISK MANAGEMENT MATRIX

Hazard Identification	Low	Pt.	Moderate	Pt.	High *	Pt.	Controls
Man							
Pilot Experience/Training Pilot Mission Time Observer Scanner	≥1000 hrs PIC ≥1000 hrs msn time ≥100 hrs msn time ≥20 hrs msn time	0 0 0 0	≥250-1000 hrs PIC ≥50-100 hrs msn ≥20-100 hrs msn ≥10-20 hrs msn	2 2 1 1	≤250 hrs PIC ≤50 hrs msn time ≤20 hrs msn time ≤5 hrs msn time	4 3 3 2	
Pilot Currency	≥10 hrs within last 30 days	0	≥5<10 hrs within last 30 days	2	<5 hrs within last 30 days	4	
Health/Crew Rest	Good health and proper crew rest	0	Fair health and/or signs of fatigue	2	Poor health and/or fatigued	N/G	
Machine							
Maintenance Factors Minimum Equipment List if applicable	Fully functional	0	Partially functional, MEL intact	1	Nonfunctional, MEL discrepancies	N/G	
Performance Factors	<5000' MSL search altitude	0	≥5000'<9000' MSL search altitude	1	≥9000' MSL search altitude	3	
Communications	Good comm, high bird available	0	Some blind spots no high bird	1	Poor comm. No high bird	3	
Mission							
Operations Tempo	1 search aircraft	0	2-4 search aircraft	1	>4 search aircraft	3	
Complexity	Simple tasks, no new technology	0	Complex tasks, no new technology	1	Complex tasks, new technology	3	
Environment							
Weather Additionally, check winds aloft	X-winds = calm Visibility = 7+ Ceiling = none Hazards = none	0	X-winds 5≤15 kts Visibility 3<7 Ceiling ≤1500' Icing = none Hazards = light turbulence	2 2 2 0 1	X-winds >15 kts Visibility <3 Ceiling = <500' Icing ≥ light Hazards = mod to severe turbulence	N/G	
Terrain	Low, flat	0	Foothills, featureless	2	High, mountainous	4	
Search Altitude	>2000'AGL		≤2000'≥1000'AGL	1	<1000'AGL	3	
Night Operations	VFR w/Current Instrument Rating	5	VFR w/out Instrument Rating	10	IMC	15	
Airfield	Familiar	0	Unfamiliar	2			
Additional Entries							
TOTALS:							

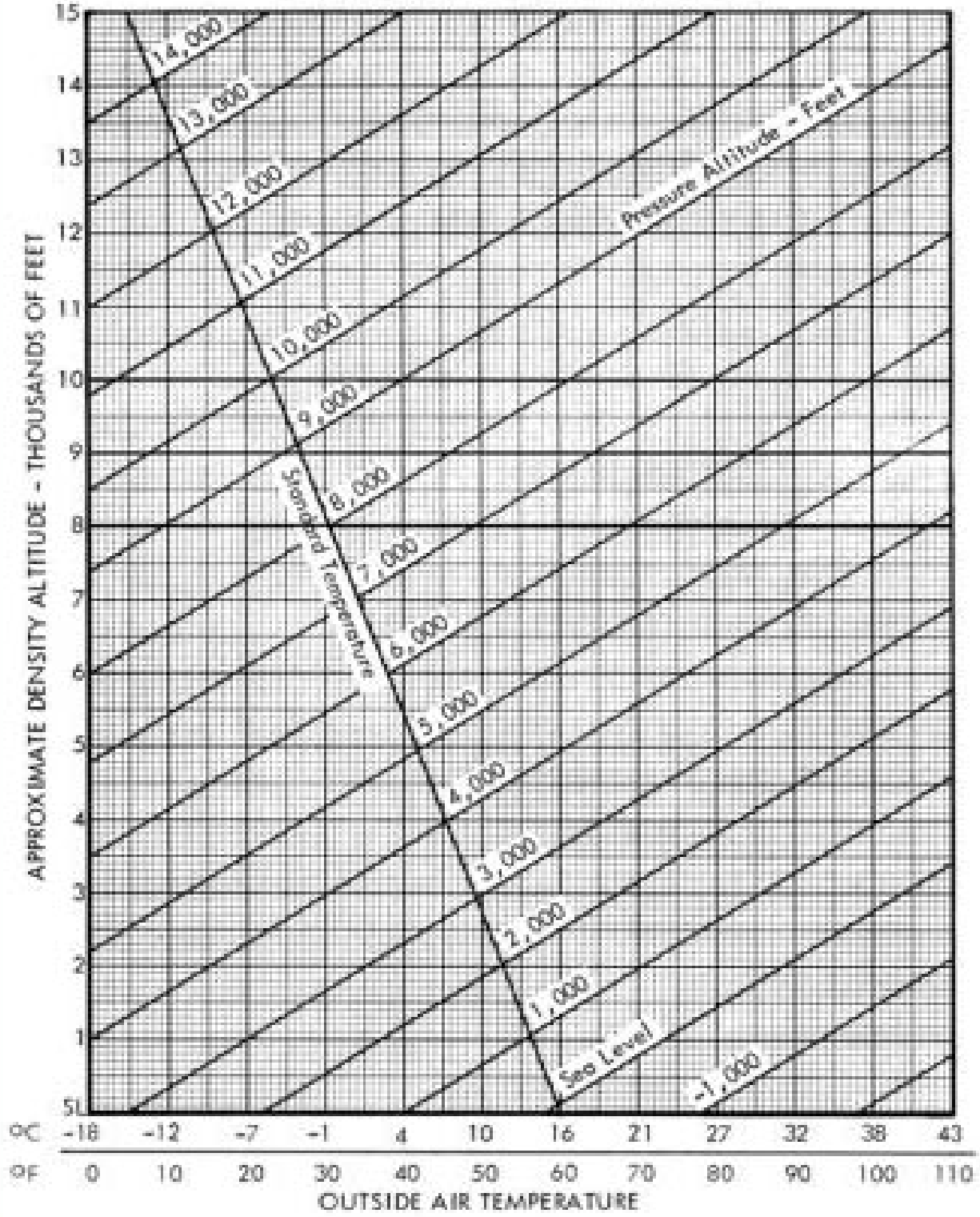
Overall Risk Assessment	Initials (if required)	Date/Time
Low Risk = 0 – 30 Flight Release Officer Approval		
Moderate Risk = 31 -34 Squadron DO/CC Approval required		
High Risk = 35 or greater IC/Wing DO Approval required		
NO GO (N/G)		

** Implement suitable controls for any item in the High range*

For moderate and high risk missions, notify the approval authority of the risk level, the threats driving the risk, and the control measures being used to mitigate the threat. The key to implementing ORM is identifying the threat and incorporating a control method to limit the impact of the threat. Common methods of threat reduction listed with some typical responses:

Limit Crew Duty Day – "We will be on the ground by 0300 hours..."
Change crew makeup – "I'm not flying today" or "We need a more experienced or better-rested crew member…"
Change mission profile – "We will wait until sunup or until weather conditions improve before we launch."
Identify controls for specific threats – "Its at night and we have high terrain, so the minimum altitude we will operate at is 5200'…"

DENSITY ALTITUDE



CROSSWIND DATA SHEET

15 KNOT CROSSWIND COMPONENT IS THE MAXIMUM INDICATED

NOTE:

The maximum demonstrated crosswind component for a Cessna 172 is 15 knots. CAP Regulation 60-1 limits CAP aircraft to the maximum demonstrated crosswind velocity.

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						

WEIGHT AND BALANCE WORK SHEET

		WEIGHT	× ARM	= MOMENT
Basic Empty Weight (current)				
Front Seats				
Rear Seats				
Baggage Area 1 (C-172 max 120#) *				
Baggage Area 2 (C-172 max 50#) *				
Fuel:	Gallons × 6 pounds/gal.			
TOTALS			**CG**	

Directions: *Multiply each WEIGHT by the ARM to get a MOMENT (A calculator is recommended). The ARM for each station can be found in your Pilot's Operating Handbook (POH). Add all the weights and moments to get TOTALS. Divide the TOTAL MOMENT by the TOTAL WEIGHT to find an ARM--this is your center of gravity (CG). Ensure your CG is within the published range from your POH. Ensure you do not exceed the maximum gross weight as published in your POH.*

* Combined Total of baggage areas may not exceed 120#
Remember to include permanently stowed items (e.g., survival kit and chocks)

NOTE: CAPR 60-1 states that the PIC is responsible for planning so as to have a minimum of one hour of fuel remaining upon landing (computed at normal POH/AFM cruise fuel consumption).

Fuel required for one hour at normal cruise = _____ gallons

FAA FLIGHT PLAN

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
					PROPOSED (Z)	ACTUAL (Z)	
☐ VFR			KTS				
☐ IFR							
☐ DVFR							

8. ROUTE OF FLIGHT

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

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

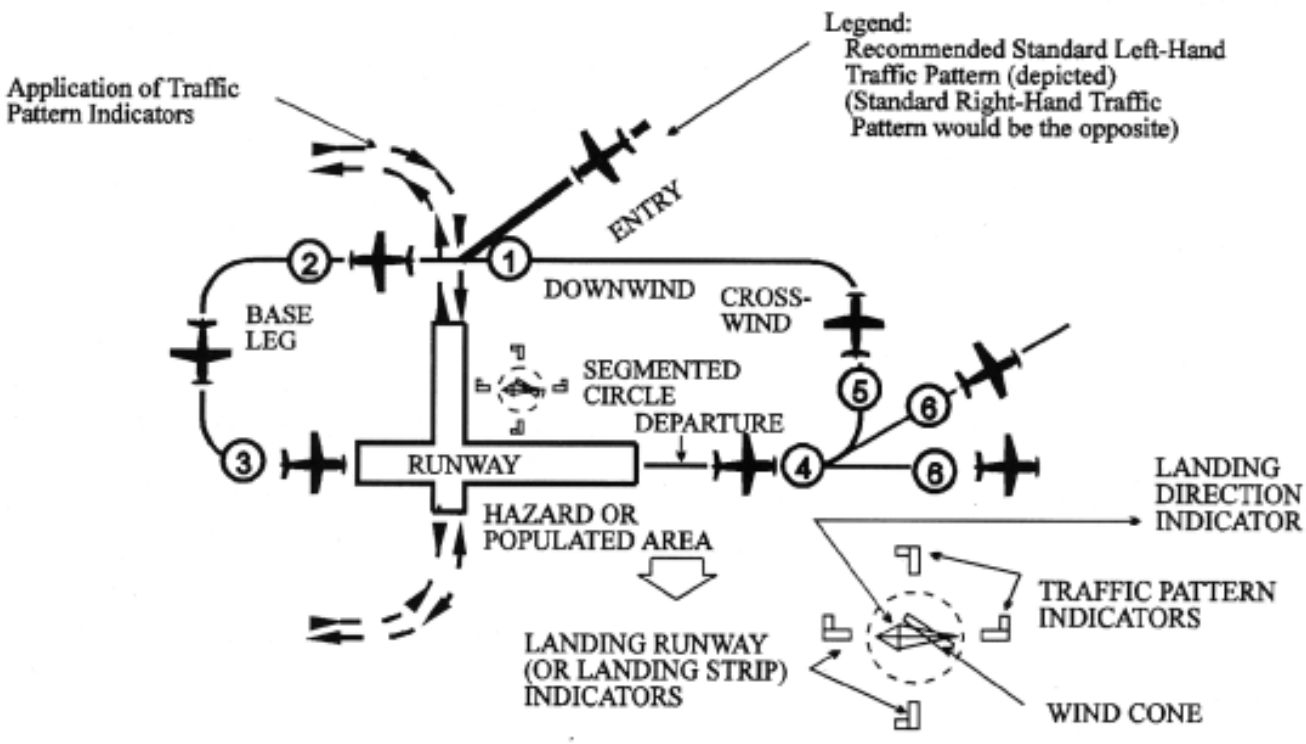
16. COLOR OF AIRCRAFT

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

FAA Form 7233-1 (8-82)

CLOSE VFR FLIGHT PLAN WITH _____ FSS ON ARRIVAL

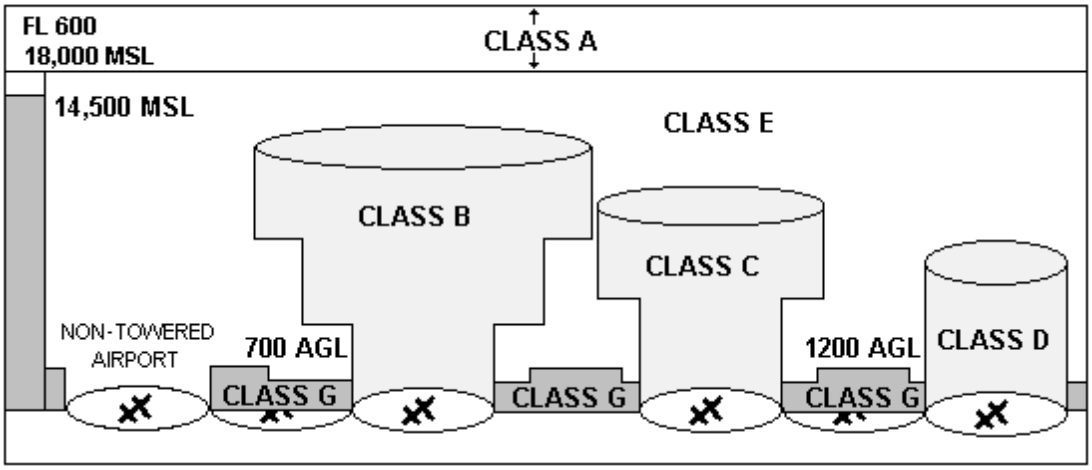
BASIC VFR TRAFFIC PATTERN
UNCONTROLLED FIELD



Note potential emergency landing areas off the ends of each runway as you fly the pattern.

VFR FLIGHT INFORMATION

VFR AIRSPACE CLASSIFICATIONS



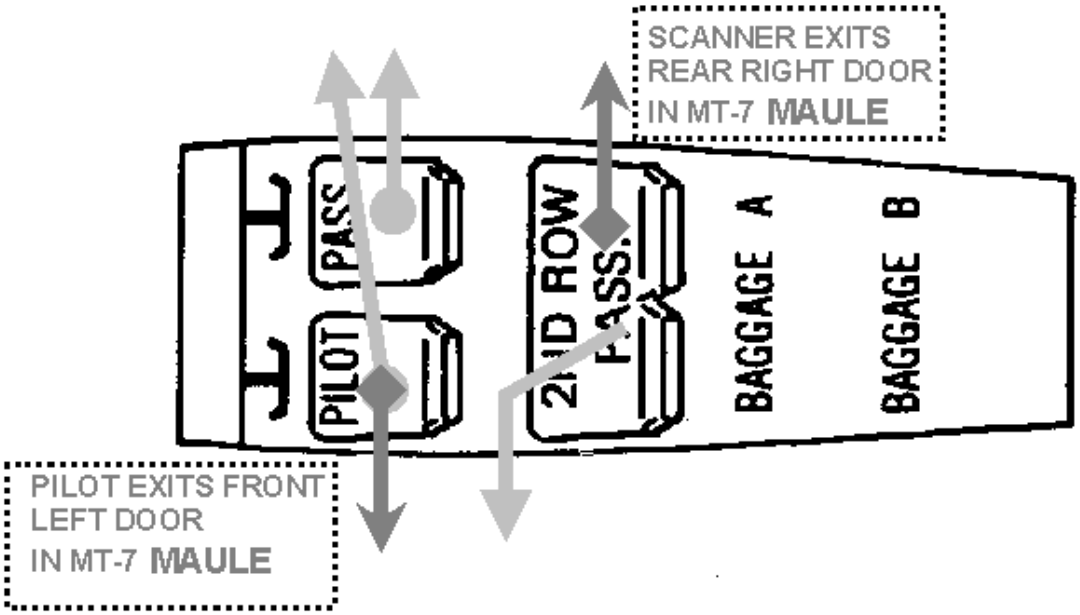
BASIC VFR WEATHER MINIMUMS

AIRSPACE	FLIGHT VISIBILITY	DIST. FROM CLOUDS
CLASS A	NOT APPLICABLE	NOT APPLICABLE
CLASS B	3 STATUTE MILES	CLEAR OF CLOUDS
CLASS C	3 STATUTE MILES	500 FT BELOW 1,000 ABOVE 2,000 HORIZONTAL
CLASS D		500 FT BELOW 1,000 ABOVE 2,000 HORIZONTAL
CLASS E LESS THAN 10,000 FEET MSL	3 STATUTE MILES	500 FT BELOW 1,000 ABOVE 2,000 HORIZONTAL
AT OR ABOVE 10,000 FEET MSL	5 STATUTE MILES	1,000 FT BELOW 1,000 ABOVE 1 NM HORIZONTAL
CLASS G (1,200 FEET ABOVE THE SURFACE (REGARDLESS OF MSL)	3 STATUTE MILES (CAPR 60-1; unless PIC is a current and qualified instrument pilot)	
DAY, EXCEPT AS PROVIDED IN SECTION 91.155 (B)	1 STATUTE MILE	CLEAR OF CLOUDS
NIGHT, EXCEPT AS PROVIDED IN SECTION 91.155 (B)		500 FT BELOW 1,000 ABOVE 2,000 HORIZONTAL
MORE THAN 1,200 FEET ABOVE THE SURFACE BUT LESS THAN 10,000 FT MSL		
DAY	1 STATUTE MILE	500 FT BELOW 1,000 ABOVE 2,000 HORIZONTAL
NIGHT	3 STATUTE MILES	500 FT BELOW 1,000 ABOVE 2,000 HORIZONTAL
MORE THAN 1,200 FEET ABOVE THE SURFACE & AT OR ABOVE 10,000 FT MSL	5 STATUTE MILES	1,000 FT BELOW 1,000 ABOVE 1 NM HORIZONTAL

EMERGENCY EGRESS

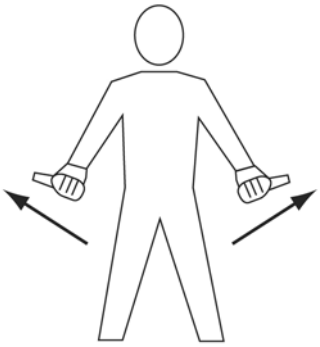
<u>WARNING</u>! DURING OVERWATER EGRESS, *DO NOT* DEPLOY PERSONAL FLOTATION DEVICES UNTIL CLEAR OF AIRCRAFT.

- **PILOT ADJUSTS SEAT ALL THE WAY FORWARD**
- **OBSERVER ADJUSTS SEAT ALL THE WAY TO THE REAR**
- **SCANNER SECURES SURVIVAL EQUIPMENT/RAFT FROM BAGGAGE COMPARTMENT**
- **PILOT AND OBSERVER EXIT THROUGH RIGHT DOOR (PILOT EXITS FRONT LEFT DOOR IN MT-7 MAULE)**
- **SCANNER EXITS THROUGH LEFT DOOR (REAR RIGHT DOOR IN MT-7 MAULE) <<DEPLOYS RAFT IF OVERWATER>>**
- **CREW MEETS *50 FEET* BEHIND THE AIRCRAFT (ON RAFT IF OVERWATER) <<REMAIN UPWIND OF ANY SMOKE>>**



Intentionally blank

FLIGHTLINE HAND SIGNALS

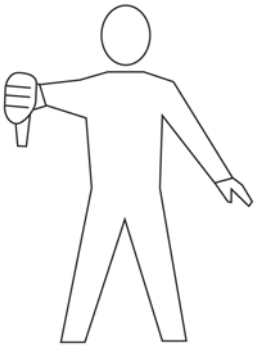


Outward motion with thumbs.
PULL CHOCKS

Circular motion of right hand at head level with left arm pointing to engine.
START ENGINE

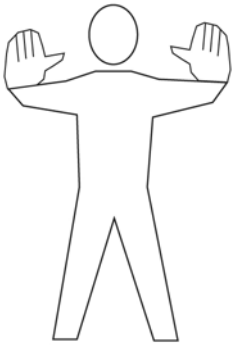
Raise arm, with fist clenched, horizontally in front of body, and then extend fingers.
RELEASE BRAKE

Thumb Up.
OK OR YES

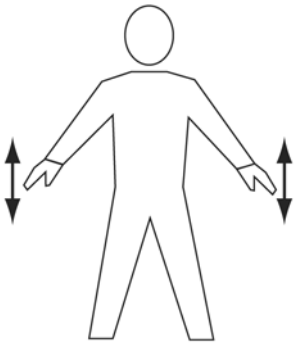


Thumb Down.
NOT OK or **NO**

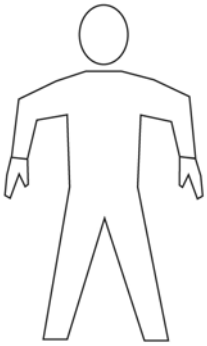
Arms above head in vertical position with palms facing inward. **THIS MARSHALLER**



Arms a little aside, palms facing backwards and repeatedly moved upward and backward from shoulder height. **MOVE AHEAD**

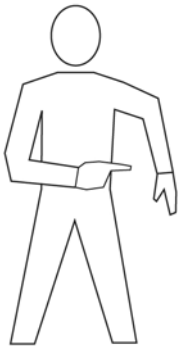


Arms down with palms toward ground, then moved up and down several times.
SLOW DOWN

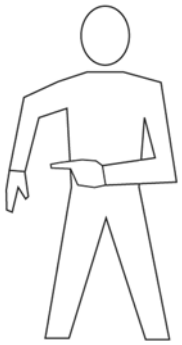


Arms extended with forearm perpendicular to ground. Palms facing body.
HOT BRAKES

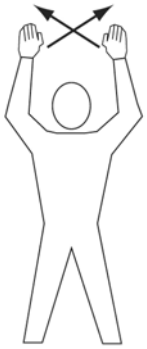
FLIGHTLINE HAND SIGNALS (CON'T)



Arms extended with forearm perpendicular to ground. Palms facing body. Gesture indicates right side.
HOT BRAKES - RIGHT



Arms extended with forearm perpendicular to ground. Palms facing body. Gesture indicates left side.
HOT BRAKES - LEFT



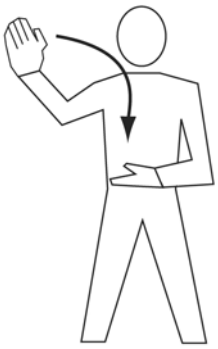
Waiving arms overhead.
EMERGENCY STOP

Right or left arm down, other arm moved across the body and extended to indicate direction of next marshaller. **PROCEED TO NEXT MARSHALLER**

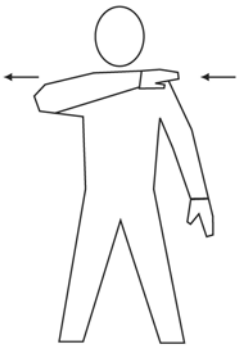
Point right arm downward, left arm repeatedly moved upward-backward. Speed of arm movement indicating rate of turn.
TURN TO THE LEFT

Point left arm downward, right arm repeatedly moved upward-backward. Speed of arm movement indicating rate of turn.
TURN TO THE RIGHT

Arms crossed above the head, palms facing forward.
STOP

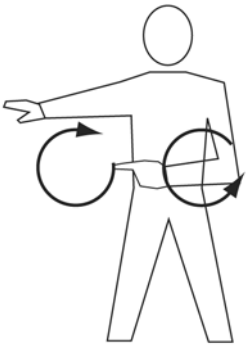


Make a chopping motion with one hand slicing into the flat and open palm of the other hand. Number of fingers extended on left hand indicates affected engine.
FEATHER / FUEL SHUT-OFF



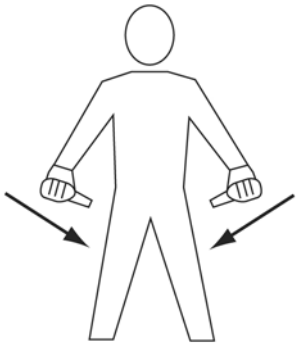
Either arm and hand level with shoulder, hand moving across throat, palm downward.
CUT ENGINES

FLIGHTLINE HAND SIGNALS (CON'T)

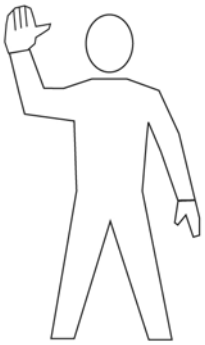


Make rapid horizontal figure-eight motion at waist level with either arm, pointing at source of fire with the other.
FIRE ONBOARD

Raise arm and hand, with fingers extended horizontally in front of the body, then clench fist.
ENGAGE BRAKE



Inward motion with thumbs.
INSERT CHOCKS



Right arm raised with elbow at shoulder height with palm facing forward.
MARSHALLER FINISHED

Intentionally blank

U.S. Department of Transportation
Federal Aviation Administration

Pilot Guide to Airport Signs and Markings

Airport Markings

Help Prevent Runway Incursions

"READ BACK" Your Air Traffic Clearance!

HOLDING POSITION: Hold Short of Intersecting Rwy Also Land and Hold Short Marking

ILS CRITICAL AREA: Hold Short During IMC Conditions

TAXIWAY/TAXIWAY HOLDING POSITION: Hold Short of Intersecting Taxiway When Directed by ATC

MOVEMENT AREA BOUNDARY: Defines Boundary of Movement Area and Non-Movement Area

TAXIWAY EDGE: Defines Edge of Usable Full Strength Taxiway Pavement. Adjoining Pavement NOT Usable

DASHED TAXIWAY EDGE: Defines Edge Taxiway Where Adjoining Pavement or Apron IS Available for Taxi

SURFACE PAINTED HOLDING POSITION: Hold Short of Intersecting Runway on Twy

SURFACE PAINTED TAXIWAY DIRECTION: Direction & Designation of Intersecting Twy

SURFACE PAINTED TAXIWAY LOCATION: Identifies Twy on Which Aircraft is Located

References: Aeronautical Information Manual (AIM). AC 90-67B, AC 150/5340-1H, and AC 150/5340-18C.

(Graphics not to scale)

U.S. Department of Transportation
Federal Aviation Administration

Pilot Guide to Airport Signs and Markings

Airport Signs — Action or Purpose

4-22 — **TWY/RWY HOLD POSITION:** Hold Short of Runway on Taxiway

Also . . . **RWY/RWY HOLD POSITION:** Hold Short of Intersecting Runway

8-APCH — **RWY APCH HOLD POSITION:** Hold Short for Acft on Approach

ILS — **ILS HOLD POSITION:** Hold Short of ILS Critical Area

NO ENTRY: Identifies Paved Areas Where Aircraft Entry is Prohibited

B — **TAXIWAY LOCATION:** Identifies Taxiway on Which Aircraft is Located

22 — **RUNWAY LOCATION:** Identifies Runway on Which Aircraft is Located

4 — **RUNWAY DISTANCE REMAINING:** Identifies Runway Length Remaining

RUNWAY BOUNDARY: Exit Boundary of Rwy Protected Areas

ILS CRITICAL AREA BOUNDARY: Exit Boundary of ILS Critical Area

L→ — **RUNWAY EXIT:** Defines Direction & Designation of Exit Twy from Rwy

Also . . . **TWY DIRECTION:** Defines Direction & Designation of Intersecting Taxiway(s)

22↑ — **OUTBOUND DESTINATION:** Defines Directions to Take-Off Runways

↖MIL — **INBOUND DESTINATION:** Defines Directions for Arriving Aircraft

TAXIWAY ENDING MARKER: Indicates Twy Does Not Continue

↙A G L→ — **DIRECTION SIGN ARRAY:** Identifies Location in Conjunction with Multiple Intersecting Taxiways

If in Doubt **Ask!**

ATCT Light Gun Signals

Color and Type of Signal	Aircraft on the Ground
STEADY GREEN	Cleared for Takeoff
FLASHING GREEN	Cleared to Taxi
STEADY RED	STOP
FLASHING RED	Taxi Clear of the Runway in Use
FLASHING WHITE	Return to Starting Point on Airport
ALTERNATING RED/GREEN	Exercise Extreme Caution

(CONTINUED ON REVERSE SIDE)

SURFACE MOVEMENT GUIDANCE AND CONTROL SYSTEM (SMGCS; PRONOUNCED "SMIGS")

Enhance taxiing capabilities in low visibility conditions and reduce the potential for runway incursions.

Stop Bar Lights are a row of red unidirectional in-pavement lights installed along the holding position marking. Operate in conjunction with green centerline lead-on lights:

- ATC gives clearance to enter the runway. Stop bar lights extinguish and the green lead-on lights illuminate.
- Do not cross illuminated stop bar lights, even if given permission by ATC!

Runway Guard Lights are a set of alternately flashing yellow lights, either elevated or in-pavement. Positioned at all taxiways that provide access to an active runway.

- Denote presence of an active runway and identify the location of a runway holding position marking.

Clearance Bar Lights are yellow in-pavement lights used to denote holding positions for aircraft (and vehicles).

- When used for hold points, they are co-located with geographic position markings.

Taxi Centerline Lighting consists of green in-pavement lights.

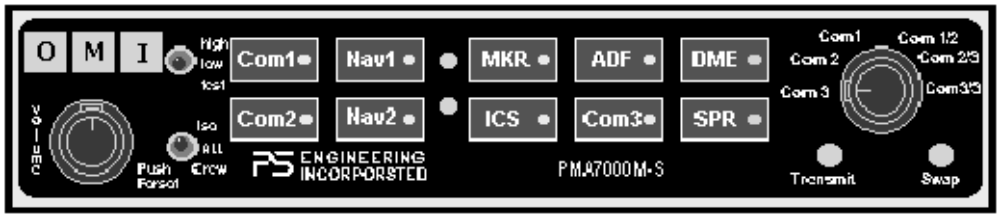
- Used to guide traffic in low visibility or darkness.

Geographic Position Markings are "pink spots" outlined with a black and white circle and designated with a number, a letter, or both.

- Can be used as hold points or for position reporting.

Intentionally blank

PMA7000MS AUDIO PANEL



NOTE: COORDINATE RADIO AND INSTRUMENT OPERATION WITH PIC BEFORE FLIGHT

VOLUME-**PUSH ON/OFF** (CHECK FOR AT LEAST 1 LED, UNLESS IN COM3 MODE)

HIGH/LOW/TEST SWITCH-**TEST** (CHECK FOR ILLUMINATION OF O M I INDICATORS) **ADJUST SENSITIVITY IF AUDIO IN USE**

ISO/ALL/CREW TOGGLE SW – **SET AS REQUIRED** (INTERCOM MODE)

INTERCOM MODES				
MODE	**PILOT HEARS**	**OBSERVER HEARS**	**SCANNER HEARS**	**COMMENTS**
ISO	A/C RADIOS PILOT SIDETONE	OBSERVER & SCANNER INTERCOM	OBSERVER & SCANNER INTERCOM	ISOLATES PILOT
ALL	PILOT OBSERVER SCANNER A/C RADIO	OBSERVER PILOT SCANNER A/C RADIO	SCANNER PILOT OBSERVER A/C RADIO	ALL HEAR RADIOS AND CAN COMMUNICATE ON THE INTERCOM
CREW	PILOT OBSERVER A/C RADIO	OBSERVER PILOT A/C RADIO	SCANNER(S)	ISOLATES SCANNER(S)

COM SWAP SW- **SWAP PILOT AND OBSERVER RADIOS** LOCATED ON INSTRUMENT PANEL (SWAP INDICATOR ILLUMINATES)

AUDIO SELECTOR SWITCHES-**SET AS REQUIRED** (SEE BELOW)

COM1- VHF1

COM2-VHF2

NAV1-VOR1 RADIO

NAV2-VOR2 RADIO

PMA7000MS AUDIO PANEL (CONT'D)

MKR-MARKER BEACON

ICS-ACTIVATES INTERCOM IN SPLIT MODES

ADF-ADF RADIO (MAY NOT BE AVAILABLE IN ALL AIRCRAFT)

COM3-CAP FM RADIO (may be labeled "FM")

DME-DISTANCE MEASURING EQUIPMENT (DME)

SPR-CABIN SPEAKER (NOT INSTALLED ON ALL CAP AIRCRAFT)

	TRANSMITTER COMBINATIONS			
	NORMAL		SWAP	
MIC SELECT	PILOT	OBSERVER	PILOT	OBSERVER
Com 1	Com 1	Com 1	Com 2	Com 2
Com 2	Com 2	Com 2	Com 1	Com 1
Com 3	Com 3	Com 3	No Swap	No Swap
Com 1/2 *	Com 1	Com 2	Com 2	Com 1
Com 1/3 *	Com 1	Com 3	Com 3	Com 1
Com 2/3 *	Com 2	Com 3	Com 3	Com 2
***SPLIT MODES MAY RESULT IN AUDIO 'BLEED OVER' BETWEEN FREQUENCIES**				

SPLIT MODES

☆ MISSION SETTING – Com 1/3

NOTE: ENSURE TRANSMITTER SETTING IS AS REQUIRED BEFORE USING RADIO.

TRANSMIT INDICATOR-ILLUMINATES WHEN TRAMSMITTING ON RADIO

SWAP-ILLUMINATES WHEN SWAP SWITCH IS ACTIVATED

NAT NPX-138 VHF FM RADIO

WARNING! ***DO NOT*** **OPERATE DURING IFR FLIGHT**

NOTE: VHF TRANSMISSIONS ON CAP FREQUENCIES MAY INTERFERE WITH SLOW- SCAN DOWNLINK

POWER -UP

MN KNOB – **ON (SELF TEST)**

NEXT SW- **TOGGLE LEFT/RIGHT**

EDIT SW-**CENTERED**

DISP- **ID MODE (DISPLAYS CH NUMBER & TEST LABEL)**

SCAN/NORM/GD- **SWITCH TO NORM**

GD1/GD2 SW - **GD2 (LESS TRAFFIC)**

CHAN SELECT- **AS REQUIRED**

MN KNOB- **ADJUST VOLUME**

SQ/HELP - **PRESS TO CHECK SQUELCH**

GD- **MINIMUM**

GUARD CHANNEL OPERATION

SCAN/NORM/GD **- GD**

GD1 - **Primary frequency (DEFAULT SETTING)**

GD2 - **Air-to-Ground frequency (DEFAULT SETTING)**

GD**- MINIMUM**

MN**- MINIMUM**

TDFM-136 DIGITAL/ANALOG VHF FM RADIO

NORMAL OPERATION

OFF/MAIN **- MAIN (now controls transmit / receive volume)**

GUARD **- Volume adjust (receive only)**

SQUELCH **- Pushbutton (AUTO: DO NOT OPERATE)**

MN/GD **– MN (Normal) or GD (Guard)**

G1/G2 **– As Briefed** (G2 if Primary displayed in Main)

HI/LO **- HI (10 watts;** LO is 1 watt**)**

4 - **Back (Scroll memory down; wraps around)**

6 - **Forward (Scroll memory up; wraps around)**

2 - **Display brighter**

8 - **Display dimmer**

5 - **Scan (Scan lists, if enabled, set by comm officer)**

If receive a message over Guard, take MN/GD toggle to GD, reply, and then back to MN to continue using the main frequency.

CAP NATIONAL STANDARD CHANNELIZATION PLAN

CHANNEL	Frequency	TYPE	Tone	Code	Use
Channel 1	Protected	Simplex	100 Hz	1Z	Primary Simplex
Channel 2	Protected	Simplex	100 Hz	1Z	Secondary Simplex
Channel 3	Protected	Simplex	100 Hz	1Z	Ground Tactical
Channel 4	Protected	Simplex	100 Hz	1Z	Air-to-Ground / Air

Note: Do not publish or reveal frequencies to unauthorized personnel!

IMPORTANT GENERAL FREQUENCIES

Actual SAR Aviation Band 123.1 MHz
Practice SAR Aviation Band 122.9 MHz
In-flight Weather (Flight Watch) 122.0 MHz
General Flight Service 122.2 MHz

HELPFUL & IMPORTANT TELEPHONE NUMBERS

Weather Briefing (Local Flight Service Station) 1-800-WX-BRIEF
CAP NATIONAL OPERATIONS CENTER: (888) 211-1812
CAP Operations Fax Back: (334) 953-4242
AFRCC Missions Only: (800) 851-3051
AFRCC SAR Controllers: (757) 764-8112
AFRCC Fax: (757) 764-8128
Time Hack: (202) 762-1401, (303) 499-7111, DSN 762-1401

CAP FM RADIO REPORTS

- Radio check (initial flight of the day)
- Take off time *
- Time entering a search area *
- Time exiting a search area *
- Landing time *
- Ops Normal (at intervals briefed by mission staff)

* Log the Time and Hobbs when making these reports to ensure you have all the data needed to complete the CAPF 104

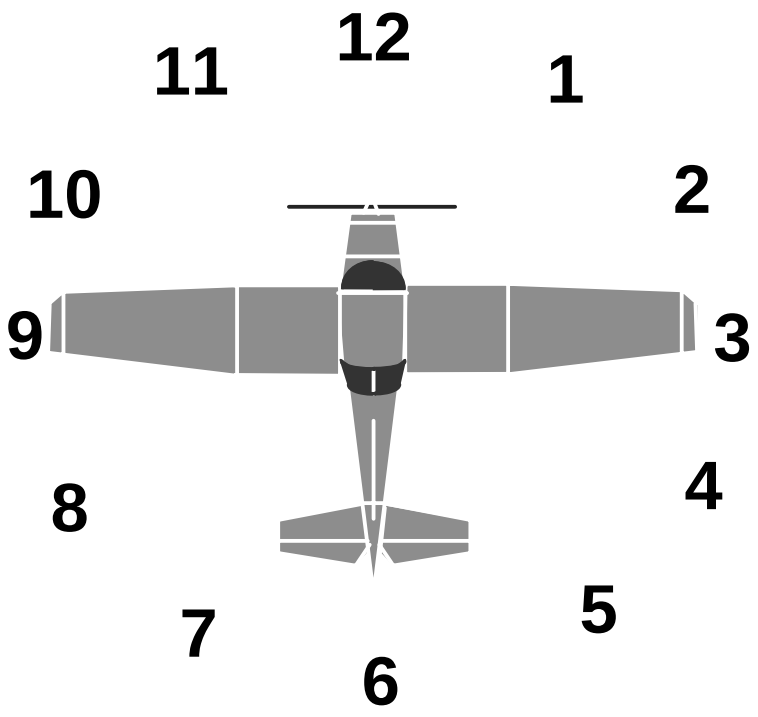
Intentionally blank

PROWORDS

TERM	DEFINITION or MEANING
AFFIRMATIVE	Yes.
ALL AFTER	The portion of the message that follows (word).
ALL BEFORE	The portion of the message that precedes (word).
BREAK	I hereby indicate the separation of the text from other portions of the message.
COPY	I understand.
CORRECT	You are correct, or what you have transmitted is correct
CORRECTION	An error has been made in this transmission. Transmission will continue with the last word correctly transmitted.
DISREGARD	The last transmission was in error. Disregard it.
DISREGARD THIS TRANSMISSION	This transmission is in error. Disregard it. This proword should not be used to cancel any message that has been completely transmitted and for which receipt or acknowledgment has been received.
EXEMPT	The addresses immediately following are exempted from the collective call.
FIGURE(s)	Numerals or numbers follow.
FROM	The originator of this message is the address designator that follows.
I READ BACK	The following is my response to your instructions to read back.
I SAY AGAIN	I am repeating transmission or portion indicated.
I SPELL	I shall spell the next word phonetically.
I VERIFY	That which follows has been verified at your request and is repeated. To be used only as a reply to VERIFY.
INFO	The addressees immediately following are addresses for information.
INITIALS	Personal initials shall be spoken phonetically prefixed by the word “INITIALS.”
MESSAGE FOLLOWS	A message that requires recording is about to follow. Transmitted immediately after the call. (This proword is not used on nets primarily employed for conveying messages. It is intended for use when messages are passed on tactical or reporting nets.)
MORE TO FOLLOW	Transmitting station has additional traffic for the receiving station.
NEGATIVE	No or “permission not granted” or “that is not correct.”
OUT	This is the end of my transmission to you and no answer is required or expected.
OVER	This is the end of my transmission to you and a response is necessary. Go ahead; transmit.
PRIORITY	Precedence PRIORITY.
READ BACK	Repeat my message back to me. A request to repeat instructions back to the sender, for the purpose of confirmation. Also, the receiver's reply, repeating the instructions, as in: "Read back is as follows..."
RED CAP	Precedence RED CAP.
RELAY (TO)	Re-transmit this message to...
ROGER	I have received and understand all of your last transmission. This should not be used to answer a question requiring a yes or no answer.
ROUTINE	Precedence ROUTINE.
SAY AGAIN	Repeat all of your last transmission. Followed by identification data means “Repeat _____ (portion indicated).”
SPEAK SLOWER	Your transmission is at too fast a speed. Reduce speed of transmission.
SPELL, or I SPELL	Please spell, or "I shall spell the next word phonetically.”
STANDBY	I must pause for a few seconds.
THIS IS	This transmission is from the station whose designator immediately follows.
TIME	That which immediately follows is the time or date-time group of the message.
TO	The addressees immediately following are addressed for action.

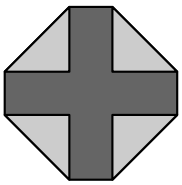
TERM	DEFINITION or MEANING
VERIFY	Verify entire message (or portion indicated) with the originator and send correct version. To be used only at the discretion of or by the addressee to which the questioned message was directed.
WAIT	I must pause for a few seconds.
WAIT OUT	I must pause longer than a few seconds.
WILCO	I have received your signal, understand it, and will comply. To be used only by the addressee. *Since the meaning of ROGER is included in that of WILCO, these two prowords are* never *used together*.
WORD AFTER	The word of the message to which I have reference is that which follows _____.
WORD BEFORE	The word of the message to which I have reference is that which precedes _____.
WORDS TWICE	Communication is difficult. Transmit each phrase or each code group twice. This proword may be used as an order, request, or as information.

AIRCRAFT CLOCK POSITIONS

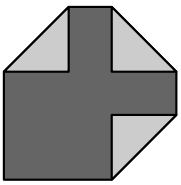


VISUAL SIGNALS

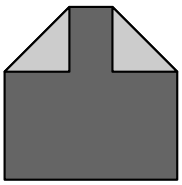
PAULIN SIGNALS



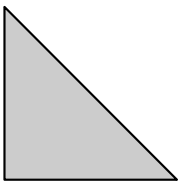
NEED MEDICAL ASSISTANCE



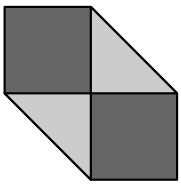
NEED FIRST AID SUPPLIES



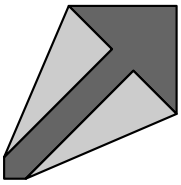
NEED WARM CLOTHING



NEED FOOD AND WATER



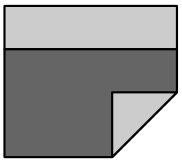
DO NOT ATTEMPT



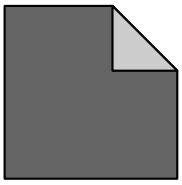
PROCEEDED IN THIS DIRECTION

SHOULD WE WAIT FOR A RESCUE PLANE?

INDICATE DIRECTION OF NEAREST HABITATION



ABANDONED PLANE-WALKING IN THIS DIRECTION



NEED GAS AND OIL

EMERGENCY DISTRESS SIGNALS

Require doctor Serious injuries

Require medical supplies

Unable to proceed

Require food and water

Indicate direction to proceed

Proceeding in this direction

Will attempt takeoff

Aircraft seriously damaged

Require fuel and oil

Probably safe to land here

All well

Not understood

No

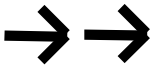
Yes

Require map and compass

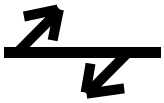
Require signal lamp

Require firearm and ammunition

Require engineer

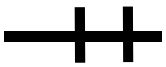


Information that A/C in this direction



Divided into 2 groups, in directions as indicated

Unable to continue; returning



Have found only some personnel

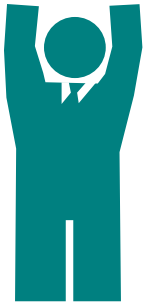
Have found all personnel

Operation complete

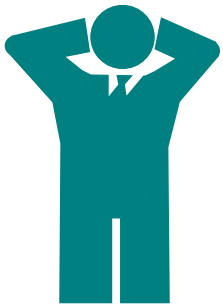
Nothing found. Will continue to search

VISUAL SIGNALS (CONT'D)

Wave Both arms across face
DO NOT ATTEMPT TO LAND



Both arms held over head
PICK UP - PLANE IS ABANDONED

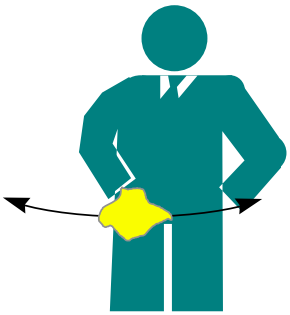


Cup hands over ears
OUR RECEIVER IS WORKING

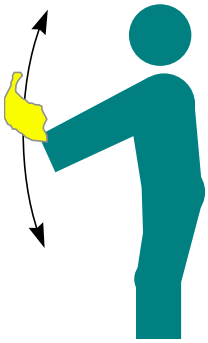
Lie flat on back with hands above head
NEED MEDICAL ASSISTANCE

Both arms horizontal
NEED MECHANIC HELP or PARTS

Wave one arm over head
ALL OK - DO NOT WAIT



Wave cloth horizontally
NEGATIVE – NO



Wave cloth vertically

AFFIRMATIVE – YES

Both arms pointing in the direction of landing while squatting
LAND IN THIS DIRECTION

One arm horizontal

WAIT IF PRACTICAL

VISUAL SIGNALS (CONT'D)

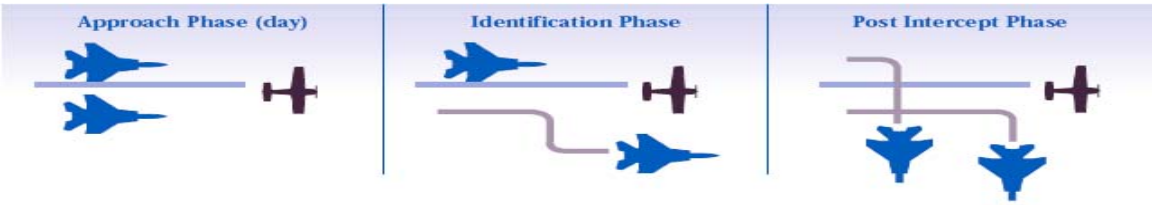
IN-FLIGHT INTERCEPT PROCEDURES

Law Enforcement Aircraft	Meaning	Intercepted Aircraft	Meaning
Rocks wings. After acknowledgement initiates a slow level turn, normally to the left, onto the desired heading.	You have been intercepted. Follow me.	Rocks wings and follows. [Also, at night flash navigational lights.]	I understand and will comply.
Performs an abrupt breakaway maneuver consisting of a climbing 90° turn, or more, without crossing the intercepted aircraft's flight path.	You may proceed.	Rocks wings.	I understand and will comply.
Circles airport, lowers landing gear, and overflies runway in the direction of landing.	Land at this airport.	Lowers landing gear, follows the LE aircraft and lands if the runway is considered safe. [Also, at night turn the landing lights on.]	I understand and will comply.

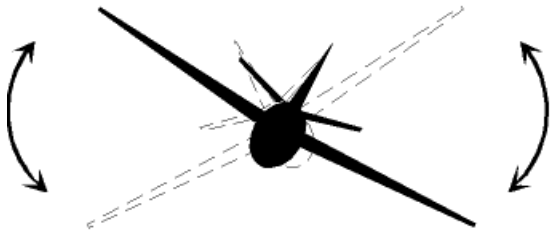
Intercepted Aircraft	Meaning	Law Enforcement Aircraft	Meaning
Raises landing gear while flying over runway between 1000' and 2000', and continues to circle the airport.	This airport is inadequate.	If the intercepted aircraft is requested to go to an alternate airport, the LE aircraft raises its landing gear and uses the intercept procedures.	Understood. Follow me.
The pilot switches on and off all available lights at *regular* intervals.	Cannot comply.	Performs the breakaway maneuver.	Understood.
The pilot switches on and off all available lights at *irregular* intervals.	In distress.	Performs the breakaway maneuver.	Understood.

<u>If you are intercepted by a U.S. Military or law enforcement (LE) aircraft, immediately</u>:

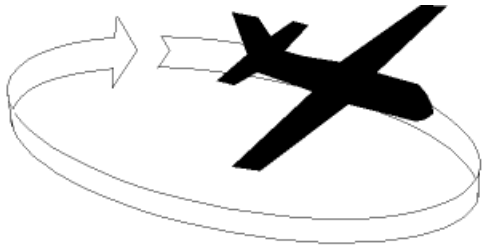
1. Follow the instructions per the chart, above.
2. Notify ATC, if possible.
3. Attempt to communicate with the intercepting aircraft and/or ATC on 121.5 MHz, giving the identity and position of your aircraft and the nature of the flight.
4. Squawk 7700, unless otherwise instructed by ATC. If any instructions 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.



AIR TO GROUND SIGNALS



a. Message received and understood

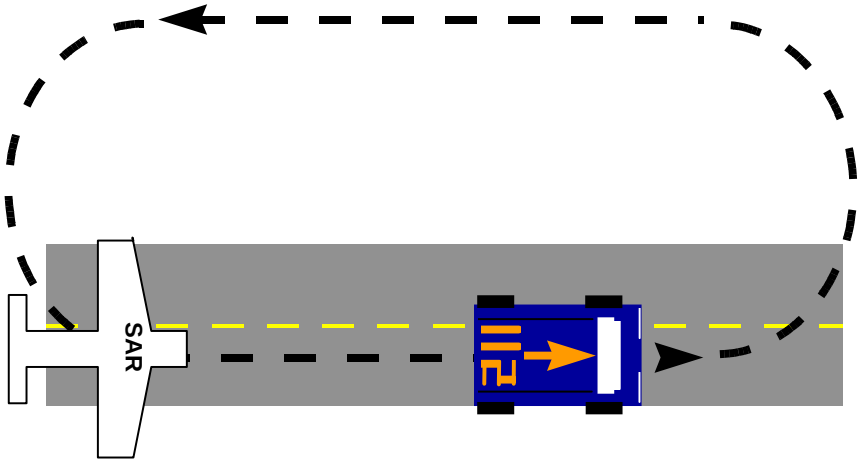


b. Message received but NOT understood

c. Yes or affirmative

d. No or negative

KEEPING UP WITH THE GROUND TEAM

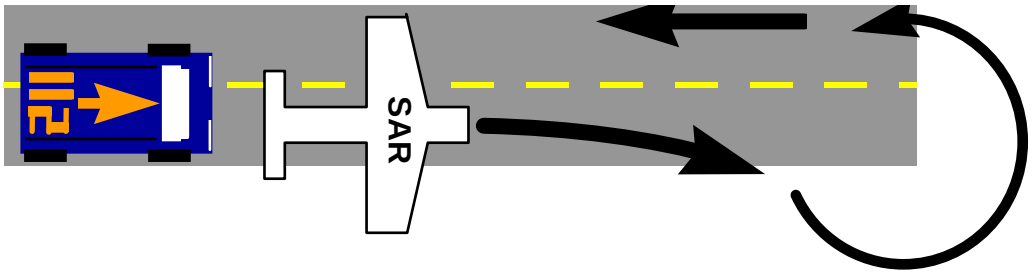


AIRCRAFT ACTION: Aircraft approaches the vehicle from the rear and turns in a normal manner right (or left) to re-approach the vehicle from the rear. Circle back as necessary using oval patterns and flying over the team from behind, indicating that they should continue. The majority of the flight path should be behind the ground team as though the aircraft were “pushing” it. This process of circling back and pushing may be referred to as a “Daisy Chain.” Daisy Chain over the ground team as long as necessary.

DESIRED TEAM ACTION: Continue driving in indicated direction along this road.

AIR TO GROUND SIGNALS (CON'T)

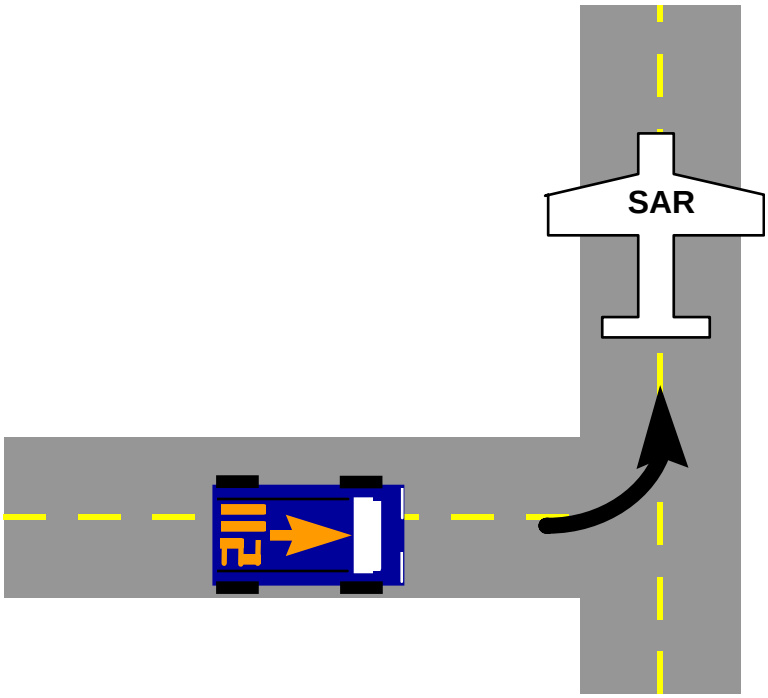
TURNING THE GROUND TEAM AROUND



AIRCRAFT ACTION: Aircraft approaches the vehicle from the rear and then turns sharply right (or left) in front of the vehicle while in motion. Then flies directly at (over) the ground vehicle. Circle back or repeat as necessary flying against the team's direction of travel, then take up the 'keeping up' procedure outlined above.

DESIRED TEAM ACTION: Turn vehicle around and proceed in direction indicated.

TURNING THE GROUND TEAM

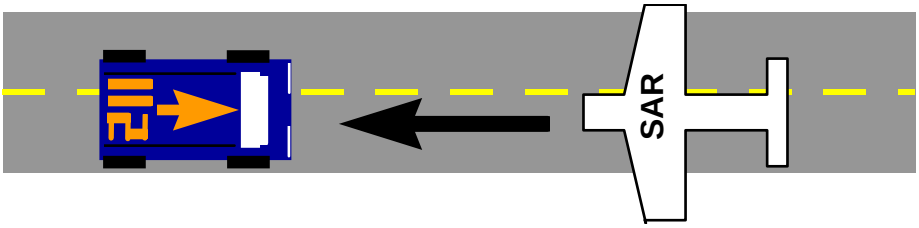


AIRCRAFT ACTION: Aircraft approaches the vehicle from the rear and then turns sharply right (or left) in front of the vehicle while in motion. Circle back as necessary using oval patterns and flying over the team from behind, indicating that they should continue.

DESIRED TEAM ACTION: Turn vehicle to left (or right) at the same spot the aircraft did and then continue in that direction until further signals are received.

AIR TO GROUND SIGNALS (CON'T)

STOP OR DISMOUNT



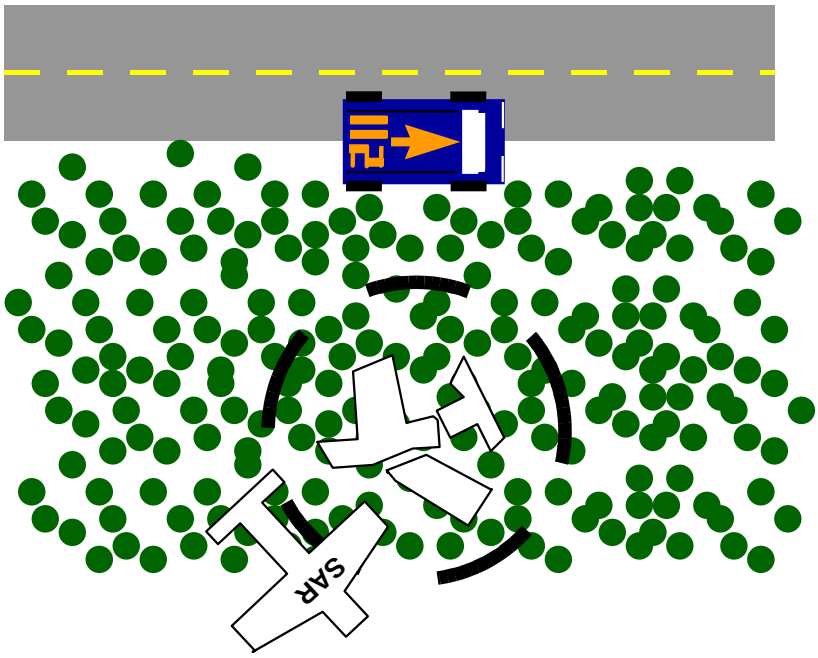
AIRCRAFT ACTION: Aircraft approaches the vehicle low and head-on while the vehicle is moving. This is not to be confused with 'turn around' because aircraft does not perform a 180° turn in front of vehicle.

DESIRED TEAM ACTION: STOP the vehicle and await further instructions

AIRCRAFT ACTION: Aircraft makes two (or more) passes in same direction over a stopped ground team

DESIRED TEAM ACTION: Get out of the vehicle, then follow the aircraft and obey further signals (proceed on foot)

OBJECTIVE IS HERE



AIRCRAFT ACTION: Aircraft circles one geographic place (and continues to circle using turns-about-a-point type procedures)

DESIRED TEAM ACTION: Proceed to the location where the low wing of the aircraft is pointing; that is the location of the target.

AIRDROP PROCEDURES

GENERAL GUIDELINES

- DROPPING OF OBJECTS IS PROHIBITED UNLESS SUCH ACTION IS TO PREVENT LOSS OF LIFE (CAPR 60-1 CHAPTER 2).
- OBJECTIVE IS TO GET AIRDROP NEAR THE RECIPIENT OR TARGET AREA. DO NOT AIM DIRECTLY AT RECIPIENT, AS HE/SHE IS NOT EXPECTED TO CATCH THE AIRDROP.
- PROCEDURE SHOULD BE CALM AND DELIBERATE.
- PILOT IS OPERATING THE AIRCRAFT AND NOT FIXATING ON THE TARGET OR THE OBSERVER'S ACTIONS.

ANY CREWMEMBER NOTING AN UNSAFE CONDITION: CALL *"NO DROP, NO DROP, NO DROP!"*

PILOT WILL CLIMB TO MISSION ALTITUDE, AND RETURN TO DOWNWIND LEG OF AIRDROP TRAFFIC PATTERN.

MESSAGE DROP

- MESSAGE DROP SHOULD CONSIST OF A LIGHT OBJECT THAT CAN BE SAFELY DROPPED ATTACHED TO A ROLL OF FLUORESCENT SURVEYOR'S TAPE.
- WRITE A DIRECTIVE MESSAGE AND INCLUDE AN EXPECTED RESPONSE FROM RECIPIENT TO CONFIRM RECEIPT. (SEE 'VISUAL SIGNALS')
- DETERMINE THE WIND DIRECTION AND ATTEMPT TO FLY A TRAFFIC PATTERN INTO THE WIND (IF OBSTACLES PERMIT).
- PILOT CONFIGURES AIRCRAFT WITH 10 DEGREES FLAPS AND 80 KNOTS TO PROVIDE A STABLE PLATFORM.
- FLY ONE RECTANGULAR PATTERN AT 800 AGL TO DETERMINE HAZARDS AND OBSTACLES.
- EXTEND THE BASE TO GIVE A TWO-MILE FINAL TO THE DROP POINT.
- DESCEND TO DROP ALTITUDE, TYPICALLY 500 FEET (TERRAIN PERMITTING) AND OPEN OBSERVER'S WINDOW FOR THE DROP.

AIRDROP PROCEDURES (CONT'D)

MESSAGE DROP (CONT'D)

- WHILE ON FINAL, THE OBSERVER WILL CALL "LEFT TURN, STOP TURN" OR "RIGHT TURN, STOP TURN" INSTRUCTIONS TO PILOT.
- WHEN THE RECIPIENT OR TARGET AREA PASSES UNDER THE RIGHT WHEEL, RELEASE THE SURVEYOR'S TAPE FIRST AND PAUSE MOMENTARILY BEFORE RELEASING OBJECT-ENSURES THE FORWARD THROW CARRIES IT PAST THE RECIPIENT (SO IT WON'T HIT THEM).
- THE TAPE UNWINDS AND MAKES A TRAIL TO THE DROP POINT.
- RECONFIGURE, CLOSE THE WINDOW, CLIMB TO MISSION ALTITUDE.

EQUIPMENT DROP

- EQUIPMENT DROP IS EXECUTED FOR SURVIVORS NEEDING FIRST AID, SURVIVAL, COMMUNICATIONS EQUIPMENT OR MEDICINE.
- PAD SENSITIVE/FRAGILE EQUIPMENT. EQUIPMENT SHOULD BE PLACED IN A SMALL BAG (LIKE A BACKPACK)
- ATTACHED SURVEYOR'S TAPE TO BAG. THE SURVEYOR'S TAPE WILL LEAVE A TRAIL IN CASE THE KIT IS LOST IN BRUSH, OR TREES
- FOLLOW MESSAGE DROP PROCEDURES. MODIFY AS NECESSARY TO ENSURE THAT AIRDROP IS CONDUCTED IN A SAFE MANNER WITHIN OPERATING LIMITS OF AIRCRAFT.
- DELAY ONE TO TWO SECONDS PRIOR TO RELEASE FOR AN EQUIPMENT DROP.

WARNING! PILOT WILL *NOT* 'SCORE' THE DROP. RADICAL FLIGHT MANUEVERS MAY RESULT IN A TAIL-STRIKE OR AIRCRAFT STALL.

AIRCREW SURVIVAL BASICS

A. BEFORE FLIGHT

1. Wear appropriate clothing *(Dress to Egress)*
   a. Don't leave gloves, hats and coats behind; dress for the current *and* forecasted weather (including weather conditions a day or two ahead).
   b. High boots (combat type) minimize ankle and lower leg injuries both in a crash and when traveling on foot.

2. Check aircraft and personal survival supplies before leaving.

3. File a flight plan (FAA and CAP) so someone will know if you do not return on time. Make sure your course and destination are known.

B. IN-FLIGHT EMERGENCY

1. Attempt to make radio contact.
   a. Begin radio transmissions at highest possible elevation.
   b. VHF range: 5 nm on the ground; 40 nm at 1000'AGL; 125 nm at 10,000'AGL.
   c. If no answer on ATC channel, use 121.5 MHz.
   d. Transmit MAYDAY (distress) or PAN-PAN (urgency), as appropriate.
   e. Know your location - check navaids and GPS.
   f. Set Transponder to: 7700 (Emergency); 7600 (Lost Communications); or 7500 (Hijack).
   g. Use CAP FM radio.
   h. Cell phones will also work, but are better at lower elevations.

2. Prepare for hard/crash landing - DON'T PANIC.
   a. Seat belts & shoulder harness secure.
   b. Doors unlatched and slightly open.
   c. Secure any loose items that may become airborne.
   d. Know where emergency equipment is located.
   e If visibility permits, evaluate the landing area while airborne and look for nearby:
      1) Clearings
      2) Water
      3) Civilization or trails/roads
   f. Be prepared to exit quickly if fire (or the potential for fire) exists.

C. AFTER LANDING

1. DON'T PANIC, REMAIN CALM
   Size up the situation. Proper mental attitude will keep you alive.
2. Treat any serious medical problems.
3. Make sure the ELT is operating.
   a. Repair antennas if necessary (24" antenna or wire for 121.5 MHz)
   b. Check Aircraft Radios and Cell phones. Minimize battery use.

AIRCREW SURVIVAL BASICS (CON'T)

4. Inventory all assets. Survival kit, fuel, radios, food, paper, water, and aircraft parts - *everything*!

5. Prepare a plan - think logically.
   a. Review survival manuals.
   b. Stay with/near the aircraft, especially if the ELT and/or radios are working.
   c. Travel *only* if survival chances are *much better* elsewhere.
   d. Much greater energy will be expended traveling (requires more food and water).
   e. Obtain shelter (e.g., aircraft body, under the wings, or in a cave).
   f. Set up a signal plan (e.g., fire, smoke, flares, or signal panels).
   g. Set up a communications plan (e.g., how often to use the radio and batteries).
   h. Look for additional sources of water (much more important than food).
   i. Don't try to travel at night.
   j. Work and stay as a team.

6. Follow your plan and wait for help to arrive.
   a. NEVER GIVE UP HOPE!
   b. Do not think negatively.
   c. Do things to improve the situation - help is on the way!

URGENT CARE / FIRST AID

If you are prepared to help others you will be better able to care for yourself in case of injury. Even if your condition is so bad that you are unable to care for yourself, you can direct others in the correct procedures.

The first, most important measures to take in the event of an accident are:
1. Do not move a person unless absolutely necessary (e.g., fire, water, smoke or noxious fumes)
2. Ensure the victim has an open airway and give mouth-to-mouth artificial respiration if necessary
3. Check for a pulse and give CPR if necessary
4. Control severe bleeding

The following provide additional directions once emergency measures have been taken to ensure victim's safety:

Do not move the victim unless it is absolutely necessary for safety.
Do not let the victim get up and walk around.
Protect the victim from unnecessary manipulation and disturbance.
Avoid or overcome chills by using blankets or covers.
Determine injuries and administer required first aid.
Plan your actions according to the nature of the injury, the needs of the situation, and the availability of human and material resources.
Remain in charge until the victim can be turned over to qualified persons.
Do not discuss the victim's condition with bystanders or reporters

POD CHARTS

MISSION POD CHART

OPEN, FLAT TERRAIN				
Srch Alt. (AGL)	Search Visibility			
Track Spacing	1 mi	2 mi	3 mi	4 mi
500 ft				
0.5 mi	35%	60%	75%	75%
1.0	20	35	50	50
1.5	15	25	35	40
2.0	10	20	30	30
700 ft				
0.5 mi	40%	60%	75%	80%
1.0	20	35	50	55
1.5	15	25	40	40
2.0	10	20	30	35
1000 ft				
0.5 mi	40%	65%	80%	58%
1.0	20	40	55	60
1.5	15	30	40	45
2.0	15	20	30	35

MODERATE TREE COVER/HILLY				
Srch Alt. (AGL)	Search Visibility			
Track Spacing	1 mi	2 mi	3 mi	4 mi
500 ft				
0.5 mi	20%	35%	50%	50%
1.0	10	20	30	30
1.5	5	15	20	20
2.0	5	10	15	15
700 ft				
0.5 mi	20%	35%	50%	55%
1.0	10	20	30	35
1.5	10	15	20	25
2.0	5	10	15	20
1000 ft				
0.5 mi	25%	40%	55%	60%
1.0	15	20	30	35
1.5	10	15	20	25
2.0	5	10	15	20

HEAVY TREE COVER/VERY HILLY				
Srch Alt. (AGL)	Search Visibility			
Track Spacing	1 mi	2 mi	3 mi	4 mi
500 ft				
0.5 mi	10%	20%	30%	30%
1.0	5	10	15	15
1.5	5	5	10	15
2.0	5	5	10	10
700 ft				
0.5 mi	10%	30%	30%	35%
1.0	5	10	15	20
1.5	5	5	10	15
2.0	5	5	10	10
1000 ft				
0.5 mi	40%	60%	75%	80%
1.0	5	10	15	20
1.5	5	10	10	15
2.0	5	5	10	10

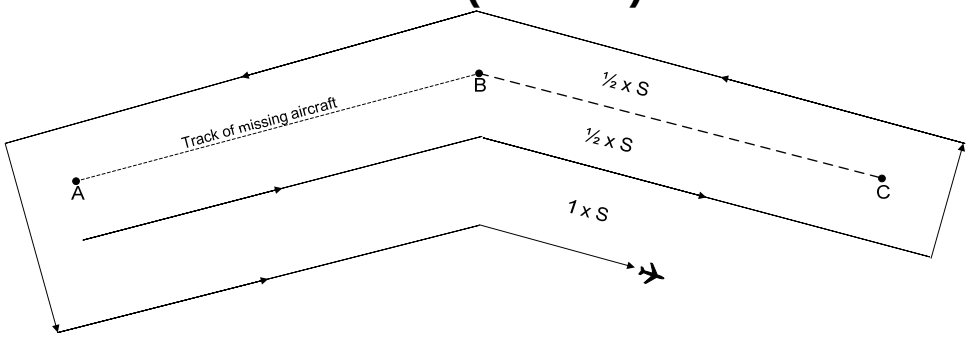
CUMULATIVE POD CHART

Previous, or Cumulative POD									
5-10%	15								
11-20%	20	25							
21-30%	30	35	45						
31-40%	40	45	50	60					
41-50%	50	55	60	65	70				
51-60%	60	65	65	70	75	80			
61-70%	70	70	75	80	80	85	90		
71-80%	80	80	80	85	85	90	90	95	
80% +	85	85	90	90	90	95	95	95	95+
	5-10%	11-20%	21-30%	31-40%	41-50%	51-60%	61-70%	71-80%	80% +
- -POD THIS SEARCH - -									

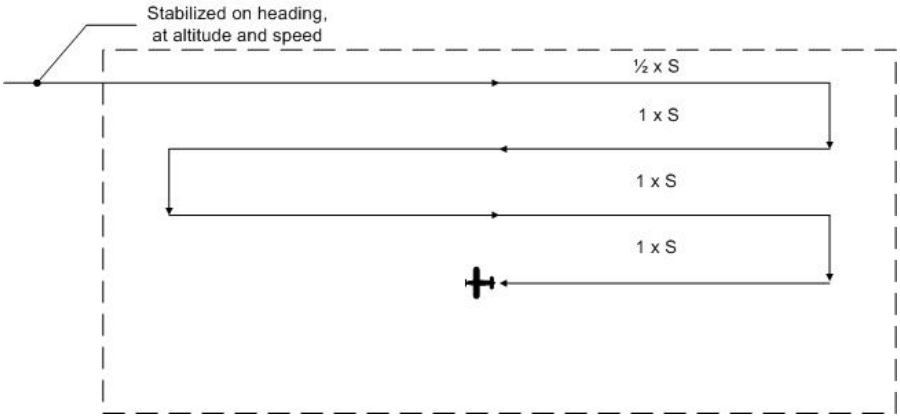
Intentionally blank

VISUAL SEARCH PATTERNS

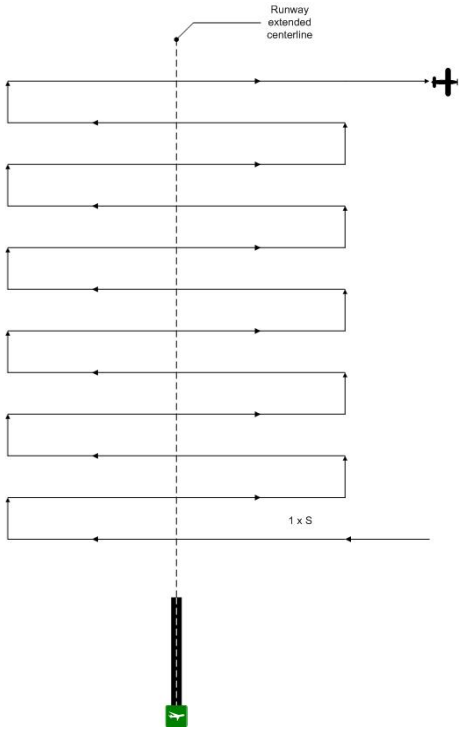
TRACK CRAWL (ROUTE) SEARCH



PARALLEL TRACK OR PARALLEL SWEEP

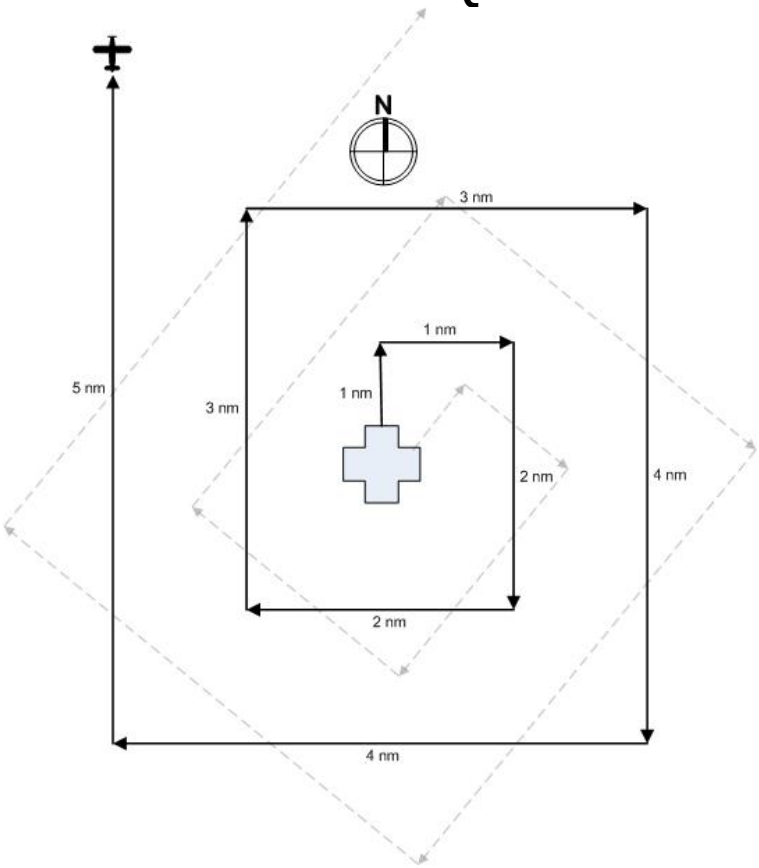


CREEPING LINE

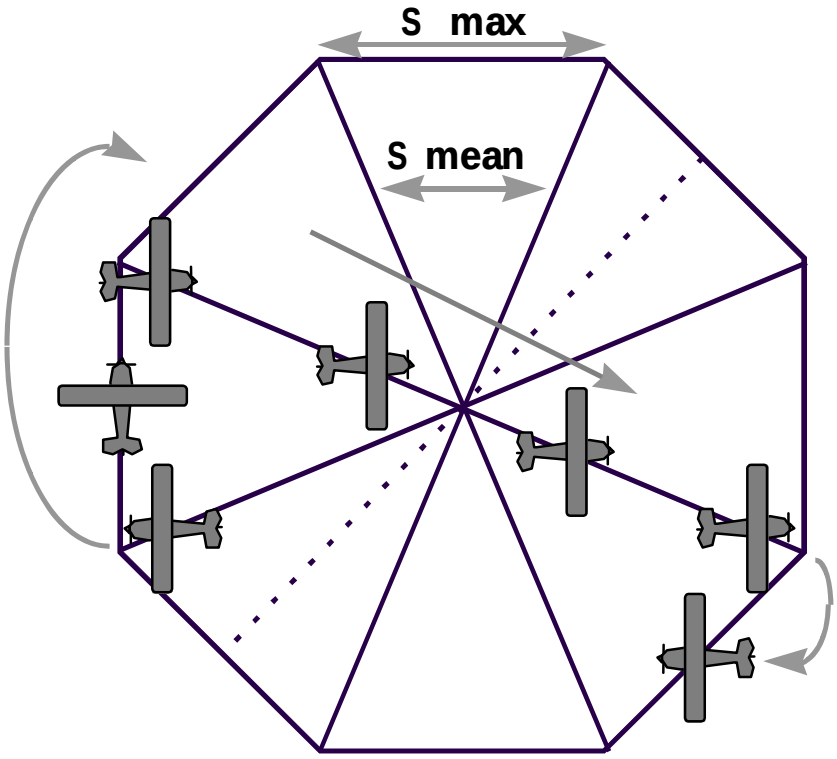


VISUAL SEARCH PATTERNS (CONT'D)

EXPANDING SQUARE



SECTOR SEARCH



APOLLO GX-55 GPS

NOTE: COORDINATE RADIO AND INSTRUMENT OPERATION WITH PIC BEFORE FLIGHT

DISPLAY CURRENT POSITION

NAV TO NAVIGATION SCREEN

O- UNTIL GPS POSITION IS DISPLAYED

"PDOP" IS POSITION DILUTION OF PRECISION (PG. 45)

SAVE CURRENT POSITION AS A USER WAYPOINT

NAV TO NAVIGATION SCREEN

DB TO DATABASE SCREEN

● - **SELECT 'PARALLEL LINE PATTERN'**

O- TO CREATE USER WAYPOINT BY LAT/LONG

ENTER

APOLLO GX-55 GPS (CONT'D)

SAR MODE SETUP: SET SEARCH AND RESCUE POSITION

PRESS MAP SMARTKEY

O– 'MAP SETUP' PAGE

SEL (THE 'ROUTE LINE' SELECTION WILL FLASH)

● - **SELECT 'ON'**

ENTER

● - **TURN COUNTER-CLOCKWISE ONE CLICK TO REACH THE SAR POSITION PAGE**

SEL ('LATITUDE VALUE' WILL FLASH)

● - **SELECT LATITUDE NEAREST TO SEARCH AREA**

O- TO 'LONGITUDE VALUE'

● - **SELECT LONGITUDE NEAREST TO SEARCH AREA**

ENTER

SAR MODE SETUP: SET SEARCH AND RESCUE MAP PAGE

MAP

O– MAP SETUP PAGE

● - **COUNTER-CLOCKWISE TO SAR MAP SETUP PAGE**

SAR **TOGGLES SAR MAP FUNCTIONS 'ON' OR 'OFF'**

GRD **TOGGLES GRID TYPE FROM 'US' TO 'BASIC'**

- ***US*** GRID POSITION IS BASED ON CAP GRIDS
- ***BASIC*** GRID POSITION BASED ON STD LAT/LON POSITIONS

APOLLO GX-55 GPS (CONT'D)

SET SEARCH AND RESCUE MAP PAGE (CONT'D)

POS **SELECTS SECTIONAL FOR US GRIDS OR QUADRANT FOR BASIC GRIDS** (WHEN USING BASIC, SET QUADRANT TO 'NW')

●- SAR MAP VALUE ON

O- TO 'GRID TYPE'

● - 'US' OR 'BASIC'

O- TURN TO 'POSITION'

●- SELECT GRID POSITION

ENTER

SAR POSITION FOR BASIC GRID TYPE

SAR POSITION DEFINES THE SE CORNER OF A 10 X 10 DEGREE GRID

MAP

O- TO 'MOVING MAP SETUP'

LAT **ENABLES SELECTION OF LATITUDE OF SE CORNER**

● - CHANGE LATITUDE IN INCREMENTS OF 10 DEGREES

ENTER

LON **ENABLES SELECTION OF LONGITUDE OF SE CORNER**

● - CHANGE LONGITUDE IN INCREMENTS OF 10 DEGREES

ENTER

MAP **RETURN TO MAP SCREEN**

APOLLO GX-55 GPS (CONT'D)

CREATE A USER WAYPOINT BY US GRID

ALLOWS FLYING DIRECTLY TO THE CORNER OF A GRID OR QUADRANT (OR INCLUSION IN A FLIGHT PLAN)

1) ENTER THE SECTIONAL IDENTIFIER IN THE 'SAR MAP SETUP' PAGE BEFORE USING THIS FUNCTION (E.G., 'DFW')

2) EACH 15° X 15° GRID IS NUMBERED (E.G., '117')

3) EACH GRID IS DIVIDED INTO 7.5° X 7.5° QUADRANTS. NAMED WITH LETTERS A – D WHERE 'A' IS THE NW QUADRANT; MOVE CLOCKWISE FOR THE REST (E.G., 'A')

3) CORNERS OF QUADRANTS ARE IDENTIFIED AS 1 - 4, BEGINNING IN THE NW QUADRANT AND MOVING CLOCKWISE AROUND THE QUADRANT [1 = NW CORNER; 2 = NE; 3 = SE; 4 = SW]

4) THE FORMAT FOR ENTERING US GRID WAYPOINTS IS
[GRID NUMBER] [QUADRANT LETTER] [CORNER NUMBER]

5) OUR DFW EXAMPLE WOULD BE ENTERED AS '117A4'

NAV TO NAV SCREEN

DB DISPLAY DATABASE SCREENS

O- TO 'CREATE USER WAYPOINT BY US GRID'

ENTER TO ENTER US GRID IDENTIFIER

SEL

● - SELECT INDIVIDUAL CHARACTERS AT FLASHING CURSOR

O- MOVE FLASHING CURSOR TO NEXT POSITION

ENTER ACCEPT CHANGES AND SAVE WAYPOINT

APOLLO GX-55 GPS (CONT'D)

MARK A SAR POSITION

AIRCRAFT CURRENT POSITION CAN BE QUICKLY SAVED TO A USER WAYPOINT BY PRESSING THE 'MARK' SMARTKEY ON THE SAR MAP PAGE. AN IDENTIFIER IS AUTOMATICALLY ASSIGNED (THE FIRST ONE IS STORED AS "SAR000" AND THE REST ARE INCREMENTED BY '001' TO PREVENT OVERWRITING. YOU CAN GO BACK AND RENAME LATER.

MAP TO MOVING MAP SCREEN

O- **SELECT 'SAR** MAP'

●- **SELECT 'PARALLEL LINE PATTERN'**

MRK BRINGS UP 'USER WAYPOINT' SCREEN, ENTERS THE PRESENT GPS POSITION AS THE LAT/LONG, AND NAMES IT

ENTER **TO SAVE WAYPOINT AND RETURN TO 'SAR MAP'**

NOTE: DISPLAY OF SAR WAYPOINTS IS CONTROLLED BY THE USR SMART KEY ON THE MOVING MAP SCREENS

PARALLEL LINE SEARCH PATTERN

SAR MODE SET, STARTING ON THE 'SAR MAP' **SCREEN**

PAT 'SEARCH PAGE' SETUP

●- **SELECT 'PARALLEL LINE'**

ENTER TO 'GRID' SETUP

SEL

● & O- **SELECT 'GRID NUMBER'**

O- **TO SELECT 'TRACK SPACING'**

●- **SELECT FROM 0.2 - 9.9 NM**

O- **SELECT 'DIRECTION OF TRAVEL'**

APOLLO GX-55 GPS (CONT'D)

PARALLEL LINE SEARCH PATTERN (CONT'D)

●- **SELECT 'N/S' OR 'E/W'**

ENTER **TO SAVE INFORMATION**

ENTER **TO ACTIVATE THE SEARCH PATTERN**
(SAR MAP PAGE REACTIVATES)

NOTE: PAT WILL **DISENGAGE (ABORT) SEARCH PATTERN**

CREEPING LINE SEARCH PATTERN

SAR MODE SET, STARTING ON THE 'SAR MAP' **SCREEN**

PAT 'SEARCH' PAGE SETUP

●- **SELECT 'CREEPING LINE'**

ENTER TO 'GRID' SETUP

SEL ENTER **SELECT 'WAYPOINT'**

● & ⭘- **SELECT 'TYPE' AND 'NAME' OF WAYPOINT**

ENTER SELECT

⭘- **TO SELECT 'TRACK SPACING'**

●- **SELECT FROM 0.2 - 9.9 NM**

⭘- **SELECT 'DIRECTION OF TRAVEL'**

●- **SELECT FROM 0° - 359°**

ENTER [Note the diamond ◊ on the lower right screen.]

●- **TO 'LEG LENGTH' AND 'START TURN'**

SEL

APOLLO GX-55 GPS (CONT'D)

CREEPING LINE SEARCH PATTERN (CONT'D)

●- **SELECT LEG LENGTH FROM 1.0 - 9.9 NM**

O- **SELECT 'DIRECTION'**

●- **SELECT 'LEFT' OR 'RIGHT'**

ENTER **TO SAVE INFORMATION**

ENTER **AGAIN TO ACTIVATE SEARCH PATTERN**

PAT **DISENGAGE (ABORT) SEARCH PATTERN**

EXPANDING SQUARE SEARCH PATTERN

SAR MODE SET, STARTING ON THE 'SAR MAP' **SCREEN**

PAT 'SEARCH' PAGE SETUP

●- **SELECT 'EXPANDING SQUARE'**

SEL ENTER **SELECT 'WAYPOINT'**

● & O- **SELECT 'TYPE' AND 'NAME' OF WAYPOINT**

ENTER

O- **TO SELECT 'TRACK SPACING'**

●- **SELECT FROM 0.2 - 9.9 NM**

O- **SELECT 'DIRECTION OF TRAVEL'**

●-**SELECT FROM 0° - 359°**

ENTER **TO SAVE INFORMATION**

ENTER **TO ACTIVATE SEARCH PATTERN**

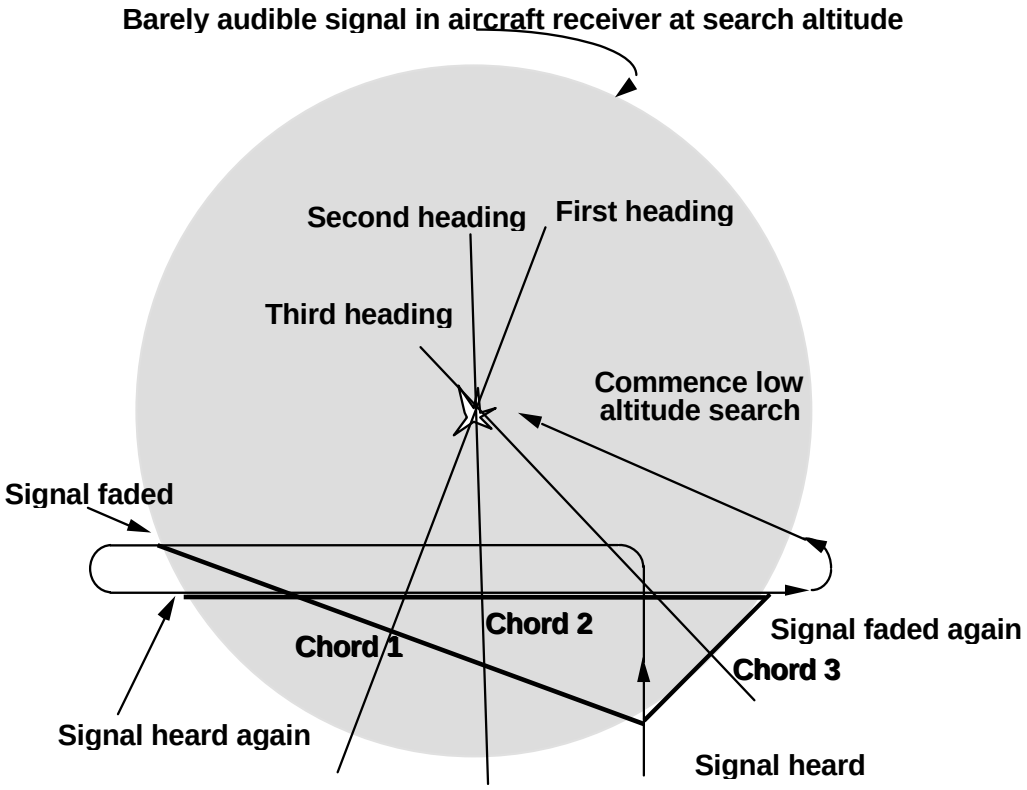
PAT **DISENGAGE (ABORT) SEARCH PATTERN**

GX-55 GPS: US GRID CHART TABLE

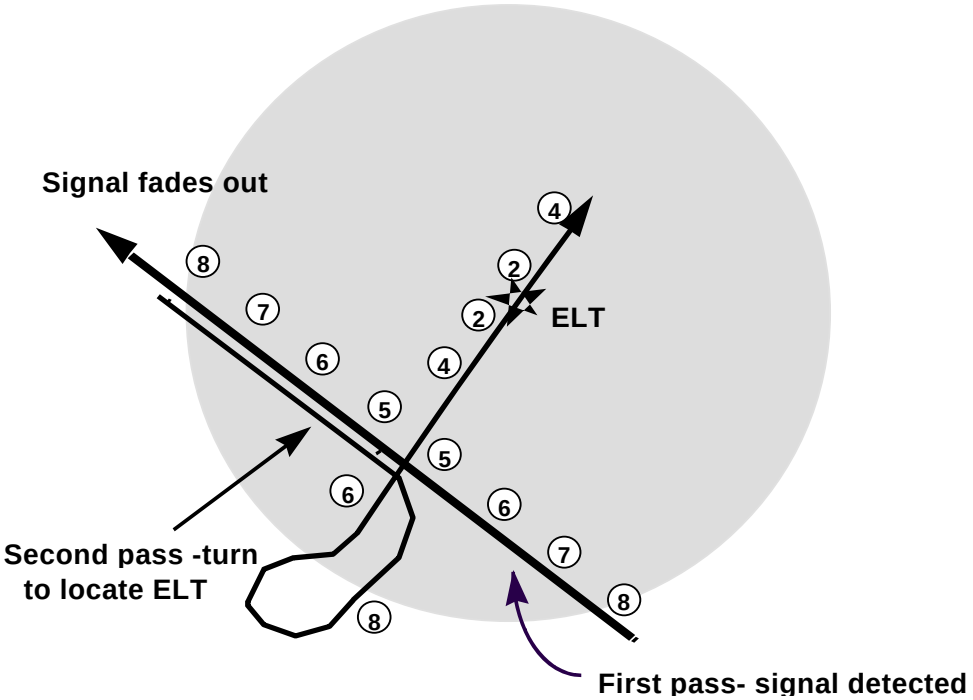
CHART	IDENT	NORTH LIMIT	SOUTH LIMIT	WEST LIMIT	EAST LIMIT	TOTAL GRIDS	GRIDS/ ROW
Seattle	SEA	49°00N	44°30N	125°00W	117°00W	576	32
Great Falls	GTF	49°00N	44°30N	117°00W	109°00W	576	32
Billings	BIL	49°00N	44°30N	109°00W	101°00W	576	32
Twin Cities	MSP	49°00N	44°30N	101°00W	93°00W	576	32
Green Bay	GRB	48°15N	44°00N	93°00W	85°00W	544	32
Lake Huron	LHN	48°00N	44°00N	85°00W	77°00W	512	32
Montreal	MON	48°00N	44°00N	77°00W	69°00W	512	32
Halifax	HFX	48°00N	44°00N	69°00W	61°00W	512	32
Klamath Falls	LMT	44°30N	40°00N	125°00W	117°00W	576	32
Salt Lake City	SLC	44°30N	40°00N	107°00W	109°00W	576	32
Cheyenne	CYS	44°30N	40°00N	109°00W	101°00W	576	32
Omaha	OMA	44°30N	40°00N	101°00W	93°00W	576	32
Chicago	ORD	44°00N	40°00N	93°00W	85°00W	512	32
Detroit	DET	44°00N	40°00N	85°00W	77°00W	512	32
New York	NYC	44°00N	40°00N	77°00W	69°00W	512	32
San Francisco	SFO	40°00N	36°00N	125°00W	118°00W	448	28
Las Vegas	LAS	40°00N	35°45N	118°00W	111°00W	476	28
Denver	DEN	40°00N	35°45N	111°00W	104°00W	476	28
Wichita	ICT	40°00N	36°00N	104°00W	97°00W	448	28
Kansas City	MKC	40°00N	36°00N	97°00W	90°00W	448	28
St. Louis	STL	40°00N	36°00N	91°00W	84°00W	448	28
Cincinnati	LUK	40°00N	36°00N	85°00W	78°00W	448	28
Washington	DCA	40°00N	36°00N	79°00W	72°00W	448	28
Los Angeles	LAX	36°00N	32°00N	121°30W	115°00W	416	26
Phoenix	PHX	35°45N	31°15N	116°00W	109°00W	504	28
Albuquerque	ABQ	36°00N	32°00N	109°00W	102°00W	448	28
Dallas/Ft Worth	GSW	36°00N	32°00N	102°00W	95°00W	448	28
Memphis	MEM	36°00N	32°00N	95°00W	88°00W	448	28
Atlanta	ATL	36°00N	32°00N	88°00W	81°00W	448	28
Charlotte	CLT	36°00N	32°00N	81°00W	75°00W	384	24
El Paso	ELP	32°00N	28°00N	109°00W	103°00W	384	24
San Antonio	SAT	32°00N	28°00N	103°00W	97°00W	384	24
Houston	HOU	32°00N	28°00N	97°00W	91°00W	384	24
New Orleans	MSY	32°00N	28°00N	91°00W	85°00W	384	24
Jacksonville	JAX	32°00N	28°00N	85°00W	79°00W	384	24
Brownsville	BRO	28°00N	24°00N	103°00W	97°00W	384	24
Miami	MIA	28°00N	24°00N	83°00W	77°00W	384	24

DF SEARCHES

METERED SEARCH

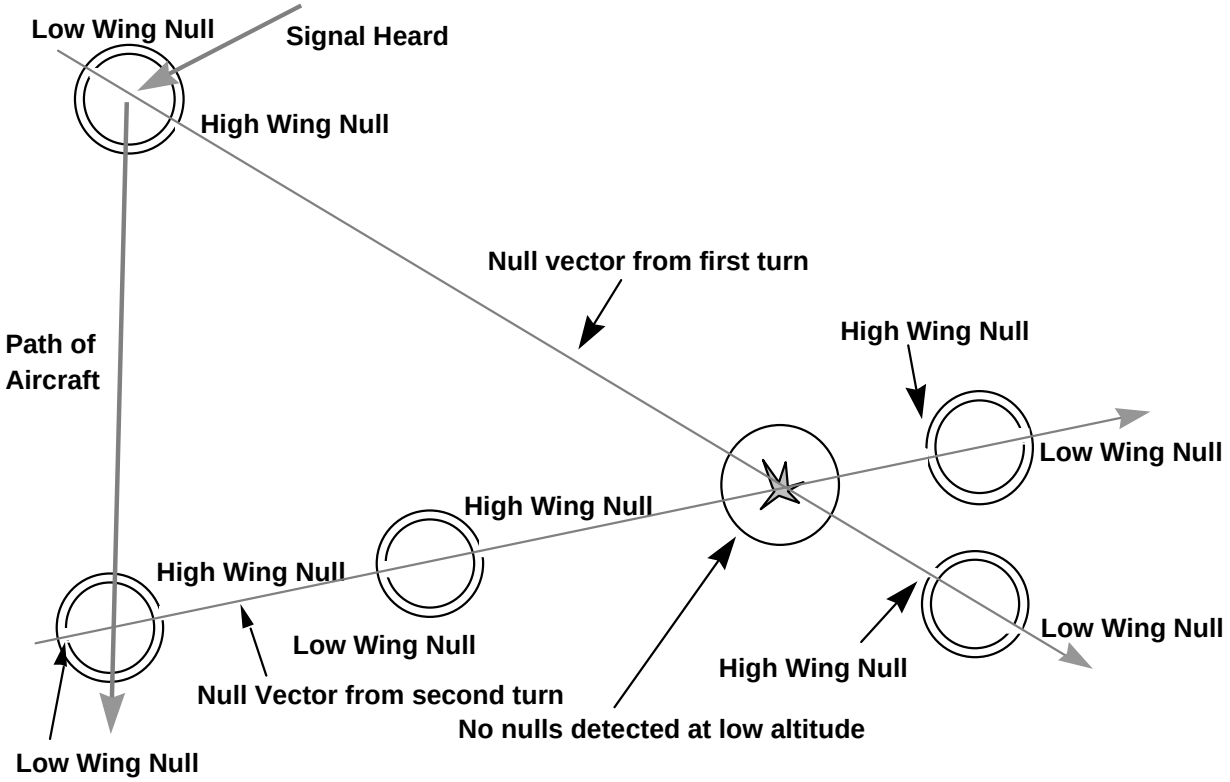


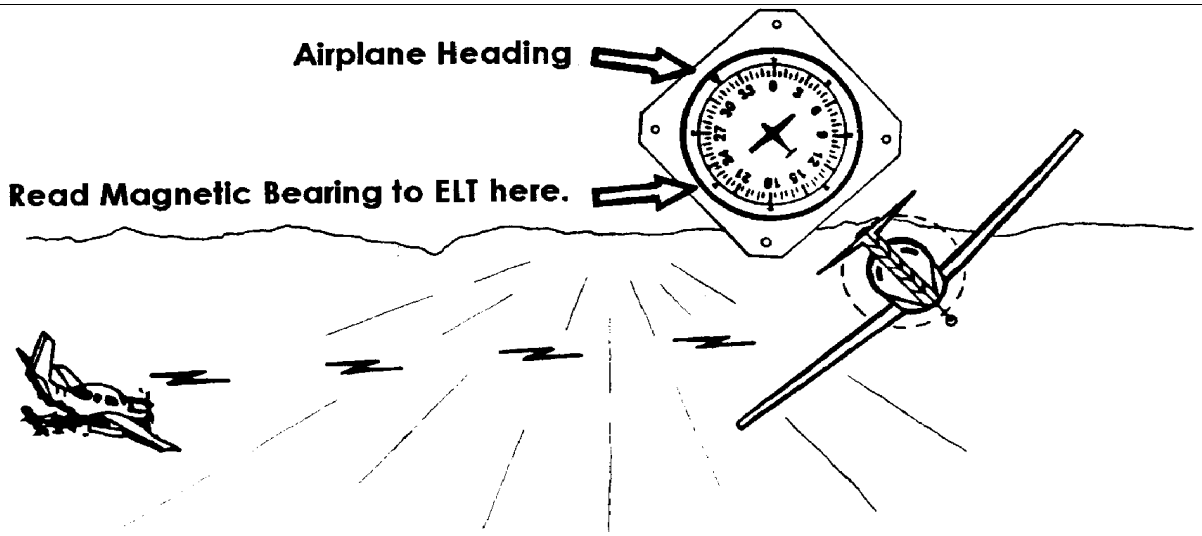
AUDIBLE SEARCH



DF SEARCHES (CONT'D)

WING NULL PROCEDURE

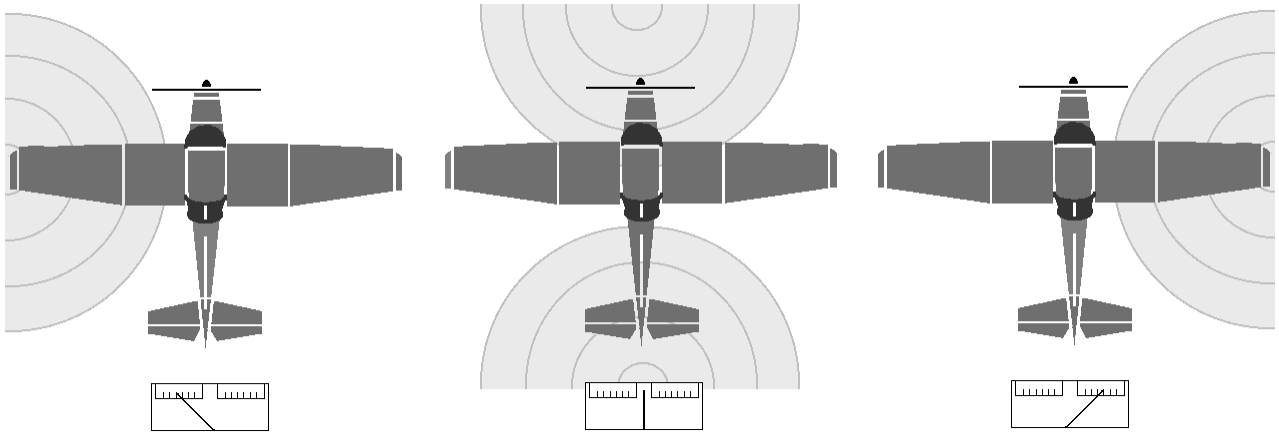




(**<u>HIGH-WING AIRCRAFT</u>** - LEFT TURN, ADD 90° TO AIRCRAFT HEADING WHEN TONE NULLS [RIGHT TURN, SUBTRACT 90°]

(**<u>LOW-WING AIRCRAFT</u>** - LEFT TURN, SUBTRACT 90° FROM THE AIRCRAFT HEADING [RIGHT TURN, ADD 90°]

DF SEARCHES (CONT'D)



DIRECTION-FINDING NEEDLE WILL POINT TO THE ELT

"*TURN TO TELL*" RULE OF THUMB: IF UNSURE WHETHER ELT IS IN FRONT OF OR BEHIND, TURN (LEFT OR RIGHT):

- **IF NEEDLE MOVES *OPPOSITE OF TURN*, ELT IS IN *FRONT* OF ACFT**
- IF NEEDLE MOVES *IN DIRECTION OF TURN*, ELT IS *BEHIND* ACFT

RESOLVING DF AMBIGUITY

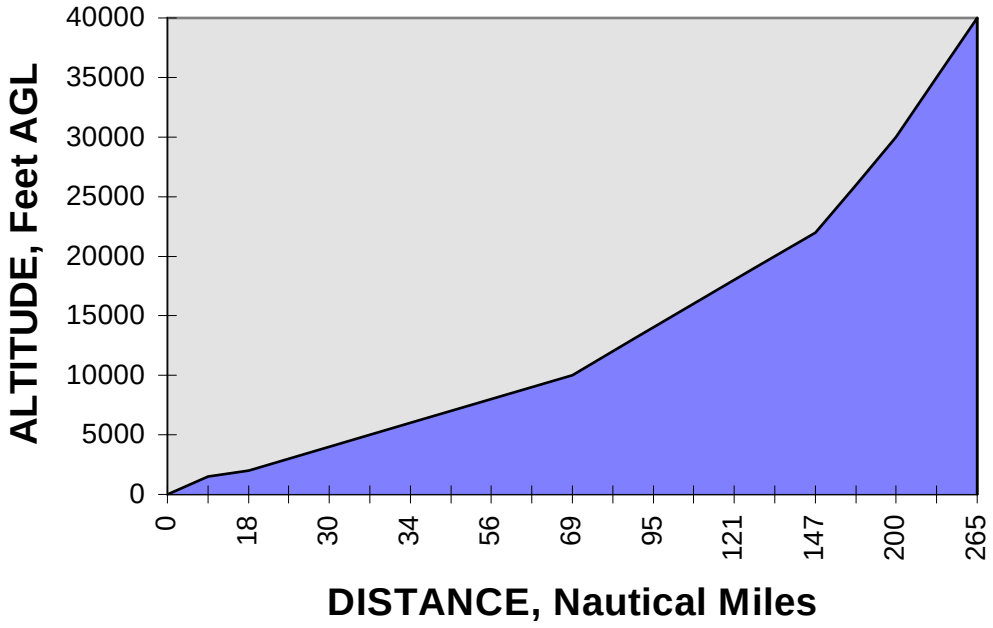
ARE YOU FLYING *TOWARD* OR *AWAY FROM* AN ELT?

	NEEDLE MOVES ◀◀ LEFT	**NEEDLE MOVES RIGHT ▶▶**
ACFT TURNS RIGHT ▶▶	**ELT TO FRONT** ***FOLLOW NEEDLE!***	**ELT TO REAR** ***TURN 180°***
ACFT TURNS ◀◀ LEFT	**ELT TO FRONT** ***TURN 180°***	**ELT TO FRONT** ***FOLLOW NEEDLE!***

"CONE OF SILENCE": AUDIO SIGNAL MAY DISPPEAR WHEN AIRCRAFT IS DIRECTLY OVER ELT

DF SEARCHES (CONT'D)

ELT RECEPTION DISTANCE



L-TRONICS VHF DIRECTION FINDER

FUNCTIONAL CHECK - NO TRANSMITTER

FREQ - **121.5 MHZ**

ALARM - **TOGGLE OFF (DOWN)**

SENS - **MAX**

VOL -**ON**

CHECK SIGNAL STRENGTH *HISSING SOUND ON AUDIO, SIGNAL STRENGTH NEEDLE ¼ TO ½ WAY BETWEEN CENTER AND LEFT END, DF NEEDLE CENTERED*

SENS – **MIN, THEN MAX** *DF NEEDLE SHOULD MOVE SLOWLY AND RANDOMLY BACK AND FORTH. CHECK AUDIO FOR BACKGROUND NOISE.*

ALARM- **TOGGLE ON (UP)** *LIGHT SHOULD FLASH FOR 10 TO 20 SECONDS AND THEN STOP*

L-TRONICS VHF DF (CONT'D)

WARNING! USE OF HIGH-POWER TRANSMITTERS CLOSE TO THE DF ANTENNAE CAN DAMAGE THE UNIT. DAMAGE CAN OCCUR FROM A 50-WATT TRANSMITTER IF IT IS WITHIN 12 FEET OF THE ANTENNAE (3 FEET FOR 5W; 4 1/2 FEET FOR 10W; 15 FEET FOR 80W). ELT TESTER SHOULD BE KEPT AT LEAST 50 FEET AWAY FROM THE ANTENNAE WHEN USING TO TEST FOR OPERABILITY OF THE DF

FUNCTIONAL CHECK - WITH TRANSMITTER

PARK AIRCRAFT IN THE OPEN AWAY FROM METAL BUILDINGS, WITH XMITTER AT LEAST 50' IN FRONT OF AND 15°- 30° TO ONE SIDE OF THE AIRCRAFT

FREQ - **121.775 MHZ**

SENS - **MIN**

VOL – **MID SCALE**

ALARM – **TOGGLE DOWN**

VOL - **ON**

SENS - **ADJUST UNTIL AUDIBLE**

DF NEEDLE SHOULD POINT TOWARD THE XMITTER. DIRECT PERSONNEL TO MOVE XMITTER TO THE OTHER SIDE OF THE AIRCRAFT. DF NEEDLE SHOULD FOLLOW XMITTER. NEEDLE MAY NOT CENTER WITH TEST XMITTER DIRECTLY FORE OR AFT. DF IS OK IF THE NEEDLE POINTS CORRECTLY WHEN THE XMITTER IS ON EITHER SIDE OF THE AIRCRAFT.

SENS– **TURN CLOCKWISE** *(STRENGTH NEEDLE SHOULD MOVE)*

NORMAL FLIGHT OPERATION

FREQ - **121.5 MHZ (121.775 MHZ FOR TRAINING MISSIONS)**

ALARM – **TOGGLE UP (*DOWN FOR DF MODE*)**

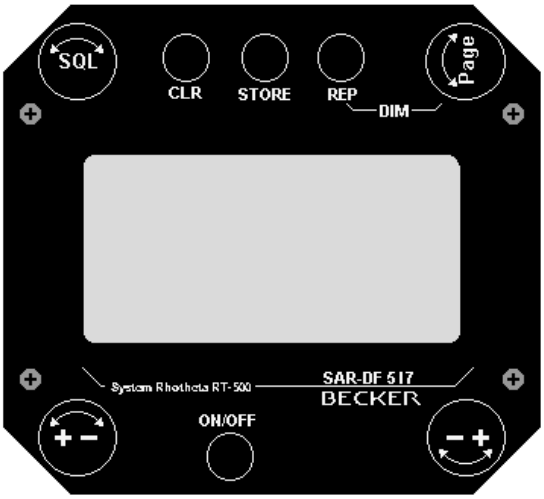
SENS – **MAX**

VOL – **MID SCALE**

DF NEEDLE WILL DRIFT SLIGHTLY LEFT AND RIGHT

Intentionally blank

BECKER SAR DF-517 CONTROL DISPLAY UNIT (CDU)



SQL – **SQUELCH LEVEL**

CLR – **ERASE CURRENT MESSAGE ON DISPLAY**

STORE – **STORE CURRENT MESSAGE ON DISPLAY (OVERWRITES PREVIOUS MESSAGE**

REP – **CURRENTLY STORED MESSAGE WILL BE DISPLAYED**

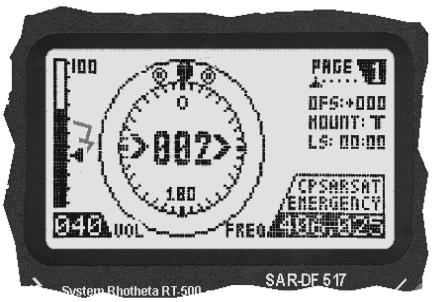
PAGE – **SELECT PAGE ON VIEWSCREEN**

LOWER LEFT KNOB – **ADJ VOLUME**

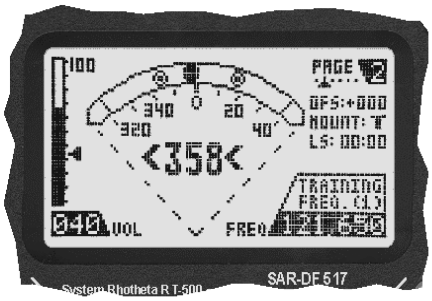
LOWER RIGHT KNOB – **ADJUST FREQUENCY**

POWER-ON/OPERATION MODE

BECKER SAR DF-517 CDU (CONT'D)



PAGE 1: 360 DEGREE VIEW



PAGE 2: 90 DEGREE VIEW

PAGE 3: DIGITAL READING

PAGE 4: COSPAS/SARSAT MODE

<u>EMERGENCY-MODE</u> WITH FIXED EMERGENCY FREQUENCIES

156.800 MHZ (CH16/SEABAND)

121.500 MHZ (VHF)

243.000 MHZ (UHF)

406.025 MHZ (CP/SARSAT)

*<u>SCAN-MODE</u> (CONCURRENTLY MONITORS 121.5, 243.00, & 406.025)

<u>TRAINING-MODE</u> WITH ADJUSTABLE TRAINING FREQUENCIES

[156 ... 158] MHZ

[118 ... 123] MHZ

[240 ... 246] MHZ

[400 ... 410] MHZ

BECKER SAR DF-517 CHECKLIST

WARNING! - UNIT OFF DURING ENGINE START-UP/SHUT-DOWN

POWER-UP

ON/OFF SWITCH – **ON**

PAGE ROTARY SWITCH – **SELECT MODE (EMERGENCY/TRAINING)**

OPERATION MODE

DIM - **DEPRESS <REP>WHILE ADJ BRIGHTNESS WITH <PAGE>**

PAGE – **SELECT AS REQUIRED**

PAGES 1 TO 3 - BEARING MODE (SEE ILLUSTRATIONS)

SQL – **SET SQUELCH LEVEL AS DESIRED**

VOL (LOWER LEFT KNOB) **– AS REQUIRED**

FREQ (LOWER RIGHT KNOB) **– AS REQUIRED**

***NOTE – DF BEARINGS ARE RELATIVE TO ACFT ('0' DEGREES IS OFF THE NOSE, 180 DEGREES IS OFF THE TAIL, ETC.)**

PAGE 4 - COSPAS/SARSAT MODE (SEE ILLUSTRATION)

CLR – **PRESS TO CLEAR STORED MESSAGES**

STORE – **PRESS TO STORE CURRENT MESSAGE ON DISPLAY**

PAGE 5 - SYSTEM CONFIGURATION*

*FOR USE BY AUTHORIZED PERSONNEL ONLY!!

BECKER SAR DF-517 CHECKLIST (CONT'D)

PAGE 6- TRAINING FREQUENCY SETTING (SEE FREQ. TABLES)

VOL (LOWER LEFT KNOB) – SELECT FREQUENCY BAND

FREQ (LOWER RIGHT KNOB) – TUNE FREQUENCY

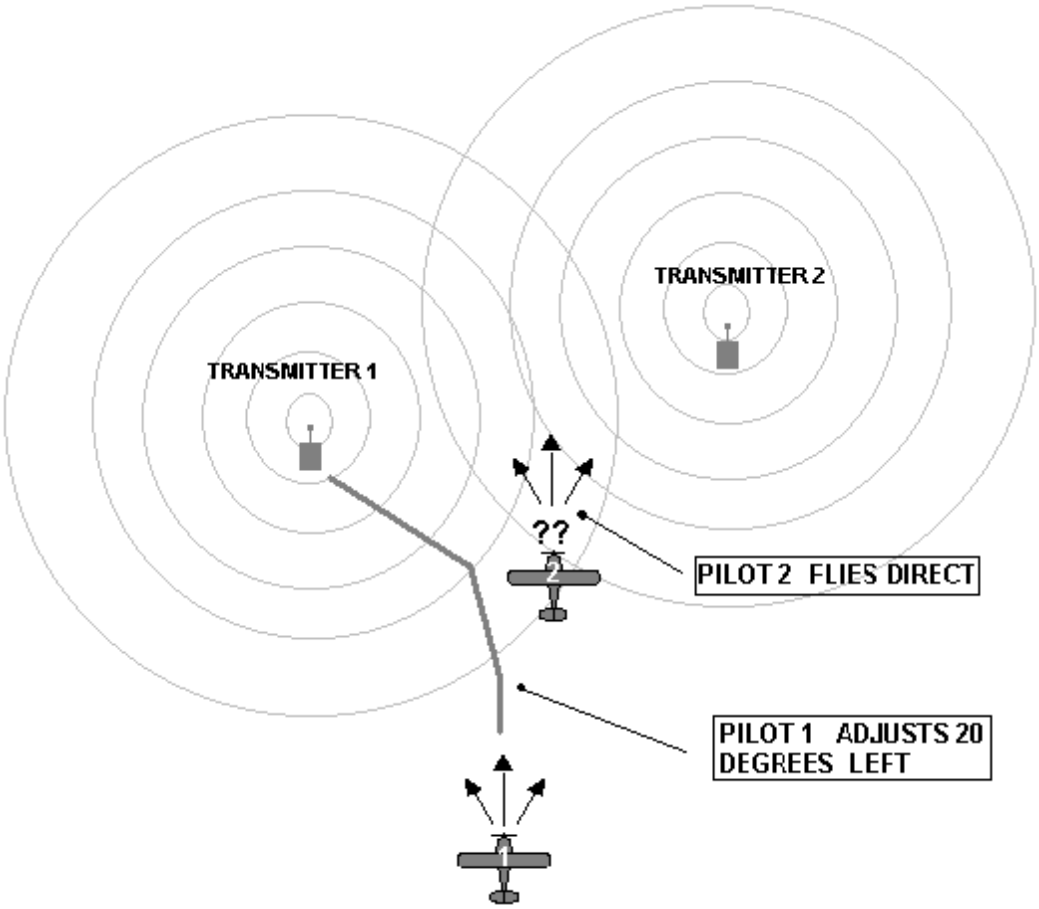
STORE- CONFIRM CHANGES VALUES

<ERROR MESSAGE>

IF ANY OF THE FOLLOWING CODES DISPLAY ON CDU, RECORD DATA, TURN UNIT OFF AND FWD DATA TO MAINTENANCE PERSONEL.

ERROR MESSAGE	ERROR, LOCATION	REASON
ERROR 10 **E10:VOLT/D**	MAIN VOLTAGE SUPPLY	VOLTAGE INPUT TOO LOW (≤10.0V)
ERROR 9 **E9:NO DATA**	CONNECTING CABLE TO ANTENNA DISPLAY OR CDU	NO OR DAMAGED CONNECTION BETWEEN ANTENNA AND CDU, OR DAMAGED CDU
ERROR 8 **E8:BAD/ANT**	CONNECTING CABLE: ANTENNA ⇔ DISPLAY	INCOMPATIBILITY OF ANTENNA AND DISPLAY RESP. BAD CONNECTION OF DISPLAY AND ANTENNA.
ERROR 7 **E7:BAD/DIS**	CDU	INCOMPATIBILITY OF ANTENNA AND CDU
ERROR 6 **E6:VOLT/A**	ANTENNA	VOLT SUPPLY AT ANT. TOO LOW (≤9.0 V). MAIN VOLT SUPPLY TOO LOW OR VOLTAGE DROP BETWEEN CDU AND ANTENNA.
ERROR 5 **E5:OSCILAT**	ANTENNA	ERROR IN SYNTHESIZER-OSCILLATOR OF RECEIVER IN ANTENNA-UNIT
ERROR 4 **E4:F/+OFS+**	RECEIVED TRANSMITTER	RECEIVED FREQUENCY TOO HIGH (MORE THAN 6 KHZ / ERROR OF TRANSMITTER
ERROR 3 **E3:F/-OFS-**	RECEIVED TRANSMITTER	RECEIVED FREQUENCY TOO LOW (> 6KHZ / OF XMTR ERROR)
ERROR 2 **E2:CS/SYNC**	RADIO DISTANCE: TRANSMITTER ⇔ DF	SYNCHRONISING BITS OF COSPAS/SARSAT SIGNAL (BIT 1 TO 24) DEFECTIVE
ERROR 1 **E1:CS/BCH1**	RADIO DISTANCE: TRANSMITTER ⇔ DF	ERROR OF DATA BITS IN 1ST COSPAS/SARSAT DATA BLOCK PDF1/BCH1
ERROR 0 **E0:CS/BCH2**	RADIO DISTANCE: TRANSMITTER ⇔ DF	ERROR OF DATA BITS IN 2ND COSPAS/SARSAT DATA BLOCK PDF2/BCH2

BEARING ON MORE THAN ONE TRANSMITTER



- **IF BEARING FROM A LONG DISTANCE, THE DF WILL BE POINTING AT THE MIDDLE OF THE TWO TRANSMITTERS**
- **EXACTLY IN THE MIDDLE BETWEEN TWO TRANSMITTERS, THE DF WILL DISPLAY AN UNUSABLE BEARING VALUE**
- **EXACTLY OVER ONE TRANSMITTER THE DF WILL BE POINTING TO ANOTHER (GARBLING CONE)**

<FLIGHT TACTICS>

DON‘T FLY THE APPROACH EXACTLY FOLLOWING THE INDICATED AVERAGED BEARING-VALUE, BUT ABOUT 20º LEFT OR RIGHT

BASIC GROUND ELT SEARCH

1. Assemble the LH-16 on the antenna mast assembly and hold vertically in front of you, such that you can see the receiver controls.

2. Turn the unit on, turn the Volume and Sensitivity full up, set the Mode knob to DF. Set the Frequency knob to the appropriate frequency: 121.5 or 243 MHz, or 121.775 MHz for practice beacons; 121.5 or 243. Listen for the distress beacon signal. If you have no signal, move to some other location where you do. [Note: 243 MHz is the harmonic transmitted by a 121.5 distress beacon; military distress beacons use 243 but many military aircraft carry civilian distress beacons that transmit on both frequencies.]

3. Once you have the signal, swing the antenna slowly through a full circle around you and determine where the needle centers. If it centers more than twice, analyze your location to determine if you might be dealing with more than one signal, reflections or interference from power lines. Remember all directions where the needle centers.

4. Switch to the REC Mode and determine where the signal strength is greatest (needle deflected farthest to the right, signal direction is off the left antenna mast). The strongest signal direction should be in one of the same directions that the needle centered in the DF Mode.

5. Switch back to the DF Mode and locate where the needle centers in the direction where the REC mode received a maximum signal. While one person keeps the unit aligned on the signal, another stands behind her and takes a compass bearing.

6. As you get closer to the signal, decrease the sensitivity to avoid overloading the receiver.

ONCE YOU'RE CLOSE

1. Use a short antenna (such as a “rubber duck” flexible antenna). Ensure you can hear the signal of the distress beacon. Adjust the Sensitivity and Volume so that you can barely hear the signal.

2. Use "body blocking" to determine a bearing to the distress beacon by placing the receiver at waist level and rotating in a circle until the weakest signal is heard. At this point the target distress beacon should be directly behind you, since your body is blocking the signal from the distress beacon. [This is like a wing null.]

3. Use the "signal strength" method if you are sure the distress beacon is located nearby (e.g., if you are at an airfield and you are sure it is in one of the planes in a hanger). If the signal strength increases rapidly you are getting closer to the distress beacon. Decrease the Sensitivity (or increase squelch), reduce the antenna height, or slightly offset receiver frequency to permit more efficient body blocking.

4. You may also use a hand-held radio for a close-in search. Sometimes, like when you are in a hanger full of aircraft, this is actually a better tool than the L-Per. Body blocking, removing the antenna, using an aluminum sleeve, and using frequency offset all work with a hand-held radio.

Hold the radio by one of the suspect aircraft's ELT antenna and turn the volume down until you can just hear the signal, then move to the next suspect aircraft and hold the radio next to its antenna. If

BASIC GROUND ELT SEARCH (CON'T)

the signal is stronger you probably have it; if it is weaker or cannot be heard it's probably the other aircraft. [*Warning*: Do not key the radio's transmitter while the antenna is removed!]

Don't ignore the obvious: some aircraft have remote indicating lights (usually red) that flash when the ELT has activated; also look for obvious signs of disturbance near an ELT.

Regardless of the methods and equipment used, you may have trouble locating and ELT once you get very close. ELTs are sometimes notoriously difficult to find when you have several aircraft within a row or several hangars. You can discuss techniques for this type of search with your local ground team or simply wait for them to arrive, since you have absolutely determined that this isn't a distress situation and no life is at stake.

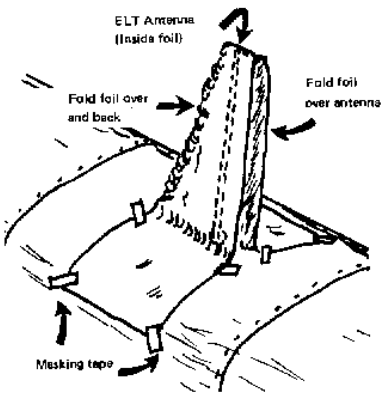
SILENCING AN ELT

Once you have determined which aircraft the signal is coming from, you have to find the (physical) ELT. Most are located in the rear of the aircraft; also look for remote switches. The following gives some general directions:

- Single-engine Cessna: right side of the upper baggage area immediately aft of the baggage door.
- Multi-engine Cessna: left side of the fuselage just forward of the horizontal stabilizer. Accessed through a small push-plate on the side of the fuselage.
- Single- and multi-engine Piper: in the aft fuselage. Accessed through a small access plate on the right side of the fuselage (requires a screwdriver).
- Single- and multi-engine Bonanza: in the aft fuselage. Accessed through a small access plate on the right side of the fuselage (requires a screwdriver).
- Large piston twins (e.g., King Air) or small jets: if installed its probably in the rear section. No visible antenna. May have a small round push-plate that allows you to access to the switch with your finger.

The preferred method of silencing a transmitting ELT is to have the owner (or a person designated by the owner) turn it off and disconnect the battery; second best is just turning it off. Some owners will take the switch to OFF and then back to ARMED; monitor the emergency frequency for several minutes afterwards to ensure the ELT doesn't resume alarming.

If you cannot find the owner (or designee), you may have to install an aluminum foil 'tent' to limit the ELT signal range:



BASIC GROUND ELT SEARCH (CON'T)

Take a piece of foil about one foot wide by about five feet long. Place the tip of the ELT antenna in the center of the foil and fold the foil down on both sides of the antenna. Let the ends lay flat against the fuselage; the flaps *must* extend at least 18" beyond the antenna. Fold the two sides of the 'tent' together to completely enclose the antenna and *securely* tape the foil to the fuselage (use a tape that won't damage the paint, such as masking tape).

Whatever you do, *do not leave an ELT/EPRIB in the alarm state unless ordered to do so by the IC/AFRCC*. You will have to consult your IC, AFRCC, and/or law enforcement to silence the ELT if the above methods are not practical.

Last but not least, ensure the aircraft owner is notified that the ELT was disabled. If you can't obtain a phone number, you can leave a note on the aircraft (not a window) stating that the ELT has been disabled.

LEGAL ISSUES

CAP members must not enter private property (except to save a life) and should not do anything that could cause harm or damage to the distress beacon or aircraft/boat. If entry is required the owner/operator or local law enforcement officials will make it. [In some cases, especially at an airport, FBO personnel have permission to enter aircraft on the premises and can assist you.]

Law enforcement authorities such as local police, the county sheriff's office or game wardens may be contacted for assistance. [If they are not familiar with CAP and your responsibilities, a simple explanation often suffices. If this doesn't work, try calling AFRCC and have them explain the situation. If, for whatever reason, you cannot gain access -- call your IC.]

NOTE: A *crashed* aircraft is under the authority of the National Transportation Safety Board (NTSB) *and no one else*. Federal law permits the NTSB to request assistance from federal, state and local agencies (including CAP) to secure a crash site.

Although not your responsibility, owners may ask you whether or not they can fly with a deactivated or inoperative ELT; the rules are found in FAR 91.207. An aircraft with an inoperable ELT can be ferried from a place where repairs or replacements cannot be made to a place where they can be made [91.207(3)(2)]. An aircraft whose ELT has been temporarily removed for repair can be flown if aircraft records contain an entry concerning the removal, a placard is placed in view of the pilot showing "ELT not installed," and the aircraft is not operated more than 90 days after the ELT was removed [91.207(f)(10)].

FLIGHT GUIDE FORMS

Intentionally blank

ELT SEARCH INFORMATION REQUIRED BY AFRCC

Once an ELT has been located, certain information needs to be collected. Contact the Incident Commander with any of this information that you can gather. He or she will also relay to you the appropriate action for silencing the ELT.

Date and time (Zulu) that you left on the sortie	
Date and time the ELT/EPIRB was first heard	
Number of aircraft [IC]	
Number of sorties [IC]	
The time in the search area (hours and tenths)	
The time enroute (hours and tenths)	
Total flight hours (Hobbs)	
Number of CAP personnel [IC]	
Area(s) searched	
Actual location of the ELT/EPIRB, including lat/long	
Date and time the ELT/EPIRB was located	
Date and time the ELT/EPIRB was silenced	
ELT/EPIRB model, manufacturer, serial number, and expiration date	
Position of ELT/EPIRB switch: ON, ARMED or OFF	

Other useful information:

1. The type of airplane or boat that contained the ELT/EPIRB.
2. The 'N' number or hull number of the airplane or boat.
3. Names of law enforcement officers and other personnel that assisted you (add to your list for future missions).
4. The name, address, and phone number for the owner of the ELT/EPIRB. *
5. The cause of activation (e.g., mishandling, damaged unit, broken switch, or hard landing) *

* If information can be easily obtained.

Intentionally blank

Observer Log

Aircraft	Pilot	Observer	Mission	Date

Destination	Total Dist	ETE	Takeoff Time	Fuel

Inflight Observations

Time	Observation

Departure Pt. / Check Points	Ident / Freq	Mag Hdg	Dist	Ground Speed	ETE / Remain	ETA / ATA	Fuel Remain

OBSERVER LOG INSTRUCTIONS

Aircraft = Aircraft 'N' number and Capflight number

Pilot = Pilot-in-Command name (note if mission pilot trainee)
Observer = Observer and Scanner names (note if Trainee)

Mission = Mission number and Sortie number

Date = Date of sortie

Destination = Destination or search area/route from CAPF 104

Total Dist = Nautical miles (optional)

ETE = Estimated time enroute from CAPF 104

Takeoff Time = Actual time of "Wheels Up" (note Hobbs reading on all required radio reports)

Fuel = Fuel on board at takeoff (also note if there will be a refueling stop)

<u>First Row</u>
Departure/Check Points = 'Departure' is the airport you are departing and 'Check Points' is the first checkpoint

Ident = Identifier of the airport you are departing

Freq = CTAF of the airport you are departing

Mag Hdg = True course (or heading from the GPS) from the airport to the first checkpoint

Dist = Nautical miles from the airport to the first checkpoint

Ground speed = Speed over the ground (from the GPS)

ETE = Estimated time enroute from the airport to the first checkpoint
ETA = Estimated time of arrival at the first checkpoint
Remain = Total sortie time enroute minus the time it took to get to the first checkpoint
ATA = Actual arrival at the first checkpoint
Fuel Remain = Total fuel onboard minus estimated fuel used to get to the first checkpoint

<u>Subsequent Rows</u>

Check Points = Subsequent checkpoints or waypoints (usually from the CAPF 104), in sequence

Ident = Identifier of the checkpoint or waypoint, if applicable

Freq = Frequency of VOR or airports used as a checkpoint, if applicable

Mag Hdg = True course (or heading from the GPS) from the last checkpoint or waypoint to the next

Dist = Nautical miles from the last checkpoint or waypoint to the next

Ground speed = Speed over the ground (from the GPS)

ETE = Estimated time enroute from the last checkpoint or waypoint to the next
ETA = Estimated time of arrival at the next checkpoint or waypoint
Remain = Total sortie time enroute minus time consumed thus far (running total)
ATA = Actual arrival at the next checkpoint or waypoint
Fuel Remain = Total fuel onboard minus estimated fuel used thus far (running total)

Inflight Observations = Time and observations (e.g., sightings and negative sightings)

Observer/Scanner Search Area Work Sheet

Tach In			Date			PIC		ID
Tach Out			'N' #			OBS		ID
Total			CAP Flight #			SCN		ID
			Mission #			SCN		ID
Hobbs In			Sortie #			FRO		ID
Hobbs Out			Sectional				CAP FM Main Channel	
Total			Grid				CAP FM Guard Channel	

Ops Normal every _____ minutes							

Made Call √	Required Calls			
	Takeoff Time			
	Startup Hobbs			
	Landing Time			
	Shutdown Hobbs			
		Search Area 1	Search Area 2	Search Area 3
	In Area Time			
	Hobbs			
	Out Area Time			
	Hobbs			

NOTES

ATIS	Wind Direction	Wind Speed	Visibility	Ceiling	Runway	Altimeter	Remarks

Weather/FSS	Unicom	Clearance	Ground	Tower	Departure	Arrival

Mission Pilot Search Area Work Sheet

Date:

A/C#

MISSION #

MSN PILOT:

SORTIE:

PILOT/OBS:

SECTIONAL:

OBS/SCN:

GRID: A B C D

OBS/SCN:

CAP FLIGHT #

FREQUENCY

AIRPORT NAME:

CLEARANCE DEL:

CITY:

APPROACH:

IDENTIFIER:

TOWER:

AIRSPACE:

GROUND:

ELEVATION:

DEPARTURE:

UNICOM FREQ:

FSS: FREQ:

ATIS/AWOS/ASOS:

CTR: FREQ:

HOBBS IN:

TACH IN:

OUT:

OUT:

TOTAL:

TOTAL:

"High Bird" Work Sheet

Date:

A/C #

SECTIONAL:

MSN PILOT:

GRID #

PILOT/OBS:

TOTAL HOBBS TIME:

MISSION #

CAP FLIGHT #

SORTIE #

INTERVAL FOR OPS NORMAL CALLS

MAIN FREQUENCY

GUARD FREQUENCY

AIRCRAFT CALLSIGN	N 3	INT 1	INT 2	INT 3	INT 4	INT 5	INT 6	INT 7	INT 8	INT 9	INT 10	INT 11	INT 12

NOTES:

Ground Teams

	Callsign		Callsign
Alpha		Delta	
Bravo		Echo	
Charlie		Foxtrot	

"High Bird" Transmission Log

Date ___ / ___ / ___

From	To	Message	Delivered	Verified

CAP-MASF13

CAP Photo/Recon Log

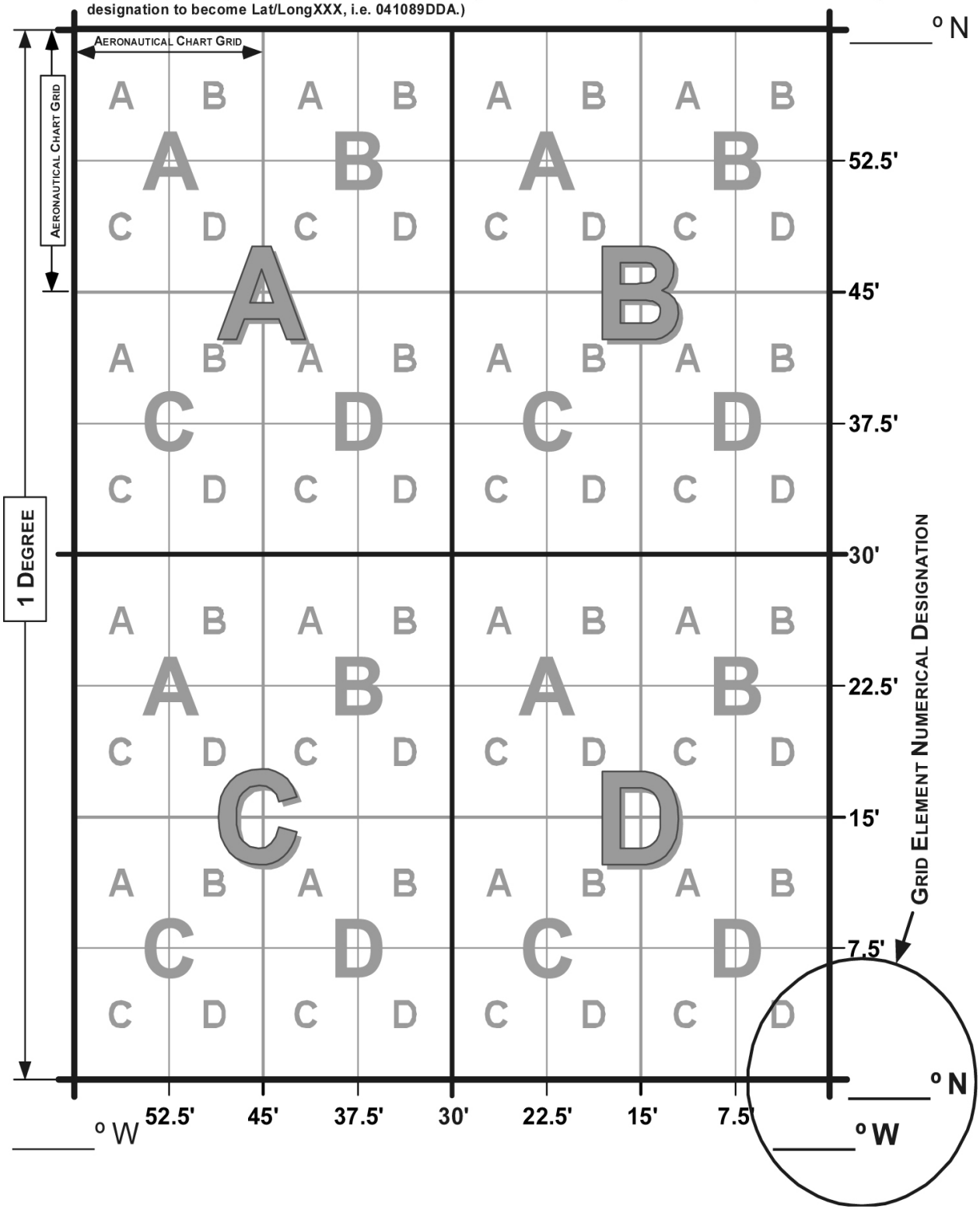
Mission #:		**Pilot:**	
Sortie #:		**Observer:**	
Date:		**Scanner:**	
A/C 'N' #:		**Scanner:**	

Image/ Waypt #	MSL	Location (e.g., lat/long and grid)	Direction Looking	Description (include time)

Image/ Waypt #	MSL	Location (e.g., lat/long and grid)	Direction Looking	Description (include time)

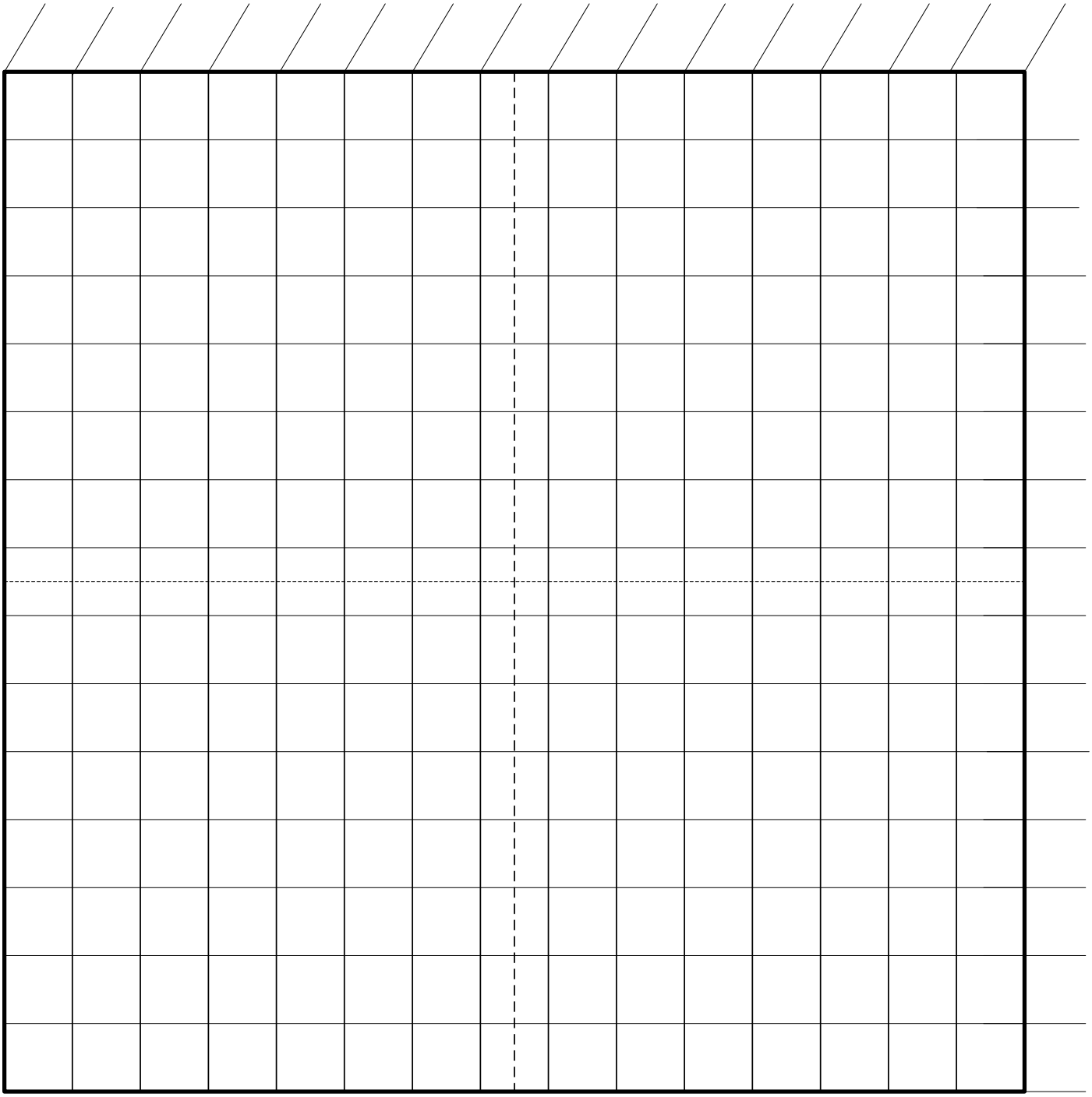
STANDARDIZED LATITUDE/LONGITUDE GRID SYSTEM

The basic element of this system is one full degree of latitude and longitude forming a square. The grid element is then designated numerically by the full degree coordinates in the lower right corner (southeast) of the grid. Example: Chicago Grid 385 is designated 40092AA; Grid 368 is designated 041089DD. The designation can be further identified by dividing the Aeronautical Chart numerical grid into 4ths creating additional ABCD quadrants allowing the designation to become Lat/LongXXX, i.e. 041089DDA.)



Standard Grid 15' x 15'

Standard Gird #:



Description:		
Mission #:	Sortie #:	Date:
PIC & ID#:	Crew & ID#:	

Standard Grid 7½' x 7½' xxA

Standard Gird #:

Description:		
Mission #:	Sortie #:	Date:
PIC & ID#:	Crew & ID#:	

Standard Grid 7½' x 7½' xxB

Standard Gird #:

Description:		
Mission #:	Sortie #:	Date:
PIC & ID#:	Crew & ID#:	

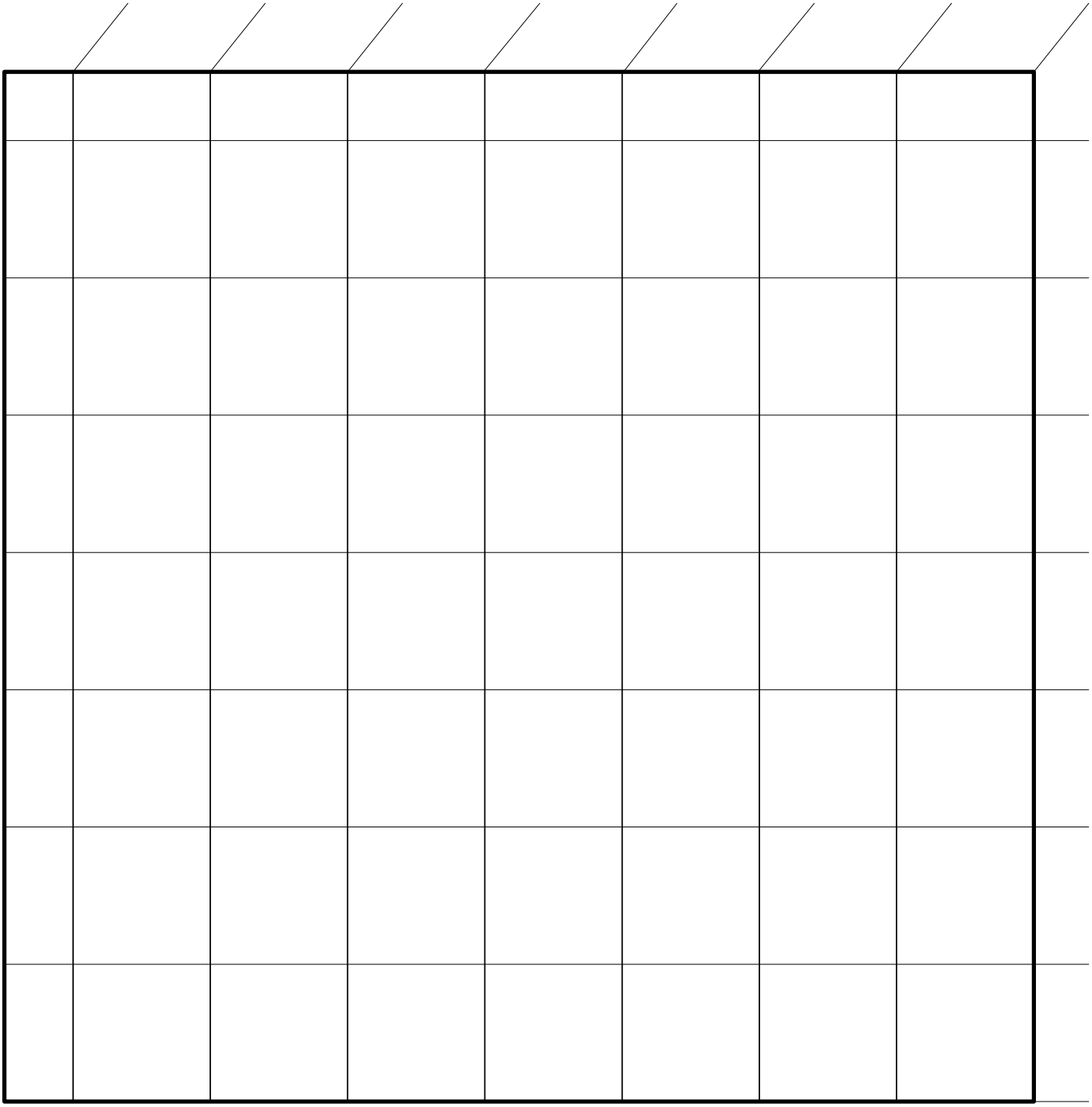
Standard Grid 7½' x 7½' xxC

Standard Gird #:

Description:		
Mission #:	Sortie #:	Date:
PIC & ID#:	Crew & ID#:	

Standard Grid 7½' x 7½' xxD

Standard Gird #:



Description:		
Mission #:	Sortie #:	Date:
PIC & ID#:	Crew & ID#:	

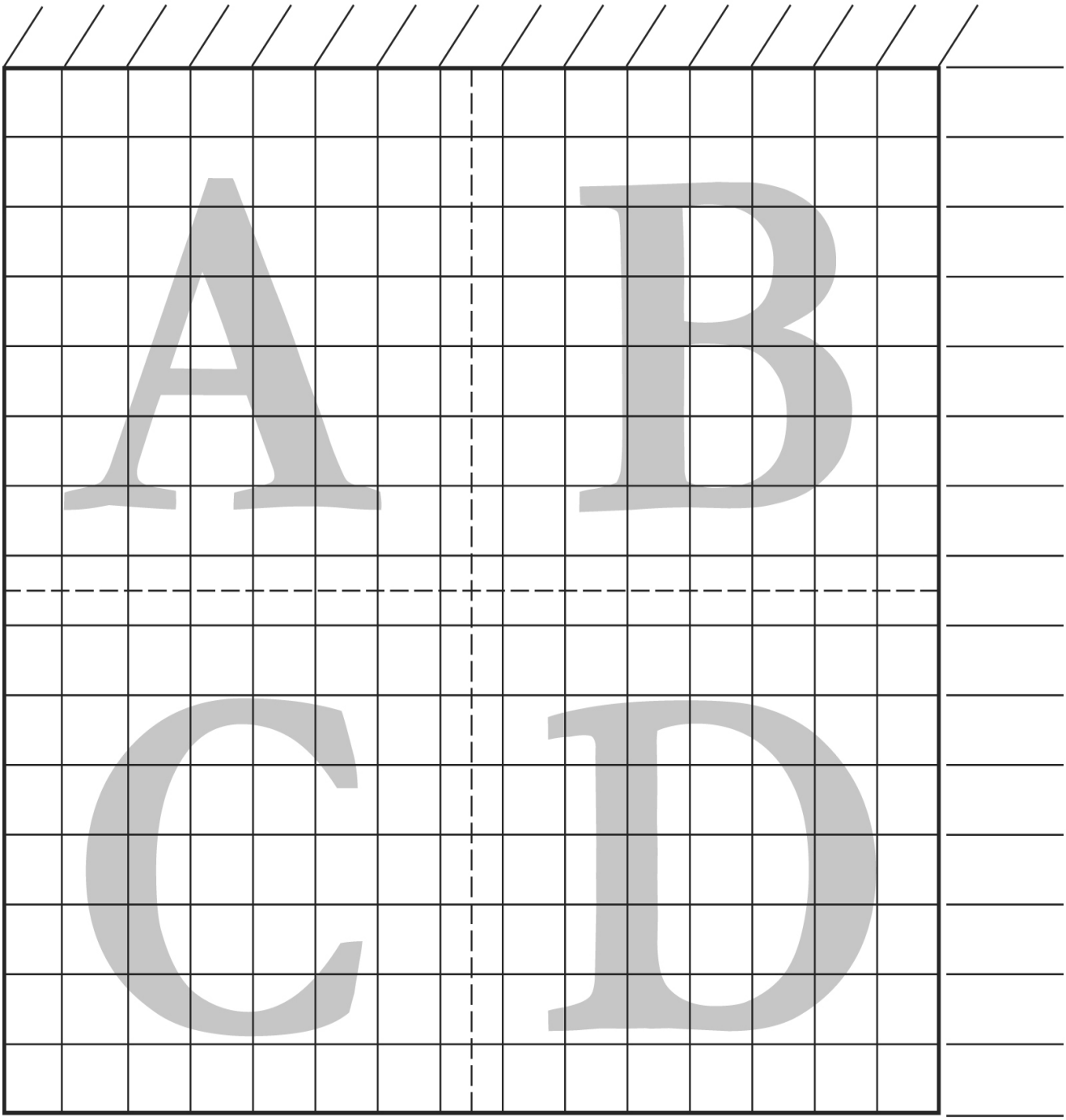
Grid Coordinates

Date:_____

Sectional: _____ Grid #: _____

Entry Point: N _____ W _____

Exit Point N _____ W _____



NAVIGATIONAL AIDS

	IDENTIFIER	FREQUENCY	RADIAL
1.	_____	_____	_____
2.	_____	_____	_____

Intentionally blank

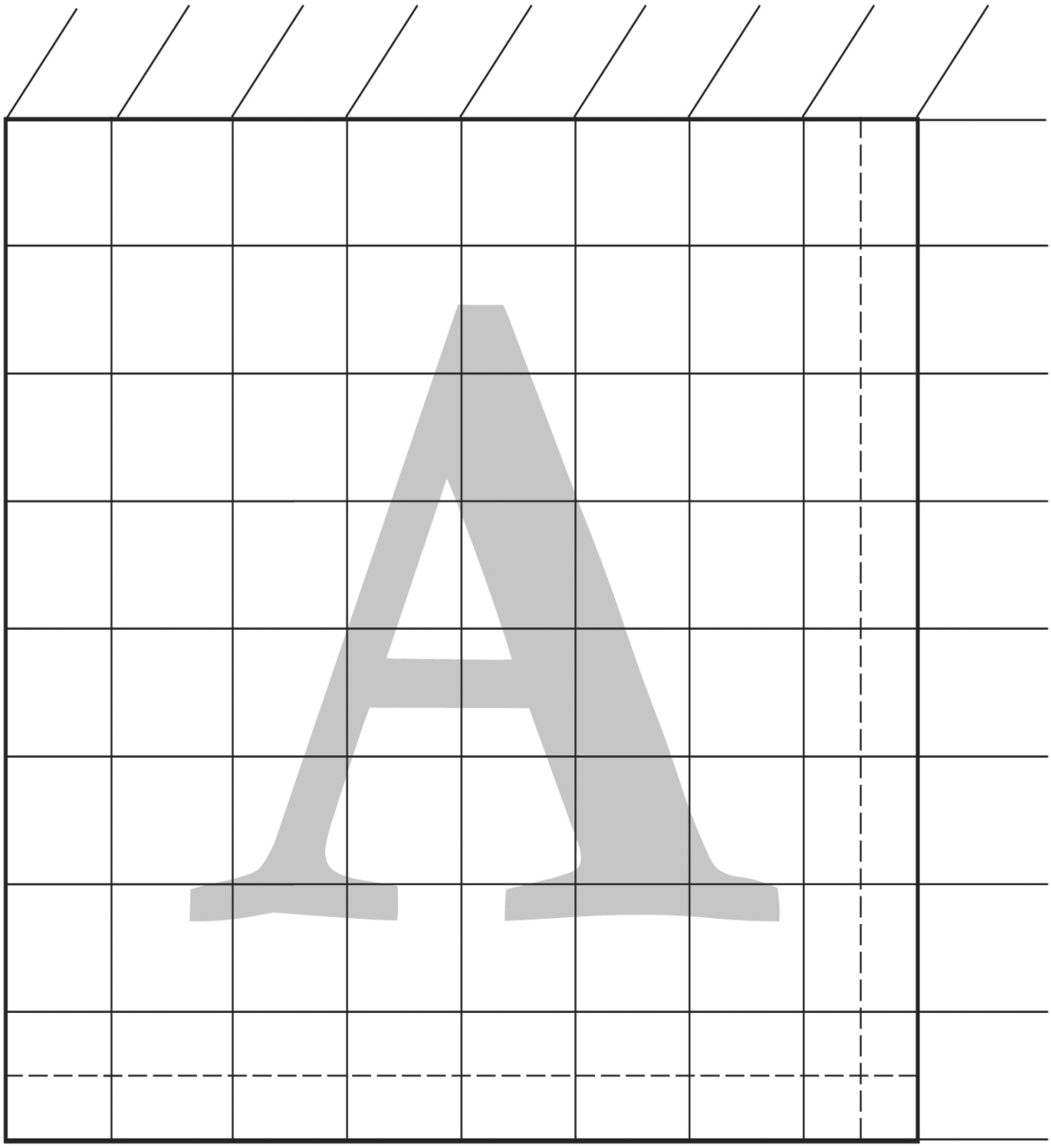
Quarter Grid Coordinates A

Date:_____

Sectional: _____ Grid #: _____

Entry Point: N _____ W _____

Exit Point N _____ W _____



NAVIGATIONAL AIDS

	IDENTIFIER	FREQUENCY	RADIAL
1.	_____	_____	_____
2.	_____	_____	_____

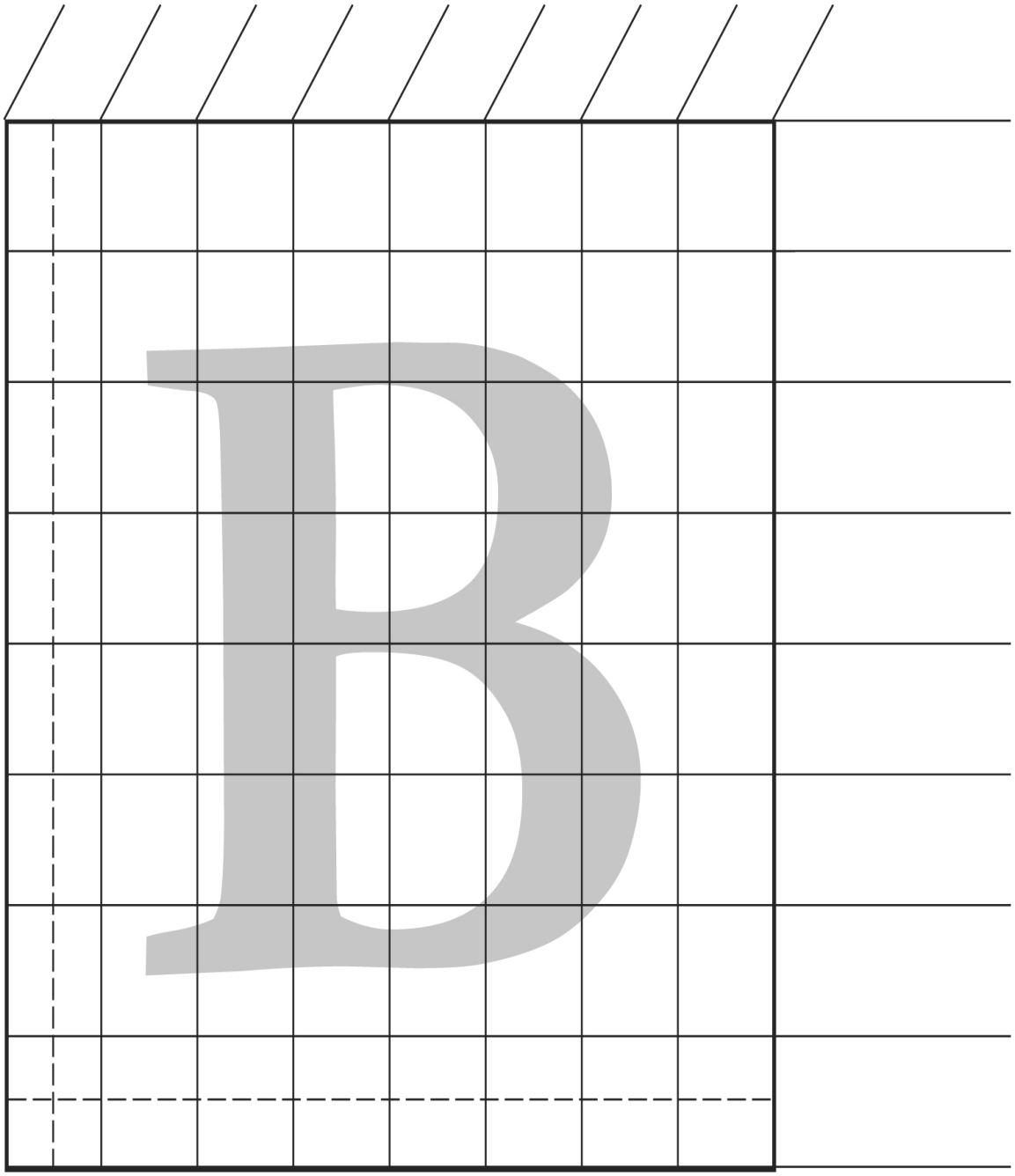
Quarter Grid Coordinates B

Date:_____

Sectional: _____ Grid #: _____

Entry Point: N _____ W _____

Exit Point N _____ W _____



NAVIGATIONAL AIDS

	IDENTIFIER	FREQUENCY	RADIAL
1.	_____	_____	_____
2.	_____	_____	_____

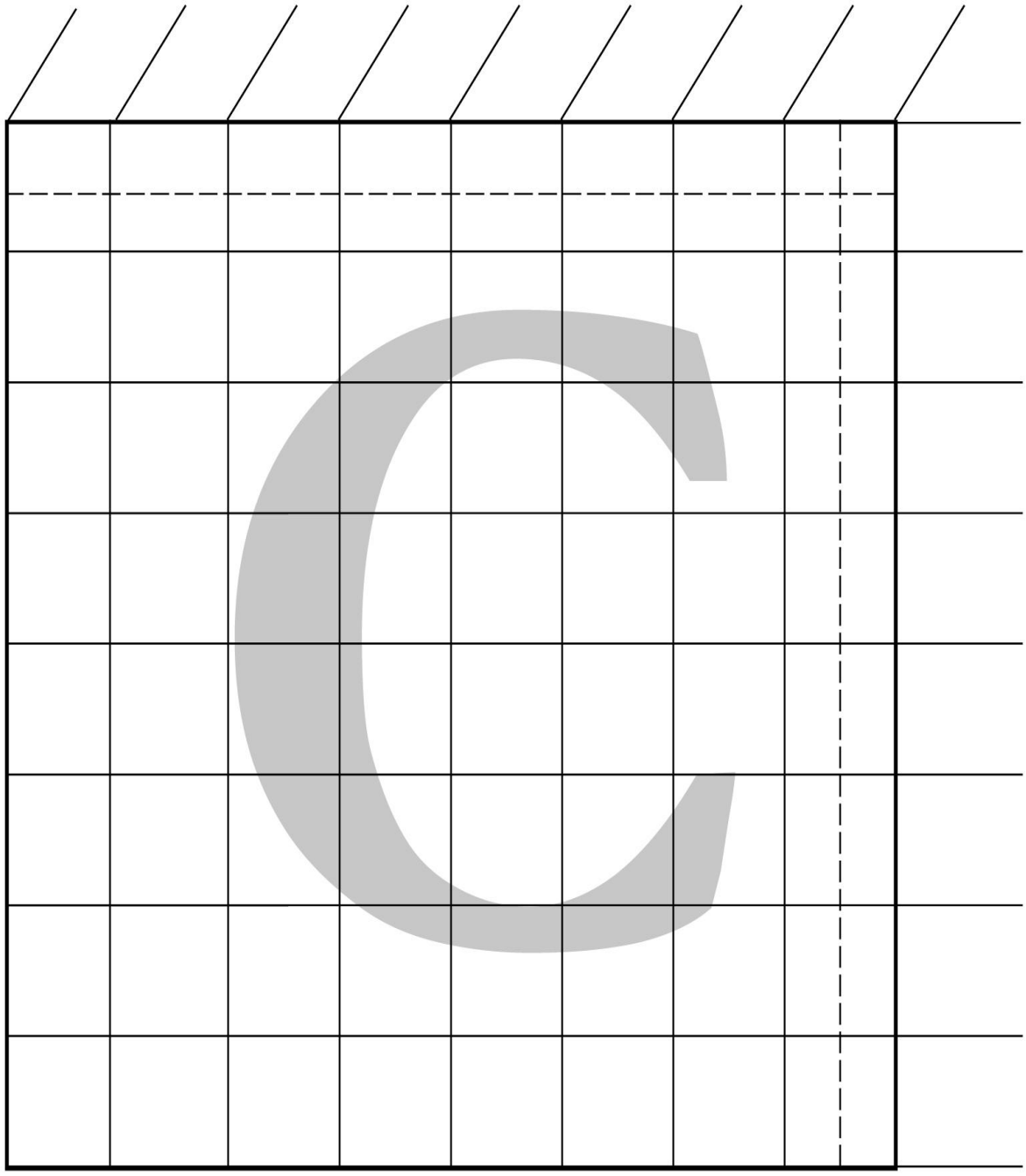
Quarter Grid Coordinates C

Date:_____

Sectional: _____ Grid #: _____

Entry Point: N _____ W _____

Exit Point N _____ W _____



NAVIGATIONAL AIDS

	IDENTIFIER	FREQUENCY	RADIAL
1.	_____	_____	_____
2.	_____	_____	_____

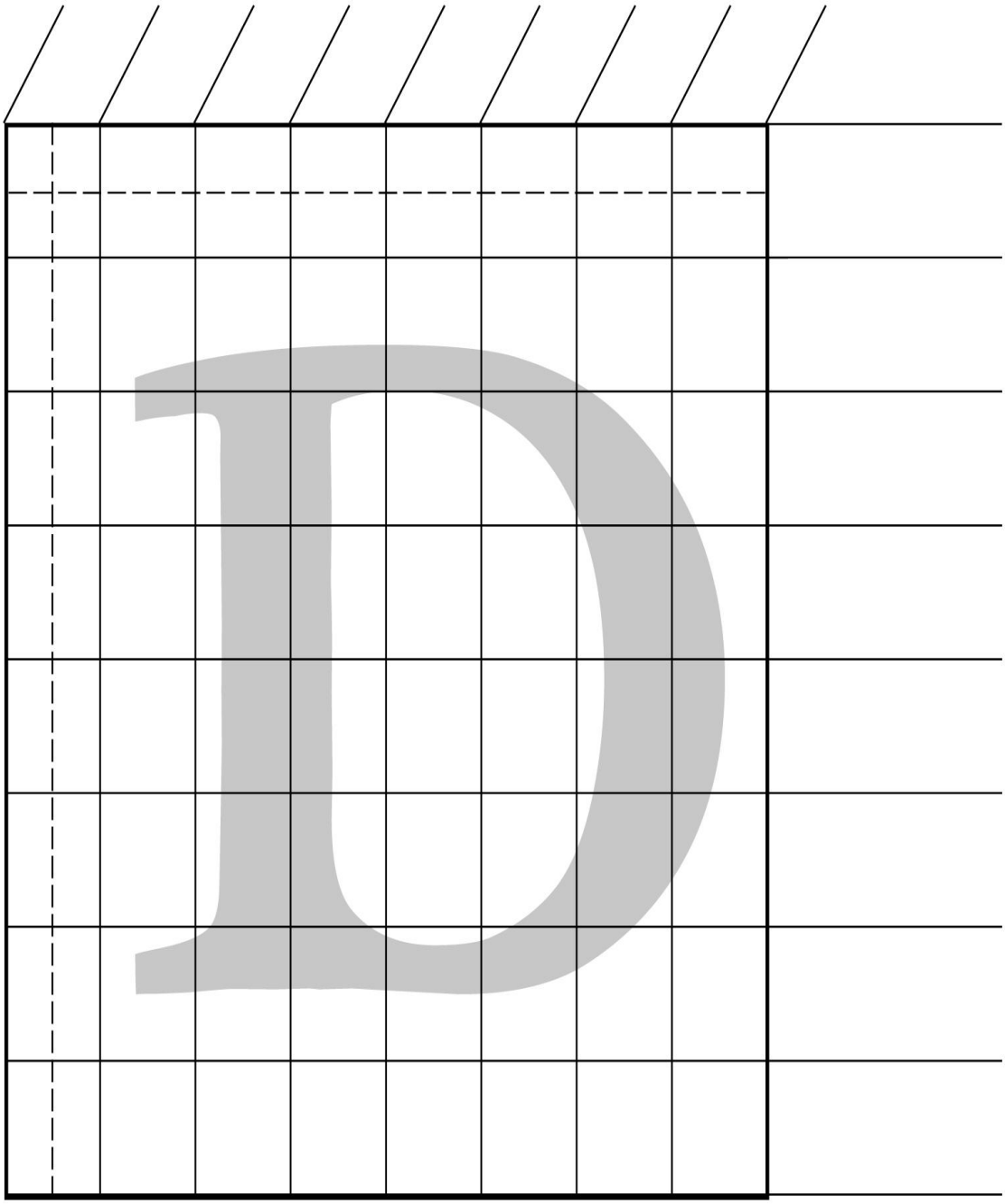
Quarter Grid Coordinates D

Date:_____

Sectional: _____ Grid #: _____

Entry Point: N _____ W _____

Exit Point N _____ W _____



NAVIGATIONAL AIDS

	IDENTIFIER	FREQUENCY	RADIAL
1.	_____	_____	_____
2.	_____	_____	_____

Route Coordinates

Date:_____

Sectional: _____ Grid #: _____

Entry Point: N _____ W _____

Exit Point N _____ W _____

NAVIGATIONAL AIDS

	IDENTIFIER	FREQUENCY	RADIAL
1.	_____	_____	_____
2.	_____	_____	_____

Creeping Line Coordinates

Date:_____

Sectional: _____ Grid #: _____

Entry Point: N _____ W _____

Exit Point N _____ W _____

NAVIGATIONAL AIDS

	IDENTIFIER	FREQUENCY	RADIAL
1.	_____	_____	_____
2.	_____	_____	_____

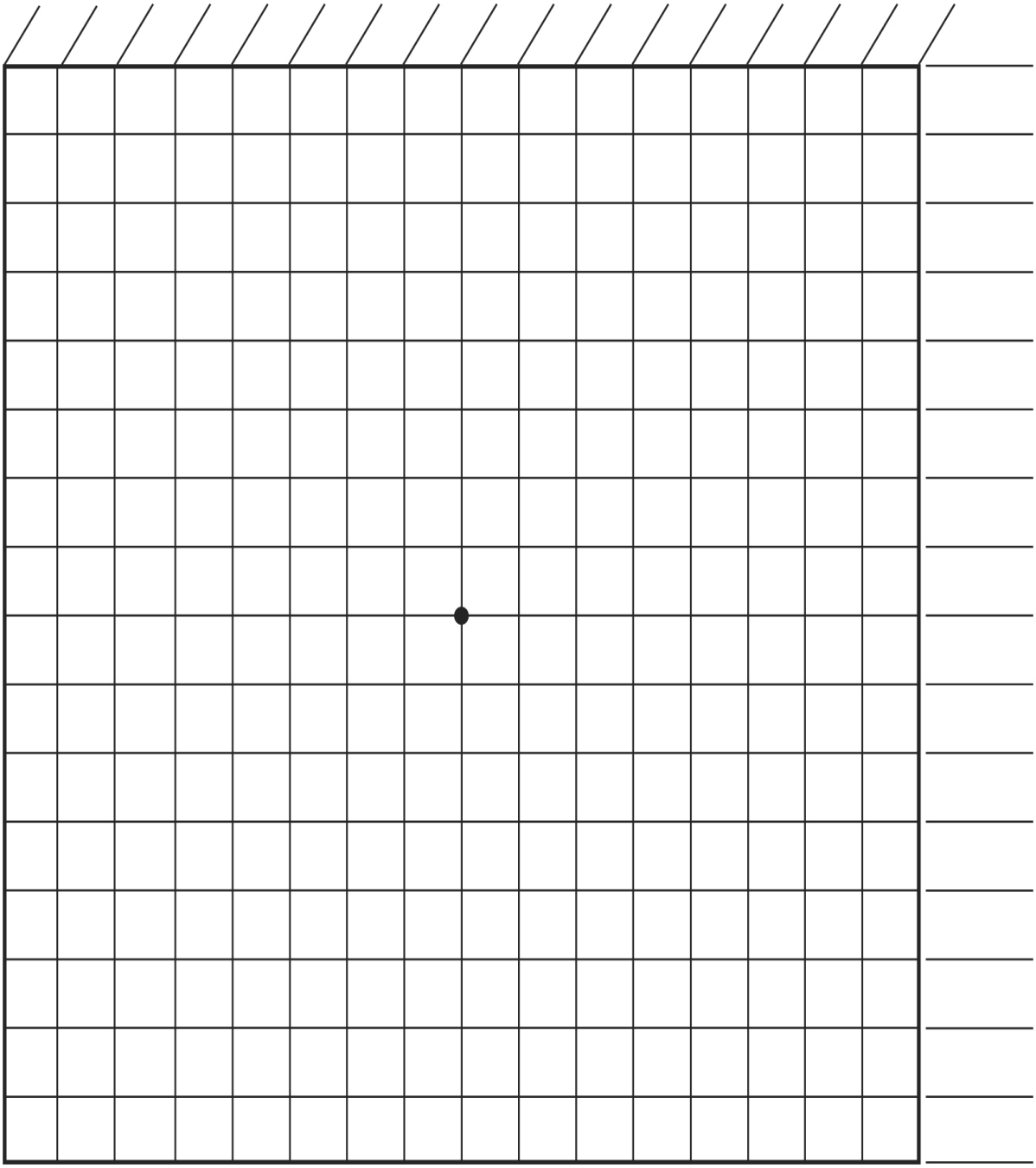
Expanding Square Coordinates

Date:_____

Sectional: _____ Grid #: _____

Entry Point: N _____ W _____

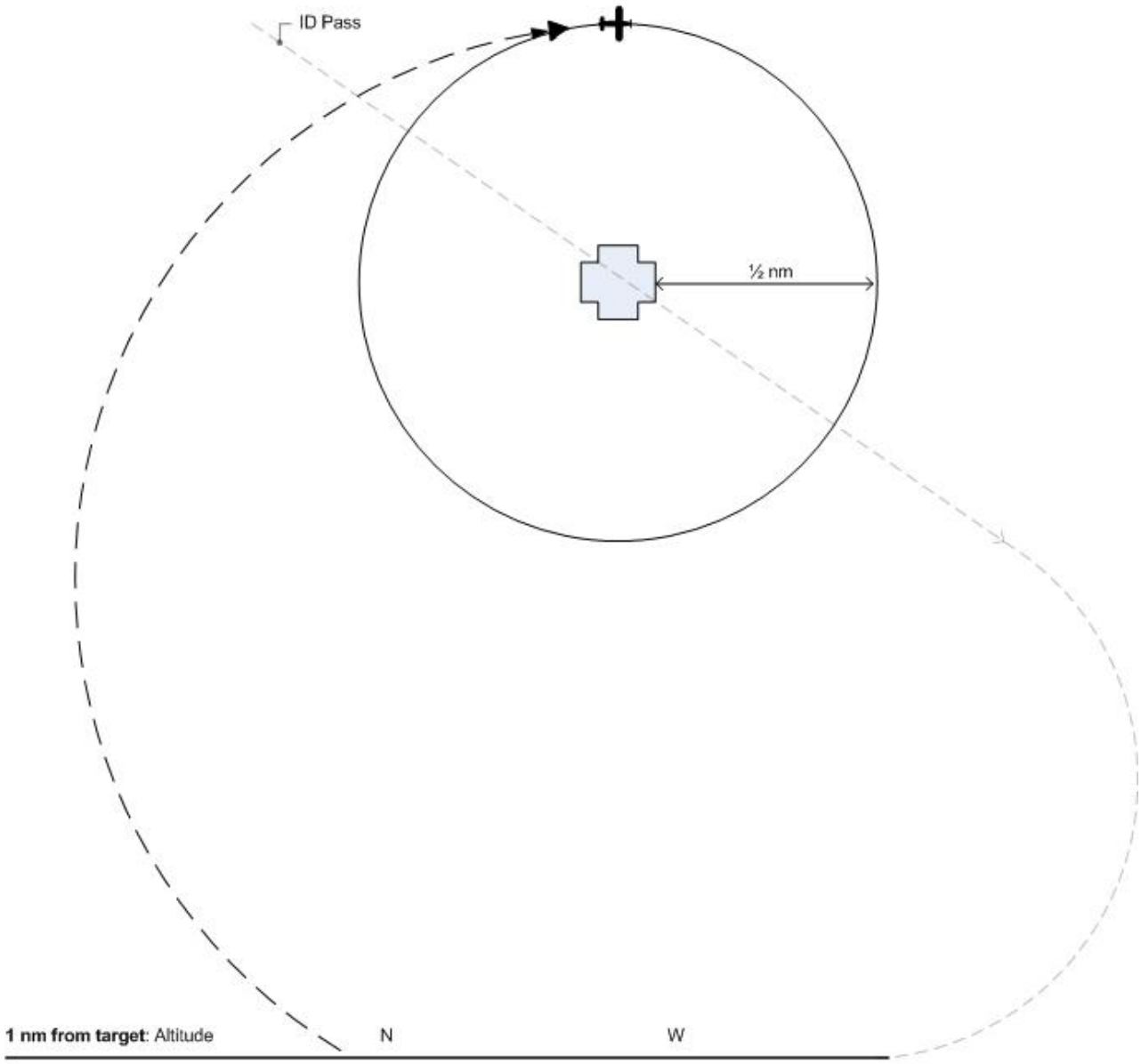
Exit Point N _____ W _____



NAVIGATIONAL AIDS

	IDENTIFIER	FREQUENCY	RADIAL
1.	_____	_____	_____
2.	_____	_____	_____

Circling Imaging Coordinates

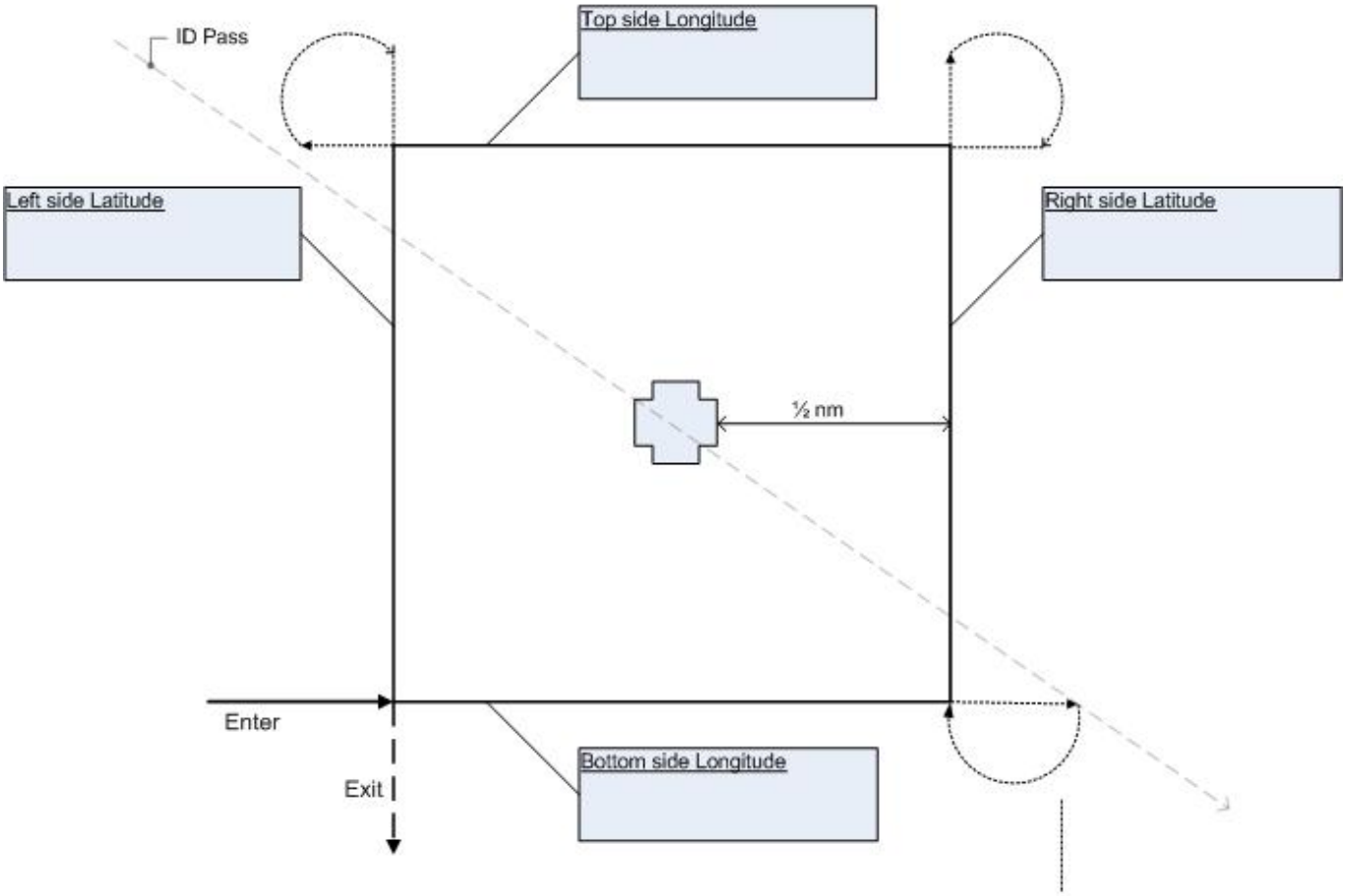


Description:		
Mission #:	Sortie #:	Date:
PIC:	Crew:	

Target Coordinates: N		W
Altitude:	Airspeed:	
Time of day:	Sunny / Cloudy / Overcast (circle or describe other)	

4-Square Imaging Coordinates

(Using Port Window)



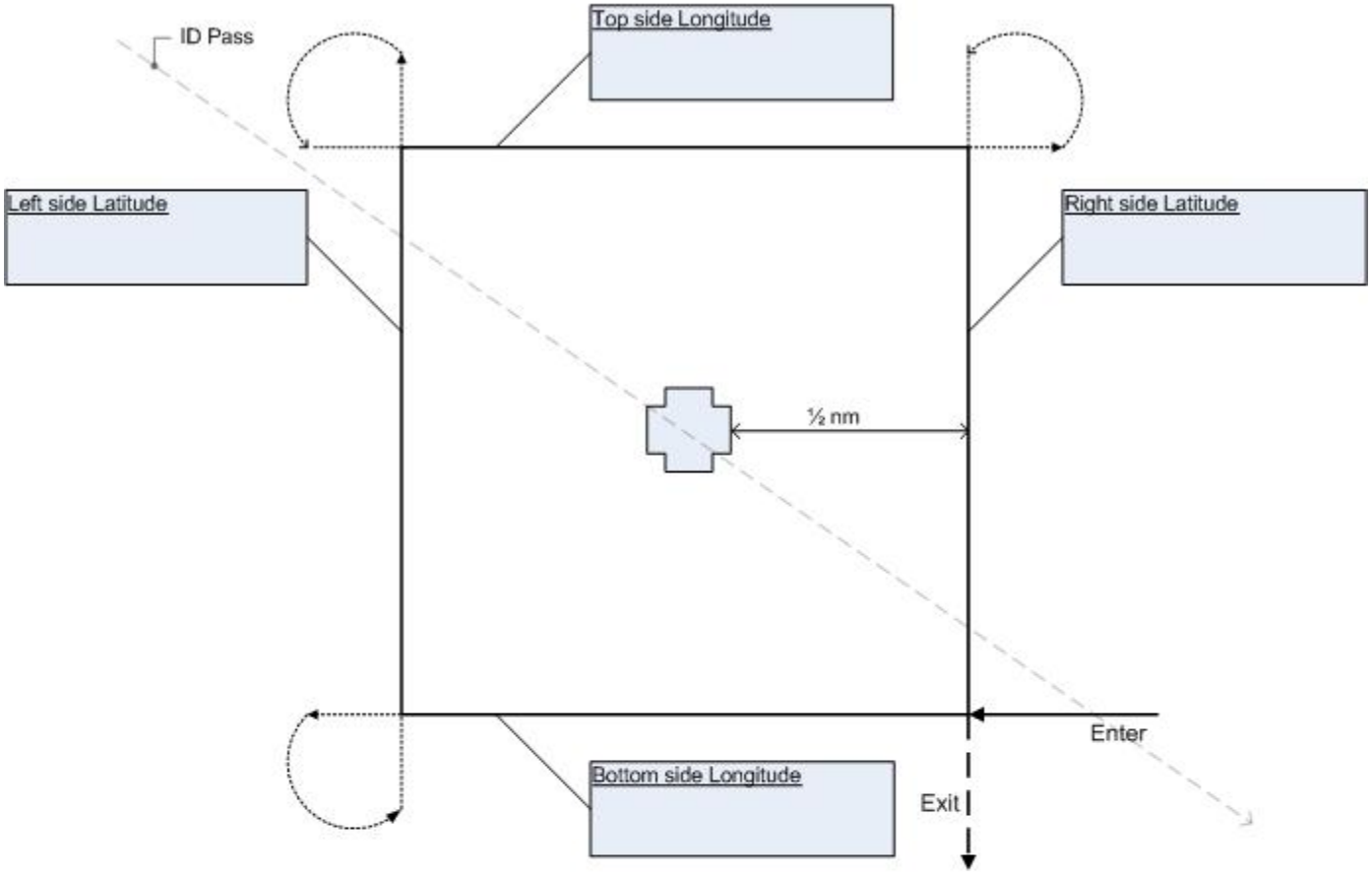
1 nm from target: Altitude N W

Description:		
Mission #:	Sortie #:	Date:
PIC:	Crew:	

Target Coordinates: N	W
Altitude:	Airspeed:
Time of day:	Sunny / Cloudy / Overcast (circle or describe other)

4-Square Imaging Coordinates

(Using Starboard Window)



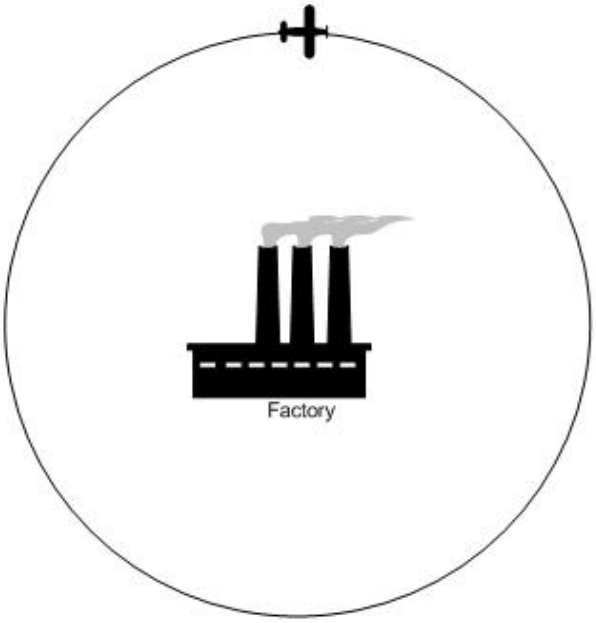
1 nm from target: Altitude N W

Description:		
Mission #:	Sortie #:	Date:
PIC:	Crew:	

Target Coordinates: N	W
Altitude:	Airspeed:
Time of day:	Sunny / Cloudy / Overcast (circle or describe other)

Bird's Eye (Overview) Imaging Pattern Planning and Data Sheet

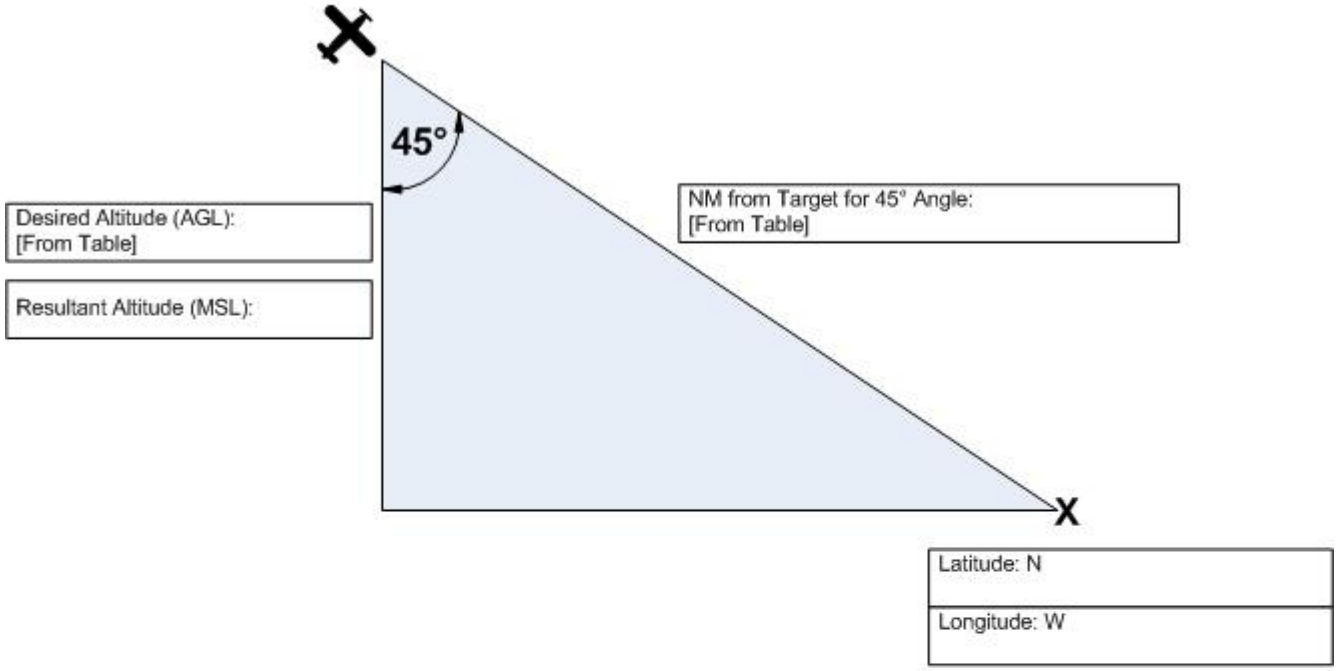
Mission #:	Sortie #:	Date:
Initial (planned) altitude over target:		Obstacles near target:
PIC:	Crew:	



Circle target to find the altitude that will permit horizontal framing and determine the best direction from which to take the imaging photo

Altitude (MSL):	Direction looking for best photo:
Time of Day:	Sunny / Cloudy / Overcast (circle one or describe other)

45° Angle to Target Imaging Pattern Planning Sheet



Height (AGL)	NM for 45° Angle
1000	0.233
1500	0.349
2000	0.465
2500	0.582
3000	0.698
3500	0.815
4000	0.931
4500	1.047

Description:

Mission #: Sortie #: Date:

PIC: Crew:

Airspeed: Time of Day:

Sunny / Cloudy / Overcast (circle or describe other)