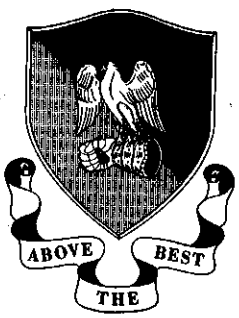
William J Fitzgerald

STUDENT HANDOUT

INSTRUMENT FLIGHT SUBJECTS

BOOK I

5/69



SEPTEMBER 1969

DEPARTMENT OF FIXED WING TRAINING
UNITED STATES ARMY AVIATION SCHOOL
FORT RUCKER, ALABAMA

TABLE OF CONTENTS

NOTE: 621-2 Navigational Computer Programed Text Booklet will be passed out in class.

WRITTEN BY: MAJ Harry F. Baldwin DATE: September 1969

APPROVED BY: COL Charles R. Shaw DATE: September 1969
Director

PERFORMANCE OBJECTIVES

TACTICAL MAP REVIEW AND TACTICAL FLIGHT PROCEDURES

1. KNOWLEDGES: Without the aid of notes, the student will be able to state without error—

   a. How grid and magnetic courses are found on a tactical map.

   b. How a grid course is converted to a magnetic course.

   c. How to plot military coordinates.

   d. How to read contour lines.

   e. The relationship of terrain elevation to obstacle elevation.

   f. Proper use of map scales to determine distance.

   g. Corridor dimensions.

   h. Minimum en route altitude (MEA).

   i. Computation of ETE in a tactical area.

   j. Obtaining magnetic course (MC) and initial magnetic heading for tactical IFR flights.

   k. Fuel required on a tactical IFR flight.

   l. The classroom procedure for authentication of the NDB.

   m. Reasons for filing a flight plan in a tactical area.

   n. Situations to consider in tactical emergency planning.

2. SKILLS: When given a tactical map, the student will be able to perform the following within the specified limitations:

   a. Identify correctly the map sheet title and number.

   b. Name correctly the 100,000 meter grid square identifier.

   c. Measure the distance between two points.

   d. Give the military grid coordinates of a specified point to the nearest 10 meters.

   e. Locate a point on the map within 10 meters when given the coordinates.

   f. Determine the elevation of a given point through the use of contour lines within 10 meters.

g. Distinguish and properly identify terrain features by analyzing contour line arrangements.

h. Name correctly the topographical features when given grid coordinates, using the legend if necessary.

Using both the mathematical conversion factor and the MB-4 computer to convert meters to feet—

i. Accurately plot a corridor on the map.

j. Determine the highest obstacle in the corridor.

k. Determine the minimum en route altitude (MEA) for use in the corridor.

STUDENT OUTLINE

TACTICAL MAP REVIEW AND TACTICAL FLIGHT PROCEDURES

1. General chart information.

a. Marginal data.

(1) Name of sheet.

(2) Sheet number.

(3) Index to adjacent sheets.

(4) Grid zone designation.

(5) Scale ratio.

(6) Distance scale.

(7) Contours.

(8) Declination diagram.

(9) Conversion of grid north to magnetic north.

(10) Elevation guide box.

(11) Legend.

b. Topographical symbols.

2. Grid and magnetic courses.

3. Military grid coordinates.

4. Mission principles.

a. Helicopter capability.

b. All-weather needs.

c. Missions.

d. Navigational aids.

e. Authentication.

5. Major planning factors.

a. Preflight planning.

(1) Briefing.

(2) Flight plan.

(3) Emergency.

b. Route survey.

(1) Corridor dimensions.

(2) MEA.

(3) ETE.

(4) Fuel.

(5) Alternate selection.

(6) Enroute hazards.

(7) Enroute procedures.

c. Copilot duties.

SOI EXTRACT

TACTICAL MAP REVIEW AND TACTICAL FLIGHT PROCEDURES

NOTE: For classroom use only. Reconnaissance at the operating area is necessary for determining general vegetation heights for en route computations and specific heights in the buffer zone.

VEGETATION HEIGHT GUIDE	
Dense jungle, forest	100 feet
Pine, rubber, mangrove trees	50 feet
Bamboo, coffee, palm trees	30 feet
Brushwood, clear space, tea	10 feet

SOI EXTRACT

NOTE: Classroom illustration only.

1. Policies.

   a. Tactical radios will be operated only as required for essential communications.

   b. Communications priority will be in the following order: Emergency, combat assault, combat support, air operations, and ground operations.

   c. Communications affecting movement in combat areas will be authenticated.

   d. Radio broadcasts in connection with observed enemy operations will be made in the clear.

   e. Radio position reports will be in the clear or coded as directed by the unit CO or higher authority.

2. Authentication system.

   a. Test elements for transmission authentication. Example: (Call sign), this is (call sign) authenticate MIKE ECHO, over.

   b. Reply elements for transmission authentication. Example: (Call sign), this is (call sign) authentication is CHARLIE MIKE, over.

   c. Procedure for using authentication table.

(1) Locate first test element character (MIKE) in left column.

(2) Locate second test element character (ECHO) in same row found in step a.

(3) Reply elements (CHARLIE MIKE) are the letters before and after the second test element.

AUTHENTICATION TABLE

A	SHPRT	QUACK	JMLVZ	DGBNY	OEWFIX
1B	KMJLE	VWQST	UPFXB	CIGOA	ZRHNDY
2C	EMSQW	LVYJR	IACTU	GOBXP	ZFKHND
3D	USNTW	JIMFD	RYKCE	ZPXLA	GHQOVB
4E	JBOQF	AXHGC	TELMN	UDKYI	WRSPZV
5F	KMUNY	DLVZH	PSRXA	QOJCB	FEITGW
6G	KGAYC	JFRZU	PWEST	NQMBX	VLDOIH
7H	LQZCR	FJNKG	EHTBD	OYSXM	IPVWUA
8I	NTQDF	CZVPG	MKHSO	JUEBW	IAXLRY
9J	QBPIH	OMUTL	KWFAJ	XYSDV	CEGNZR
K	GDBHM	UILEF	QPNYZ	KVORX	JCWATS
L	DZNAU	BLTGC	FWRQI	HXSMV	YKEPJO
M	FNQZO	XAPYV	GWJTL	RSHBK	UCEMDI

PRACTICAL EXERCISE NO. 1

TACTICAL MAP REVIEW AND TACTICAL FLIGHT PROCEDURES

LE THANH - 6536 IV

1. In what 100,000-meter grid square does this chart fall?

2. What is the grid zone designator for this chart?

3. A grid course of 060° would be a magnetic course of _____.

4. There are four cultural features located in Grid Square YA8425. They are—

   a.

   b.

   c.

   d.

5. What are the six-digit coordinates of the highest spot elevation of this map according to the elevation guide?

6. The scale 1:50,000 means—

   a. 1 inch equals 50,000 inches.

   b. 1 meter equals 50,000 meters.

   c. 1 nautical mile equals 50,000 nautical miles.

   d. All of the above.

7. Can you consider the boundary between Vietnam and Cambodia as authoritative?

8. How do you distinguish between two or more villages with the same name?

9. In Grid Square YA872321, there is a stream that crosses a trail.

   a. What is the terrain elevation at that point?

   b. In what general direction does the stream flow?

10. Comparing the elevation between Grid Squares YA8924 and YA9025, what would be considered as the highest elevation?

11. State one reason for filing a flight plan in the tactical area.

12. Compute the MEA's, considering these heights to be the highest obstructions in the corridors.

HIGHEST OBSTRUCTION		MEA
a. 320 meters.	(1)	_____.
b. 340 feet.	(2)	_____.
c. 1140 feet.	(3)	_____.
d. 500 meters.	(4)	_____.
e. 1890 feet.	(5)	_____.
f. 800 meters.	(6)	_____.

13. You are located on the airfield at YA843254. From there you will fly direct to Hill 622 located in Grid Square YA7935. Then proceed direct to the outpost at YA871459. After picking up two wounded personnel, you will then return to the airfield.

The alternate for the first leg is YA871459.
The alternate for the second leg is YA843254.
TAS: 80 knots.
Fuel consumption: 400 pounds per hour.
Use the authentication table in book I.
Use the vegetation height guide in book I.
In your estimate for time, include 10 minutes at each LZ.

a. What are the three MEA's for this flight?

(1)

(2)

(3)

b. What are the magnetic headings and distances for this flight?

(1)

(2)

(3)

c. What is the estimated time en route for the flight?

d. What is the fuel requirement for this flight?

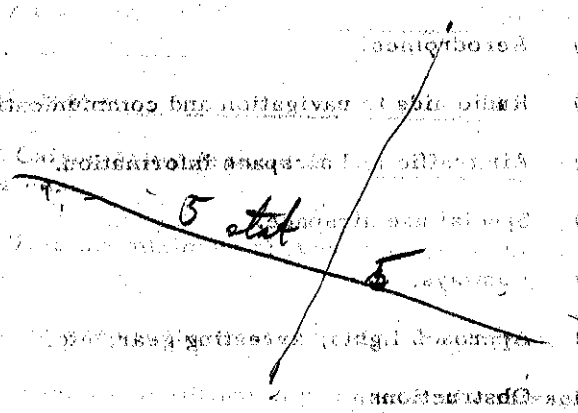
e. What type of vegetation exists at each of the LZ's?

(1)

(2)

f. What town is near the second LZ?

g. What is the authentication for Eight Yankee?



PERFORMANCE OBJECTIVES

ENROUTE AND APPROACH CHARTS

1. KNOWLEDGES:

   a. With the aid of DOD FLIP low altitude enroute, arrival, and terminal approach charts, the student will be able to write or state with at least 90 percent accuracy, the meaning and application of symbols depicting—

      (1) Aerodromes.

      (2) Radio aids to navigation and communication boxes.

      (3) Air traffic and airspace information.

      (4) Special use airspace.

      (5) Runways.

      (6) Approach lights, arresting gear, etc.

      (7) Obstructions.

      (8) Approach plan view.

      (9) Approach profile view.

      (10) Miscellaneous symbols.

      (11) Special notes.

   b. When given a DOD FLIP low altitude enroute, arrival, and/or terminal approach chart, holding facility/intersection, aircraft landing, and holding track/direction, the student will be able to state or write/diagram without error—

      (1) Holding entry procedures, both standard and nonstandard.

      (2) Holding leg times.

      (3) Crosswind correction.

2. SKILLS: With the aid of DOD FLIP low altitude enroute, area, and terminal approach charts, the student will be able to work a performance check and/or practical exercise with 90 percent accuracy.

STUDENT OUTLINE

ENROUTE AND APPROACH CHARTS

1. Aerodromes (enroute chart).

   a. Aerodrome information.

   b. Runway information.

2. Radio aids to navigation and communication boxes.

   a. Navigation aids.

   b. Radio aids to navigation data boxes.

   c. Air-ground communication boxes.

3. Air traffic and airspace information.

   a. Route data.

   b. Reporting points.

   c. Boundaries.

   d. Airspace information.

   e. Miscellaneous.

4. Special use airspace.

5. Description and purpose of DOD FLIP approach charts.

6. Arrangement of the approach charts in FLIP.

7. Chart border information.

8. Approach chart plan view.

9. Approach chart profile view.

10. Landing minima. MDA high above touchdown

11. Aerodrome information.

transition fix (area, course, distance)

weather min in parentheses (used for planning purposes)
landing min (know the type of approach) and read
the min alt. and RVR.

12. Holding procedures.

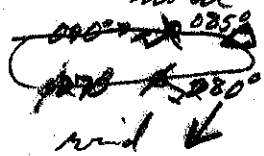
a. When required.

b. Clearance.

c. Pattern. standard (right hand turns)

d. Entry. direct (within 30°) of holding course
parallel
teardrop (optional)

e. Crosswind correction. when the inbound heading is
than 10° hold thrice the amount in the opp.



5 L off
5 left
10° right

13. Practical exercise.

PRACTICAL EXERCISE NO. 1

ENROUTE AND APPROACH CHARTS

1. Airways and airspace within the conterminous United States shown on the low-altitude enroute charts are effective up to, but not including, 18000 feet (MSL).

2. A flight from Salt Lake City to El Paso, Texas, would require enroute chart (EC) numbers L-4 L-5 L-7.

3. What, if any, area charts would be required?

4. Tucumcari, New Mexico, is in the _____ time zone. (L-4, panel H)

5. What is the variation at Tucumcari, New Mexico?

6. What ARTCC controls IFR enroute traffic at Tucumcari, New Mexico?

7. What is the ARTCC sector remote site name?

8. What UHF frequency is used for low-altitude communications? (Use IFR-S.)

9. What Flight Service station communication frequencies, if any, are available at Tucumcari, New Mexico? (Use map legend.)

10. What is the distance from Texico VORTAC to Anton Chico VORTAC?

11. What stations are used to establish FIELD Intersection?

12. What is the MEA between Texico and FIELD Intersection?

13. What is the distance and magnetic direction from Tucumcari, New Mexico VORTAC direct to Roswell, New Mexico VORTAC?

14. Is R-5105 joint- or sole-use restricted airspace?

15. Is an instrument approach available at Ft. Sumner Municipal Airport? (Panel H)

16. What is the frequency of Cannon navigational aid? (Panel H)

17. Is voice transmitted over Cannon navigational aid frequency?

18. What must you do to comply with the minimum crossing altitude at SOCORRO VORTAC (L-4, panel G)?

19. List two places where approach control and tower communication frequencies are listed.

    a.

    b.

20. If ILS is available at an airport, how is this shown on the enroute chart?

21. List three places where GCA availability is shown in FLIP?

a.

b.

c.

You are flying southwest on V-20 to Mobile, Alabama (EC L-18, panel E), with a heading of 215°, 4,000 feet altitude, and receive a clearance to hold west of Mobile VOR on the 231 radial. Left turns. EAC ILS Runway 14 Bates Field at 30 minutes after the hour.

22. Upon initial station passage, to what heading should you turn (regular entry; not teardrop)?

23. How long should you hold this heading?

24. At the end of the initial outbound timing, in what direction should you turn?

25. Upon reaching the VOR, which direction should you turn (left, right) to what heading (_____), for what time (_____)?

26. Established in the holding pattern, the inbound heading required to hold the course is 060°. To what heading should you turn for the outbound leg?

27. At 30, you are cleared for an ILS Runway 14 approach. Upon reaching the LOM, to what heading should you turn?

28. When may you begin descending out of 4,000?

29. What is the distance from the LOM to missed approach?

30. What is the longest runway at Bates Field? How many feet are not usable?

PRACTICAL EXERCISE NO. 1 - KEY

ENROUTE AND APPROACH CHARTS

1. 18,000.
2. L-7, L-5, L-4.
3. None.
4. Mountain standard.
5. 12°E.
6. Albuquerque.
7. Tucumcari.
8. 319.2 (IFR supplement under Albuquerque Center).
9. 122.2, 122.1R, 122.6, 123.6, 255.4 (Shadow Box, EC Legend).
10. 115 nautical miles.
11. Texico (TXO, 112.2, 278°) and Tucumcari (TCC, 113.6, 170°).
12. 6,500.
13. 121 nautical miles, 193°.
14. Joint-use (controlled airspace shading).
15. No (brown airport symbol).
16. Channel 104.
17. No. (TACAN channels do not transmit voice signals.)
18. 10,000 feet going west on V264.
19. Instrument approach charts, IFR supplement (VFR supplement for VFR only towers).
20. Paper airplane-type symbol with point at airport symbol. Larger ILS course diagram indicates ILS availability plus airway fix function.
21. Enroute charts, approach charts, IFR supplement.
22. 231°.
23. 1 minute.

24. Right.

25. Left, 231°, 1 minute.

26. 213° (9° R doubled in opposite direction).

27. 320° (fly depicted procedure unless otherwise specified or directed).

28. Now.

29. 4.6 nautical miles.

30. Runway 14 (7,800 feet). 1,000 feet is not usable on Runway 32.

PRACTICAL EXERCISE NO. 2

ENROUTE AND APPROACH CHARTS

SITUATION I

Use Fort Rucker, Alabama approach chart VOR Runway 6.

1. The frequency used for the Cairns VOR is _____ and the three-letter identifier is _____.

2. The field elevation at Cairns is _____ feet.

3. The longest runway at Cairns Army Airfield is _____ feet long and _____ feet wide.

4. _____ feet MSL is the minimum altitude authorized for completion of the procedure turn.

5. At 80K on final, where or when is the missed approach started?

6. You would climb to what indicated altitude if you executed a missed approach?

7. You would climb out on the _____ radial to _____ _____ for a missed approach on this facility.

8. The transition from Opp Intersection to the approach fix is MEA _____; course, _____ and distance, _____.

9. Procedure turn must be completed _____ of the published approach course and within the _____ circle.

SITUATION II

Use Memphis Metropolitan approach chart ADF-1/ILS Runway 9.

10. What approach lighting systems are there on the Memphis Metropolitan Airport?

11. You are arriving in the Memphis area from the east. You would expect to contact Memphis Approach Control on _____ UHF.

12. The distance from the Kerrville Intersection to the outer compass locator (LOM) is _____ miles.

13. The airport elevation at Memphis Metropolitan Airport is _____ feet.

14. The inbound magnetic bearing to the LOM from the Kerrville Intersection is _____ _____.

15. What is the identifier of the outer marker?

16. What is the identifier of the LOM?

17. The frequency of the middle marker is _____, and it is identified by _____.

18. At 70K on final, the time from the final fix inbound is _____ minutes and _____ seconds.

19. The _____ is 731 feet MSL, and the _____ is 400 feet AGL. (Straight-in ADF.)

SITUATION III

Use the Tallahassee Municipal LOC (BC) Runway 18 approach chart.

20. You are cleared for an LC (BC) Runway 18 approach, landing Runway 9. What are your approach minimums? (Rotary wing.)

21. What is the MDA?

22. What is the final approach fix?

23. Inbound on final, your vertical needle is deflected to the blue section of the indicator (left of center), you should correct to the (right - left)?

24. Inbound from Havana Intersection, what is indicated in regard to the procedure turn?

25. The highest obstruction on this chart is _____ feet.

26. What are the map coordinates of the TLH airport?

27. Which would be the most acceptable runway to use for night IFR operations?

28. What is the localizer frequency?

29. You would contact Tallahassee tower on _____ UHF.

PRACTICAL EXERCISE NO. 2 - KEY

ENROUTE AND APPROACH CHARTS

1. 111.2, OZR.
2. 305.
3. 5,000, 150.
4. 1,700.
5. Missed approach begins at the VOR.
6. 2,000 feet.
7. 165, Hartford Intersection.
8. 2,000, 088, 23.8 nautical miles.
9. north, 10-nautical-mile.
10. U.S. Standard for Runway 9; IVALA for Runway 35; and VASI for Runway 27.
11. 338.3.
12. 19.6 nautical.
13. 331.
14. 192°.
15. Dashes.
16. ME.
17. 75 MegaHertz, dots and dashes.
18. 3, 36.
19. MDA, ceiling.
20. 500-1/2.
21. 500.
22. Joseph Intersection.
23. Right (back course).
24. Procedure turn is not authorized.

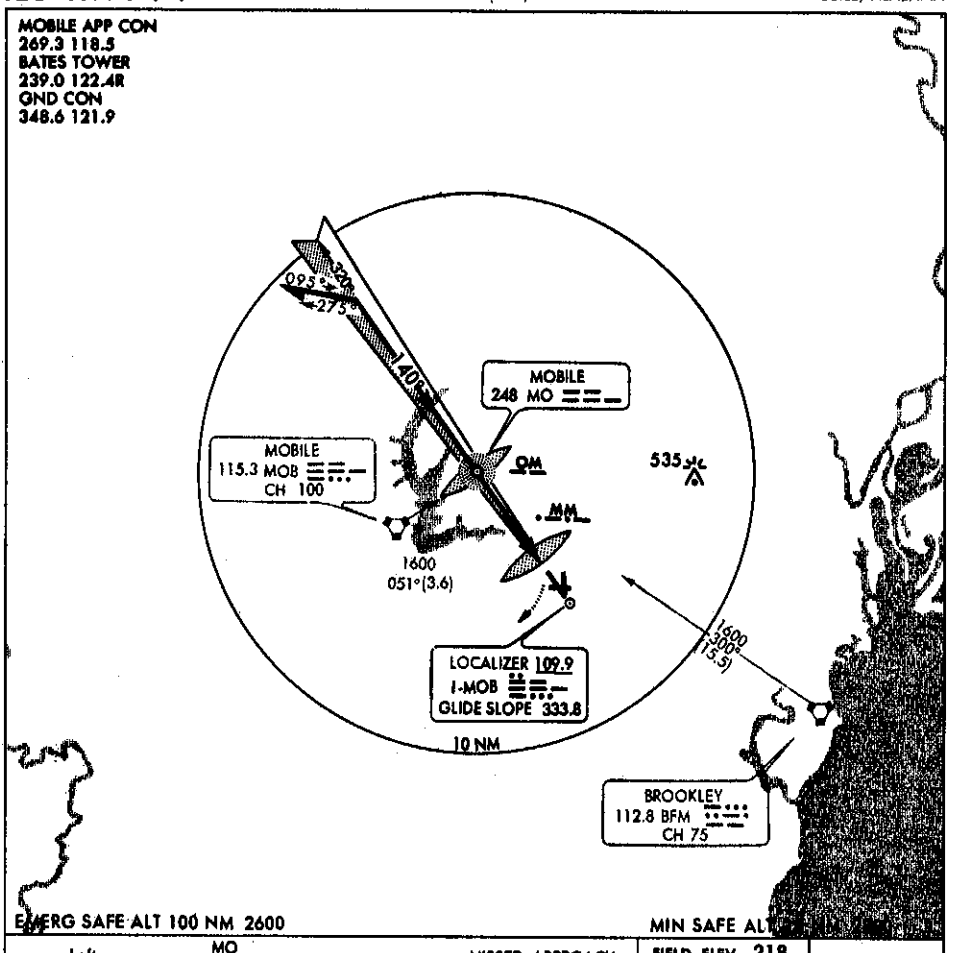
25. 549.

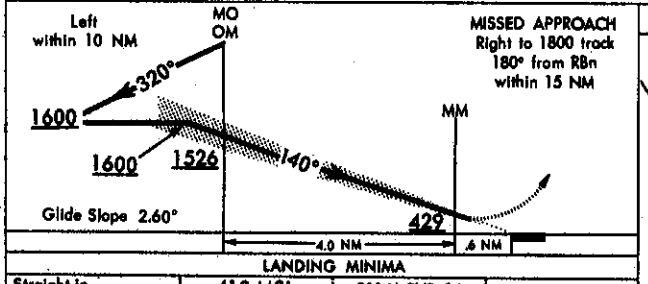
26. 30° 24 minutes north, 84° 21 minutes west.

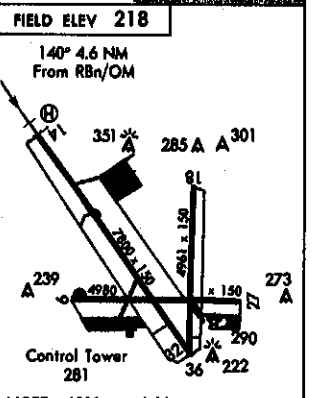
27. 36. (High intensity lights.)

28. 110.3.

29. 257.8.







LANDING MINIMA

Straight-in	418 MSL	200-½ RVR 24
Circling	718 MSL	500-1
Circling below 65 Kt W/O G/S	618 MSL	400-1 400-1 ⅝ RVR 24

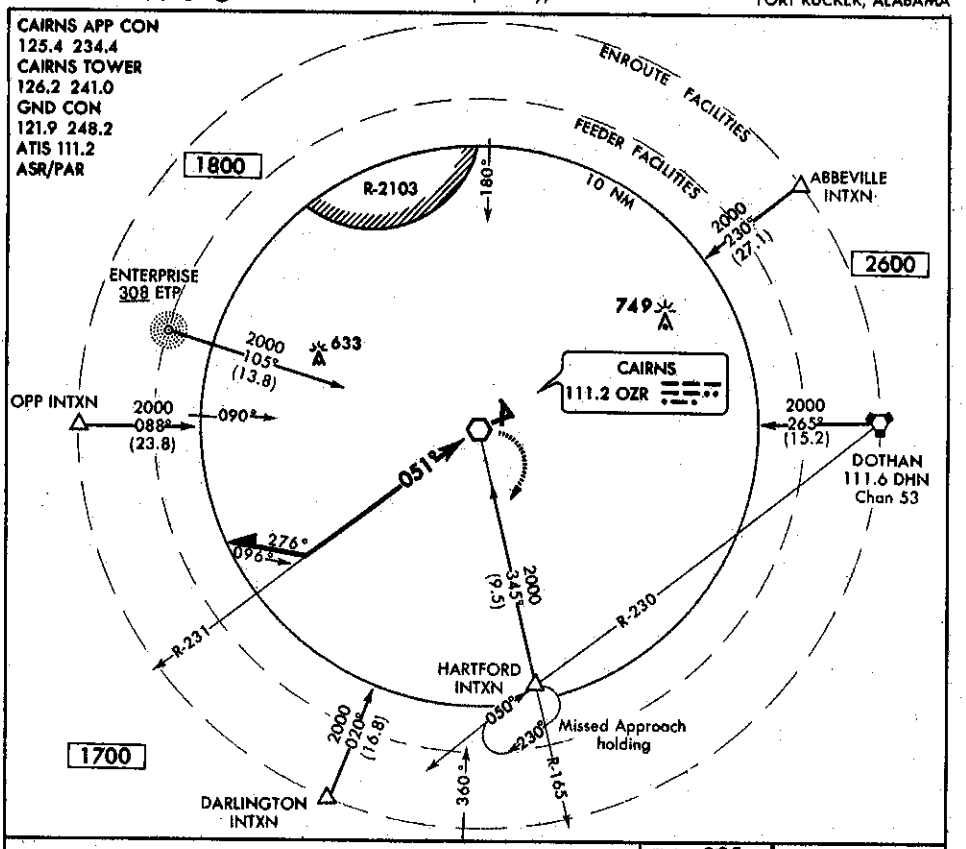
RBn/OM to Missed Approach 4.6 NM

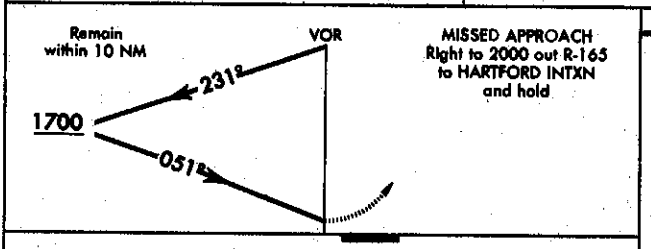
Knots	75	90	105	120	130	160
Min: Sec	3:41	3:04	2:37	2:18	2:07	1:44

VOR RWY 6

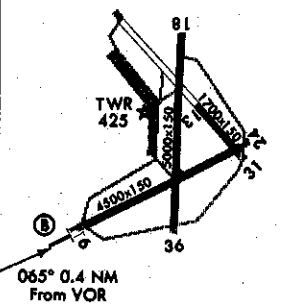
CAIRNS AAF
FORT RUCKER, ALABAMA

CAIRNS APP CON
125.4 234.4
CAIRNS TOWER
126.2 241.0
GND CON
121.9 248.2
ATIS 111.2
ASR/PAR





ELEV 305



HIRL avol Rwy 6-24

CATEGORY	A	B	C	D
S-6	700/40 403 (500-¾)			NOT AUTHORIZED
CIRCLING	760-1 455 (500-1)	760-1 455 (500-1)	760-1½ 455 (500-1½)	

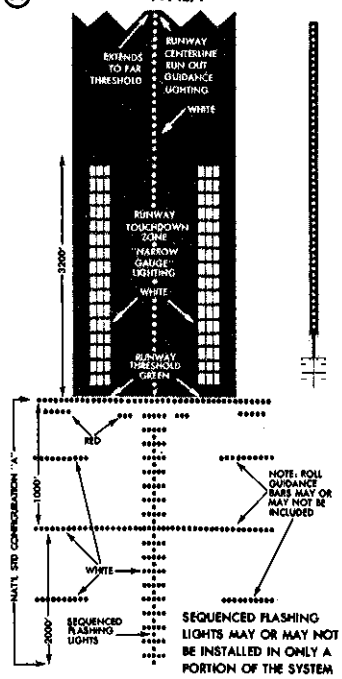
LEGEND

INSTRUMENT APPROACH PROCEDURES (CHARTS)
APPROACH LIGHTING SYSTEMS – UNITED STATES

Actual length will be shown on Airport Diagram for any system, or portion thereof, not conforming to standard lengths listed on this page.

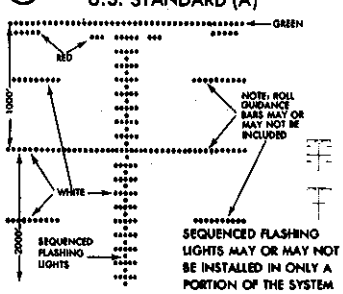
Each approach lighting system indicated on Airport Diagrams will bear system identification letter (A, B, etc.) indicated in legend.

(A) IVALA



NOTE: STANDARD LENGTH 3000 FEET

(A1) (formerly (H)) U.S. STANDARD (A)

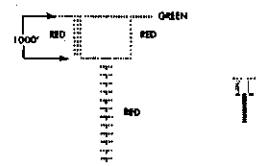


NOTE: STANDARD LENGTH 3000 FEET

(A2) SHORT APPROACH LIGHT SYSTEM (SALS)

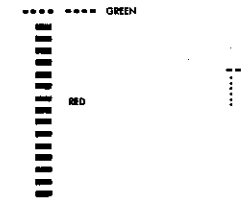
SAME AS FIRST 1500' OF U.S. STANDARD (A)

(B) U.S. CONFIGURATION (B)



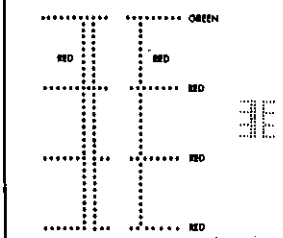
NOTE: STANDARD LENGTH 3000 FEET

(C) NEON LADDER



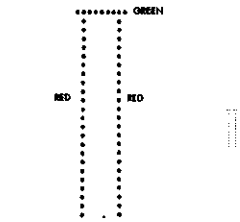
NOTE: STANDARD LENGTH 1500 FEET

(D) NAVY PARALLEL ROW AND CROSS BAR



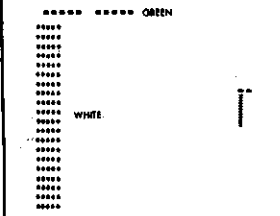
NOTE: STANDARD LENGTH 1500 FEET

(E) TWO PARALLEL ROW



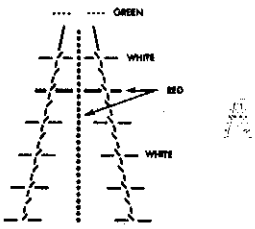
NOTE: STANDARD LENGTH 2400 FEET

(F) LEFT ROW (HIGH INTENSITY)



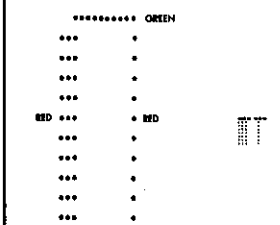
NOTE: STANDARD LENGTH 3000 FEET

(G) NAVY COMPOSITE



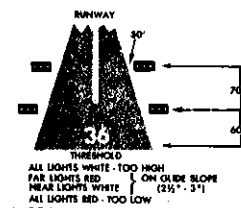
NOTE: STANDARD LENGTH 3000 FEET

(I) AIR FORCE OVERRUN

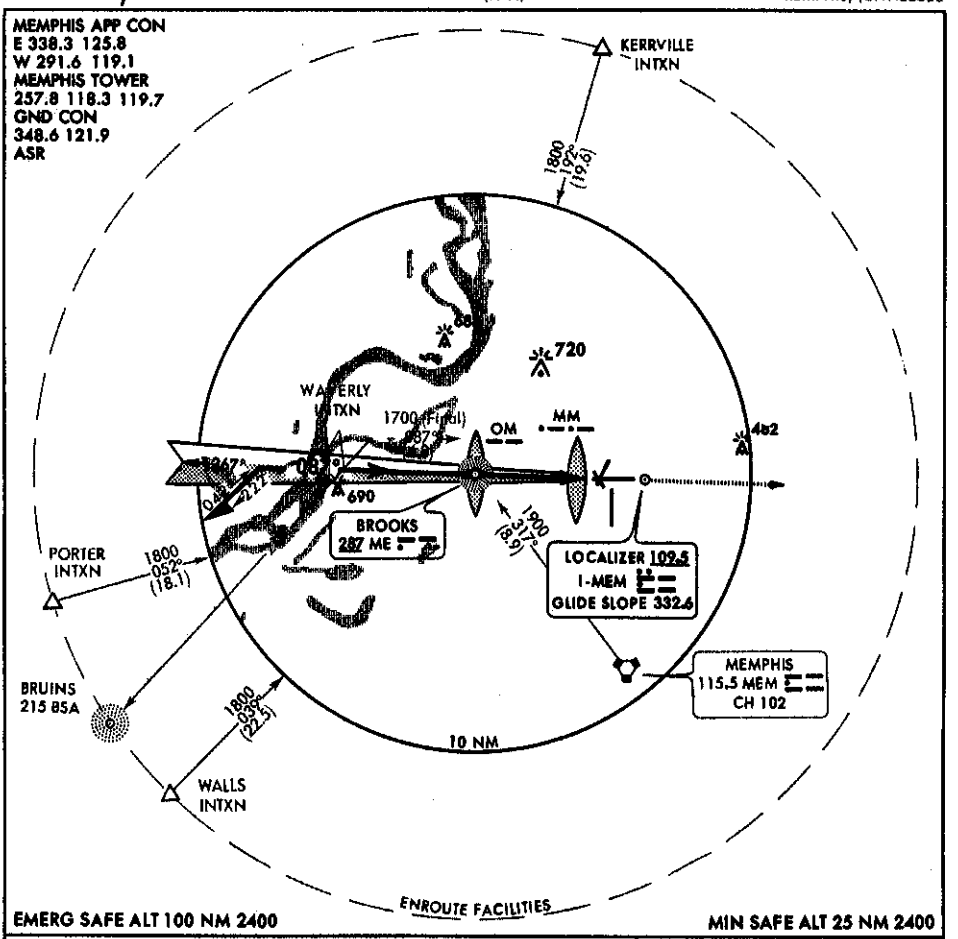


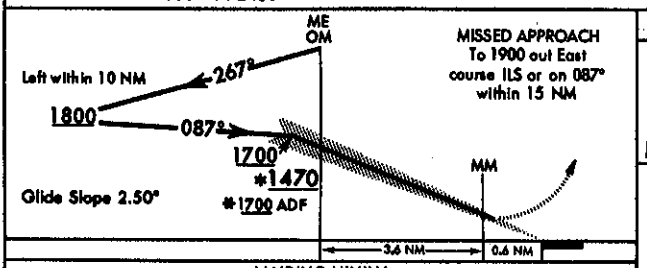
NOTE: STANDARD LENGTH 1000 FEET

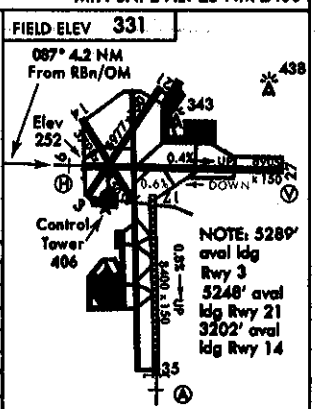
(V) VISUAL APPROACH SLOPE INDICATOR



NOTE: DIMENSIONS GIVEN ARE FOR STANDARD INSTALLATIONS. SOME VARIATIONS MAY EXIST.







LANDING MINIMA		
Straight-in ILS	531 MSL	200-½ RVR 24
Straight-in ADF	731 MSL	400-1 ½
Circling	831 MSL	500-1
W/O G/S	731 MSL	400-1 ½ RVR 40**

**RVR 24 authorized with operating approach lights

RBn/OM to Localizer Missed Approach 4.2 NM

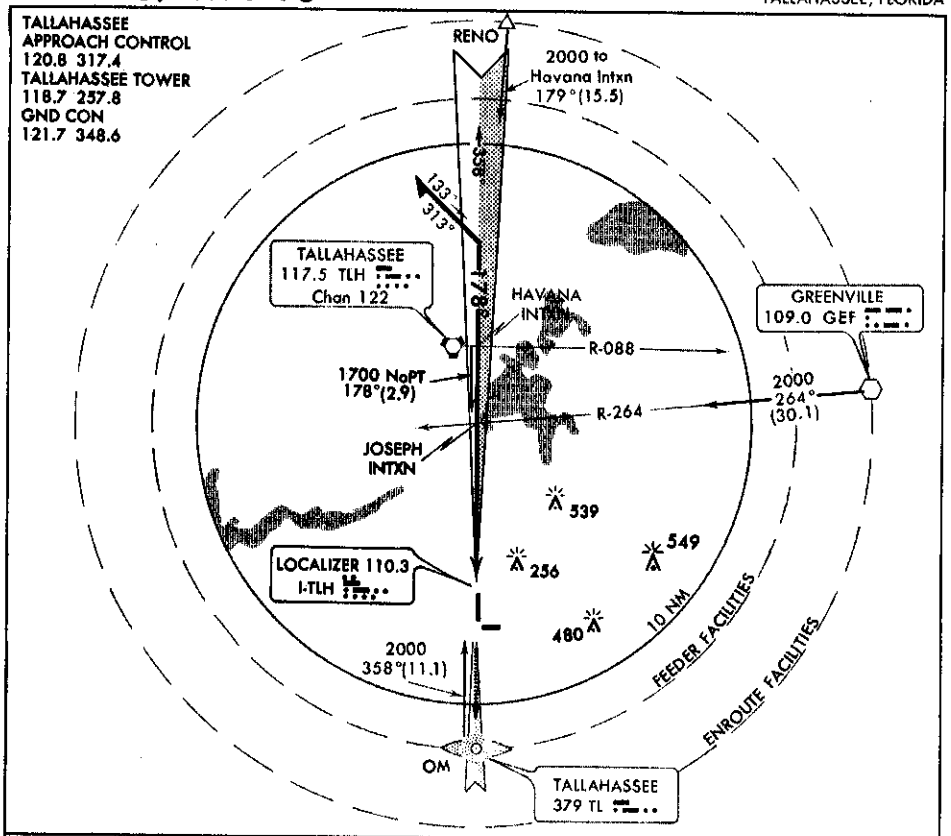
Knots	75	90	105	120	130	160
Min:Sec	3:21	2:48	2:23	2:06	1:56	1:35

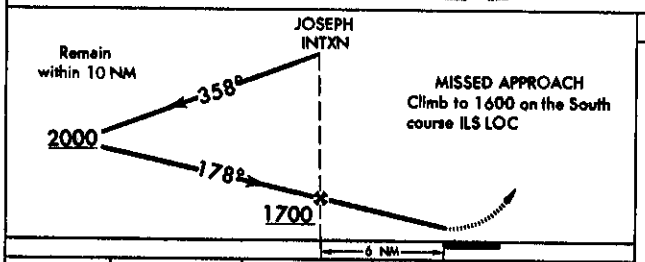
LOC (BC) RWY 18

183
AL-5048 (FAA)

TALLAHASSEE MUNI
TALLAHASSEE, FLORIDA

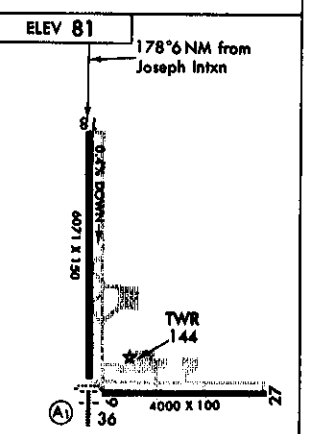
TALLAHASSEE
APPROACH CONTROL
120.8 317.4
TALLAHASSEE TOWER
118.7 257.8
GND CON
121.7 348.6





CATEGORY	A	B	C	D
S-18	500-¾ 419 (500-¾)			500-1 419 (500-1)
CIRCLING	500-1 419 (500-1)	540-1 459 (500-1)	540-1½ 459 (500-1½)	640-2 559 (600-2)

ELEV 81



HIRL Rwy 18-36

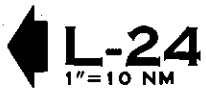
INTXN to Missed Approach 6 NM					
Knots	70	100	125	150	165
Min:Sec	5:09	3:36	2:53	2:24	2:11

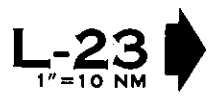
LOC (BC) RWY 18

30°24'N-84°21'W
183

TALLAHASSEE, FLORIDA
TALLAHASSEE MUNI

L L L L L L L L L L L L





UNITED STATES GOVERNMENT
FLIGHT INFORMATION PUBLICATION

ENROUTE LOW ALTITUDE – U. S.

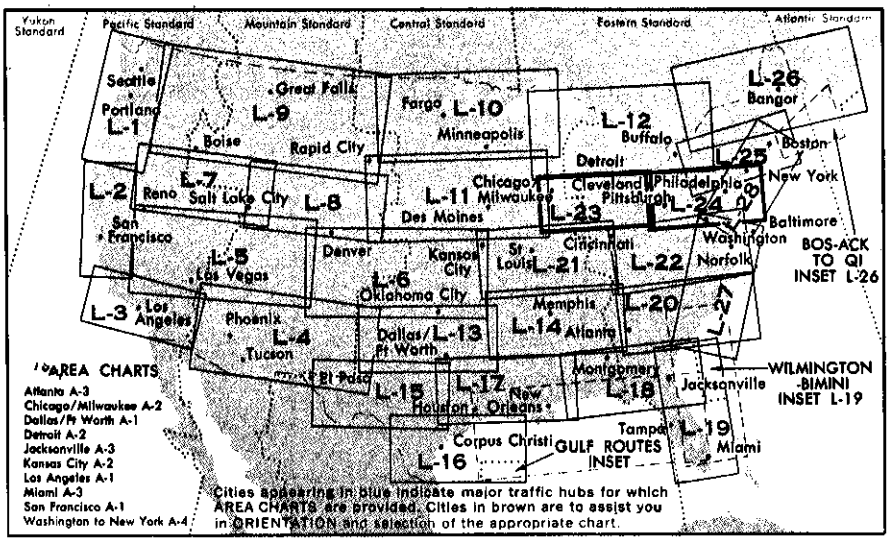
For use up to but not including 18,000' MSL

EFFECTIVE 0901Z 14 NOV 1968
TO 0901Z 12 DEC 1968

PUBLISHED IN ACCORDANCE WITH INTER-AGENCY AIR CARTOGRAPHIC COMMITTEE
SPECIFICATIONS AND AGREEMENTS, APPROVED BY:
DEPARTMENT OF DEFENSE * FEDERAL AVIATION ADMINISTRATION * DEPARTMENT OF COMMERCE

UNITED STATES

14 NOV 1968



CORRECTIONS, COMMENTS AND/OR PROCUREMENT
Refer to General Information Section FLIP Enroute Supplement
Compiled by Coast and Geodetic Survey, ESSA, U. S. Department of Commerce
Lithographed by CARTECH, Inc., Quincy, Ill.
for the Department of Defense
USAF Aeronautical Chart and Information Center, St. Louis, Mo.

UNITED STATES GOVERNMENT
FLIGHT INFORMATION PUBLICATION

ENROUTE LOW ALTITUDE – U. S.

For use up to but not including 18,000' MSL

L E G E N D

AERODROMES

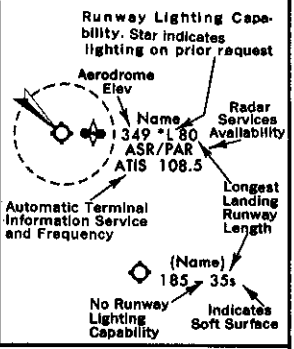
Aerodromes/Seadromes shown in BLUE have an approved Low Altitude Instrument Approach Procedure published. The DOD FLIP Terminal contains only those shown in DARK BLUE. Aerodromes/Seadromes shown in BROWN do not have a published Instrument Approach Procedure.

LAND / SEA
- Civil
- Joint Civil-Military
- Military
- Heliport

RELATED FACILITIES
Pilot to Forecaster Service (PFSV)
- Continuous Operation
- Less Than Continuous
- Weather Radar (WXR)
- PFSV and WXR Combined

ILS Availability

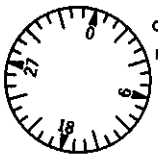
1. Parentheses around aerodrome name indicate military landing rights not available.
2. Aerodrome elevation given in feet above or below mean sea level.
3. Length of longest runway given to nearest 100 feet with 70 feet as the dividing point (Add 00).
4. Aerodrome symbol may be offset for enroute navigation aids.
5. Pvt-Private use, not available to general public.



RADIO AIDS TO NAVIGATION AND COMMUNICATION BOXES

RADIO AIDS TO NAVIGATION

VHF/UHF Aids are depicted in BLUE
LF/MF Aids are depicted in BROWN



COMPASS ROSE Oriented to Magnetic North

VOR TACAN VORTAC

LF/MF Range with simultaneous Voice Signal Capability (Solid tip in "N" Quadrant)

LF/MF Range without simultaneous Voice Signal Capability

LF/MF Range Course Feathered side indicates "A" Quadrant

LF/MF Non-directional Radiobeacon or Marine Radiobeacon

UHF Non-directional Radiobeacon

Compass Locator Beacon

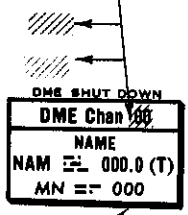
Consolan Station

Marker Beacon
Fan (FM) Bone (BM)

ILS Localizer Course with ATC Function. Feathered side indicates Blue Sector

RADIO AIDS TO NAVIGATION DATA BOXES

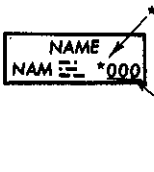
Abnormal Status Underprint for Affected Data, e.g., TO BE CMSN, SHUT DOWN, MAY BE CMSN, etc.



VOR with TACAN compatible DME

Combined VHF/UHF and LF/MF data

(T) Frequency protection Usable range at 12,000'–25 NM



TACAN channels are without voice but are not underlined

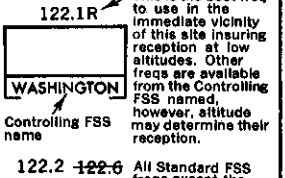
Norfolk Weather Radio — U.S. Weather Station with Voice Communication

IDENT 000 — Commercial Broadcast Station

AIR/GROUND COMMUNICATION BOXES

Shadow box indicates Standard FSS A/G Voice Communications freqs 122.1R, 122.6, 123.6 and 255.4 are available at all altitudes without terrain interference.

Plain box, with freq/s, indicates all Standard FSS freqs are not available, or are not available at all altitudes, due to terrain interference.



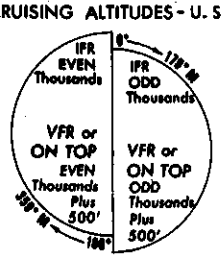
122.2 ~~122.6~~ All Standard FSS freqs except the crossed out 122.6 are available at this location: 122.2 and 122.3 are additional FSS frequencies available at selected locations.

Plain box, without frequencies, indicates no Standard FSS frequencies available.

⊙..... Flight Service Station (FSS)
Remote Communications Outlet (RCO)
Limited Remote Communications Outlet (LRCO)

THE U.S. FEDERAL GOVERNMENT DISCLAIMS RESPONSIBILITY FOR NON-FEDERAL NAVIGATIONAL FACILITIES

CRUISING ALTITUDES - U. S.



VFR at or above 3000' AGL
IFR -- Outside controlled airspace
IFR within controlled airspace as assigned by ATC

AIR TRAFFIC SERVICES AND AIRSPACE INFORMATION

AIRWAY AND ROUTE DATA

VHF/UHF Data is depicted in BLUE; LF/MF depicted in BROWN

- V4 — VOR Airway and Identification
- G3 — LF/MF Airway and Identification
- R53 — Uncontrolled LF/MF Airway
- 55-57V — VHF/UHF Oceanic Route Identification
- ALFA ROUTE — LF/MF Oceanic Route Identification
- Oceanic Route
- Military Route
- Military Advisory Route
- Substitute Route Structure (see NOTAMs for facility outages)
- Unusable or Closed Segment
- NME 000.0 — Facility Locator used with Radial Line in the formation of a Reporting Point
- AME 000 — Facility Locator used with Bearing Line in the formation of a Reporting Point

- 036 → — Radial Outbound from a UHF/VHF Radio Aid
- ←036 — Bearing Inbound to a LF/MF Radio Aid
- 123 / (123) — Total Mileage between Compulsory Reporting Points and/or Radio Aids
- 23 / 23 — Mileage between other Reporting Points, Radio Aids, and/or Mileage Breakdown
- 42 / 26 — VOR Changeover Point Giving mileage to Radio Aids (Not shown at mid-point locations)
- X X — Mileage breakdown
- Denotes DME fix (Distance same as route mileage)
- (15) → — Denotes DME fix (Encircled mileage shown when not otherwise obvious
- MAA-15500 — MAA (Maximum Authorized Altitude
- 3500 / 3500 — MEA (Minimum Enroute Altitude
- *3000 / *3000 — MOCA (Minimum Obstruction Clearance Altitude)
- EVEN — Canada only - Direction of Flight indicator. (Shown when exception to Cruising Alt Diagram.
- MEA, MAA and/or MOCA Change at other than Radio Aids to Navigation
- MRA (Minimum Reception Altitude)
- MCA (Minimum Crossing Altitude)

REPORTING POINTS

- Compulsory Reporting Point
- Non-Compulsory Reporting Point
- Offset Arrows Indicate Facility Forming a Reporting Point. Toward LF/MF, Away from VHF/UHF

BOUNDARIES

- Altimeter Setting Change
- Altimeter Setting Change when not otherwise defined
- Air Route Traffic Control Center (ARTCC)
- NAME / Nome — ARTCC Remoted Sites
- Flight Information Region (FIR)
- Air Defense Identification Zone (ADIZ)
- Combined FIR and ADIZ
- Oceanic Control Area (CTA)
- Control Zone
- Intnl Boundary (Omitted when coincident with ARTCC or FIR)
- Area of Enlargement (Contains only data for through flights). See Area Charts for complete data
- Official Time Zone

AIRSPACE INFORMATION

MISCELLANEOUS

7°E — Isogonic Line and Value

Within the U.S., non-Federal owned/operated radio aids to navigation are annotated to indicate whether operated by State, City, County, Private, etc.

ALL MILEAGES ARE NAUTICAL EXCEPT AS NOTED

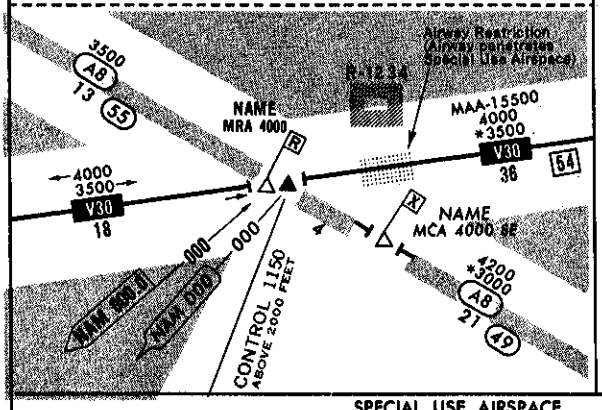
ALL RADIALS AND BEARINGS ARE MAGNETIC

ALL ALTITUDES ARE MSL UNLESS OTHERWISE STATED.

ALL TIME IS GREENWICH MEAN (STANDARD) TIME (GMT)

‡DURING PERIODS OF DAYLIGHT SAVING TIME (DST), EFFECTIVE HOURS WILL BE ONE HOUR EARLIER THAN SHOWN

EXAMPLE OF GROUPING

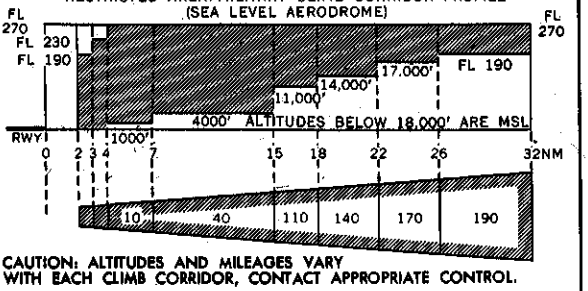


SPECIAL USE AIRSPACE

†P-56
W-123
C-46
A-123
REESE 1
R-1234 ①
TO 10,000 ②
0600-1800Z
MON-FRI ③
IFR ④
FSS ⑤

P - Prohibited Area
R - Restricted Area
W - Warning Area
D - Danger Area
C - Caution Area
A - Alert Area
Intensive Student Jet Training Area

RESTRICTED AREA/MILITARY CLIMB CORRIDOR PROFILE
(SEA LEVEL AERODROME)



CAUTION: ALTITUDES AND MILEAGES VARY WITH EACH CLIMB CORRIDOR, CONTACT APPROPRIATE CONTROL.

For VFR flight through Military Climb Corridors, civil aircraft contact approach control on 122.5 or the frequency shown within the area on the face of the chart. Military aircraft consult FLIP Enroute Supplement for frequencies and FLIP Planning Section II for procedures.

SPECIAL USE AIRSPACE WILL INCLUDE:

① Area Identification. In Canada area ident is preceded by the letters CY (CANADA) followed by a number (PROVINCE).

② Effective Altitude of airspace is shown up to but not including 18,000'. When the airspace encompasses all altitudes in the low altitude structure, no altitude will be shown.

③ Operating Time. When continuous no time is shown.
Days: Sunrise to Sunset
Night: Sunset to Sunrise
Hours: Given in GMT, e.g., 0600-1300Z.
Mon-Fri: Indicates area does not exist on Sat. or Sun.
1 Mar-15 June: Indicates area in use only through dates given.

④ Weather Conditions during which the area is in operation. When continuous no weather is shown.
VFR: Used only during VFR Conditions.
IFR: Used only during IFR Conditions.

⑤ Voice Call of Controlling Agency for enroute clearance through area. No A/G unless indicated..

† Indicates complete information in tabulation on front panel