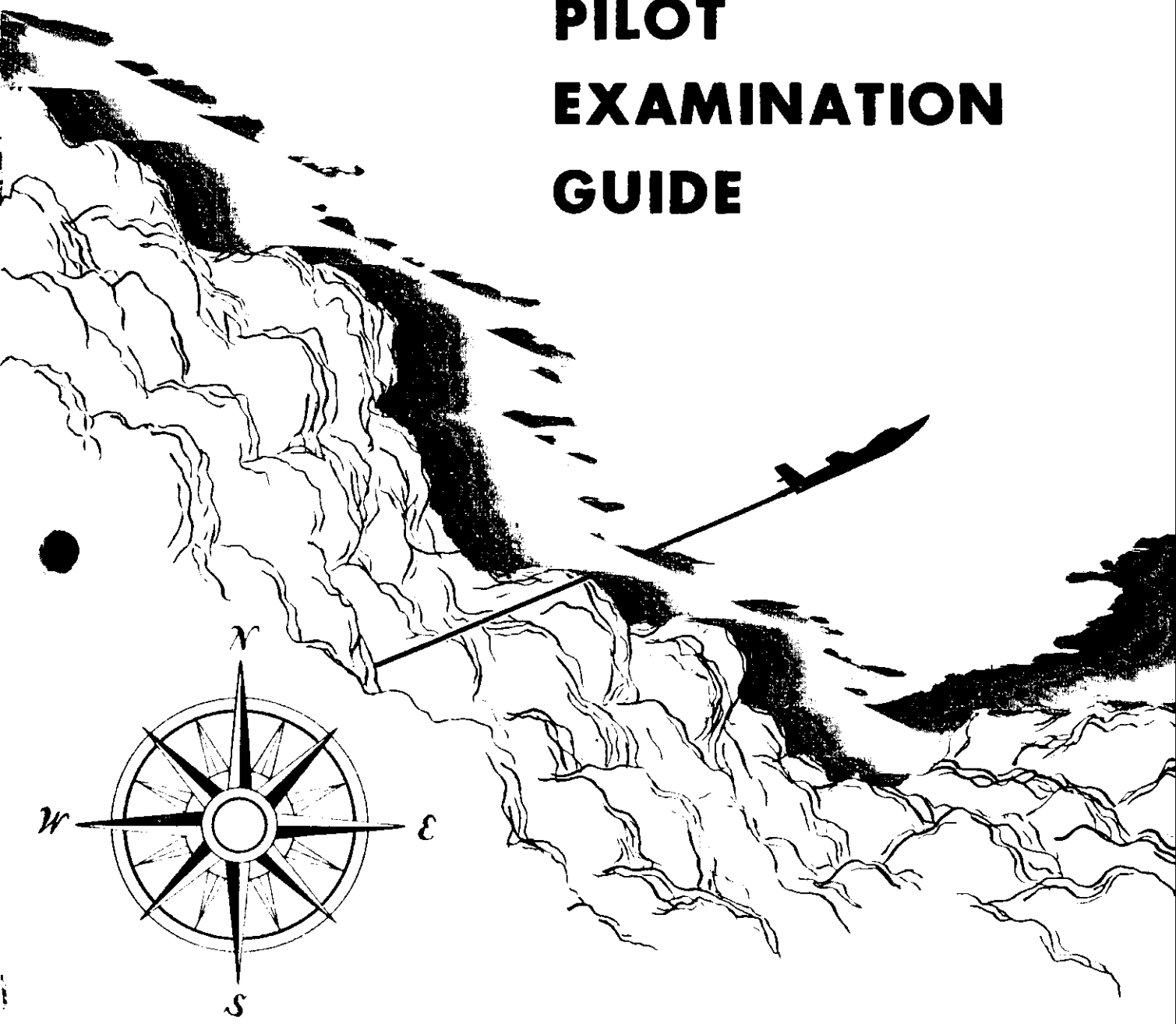
Repl. by 8A

AC 61-8

INSTRUMENT PILOT EXAMINATION GUIDE



FEDERAL AVIATION AGENCY

Federal Aviation Agency

ADVISORY CIRCULAR

AC NO:
AC 61-8
Certification: Pilots and Flight Instructors
EFFECTIVE:
May 8, 1964

SUBJECT: INSTRUMENT PILOT EXAMINATION GUIDE

---

1. PURPOSE. This circular announces the availability of a revised Instrument Pilot Examination Guide.

2. DESCRIPTION OF THE PUBLICATION. This study guide provides information to prospective instrument pilots and other persons interested in Federal Aviation Agency Certification of instrument pilots. It guides the prospective applicants toward a clear understanding of the requirements, reference materials, examinations, and examining procedures.

3. HOW TO GET THIS PUBLICATION.

   a. Order copies of this publication from:

      Superintendent of Documents
      U. S. Government Printing Office
      Washington, D. C. 20402

   b. Identify the publication in your order as:

      FAA Advisory Circular AC No: 61-8
      Instrument Pilot Examination Guide - 1964

   c. Send check or money order with your request, made payable to the Superintendent of Documents in the amount of 40¢ for each copy.

George S. Moore
Director
Flight Standards Service

INSTRUMENT PILOT EXAMINATION GUIDE

Revised
1964

FEDERAL AVIATION AGENCY

N. E. Halaby, *Administrator*

Flight Standards Service

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C., 20402 - Price 40 cents

PREFACE

The *Instrument Pilot Examination Guide* is one of a series of study aids prepared by the Flight Standards Service of the Federal Aviation Agency to provide guidelines for airmen preparing for written examinations required for certification. This guide points out the subject areas covered in the examination for instrument rating, and suggests to the student the phases of aviation knowledge in which he should be well informed.

Federal Aviation Regulation Part 61 sets forth the requirements for the instrument rating. These requirements are discussed in detail in this publication; and sample examination questions are presented with the answers explained. Supplementary material is included in the appendix.

This guide supersedes the *Instrument Pilot Examination Guide* dated July 1961 and is issued as FAA Advisory Circular No. 61-8.

INSTRUMENT PILOT EXAMINATION GUIDE

ELIGIBILITY FOR INSTRUMENT PILOT RATING

An instrument rating entitles a pilot to fly in instrument conditions—to be pilot in command of an aircraft operating under instrument flight rules (IFR) or in weather conditions less than the minimums prescribed for visual flight rule (VFR) conditions. The rating certifies that the pilot is competent to meet the responsibilities for safe flight under instrument flying conditions.

Federal Aviation Regulation Part 61 sets forth the requirements for this rating and defines the aeronautical knowledge, experience, and skill required of a private pilot or a commercial pilot to meet the qualifications. This guide will acquaint you, the applicant, with the examination procedures and requirements.

The written examination is designed to test your mastery of the basic knowledge required for safe instrument flight operations. You must have sound knowledge in the following areas:

1. Federal Aviation Regulations pertaining to IFR flight.
2. Radio navigation systems and procedures.
3. Radio communication procedures.
4. Proper interpretation and use of instruments necessary for IFR flight.
5. Essentials of competent flight planning.
6. Meteorology: Characteristics of air masses, fronts, and associated weather.
7. Elementary principles of weather forecasting.
8. Availability, evaluation, and utilization of weather data for pilot use.
9. Weight and balance limitations.
10. Aircraft performance.

GENERAL REQUIREMENTS

Instrument training by an able instructor is essential for the prospective instrument pilot. The quality of training required to produce safe instrument pilots demands a high level of professional experience and skill. The applicant who looks for a shortcut to the instrument rating is a potential source of danger to everybody in the air.

In no other field of transportation is the common phrase so appropriate: "There's a time and place for everything." From the moment the pilot is ready to taxi, his own safety, as well as the safety of everybody in his vicinity, depends upon his proper use of standardized operational procedures. The pilot who fumbles with his communications equipment or misinterprets the information he reads on his instruments is a hazard from the time he starts his engine. Competent instruction, then, is cheap insurance in the long run. Without it, many pilots have eventually faced an accumulation of boners and a shortage of fuel.

During your training for the instrument rating, you will not only acquire the aeronautical knowledge necessary for instrument flying but, through professional instruction, you will come to appreciate the necessity for systematic methods of applying this knowledge. You will learn that, once your engine is started, you have committed yourself not only to what you have planned properly, but also to every bit of carelessness, every miscalculation, and every oversight in the planning—things that could have been avoided by more careful and competent flight planning. With proper training you will learn how to identify and correct errors before they become critical.

You will also learn that completion of the best formal instrument training course is not an absolute guarantee of safe instrument flight. Your instructor will stress the fact that a training flight under simulated instrument conditions is quite a different experience from a weather flight on your own. The psychological advantage of having an "old hand" along to guarantee a safe flight is a "crutch" you will miss the first time you encounter the unexpected by yourself.

Your instructor will teach you how to make the transition safely and competently from formal training to weather flying. Your own thoroughness and resourcefulness in training are most essential.

Regardless of how much you learn from study manuals, you will find that visits to control towers, Flight Service Stations, weather bureau offices, and air traffic control centers will fill unsuspected gaps in your knowledge.

Use Flight Following Service when filing VFR. The practice of coordinating with traffic control agencies, using proper voice procedures, and maintaining an accurate flight log will help you to accumulate experience for IFR flight. If your instrument training has been conducted entirely under simulated conditions, it will be to your advantage to arrange dual weather flights with a competent instrument instructor.

THE EXAMINATION

The applicant for the instrument rating written examination may apply at any FAA General Aviation District Office or FAA Air Carrier District Office. The address of the nearest office can usually be learned from local aviation interests or by writing to one of the FAA Regional Offices listed in the appendix of this guide.

The written examination for the instrument rating is of the single-section type, employing a typical cross-country flight. The test items relate to a realistic progression of problems from

flight planning to arrival at destination. The applicant applies all pertinent flight information in planning his trip and then applies his knowledge of air traffic rules, weather, navigation, radio, and enroute and terminal area procedures for a successful flight.

When the applicant takes the examination, appropriate planning materials are given to him in a supplementary booklet. Similar materials are included in the appendix of this guide for study use.

Type of Examination Questions and Scoring

Examination questions are of the objective, multiple-choice type, like those shown in the sample examination in this guide.

The applicant marks his answers on a special answer sheet, which is later graded electrically on a scoring machine. The directions for taking the examination and for marking the answers should be carefully read and understood by the person taking the examination. Follow instructions carefully. Incomplete or erroneous personal information on the scoring sheet delays the scoring process.

The minimum passing grade on FAA written examinations is 70 percent. All answer sheets graded below passing (70%) are hand-checked for verification before the results are mailed to the applicant on Form FAA 578A. An applicant who receives a failing grade MUST present this form when applying for reexamination.

A failed examination may be retaken after 30 days; or upon presentation of a statement from a flight instructor with an instrument rating, or a ground instructor with ratings for the subject covered in the examination failed, certifying that (a) he has given you additional instruction and (b) he now deems you competent to pass the examination.

Taking the Examination

Bear in mind the following points while you are taking the examination:

1. Test items should be answered in accordance with the latest regulations and procedures.

2. Read every question thoroughly. Comments received from examination applicants indicate that unsatisfactory performance on the written examination is frequently the result of failure to read instructions carefully rather than lack of knowledge. Do not try to solve the problem before you understand the question.

3. Do not consider a complicated problem a "trick" question. There are no trick questions in the examination.

4. Among the answers given, it may seem that there is more than one possible answer, but there is only one correct and complete answer for each item.

5. Do not waste too much time on problems that stump you. Go on to the questions that you can answer readily, then return to the difficult items.

6. For a computer problem, select the answer closest to your own solution. Regardless of the type of computer you use, if it is accurate, your answer on an examination test item will be closer to the correct answer than to any of the other choices—provided your solution is correct. The correct choice listed is an average of solutions using several computers. An applicant may use any good computer for solving navigational problems.

RECOMMENDED STUDY MATERIALS

Persons studying for the Instrument Pilot Examination will find the publications listed in this section most helpful. The list identifies source material essential to preparing for the examination but does not include all material available on the subject of instrument flying. It is the responsibility of each applicant to obtain study material appropriate to his needs.

Check with your instructor about specific publications that will be useful to you in your instrument training. Textbooks and reference materials are available from commercial publishers; and many public and institutional libraries offer study materials in this area.

Airman's Guide—($7.00 annual subscription. Prices of individual copies vary.) Issued by FAA every 2 weeks, this publication gives new and current information on navigation aids and facilities, airport facilities and operations patterns, and other pertinent information needed by a pilot. All issues carry NOTAMS, Special Notices, and Radar-Radio Listings. The *Directory of Airports and Seaplane Bases* is published quarterly as a supplement to the Guide.

Air Traffic Control Procedures, AT P 7110.1A—($2.00 for basic manual with supplements as issued). An FAA publication prescribing procedures and standard phraseology to be used by personnel of all facilities providing air traffic control service. Although written for the air traffic controller, the text is excellent for the study of standard communications procedures by others who need to be familiar with them.

All-Weather Flight Manual, NAVAER 00-80T-60—($3.50 for manual; $1.75 for 1961 revision pages). This U.S. Navy publication is an excellent basic text for instrument flying techniques and weather flying.

Daily Weather Map—(5¢ each) Issued daily by the U.S. Weather Bureau. For study purposes, request the Sunday issue carrying the legend and explanations on the back.

Federal Aviation Regulations—

Part 61, Certification: Pilots and Instructors	30¢
Part 91, General Operating and Flight Rules	30¢
Part 95, IFR Altitudes	20¢
Part 97, Standard Instrument Approach Procedures	20¢

Flight Information Manual—($3.75 for basic manual and amendments). An aeronautical reference book for pilots issued by FAA. It gives information the pilot must know on air traffic procedures, navigation aids, and flight assistance for the pilot.

Instrument Flying, AF Manual 51-37—($2.25). This U.S. Air Force publication is a primary manual giving proven and effective basic instrument flying techniques and radio navigation.

Meteorology for Naval Aviators, NAVAER 00-804-24—($2.00). This is a U.S. Navy technical publication written for the professional pilot. It explains in considerable detail important phases of meteorology.

Pilots Radio Handbook—(75¢). This FAA publication is written in nontechnical language to explain and encourage the maximum use of aircraft radio and other communication equipment when flying.

Charts

Instrument Approach Procedure Charts (available for Range, ADF, VOR, and ILS Approach)	10¢ per airport
Individual charts give detailed information on procedure for specific airport.	
Instrument Enroute Charts (available for low, intermediate, and high altitude)	25¢ each
These charts provide the necessary aeronautical informa-	

tion for enroute instrument navigation (IFR) in established altitude levels.

Low-Altitude Area Charts.. 10¢ each

These charts supplement the Instrument Enroute charts by giving departure, arrival, and holding procedures at principal airports.

Sectional Aeronautical Charts ---------- 30¢ each

Local Aeronautical Charts.. 30¢ each

Sectional charts may be used for all forms of navigation but are designed especially for visual flight.

How To Obtain Study Materials

The listed study materials except the charts may be obtained by remitting check or money order to:

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

Charts may be procured at your local airport or by sending a check or money order to:

U.S. Coast and Geodetic Survey
Washington, D.C. 20230

Domestic prices are given; for foreign delivery, add 25 percent.

STUDY OUTLINE FOR THE INSTRUMENT PILOT WRITTEN EXAMINATION

This study outline indicates the areas of aeronautical knowledge and instrument flight procedures that must be mastered by the applicant. The outline includes aeronautical knowledge requirements set forth in Federal Aviation Regulations, and is based on airman activity for flight in instrument conditions.

I. RULES AND PROCEDURES GOVERNING INSTRUMENT FLIGHT

A. Aircraft
1. Certificates, documents, inspections.
2. Equipment and accuracy requirements.

B. Airmen
1. Pilot certificates and ratings.
2. Pilot logs and flight time requirements.
3. Recency of experience.

C. Flight rules (FAR 91)
1. General flight rules.
2. Visual flight rules (VFR).
3. Instrument flight rules (IFR).
   a. Controlled and uncontrolled airspace.
   b. Positive control airspace.

D. Air traffic control procedures (Use the *Flight Information Manual*)
1. Definitions and abbreviations.
2. Communications procedures, radiotelephone techniques.
3. Special VFR flights.
4. Enroute procedures.
5. Terminal procedures.
6. Holding procedures.
7. Airport traffic procedures.
8. Security control of air traffic.
9. Prohibited, restricted, warning areas.
10. Emergency procedures.
11. Compulsory reports.
12. Air traffic clearances.

II. INTERPRETATION OF FLIGHT AND NAVIGATIONAL INSTRUMENTS

A. Altimeter
1. Effect of changes in temperature and pressure
   a. Errors.
   b. Altimeter settings.
2. Types of altitudes.

B. Airspeed indicator
1. Static sources and errors.
2. Limitation markings.

C. Magnetic compass
1. Acceleration and deceleration errors.
2. Turning errors.

D. Turn and bank
1. Relationship of TAS and angle of bank to rate of turn.
2. Interpretation of turn needle (2 and 4 minute).

E. Gyro instruments
1. Principles of operation.
2. Operating characteristics and limitations.

F. Determining aircraft attitude from instrument indications.

G. Determining aircraft position from instrument indications.

III. FLIGHT PLANNING

A. Publications and notices
1. *Flight Information Manual.*
2. *Airman's Guide* (special notices and general content) and *Directory of Airports.*
3. NOTAMS.
4. PIREPS.

B. Charts
1. Enroute low-altitude chart.
2. Enroute intermediate-altitude chart.

3. Low-altitude area chart.
   a. Departure.
   b. Arrival.
4. Standard instrument Departure (SID).
5. A/L-Instrument approach procedure.
6. Graphic NOTAMS.

C. Weather
1. Elements of weather.
   a. Winds and general circulation.
   b. Air masses.
   c. Cloud types and characteristics.
   d. Frontal systems and characteristics.
   e. Factors affecting visibility.
   f. Thunderstorms.
   g. Turbulence.
   h. Icing.
2. Weather maps.
   a. Surface weather map (position and movement of fronts, isotherms, station model, etc.)
   b. Surface weather depiction chart.
   c. Constant pressure charts, 500 and 700 mb.
3. Weather reports and forecasts (read and interpret).
   a. Hourly surface reports.
   b. Area forecasts.
   c. Terminal forecasts.
   d. Winds aloft reports and forecast.
   e. Radar reports.
   f. PIREPS.
   g. Weather advisories (advisories to light aircraft and sigmets).

D. Destination and alternate
1. Landing aids (radio, radar, and lighting).
2. Communications (facilities and frequencies).
3. Services available.
4. Landing minimums and missed approach.

E. Weight and balance, and aircraft performance.

F. Time zones.

G. Flight logs.
1. Reporting points.
   a. Compulsory.
   b. Noncompulsory.
   c. Directional.
2. Courses and mileages.
3. Radio navigation frequencies.
4. Computations.
   a. Time/distance.
   b. TAS.
   c. Headings and drift correction angles.
   d. Groundspeed.
   e. Fuel consumption and requirements.
   f. Wind direction and velocity in flight.

IV. ENROUTE NAVIGATION AIDS

A. Ranges (VOR and L/MF)
1. Operating characteristics and limitations.
   a. Ground equipment.
   b. Airborne equipment.

B. Homing facilities (beacons and broadcast stations)
1. Operating characteristics and limitations.
   a. Ground equipment.
   b. Airborne equipment.

C. Primary radar (ASR and ARSR)
1. Operating characteristics and limitations.

D. DME (distance measuring equipment)
1. Operating characteristics and limitations.
   a. Ground equipment.
   b. Airborne equipment.

E. Beacon system (secondary radar)
1. Operating characteristics and limitations.
2. Transponders

F. Location markers
1. Operating characteristics and limitations
   a. Ground equipment.
   b. Airborne equipment.

G. Radio class designations.

V. OPERATIONAL PROCEDURES AND TECHNIQUES FOR INSTRUMENT FLIGHT

A. Air traffic control procedures (refer to I.D.)

B. Enroute navigation
1. Dead reckoning procedures.
2. Radio navigation
   a. VOR enroute flying.
   b. ADF (automatic and manual loop).
3. Radar vectors and traffic information.

C. Departure, climb, holding, and approach procedures
1. *Flight Information Manual.*
2. Area charts and AL charts.

3. Standard instrument departures.

D. Weather in flight
   1. Weather flying.
      a. Icing.
      b. Turbulence.
   2. Obtaining weather information in flight
      a. Scheduled weather broadcasts.
      b. Weather advisories.
      c. Pilot-to-forecaster service.
      d. Weather radar service.

E. IFR flight in VFR weather conditions
   1. Pilot responsibilities.
   2. "VFR Conditions On Top" requirements and procedures.

F. Changes of conditions in flight
   1. Changes in flight plan.
      a. Deviation in ETA and/or TAS.
      b. Altitude and route changes.
      c. Revised ATC clearances.
   2. Emergencies
      a. Equipment failure (instrument-radio).
      b. Disorientation—lost (radar and DF service).

G. Standard instrument approach procedures
   1. ILS
      a. System components.
      b. Front course.
      c. Back course.
      d. Precision radar approach (PAR).
   2. VOR.
   3. ADF.
   4. Surveillance radar approach.
   5. Visual glide slope indicator (VASI).

SAMPLE EXAMINATION

Examination questions based on a typical instrument flight are presented in the text that follows. These questions are only "samples," indicating the form of those used in the certifying examinations. All topics tested in the examinations are not represented by these samples. Ability to answer all of these questions does not necessarily indicate that the applicant is thoroughly prepared to take the examination. Proper preparation for the examination requires considerable study and effort by the applicant. Guidance by a competent instructor is advised as the best method of acquiring proficiency.

NOTE.—*The sample items, answers, and analyses are based upon procedures and regulations in effect at the time of preparation of this publication. Regulatory and procedural changes subsequent to the date of publication should be checked for their effect on the applicable item.*

This examination is based on a simulated flight from Washington, D.C. (DCA), to Cincinnati, Ohio (CVG). You will be expected to make reasonable decisions based on compliance with pertinent regulations, sound operating procedures, and information supplied with the examination. In the appendix of this publication you will find radio aids to navigation, airport information, Notices to Airmen, En Route Chart segments, Instrument Approach and Procedure Charts, weather map, and general flight information pertinent to the proposed flight. These should be referred to when applicable. Aircraft operation data, airway routes, and weather forecasts and reports are also given, and are to be used as required. For the certifying written examination, complete Enroute Low-Altitude Charts will be supplied when taking the examination.

The plane you are assumed to be flying is a five-place, twin-engine airplane, typical of various light twins currently in use, herein called "Hiflyer." It is appropriately equipped for instrument flying and has the following radio equipment:

One L/MF receiver.

One automatic direction finder (ADF).

Dual VHF receivers, both with frequency range 108.0–126.9 mc. omni heads of the three-element type (course selector, course deviation indicator, and "TO/FROM" indicator) and instrument landing equipment (ILS localizer and glide slope).

One marker beacon receiver.

One 360 channel VHF transceiver range (118.0–135.9 mcs).

One 90 channel VHF transmitter range (118.0–126.9 mcs).

One Distance Measuring Equipment (DME).

Use the following information as pertinent to your aircraft:

EMPTY WEIGHT: As equipped 3,100 lb.

MAXIMUM ALLOWABLE GROSS WEIGHT: 4,830 lb.

MAXIMUM LANDING WEIGHT: 4,600 lb.

OIL CAPACITY: 6 gallons (3 gal./engine).

USABLE FUEL: 100 gals. (two 51-gal. tanks).

FUEL CONSUMPTION: Average 22 gal./hr. (11 gal./hr./engine).

BAGGAGE COMPARTMENT: Maximum capacity 200 lb.

CALIBRATED AIRSPEEDS: (CAS)

Climb—110 knots.

Cruise—160 knots.

Approach—90 knots.

Stall—70 knots.

ALTITUDES: All flight altitudes will be in terms of Mean Sea Level (MSL) *unless otherwise specified.*

RADIO CALL: Hiflyer 1234B.

DE-ICING EQUIPMENT: Aircraft is equipped with propeller anti-icing; wing, vertical, and horizontal stabilizer deicing.

COMPASS CORRECTION CARD:

FOR (MH)	0	30	60	90	120	150	180	210	240	270	300	330
STEER (CH)	0	30	61	91	120	148	180	210	242	273	303	332

Proposed Instrument Flight

The Problem

You are a commercial pilot with an instrument rating. You plan an instrument flight from Washington, D.C., to Cincinnati, Ohio. You choose a tentative route as follows, using the appropriate Enroute Low-Altitude Charts (see appendix).

WASHINGTON, D.C. (DCA) TO CASANOVA VOR (CSN)
VIA SID MOSBY ONE
CSN TO LINDEN VOR (LDN) VIA V-286
LDN TO YORK VOR (YRK) VIA V-174
YRK TO CINCINNATI VOR (CVG) VIA V-128

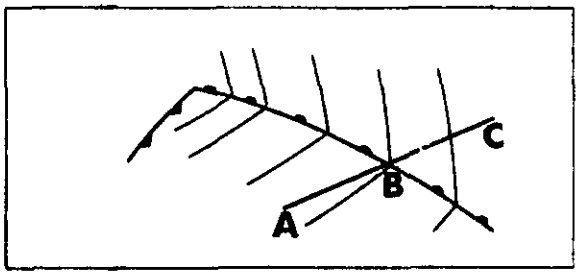
ALTERNATE:
CVG TO CHARLESTON, W. VA. (CRW) VIA V-128

Prior to the flight you conduct your preflight planning and a review of regulations as they pertain to your operation of an aircraft in instrument conditions.

1. To qualify as pilot in command for this instrument flight, you must have acquired a minimum instrument time of—
   1. 6 hours in the last 6 months, 3 hours of which may have been in an approved synthetic instrument trainer.
   2. 2 hours in the last 6 months, all of which must have been in an aircraft.
   3. 6 hours in the last 6 months, all of which may have been in an approved synthetic instrument trainer.
   4. 6 hours in the last 6 months, 3 of which must have been in an aircraft of the type and model being used for this flight.
2. During preflight preparation, you review departure procedures for DCA. You note from the DCA Area Departure Chart that Standard Instrument Departures (SIDs) are approved for Washington National Airport. Which of the following statements concerning SIDs is true?
   1. Pilots are required to request the appropriate SID.
   2. SIDs are used for complex departure routes only.
   3. Only the requested SID may be assigned for the departure.
   4. Request for a particular SID is an indication that the pilot is prepared to accept any SID that is established for the airport of departure.
3. You review the area forecasts and determine that the conditons you are likely to encounter along your route of flight will include (assume takeoff 1030E)—
   A. VFR conditions on top of all clouds at 8,000 feet in West Viriginia and Ohio.
   B. Light to moderate icing in clouds and precipitation above 9,000 feet.
   C. Movement of the cold front to eastern Ohio and western West Virginia by 1800E.
   D. Moderate turbulence in the vicinity of rain showers.
   E. 500 to 2,500 feet broken ceilings 50 miles west of the front.
      1. B, C, E.
      2. B, C, D.
      3. C, D, E.
      4. A, B, C.
4. Situation:
   Altimeter setting departing DCA 30.01.
   Altimeter setting arriving CVG 29.71.
   No altimeter corrections are made in flight.

   Under the above conditions, when your altimeter indicates the minimum altitude for an approach at CVG, your actual altitude is—
   1. 30 feet above the minimum.
   2. 300 feet below the minimum.
   3. 30 feet below the minimum.
   4. 300 feet above the minimum.
5. The area of low ceilings and showers occurring to the east and southeast of the low (lying south of the Great Lakes) are most likely caused by (see appendix, Surface Weather Map)—

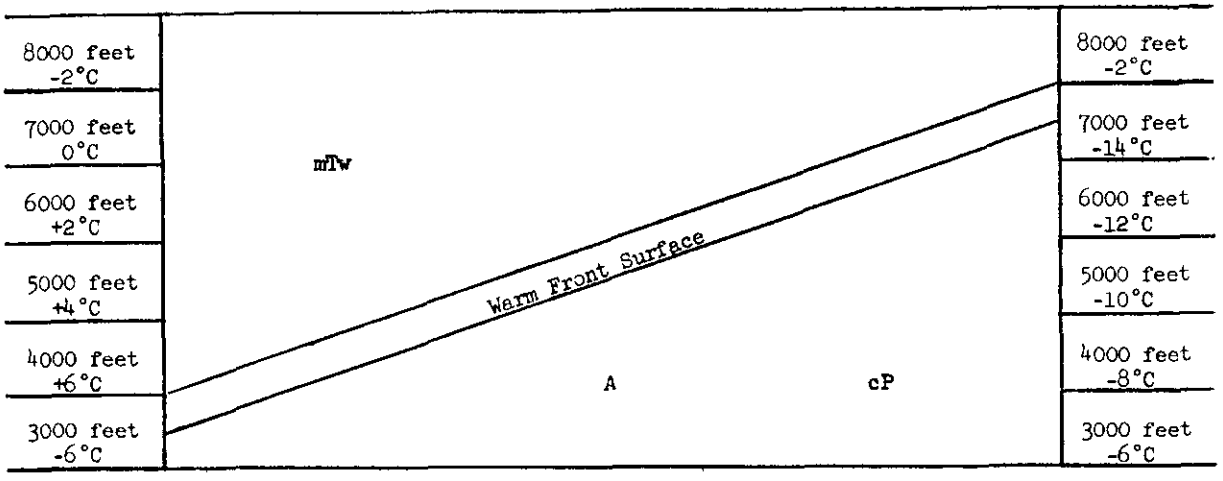
1. Warm moist air brought in by the clockwise circulation of air around the low.
2. The cooler dry air behind the front overrunning warm moist air.
3. Warm moist air from the gulf area being forced up the frontal slope by counterclockwise circulation around the low.
4. The cold front occlusion at the surface.



6. Refer to the surface frontal diagram in the illustration. A flight maintaining a straight track from A to C at approximately 5,000 feet above the surface would expect to correct heading to the—
   1. Right after noting a drop in OAT (outside air temperature) at the midway point B.
   2. Right after noting a drop in OAT between points B and C.
   3. Left after noting a rise in OAT between points B and C.
   4. Right after noting a drop in OAT between points A and B.

7. If you are flying in the cold-air mass depicted in the illustration and encounter freezing rain at position "A", select from the procedures listed below the ones that would reduce structural ice accumulation to a minimum.
   A. Descend to a lower altitude.
   B. Remain at the same altitude and reduce airspeed.
   C. Remain at the same altitude and increase airspeed.
   D. Climb into the warm air above.
   E. Fly a heading that will allow you to penetrate the front at a right angle.
      1. D and E.
      2. A and C.
      3. B and C.
      4. A and D.

8. During your preflight planning, you check pertinent publications to determine the facilities and services available at CVG and CRW. Which of the following statements are correct?
   A. ASR is available at Kanawha (Charleston, West Virginia) and Greater Cincinnati airports.
   B. VHF/DF facilities are available at CRW and CVG.
   C. You may plan to utilize ILS for approaches at CRW and CVG.
   D. There are no overnight parking or tiedown facilities for civil aircraft at CRW, Kanawha Airport.
   E. Both CRW and CVG airports are equipped with visual approach slope indicators.



F. Major airframe and powerplant repairs may be obtained at both CRW and CVG.
   1. A, C, D.
   2. C, D, E.
   3. B, E, F.
   4. A, B, F.

9. Prior to takeoff you review the approach charts for DCA, CVG, and CRW. You would find information concerning the dates of changes and of latest editions of these charts in the—
   1. *Flight Information Manual.*
   2. *Notices to Airmen* (NOTAMS).
   3. *Airman's Guide.*
   4. *Air Traffic Procedures Manual.*

10. A new turn and bank indicator was installed in your aircraft after the last flight. You wish to check the calibration of the instrument during this flight. In addition to the clock, inflight calibration of the turn needle requires references to which of the following instruments?
   1. Artificial horizon (attitude indicator) and the turn needle.
   2. Magnetic compass and turn needle.
   3. Directional gyro and artificial horizon.
   4. Directional gyro and turn needle.

11. To find the *most current* information available as to the status of air navigation radio aids for this flight, you should check which of the following sources?
   1. Teletype Notices to Airmen.
   2. *Flight Information Manual.*
   3. *Airman's Guide.*
   4. NOTAM Code.

12. FAR 91 requires that certain weather minimums must be forecasted before an airport that is served by a radio directional facility may be listed as an alternate for an instrument flight.

You list Kanawha Airport (CRW) as your alternate. If the VOR is the facility that you will use for your approach, the forecasted ceiling and visibility minimums at your ETA must be at least—
   1. 1,000 feet broken clouds or better and 1 mile.
   2. 1,000 feet and 2 miles.
   3. 900 feet and 1½ miles.
   4. 800 feet and 2 miles.

13. An IFR altitude that meets obstruction clearance requirements and assures adequate reception of navigation signals for a maximum distance of 25 statute miles from a VOR station, is known as the—
   1. Minimum safe altitude.
   2. Minimum reception altitude.
   3. Minimum obstruction clearance altitude.
   4. Minimum enroute altitude.

14. Preferred routes are established to guide pilots in flight planning, to minimize route changes during flight, and to aid in efficient management of air traffic using the Federal airways.

Latest information concerning preferred routes will be found in the—
   1. *Flight Information Manual.*
   2. *Air Traffic Procedures Manual.*
   3. Enroute Low-Altitude Charts.
   4. *Airman's Guide.*

For flight plan data see the appendix and the Flight Time Analysis sheet on page 51. Use the blank Flight Time Analysis sheet to record your computations. Refer to the appendix for weather information and winds aloft and aircraft data.

KEEP THESE COMPUTATIONS IN ORDER. YOU WILL REFER TO THEM FOR SUBSEQUENT TEST ITEMS.

15. The estimated time en route from DCA to CVG is (assume 1030E departure)—
   1. 2 hours, 09 minutes.
   2. 2 hours, 30 minutes.
   3. 2 hours, 20 minutes.
   4. 2 hours, 40 minutes.

16. To comply with fuel requirement regulations, the fuel needed for this flight is approximately—
   1. 90 gals.
   2. 72 gals.
   3. 94 gals.
   4. 87 gals.

17. The estimated flight time from CVG to the alternate (CRW) is—
   1. 1 hour.
   2. 55 minutes.
   3. 45 minutes.
   4. 50 minutes.

18. The compass heading departing LDN for EKN, as computed in preflight planning, is—
    1. 285°.
    2. 279°.
    3. 273°.
    4. 291°.

The desired loading of the aircraft for this flight is as follows:

Pilot and front seat passengers	340 lb.
Passengers (3) rear seat Std.	570 lb.
Full fuel service	600 lb.
Baggage	Maximum allowable consistent with takeoff weight limitations.

19. The flight may be made under the conditions noted above if the baggage is limited to a maximum weight of—
    1. 175 lb.
    2. 163 lb.
    3. 150 lb.
    4. 200 lb.

20. According to preflight computations, if CVG is below minimums upon your arrival, the maximum time you may hold awaiting weather improvement, before proceeding to your alternate, is—
    1. 27 minutes.
    2. 30 minutes.
    3. 19 minutes.
    4. 35 minutes.

21. Washington National Airport is equipped with a VOR Radiated Test Signal (VOT). From the statements below, select those that properly apply to VOR receiver accuracy checks.
    A. A VOR accuracy check must be made every 10 hours of aircraft flight time or every 10 days.
    B. If a VOR accuracy check (ground check) is made utilizing a VOT, the maximum allowable receiver error is ±6°.
    C. A VOR accuracy check must be made every 10 hours of aircraft flight time and every 10 days.
    D. When using the VOT for a ground accuracy check, if the omni bearing selector is set to 0°, the "TO-FROM" indicator should indicate "FROM."
    E. When using the VOT for a ground accuracy check, the "TO-FROM" indicator should indicate "FROM," with the omni bearing selector set to 180°.
        1. A and B.
        2. B and D.
        3. C and D.
        4. C and E.

22. From a safety standpoint, it is a good policy to review and have available the approach charts for the point of departure in the event that an emergency should require you to return and land.

From your review of the DCA ILS approach chart you determine that—
    A. High intensity approach lights are installed on all runways.
    B. The procedure turn is a standard turn.
    C. At a 90-knot groundspeed for approach, the time from the LOM to the LMM is 2 minutes, 42 seconds.
    D. The back course may be used for holding and missed approaches.
    E. The speeds listed under "MINIMA" are stalling speeds (CAS) with gear and flaps down and power off.
        1. A and B.
        2. B and D.
        3. C and E.
        4. C and D.

23. From the list below select the discrepancies that *must* be corrected prior to takeoff for the flight proposed in this examination.
    A. Vertical speed indicator indicates 250 feet per minute rate of descent.
    B. Amp. meter indicates discharge at 2,000 rpm.
    C. Clock sweep second hand is inoperative.
    D. Artificial horizon indicates a 3° bank when the aircraft is level.
    E. Ball-bank indicator is stuck in center of the race.
    F. Altimeter Kollsman dial indicates +.03 inch Hg higher than current altimeter setting when altimeter is set at field elevation.
        1. A, B, C.
        2. B, C, D.

3. D, E, F.
4. B, C, E.

You file your flight plan at 1000E proposing departure at 1530Z. While in the runup position, you receive the following clearance from Clearance Delivery.

ATC CLEARS NOVEMBER ONE TWO THREE FOUR BRAVO TO THE CINCINNATI AIRPORT VIA MOSBY ONE DEPARTURE CASANOVA FLIGHT PLANNED ROUTE MAINTAIN FIVE THOUSAND. REPORT TO WASHINGTON CENTER ONE TWO FOUR ZERO AT CASANOVA.

24. Departure from DCA is made in compliance with the above clearance. Select the correct statement pertaining to ATC clearances you will receive on this flight. ATC clearances—
    1. Assure traffic separation between your flight and all other traffic.
    2. Assure that your flight will be conducted in compliance with Federal Aviation Regulations.
    3. Give your flight priority over VFR flights.
    4. Provide authorization to proceed in controlled airspace under specified traffic conditions.

25. If an emergency of a minor nature, such as malfunction of the artificial horizon, were to occur at Casanova VOR, and you made the decision to return to DCA for a landing, how much longer must you remain airborne to comply with the landing weight restriction on this aircraft? (See aircraft particulars preceding sample examination.)
    1. 1 hour, 31 minutes.
    2. 1 hour, 45 minutes.
    3. 1 hour, 24 minutes.
    4. 1 hour, 38 minutes.

26. Assume as a result of the emergency (in the preceding test item), that ATC had to give priority to your aircraft. In this situation, you—
    1. Are required to make a written report only if you deviated from FAR 91.
    2. Must make a written report within 48 hours to the nearest FAA District Office.
    3. Must make a written report within 48 hours to the CAB.
    4. Must make a written report within 48 hours to the nearest FAA Regional Office.

27. If you are unable to contact Washington Center on 124.0 mc. at Casanova, ATC would expect you to follow a specific order of procedure in reestablishing communications. From the listing below, select the proper sequence of procedures.
    A. Call any facility on 121.5 mc.
    B. Attempt to recontact Washington Departure Control (118.1 mc.).
    C. Call Washington Center on the Center Area Discreet frequency (124.5 mc.).
    D. Attempt to contact any FSS on 126.7 or 122.1 mc.
        1. C, B, A, D
        2. B, C, D, A
        3. A, B, C, D
        4. D, B, C, A

28. Assume that you are unable to reestablish communications using the proper procedure in the test item above. To conform to procedures outlined for radio failure you would—
    1. Maintain 5,000 feet until passing Linden VORTAC, then climb to and maintain 5,300 until passing Moorefield Intersection, then climb to and maintain, 6,800 feet.
    2. Climb to cross Linden VORTAC at 5,300 feet, maintain 5,300, then climb to cross Moorefield Intersection at 6,800 feet.
    3. Maintain 5,000 feet until passing Linden VORTAC, climb to and maintain 6,000 until passing Moorefield Intersection, then climb to and maintain 7,000 feet.
    4. Climb to cross Linden VORTAC at 5,300 feet, maintain 5,300 until passing Moorefield Intersection, then climb to and maintain 6,800.

29. Assume all communications difficulties are resolved by the time you arrive at Linden VORTAC. Which of the following examples represents the proper position reporting phraseology? (Initial contact

with Washington Center has already been made.)

1. HIFLYER THREE FOUR BRAVO LINDEN FIVE EIGHT, FIVE THOUSAND, ELKINS THREE ONE, HENDERSON.
2. HIFLYER 1234 B/D OVER LINDEN VORTAC FIVE EIGHT ELKINS, HENDERSON.
3. HIFLYER 1234 B/D OVER LINDEN VORTAC FIVE EIGHT ESTIMATING ELKINS THREE ONE, HENDERSON ONE ZERO.
4. HIFLYER 34B LINDEN VORTAC 1558 ZULU, ESTIMATING ELKINS 1631 ZULU, CINCINNATI.

30. After completion of your position report, Washington Center replies as follows:

HIFLYER THREE FOUR BRAVO, ROGER, RADAR CONTACT, CLIMB TO AND MAINTAIN EIGHT THOUSAND. WASHINGTON ALTIMETER TWO NINER NINER EIGHT.

To comply with the above clearance, you should—

1. Depart 5,000, climb as rapidly as practicable to 8,000, and report arriving 8,000.
2. Report leaving 5,000, climb as rapidly as practicable to 7,000, then climb at rate of 500 feet per minute to 8,000.
3. Depart 5,000 and climb at any rate to 8,000.
4. Report leaving 5,000, climb at 500 feet per minute to 8,000, and report arriving 8,000.

31. Which of the following items of information must without request be reported to ATC by aircraft operating under Instrument Flight Rules?

A. Time leaving an assigned holding fix or point.
B. Completion of procedure turn on final approach.
C. Arrival at a newly assigned altitude.
D. Any inflight malfunction of VOR, ADF, or LF navigation receiver capability affecting the flight.
E. Time and altitude reaching an assigned holding fix.
F. Vacating an assigned altitude for a newly assigned altitude.
G. Whether flying in VFR, or IFR weather conditions.

1. A, C, D, G.
2. A, D, E, F.
3. B, C, E, G.
4. A, B, D, F.

32. Between Linden and Elkins you note that a compass heading of 266° is necessary to remain on the centerline of V–174. You check your groundspeed at Moorefield intersection and determine it to be 157 knots. TAS is 182K. From the foregoing information you compute the wind at your altitude to be from approximately—

1. 205° at 53 knots.
2. 230° at 34 knots.
3. 335° at 54 knots.
4. 095° at 53 knots.

33. As a result of the wind computed in the item above, you—

1. Are expected to submit to ATC a revised ETA at Cincinnati.
2. Are expected to submit to ATC a revised ETA at Elkins VORTAC.
3. Are not required to advise ATC.
4. Must advise ATC, because a 10-knot change in groundspeed constitutes a change in your flight plan.

34. You make a position report to Washington Center upon arrival at Elkins. Washington acknowledges your report and advises you to contact Indianapolis Center 118.2 mc. at three seven. Which of the following represents the correct phraseology for initial contact with Indianapolis, assuming York ETA is 28?

1. INDIANAPOLIS CENTER, NAN ONE TWO THREE FOUR BRAVO ON 118.2 mc. ESTIMATING YORK TWO EIGHT.
2. INDIANAPOLIS CENTER, HIFLYER ONE TWO THREE FOUR BRAVO ON 118.2 mc. AT THREE SEVEN OVER.
3. INDIANAPOLIS CENTER, HIFLYER ONE TWO THREE FOUR BRAVO, ESTIMATING YORK

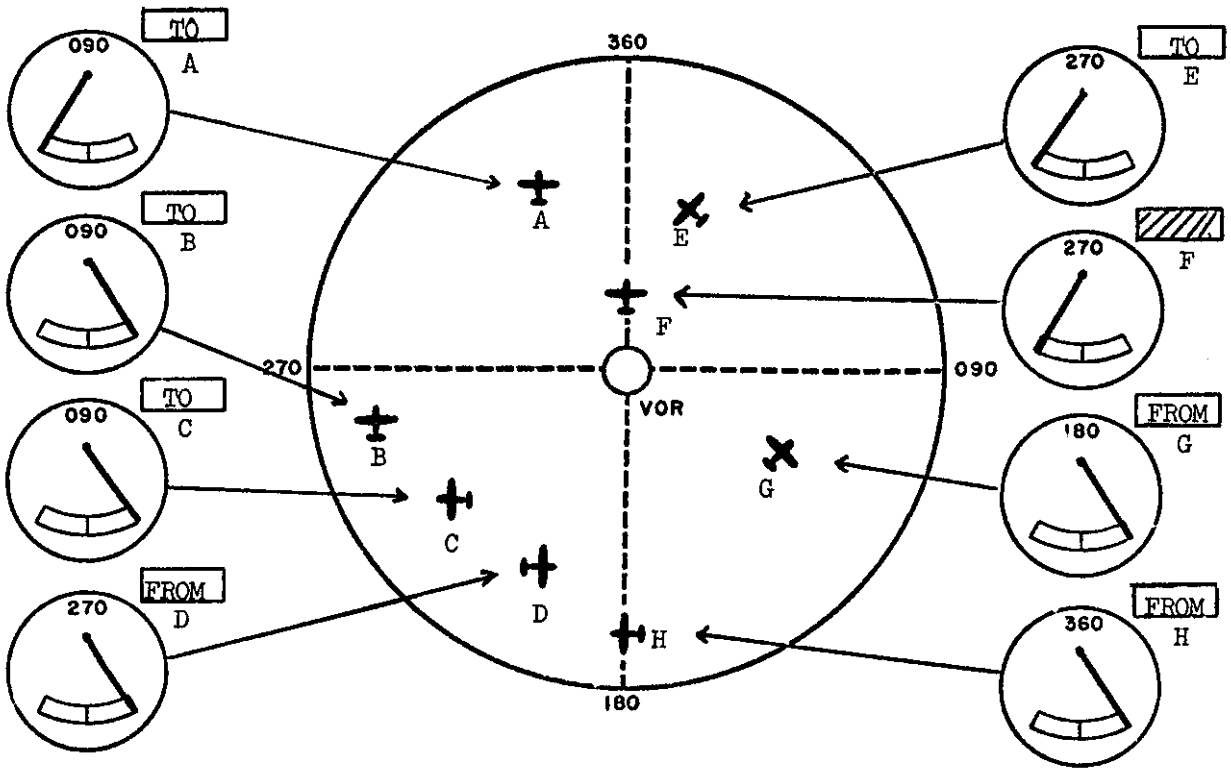
TWO EIGHT AT EIGHT THOUSAND.

4. INDIANAPOLIS CENTER, HI-FLYER ONE TWO THREE FOUR BRAVO ON 118.2 mc. EIGHT THOUSAND IFR WASHINGTON TO CINCINNATI OVER.

35. Approaching YORK on V–174, you tune your ADF to a broadcasting station to the right of your course(not shown on your En-route Chart). Maintaining a constant heading, you note a relative bearing of 090° to the station. Two minutes later the relative bearing has increased to 100°. Time to the station, assuming no wind, is approximately—
    1. 12 minutes.
    2. 15 minutes.
    3. 14 minutes.
    4. 8 minutes.

36. In the illustration, which omni indications *correctly* depict the position of the corresponding aircraft with relation to the VOR station?
    1. A, C, D, H.
    2. B, D, F, G.
    3. B, C, E, H.
    4. D, E, F, G.

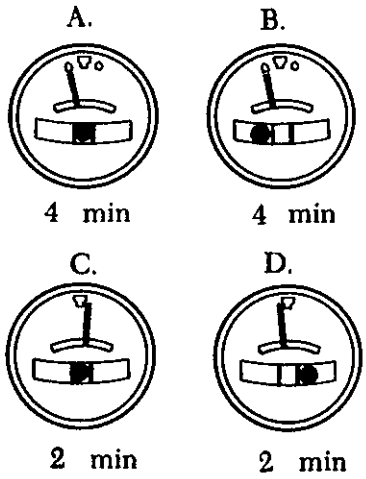
37. Without radar assistance, your standby magnetic compass would be your only source of directional information if the gyrocompass should become inoperative. With reference to the magnetic compass, which of the following statements is true (assume 15° to 18° bank and a TAS of 220 knots or less).
    1. The lead required to roll out on a heading of south is the same as that required to roll out of a turn on a heading of north.
    2. Acceleration error on headings of north and south is the same as acceleration error on headings of east and west.
    3. The amount of turning error in a magnetic compass is determined by the latitude at which the turn is being made.
    4. The amount of lead required to roll out of a turn on a heading of 030° is the same as that required to roll out of a turn on a heading of 060°.



38. You are assigned a DME holding pattern at California intersection. Which of the following statements applies to this pattern? (Refer to CVG Area Chart in the Appendix.)
    1. You start your turn inbound so your maximum distance from CVG VORTAC will not exceed 24 nautical miles.
    2. You start your turn inbound when your odometer indicates 24 nautical miles.
    3. Your outbound leg may not exceed 2½ minutes regardless of distance.
    4. Distance measurements for DME are based on horizontal distances.

39. Which of the statements below apply to non-DME holding procedures for the aircraft used in this examination? (Holding Airspeed 130K)
    A. An aircraft is considered in the holding pattern at the initial time of arrival over the fix.
    B. Speed should be reduced to maximum holding speed or less, 5 minutes before estimated time of arrival over the holding fix.
    C. Maximum holding speed for propeller-driven aircraft is 175 knots.
    D. Below 14,000 feet the outbound course should be flown for 3 minutes or less.
    E. Speed should be reduced to maximum holding speed or less, 3 minutes before estimated time of arrival over the holding fix.
        1. A, C, E.
        2. B, D, E.
        3. A, B, D.
        4. C. D, E.

40. If you arrive at a "clearance limit" short of your destination and due to frequency congestion have not received further clearance or holding instructions, you should—
    1. Hold in a standard holding pattern on on the proposed route directly beyond the fix.
    2. Continue on your route and stand by for further clearance.
    3. Hold in a standard holding pattern in the direction from which you approached the fix.
    4. Continue on your route and immediately request further clearance.



41. From the diagram, select those instruments that indicate a standard rate turn:
    1. A and D only.
    2. C and D only.
    3. A and B only.
    4. A, B, C, and D.

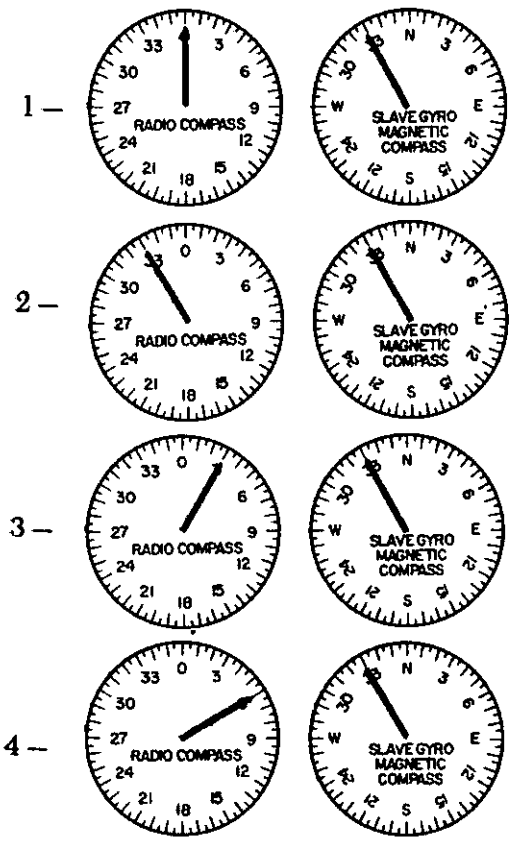
42. If you were to make this IFR flight in "VFR CONDITIONS ON TOP," at an altitude of 14,500 MSL, which of the following conditions must be complied with?
    A. Flight visibility of at least 3 miles.
    B. Minimum distance under clouds of 500 feet.
    C. Use of a 29.92 altimeter setting.
    D. Flight along the centerline of the clearance route or airway.
    E. Horizontal cloud clearance of at least 1 mile.
    F. Flight visibility of at least 5 miles.
    G. Horizontal cloud clearance of at least 2,000 feet.
    H. Aircraft equipped with a coded radar transponder.
        1. A, B, G.
        2. D, E, F.
        3. C, D, H.
        4. E, F, H.

43. If you should encounter light icing at your last assigned altitude, you should make—
    1. A report of this condition to ATC as soon as possible.

2. No report of this condition, because your aircraft is equipped for flight in light to moderate icing conditions.
3. A report to the Weather Bureau at CVG upon landing.
4. No report because the icing is light.

44. CVG Approach Control vectors you to a position to intercept the final approach course on a heading of 330° at 4 miles south of the outer compass locator. At this time you are advised to contact CVG tower on 118.3 mc.

If you hold the last assigned heading, which of the following instrument indications represents the approximate heading and ADF indications upon interception of final approach course?



45. As you pass the outer compass locator inbound, CVG tower advises the current weather is 300 feet and 1 mile. Under these circumstances you—
1. May continue your approach and, if you are not contact at the published minimums, execute a missed approach.
2. Must execute a missed approach immediately upon receipt of the above weather information.
3. Must execute a missed approach and proceed directly to your alternate.
4. May continue your approach to an altitude of 50 feet below the published minimums before executing a missed approach.

46. Make the following assumptions:
a. Departure from DCA is made with minimum fuel to comply with FAR 91.
b. Enroute time to destination exceeds flight planned time by 15 minutes.
c. Destination is below minimums on arrival.

Which of the following actions do you take? You—
1. Must select another alternate that is near enough to allow arrival there with 45 minutes reserve fuel.
2. May hold for improvement if minimums for destination airport are forecasted within 30 minutes.
3. May proceed to your flight planned alternate without holding at CVG.
4. May hold for improvement if minimums for destination airport are forecasted within 15 minutes.

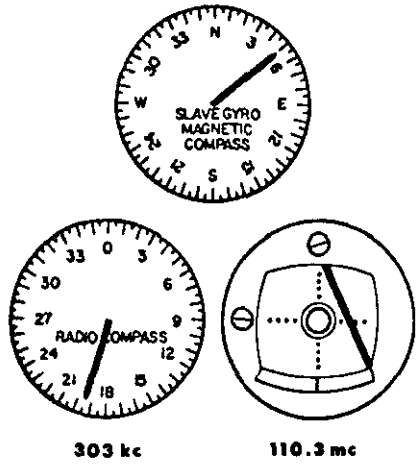
47. Which of the following applies to a back course of an ILS listed as "Restricted"?
1. Restricted to approaches when ceiling and visibility conditions are at ceiling minimums or higher.
2. Restricted against use for any purpose.
3. Suitable for holding intersections, transitions, and missed approaches, but not suitable for back course ILS approaches.
4. Restricted to use when weather conditions meet minimum VFR conditions or higher.

48. The Visual Approach Slope Indicator (VASI) system is designed to provide a visual glide slope within the approach zone. It will provide guidance for a safe approach to a landing well within the first third of the runway. The lights at the 600-foot mark from the threshold are known as the downwind bars, and the lights at the 1,300-foot mark are known as the

upwind bars. The pilot of an approaching aircraft will see combinations of lights. When approaching on the *proper* glide slope, he will see—

1. The upwind lights white and the downwind lights red.
2. Both upwind and downwind lights white.
3. Both upwind and downwind lights pink.
4. The upwind lights red and the downwind lights white.

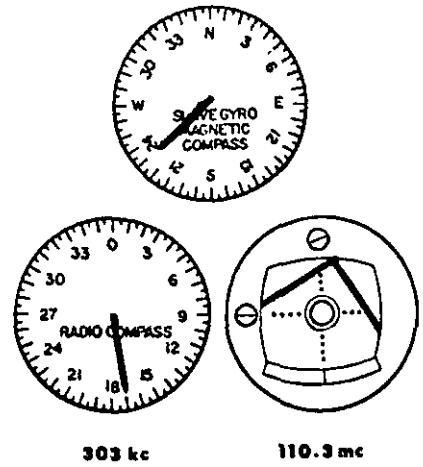
49. You advise CVG tower of your missed approach. You request and receive clearance to your alternate (CRW). Upon arrival at CRW VOR you are cleared for an ILS approach. The transition from the VOR to the ILS localizer is made and you establish an outbound heading of 050°. While maintaining a constant heading outbound to the procedure turn, you note the instrument indications shown here.



You then know that you—

1. Are to the left of course.
2. Should turn to a heading of 065° to reintercept the localizer course.
3. Are to the right of course.
4. Should turn to a heading of 035° to reintercept the localizer course.

50. On the final approach, you observe the instrument indications shown here.



You should correct heading to the—

1. Right and decrease your rate of descent.
2. Left and decrease power.
3. Left and increase rate of descent.
4. Right and maintain present rate of descent.

ANSWERS TO SAMPLE EXAMINATION ITEMS

Item	Answer number	Item	Answer number
1	1	26	4
2	4	27	2
3	2	28	3
4	2	29	1
5	3	30	2
6	2	31	2
7	1	32	1
8	4	33	3
9	3	34	3
10	4	35	1
11	1	36	4
12	2	37	3
13	3	38	2
14	4	39	1
15	2	40	3
16	1	41	4
17	4	42	2
18	3	43	1
19	1	44	3
20	1	45	1
21	4	46	3
22	3	47	3
23	4	48	4
24	4	49	3
25	3	50	1

ANALYSIS OF ANSWERS TO SAMPLE EXAMINATION ITEMS

Item *Answer*

1 1 The reference is found in FAR 61-47(D). A pilot may not act as pilot in command under IFR or in weather conditions less than prescribed VFR minimums unless, within the preceding 6 calendar months, he has had at least 6 hours of instrument flight under actual or simulated instrument flight conditions. Not more than 3 hours in a synthetic instrument trainer acceptable to the FAA Administrator may be substituted for 3 of the 6 hours of instrument flight time required.

2 4 Reference *Flight Information Manual*. The filing of a specific SID or any SID for the airport of departure, in a proposed instrument flight plan, or any request by the pilot, prior to takeoff, for a specific or any SID is considered a statement by the pilot that he is familiar with and has available all of the SIDs pertinent to his operation from the airport of departure.

3 2 The following comments apply to the lettered phrases.

B. Light to moderate icing is forecasted above 9,000 to 11,000 feet.

C. The front is forecasted to move eastward, with ceilings improving to 2,500 to 3,500 broken, 50 miles behind the front.

D. Moderate turbulence is forecasted in vicinity of rain showers.

4 2 When flying from high to low pressure with an uncorrected altimeter, you will be lower than indicated. The amount of error is equal to approximately 100 feet for each 0.1 inch of pressure change.

5 3 The circulation of air about a low-pressure area is counterclockwise. This circulation is bringing in moisture-laden air from the gulf coast area.

6 2 A. Circulation of air around a low is counterclockwise.

B. Above the friction layer movement of air parallels the isobars.

C. The warm front aloft will be in advance of the surface front (at some point between B and C) because warm air is being forced up the slope of cooler air. At 5,000 feet you are above the friction layer flying in warm air until passage of the front aloft between B and C. You would correct to the right after noting a drop in outside air temperature which indicates you have flown into the cooler air mass.

7 1 Freezing rain is indisputable evidence of warm air above. If you are unable to climb into the warm air sector, perpendicular penetration of the front into the warm air will reduce exposure to icing to a minimum.

8 4 A. The radar listings in the *Airman's Guide* indicates that ASR is available at CRW and CVG.

B. This information is found in the Air Navigation Radio Aids section of the *Airman's Guide*.

Item	Answer	
		F. This information is found in the *Directory of Airports* supplement of the *Airman's Guide*.
9	3	The "Instrument Approach Procedure Charts" section of the *Airman's Guide* lists the new charts and new editions of these charts.
10	4	Reference *Instrument Flying* USAF Manual 51–37.
11	1	On the cover of the *Airman's Guide* appears the following statement: "Consult Teletype NOTAMs for latest information."
12	2	FAR 91 sets up basic minimums of 1,000 feet and 1 mile, 900 feet and 1½ miles or 800 feet and 2 miles for an alternate airport served by a radio directional facility. However, higher or lower minimums may be prescribed for individual airports. These prescribed minimums are found on the Instrument Approach Procedure Charts.
13	3	Reference FAR 95.1(e)—The MOCA assures obstruction clearance between fixes specified but adequate reception of navigational signals is assured only within 25 statute miles of the VOR station concerned.
14	4	Information concerning preferred routes is found in the *Airman's Guide* and on Enroute Charts. Since the *Airman's Guide* is published every 2 weeks, the latest information will be found in it.
15	2	Refer to the sample Flight Time Analysis sheet.
16	1	Fuel needed to comply with regulations is shown below: (Average consumption 22 GPH) Climb ..... 7.7 gal. Cruise ..... 47.3 gal. Alternate ..... 18.3 gal. 0:45 Reserve ..... 16.5 gal. 89.8 or 90 gal.
17	4	Refer to the sample Flight Time Analysis sheet on page 23.
18	3	Refer to sample Flight Time Analysis sheet on page 23 and to the compass correction card on page 10. TC ± WC = TH ± VAR = MH ± DEV = CH 273° − 9° = 264° + 6° = 270° + 3° = 273°
19	1	Empty weight ..... 3,100 lb. Oil ..... 45 lb. Pilot and front seat passenger ..... 340 lb. 3 passengers, std. rear seat ..... 570 lb. 100 gal. fuel (6/lb./gal.) .. 600 lb. 4,655 lb.
20	1	Usable fuel ..... 100 gal. Fuel required ..... 90 gal. 10 gal. 10 gal. extra at 22 gal./hr. = 27 min. holding.
21	4	Reference *Flight Information Manual*
22	3	Reference DCA ILS Approach Chart C. 4.1 nautical miles at 90K = 2 min. 42 sec. E. Correct as stated.
23	4	Reference FAR 91.33(D)
24	4	Reference *Flight Information Manual*, "Air Traffic Control Procedures."
25	3	Max. takeoff gross weight .. 4,820 lb. Max. landing gross weight .. 4,600 lb. Weight of fuel to be used before attaining max. landing gross weight ... 230 lb. 22 gph × 6 lb./gal. = 132 pph 230 lb. ÷ 132 pph = 1:45 1:45 − :21 to Casanova VOR = 1:24 to attain landing gross
26	4	Reference FAR 91–75 (D) Correct as stated.

FLIGHT TIME ANALYSIS *

Check pts. from	Check pts. to	Cruise altitude	Ave. True Course	Ave. Drift Corr.	Ave. TAS kts.	W/V kts.	Ave. G/S	Dist. n. m.	Time
DCA	CSN	Climb	* -	-	-	-	-	-	:21.0
CSN	LDN	8000	308°	10°L	182	210/31	184	20	:06.5
LDN	EKN	8000	273°	9°L	182	210/31	167	89	:32.0
EKN	HNN	8000	264°	3°L	183	250/39	144	91	:38.0
HNN	YRK	8000	262°	2°L	183	250/39	144	45	:18.8
YRK	CVG	8000	287°	7°L	183	250/39	152	84	:33.2

ALTERNATE DATA

CVG	YRK	5000	105°	10°R	175	200/30	174	84	:29.0
YRK	CRW	5000	107°	10°R	175	200/30	174	60	:21.0

*VARIOUS TRUE COURSES

USE DCA WINDS ALOFT DCA - EKN

USE CVG WINDS ALOFT EKN - CVG - CRW

INTERPOLATE WINDS AND TEMPERATURES WHERE NECESSARY

Fuel summary

	time	gals
climb	:21	7.7
cruise	2:09	47.3
alternate	:50	18.3
reserve	:45	16.5
extra	:27	10.1
Total	4:32	99.9

Item Answer

27 2 Reference *Flight Information Manual*, "Frequency Use Plan."

28 3 Reference FAR 91.127(c)(1)(iii)—Climb to the lowest cardinal altitude or flight level at or above the MEA of the highest route structure.

29 1 Reference *Flight Information Manual*—A position report after initial contact consists of:

1. Aircraft identification.
2. Position.
3. Time.
4. Altitude.
5. Estimate at next compulsory reporting point.
6. Name of subsequent reporting point.

30 2 Reference *Flight Information Manual.* For any change of altitude in excess of 1,000 feet, report leaving assigned altitude, climb or descend as rapidly as practicable to 1,000 feet below

Item	Answer	
		or above the newly assigned altitude, then proceed at the rate of 500 feet per minute to that altitude.
31	2	Reference *Flight Information Manual*
32	1	The information needed to solve this problem is as follows: TC 273° TH 257° TAS 182K GS 157K Resultant wind approximately 205°/53 knots.
33	3	The computed wind will not require your advising ATC of any change because your estimate at the next reporting point does not vary by 3 minutes or 10 knots TAS.
34	3	Reference *Flight Information Manual.* When contact is to be made at a specific time or place and no position report is required, the following information is transmitted: 1. Identification. 2. Estimate at next compulsory reporting point. 3. Altitude.
35	1	Time to station may be resolved by application of the following equation: Time to station = $\frac{60° \times \text{Time}}{\text{degree of bearing change}}$ Time to station computed as: $T = \frac{60° \times 2 \text{ min.}}{10°} = 12 \text{ minutes}$
36	4	The selected omni bearing and the aircraft's magnetic position relative to the VOR station determine the Course Deviation Indicator (CDI) and the TO-FROM indications. Neither CDI or TO-FROM is affected by the heading of the aircraft.
37	3	Reference *Instrument Flying,* USAF Manual 51–37. Correct as stated.
38	2	DME measurements are based on slant range distance. Time does not enter into the holding pattern procedure. The designated distances are the limits for starting the turns in the holding patterns.
39	1	Reference *Flight Information Manual.* "Aircraft Holding."
40	3	Reference *Flight Information Manual,* You will be expected to begin a standard holding pattern on the course on which you approach the fix, disregarding any other pattern shown for the fix.
41	4	All instruments indicate a standard rate turn. The position of the ball is irrelevant to the rate of turn.
42	2	Reference "Instrument Pilot Exam-O-Gram #6" and *Flight Information Manual* and FAR 91.105.
43	1	You are required by regulations to report encountering any unforecasted weather conditions at the time of position report, but pilots are encouraged to report these conditions as soon as possible.
44	3	Final approach course 360° magnetic. Interception heading of 330° is 30° to left of final approach course. Therefore, when the ADF needle indicates 30° to right of final approach bearing, you have intercepted the desired bearing.
45	1	Reference FAR 91.115(c). No person operating an aircraft (except a military aircraft of the United States) may land that aircraft using standard instrument approach procedures unless weather conditions are at or above the landing weather minimums prescribed for the procedure used.
46	3	Reference FAR 91.23. No person may operate a civil aircraft in IFR Conditions unless it carries enough fuel (*considering weather reports and forecast, and weather conditions*) to complete the flight to the first intended point of landing, to fly from that point to the alternate airport, and fly thereafter for 45 minutes at normal cruising speed.
47	3	Reference *Flight Information Manual.* An ILS back course classified as "restricted" may be used for inter-

Item	Answer	
		sections, holding, transitions, or missed approaches.
48	4	Reference *Airman's Guide*. Correct as stated.
49	3	When outbound on the front course of an ILS the sensing of the CDI is reversed (nonautomatic type receiver). Therefore, in this illustration the aircraft is to the right of course. According to the ADF you are 15° to the right of the desired outbound bearing. Correcting to 035° would not be a sufficient heading change to intercept the localizer.
50	1	You are to the left of course and below the glide slope.

Area Forecast

FA DCA
Ø6ØØE-18ØØE

CLDS AND WX. SHWRS AND RAIN OVR WRN PTNS VIRGINIA AND WEST VIRGINIA WILL SPRD EWD DURG THE FCST PRD AND COVER ENTIRE AREA BY MID AFTN. CIGS AND VSBY IN PCPN GENLY 1Ø-2Ø⊕AGL AND 1-3 MIS LCLY C5X1/2 IN SCTD RW+ DRG AFTN. OTHERWISE C5Ø-8Ø ⊕ TOPS 15Ø. TOPS IN SHWRS AND TSTMS 22Ø-3ØØ.

ICG. LGT TO MDT ICGICIP ABV FRZG LVL 9Ø-11Ø.

TURBC. MDT VCNTY SHWRS AND TSTMS.

OTLK 18ØØE TUES. Ø6ØØE WED. FRONT FM W MOVG INTO EXTM WRM PTN AREA ERLY EVE WITH CONDS IPVG TO C15-75◍V⊕3-5R- TWO-FOUR HRS FLWG FRONT. ELSW NO SIG CHG.

FA CVG
Ø6ØØE-18ØØE

CLDS AND WX. OCLDD FRONT AT Ø6ØØE LCTD ON A N-S LN FM EXTRM SW MICH TO EXTRM SE IND MOVG EWD ABT 15 KTS. THE FRONT WL MOV TO EXTRM ERN OHIO. EXTRM WRN WEST VIRGINIA BY END OF FCST PRD.

E OF FRONT. GENLY C8-15⊕1-3R OR RW LCLY C5X1/2 RW+ DRG AFTN TOPS 15Ø.

W OF FRONT. C15-3Ø+5-7 R- JUST W OF FRONT IPVG TO C25-35◍ ABT 5Ø MI W OF FRONT. TOPS 15Ø.

ICG. OCNL MDT ICGICIP ABV FRZG LVL 9Ø-11Ø.

TURBC MDT VCNTY BLDUPS OTHERWISE NONE OF CONSEQUENCE.

OTLK 18ØØE TUES. Ø6ØØE WED. CONTD IPVMT FLWG FROPA.

Terminal Forecast

FT1 181Ø45
11Z-23Z TUES.

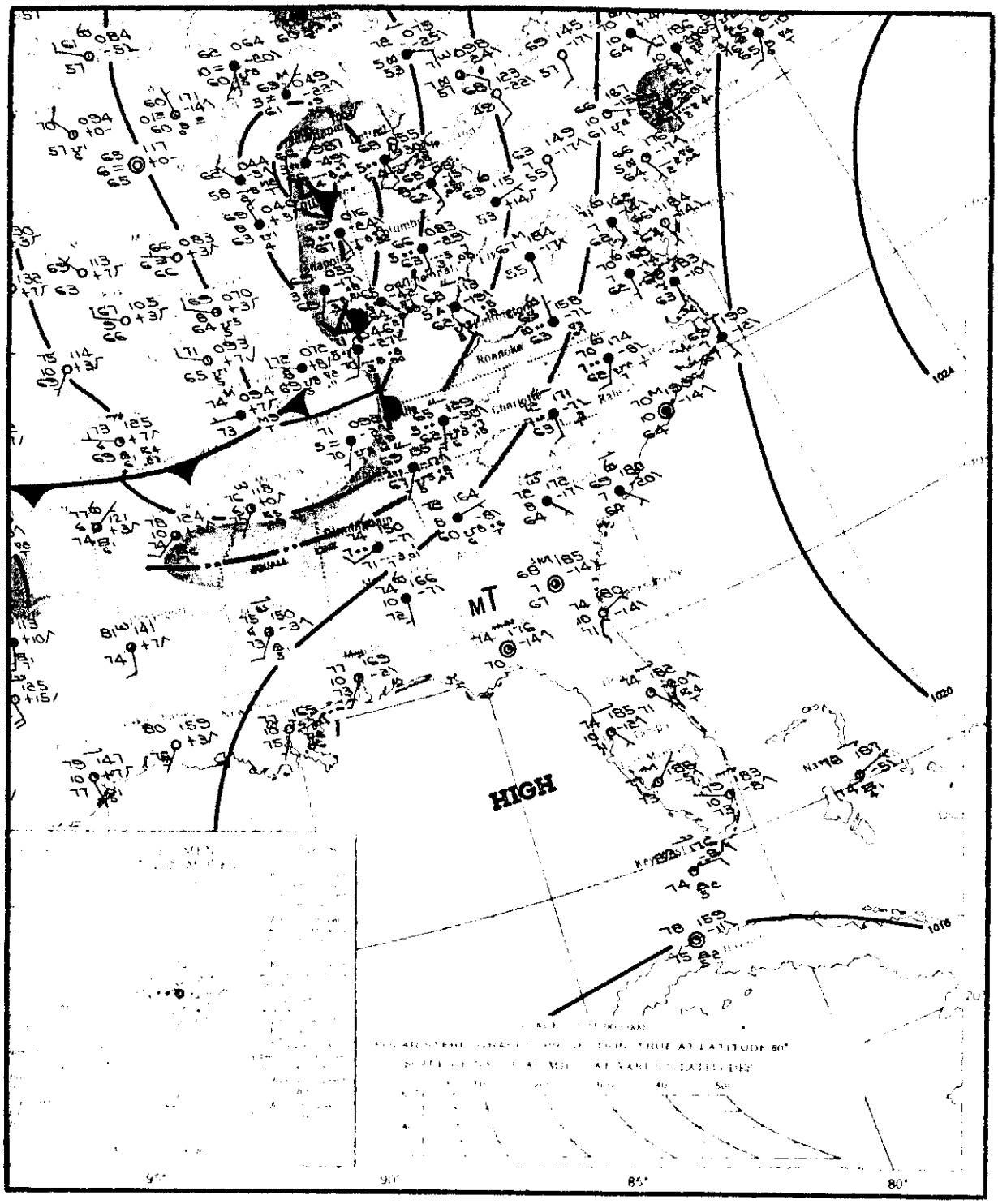
DCA Ø6ØØE 100◯2/1310 Ø9ØØE C8Ø⊕2. 12ØØE C5Ø⊕1. 15ØØE C11⊕2RF. CRW Ø6ØØE C5Ø⊕8R. Ø9ØØE C45⊕8R. 12ØØE C25⊕3R. 15ØØE C1Ø⊕3R-. CVG Ø6ØØE C8⊕6RF. Ø9ØØE C4⊕5R. 12ØØE FROPA C1Ø⊕4RF. 15ØØE C15⊕4RF IND Ø6ØØE C9⊕3RF Ø9ØØE FROPA C25⊕7 15ØØE C25◍5

Winds Aloft Forecast

SD DCA 18Ø35Ø
23E MON—11E TUES
DCA 3-2Ø15/16 5-2Ø25/12 1Ø-2235/2 15-234Ø/-6
CVG 3-2Ø1Ø/17 5-2Ø3Ø/13 1Ø-2745/3 15-275Ø/-5 14ØØE 3-2715/17 16ØØE 3-2715/17 5-273Ø/13
IND 3-1915/16 5-232Ø/12 1Ø-3Ø35/4 15-3Ø4Ø/-6 11ØØE 3-2415/16 13ØØE 3-2915/16 5-2725/12

Hourly Sequence Reports

SA 15ØØZ
DCA M8Ø⊕7 153/75/64/151Ø/998
CRW M2Ø⊕5R 1Ø3/67/65/131Ø/983
RIC E7Ø⊕ 159/75/67/18Ø5/ØØØ
CVG M18⊕3R- Ø41/69/68/13Ø5/965
IND M18⊕3R Ø3Ø/72/72/1315/962



Surface Weather Map

RADAR - RADIO LISTINGS

(ICAO) INTERNATIONAL PHONETIC ALPHABET

A	ALFA	●▬	J	JULIETT	●▬▬▬	S	SIERRA	●●●
B	BRAVO	▬●●●	K	KILO	▬●▬	T	TANGO	▬
C	CHARLIE	▬●▬●	L	LIMA	●▬●●	U	UNIFORM	●●▬
D	DELTA	▬●●	M	MIKE	▬▬	V	VICTOR	●●●▬
E	ECHO	●	N	NOVEMBER	▬●	W	WHISKEY	●▬▬
F	FOXTROT	●●▬●	O	OSCAR	▬▬▬	X	XRAY	▬●●▬
G	GOLF	▬▬●	P	PAPA	●▬▬●	Y	YANKEE	▬●▬▬
H	HOTEL	●●●●	Q	QUEBEC	▬▬●▬	Z	ZULU	▬▬●●
I	INDIA	●●	R	ROMEO	●▬●			

ALWAYS CHECK NOTICES TO AIRMEN SECTION

VOR MONITORING CLASSIFICATION FOR AIR TRAFFIC CONTROL PURPOSES: Category I=Course alignment and signal level are monitored continuously. VOR has automatic transfer and shutdown unit, and is monitored remotely by a person. Category II=This is a Category I VOR wherein remote monitoring capability has failed and the VOR is temporarily monitored solely through use of automatic equipment which monitors course and signal level and has an automatic transfer unit. Upon receipt of a pilot report that the VOR is operating normally, it is placed in Category II which permits it to be used for air navigation and air traffic control purposes. Category III=VOR monitored solely through use of automatic equipment which monitors course and signal level and has automatic transfer and shutdown unit. Such a VOR may be inoperative for a limited period before a NOTAM is issued. VORs which are not controlled by an FSS, and are located too far from a staffed facility to be monitored with a VHF receiver, will fall into Category III. Category IV=Course alignment and signal level are monitored continously at an adjacent FSS but there is no automatic transfer and shutdown unit. During periods when the remote control feature is inoperative, a VOR in this category will be advertised, by NOTAM, as out-of-service regardless of its operating condition. **Note:** Category I, III, IV shown by 1, 3, 4 following name in Location Column.

LEGEND

FSS=Flight Service Station (FAA) (Formerly ATCS) location capitalized.
NOTE: The Federal Government disclaims responsibility for non-Federal air navigation facilities.

(A)=Army facility.
(AF)=Air Force facility.
(ANG)=Air National Guard facility.
(N)=Navy facility.
(P)=Private facility.
(S)=State facility.
(0700-2300)=Hours of operation local time
3=Monitoring category
●=New or revised data

RADIO CLASS DESIGNATIONS

Identification of VOR/VORTAC/TACAN Stations by Class (Operational Limitations):

Class	Normally Anticipated Altitude Service	Normally Anticipated Interference-free Distance Service
H-	20,000-75,000' MSL	180 smi (156.31 nmi)
M-	15,000-20,000' MSL	90 smi (78.16 nmi)
L-	Up to 15,000' MSL	45 smi (39.08 nmi)

NOTE: An H-VOR facility is capable of providing M- and L- service volume and an M- facility additionally provides L- service volume.

AAS ..... Airport Advisory Service at FSS-located airport shown in Location Column.
AB ..... Continuous automatic transcribed broadcast service.
AC ..... Approach Control Tower, FAA (transmits on voice channel or associated ranges and ILS in addition to frequencies listed.)
B ..... Scheduled Broadcast Station (broadcasts weather at 15 and 45 minutes after the hour; Air Force Broadcasts, generally, 29 minutes).
C ..... Control Tower, FAA.
CI ..... Control Tower (City, County, Private, etc.).
CM ..... Control Tower (Military, listing only civil frequencies available).
CONSOLAN .. LF/MF long range navigation aid; aircraft must have beat frequency oscillator (BFO).
DME ..... UHF standard (TACAN compatible) distance measuring equipment.
GCA ..... Ground Controlled Approach System.
H ..... Non-directional radio beacon (homing), power 50 watts to less than 2000 watts.
HH ..... Non-directional radio beacon (homing), power 2000 watts or more.
ILS ..... Instrument Landing System (voice on localizr channel).
J ..... L/MF (200-415 kc) voice facility on other than range frequency.
LFM ..... VHF fan marker, low powered (5 watts).
LMM ..... Compass locator station when installed at middle marker site.
LOM ..... Compass locator station when installed at outer marker site.
LRCO ..... Limited Remote Communication Outlet.
MA ..... Range (adcock, vertical raditors), power less than 50 watts.
MH ..... Non-directional radio beacon (homing) power less than 50 watts.
ML ..... Range (loop radiators), power less than 50 watts.
MM ..... VHF middle marker.
MRA ..... Range (adcock, vertical radiators), power 50 watts or more, but less than 150 watts.
MRL ..... Range (loop radiators), power 50 watts or more, but less than 150 watts.
OM ..... VHF outer marker.
RA ..... Range (adcock, vertical radiators), power 150 watts or more.
RCO ..... Remote Communications Outlet.
Req ..... Operates on request.
RL ..... Range (loop radiators), power 150 watts or more.
S ..... Simultaneous range, homing signal and/or voice.
SLMM ..... Simultaneous middle marker compass locator and twr voice transmission.
SLOM ..... Simultaneous outer marker compass locator and twr voice transmission.
TACAN ..... UHF navigational facility—omnidirectional course and distance information.
VOR ..... VHF navigational facility—omnidirectional, course only.
VOR/DME ... Collocated VOR navigational facility and UHF standard distance measuring equipment.
VORTAC ..... Collocated VOR and TACAN navigational facilities.
W ..... Without voice facilities on range frequency.
Z ..... VHF station location marker at a LF range station.

NOTES

1. Range courses are magnetic in-bearings.
2. All FAA MH facilities operate continuously unless cited as follows: (on req).
3. All FAA ranges operate continuously. Those which are not manned continuously are cited in the remarks column with hours of operation in parentheses, e.g., (0600 2400).
4. LMF and VHF ranges listed at the same location are controlled by the same FSS. The communication frequencies and the controlling FSS are listed with either the LF/LMF or the VOR facility.
5. The controlling facility is shown in the Remarks column for an aid the name of which is NOT capitalized in the Location column and is NOT suffixed by the letter "W" in the Class column; e.g., Eufaula, (Alabama), L-BVOR is controlled by the Columbia, Georgia, FSS. Drake², (Arizona), L VORW—not controlled remotely.

FAA-OPERATED RADAR UNITS

Note: Transmitting frequencies below 118.0 mc are not guarded; others listed plus 3023.5 kc are guarded unless otherwise shown under Remarks. Frequency 122.5 mc is guarded unless 122.4 mc, 122.6 mc or 122.7 mc is shown. (Guarding frequencies not applicable to ARSR facilities.) Emergency frequency 121.5 mc transmits and guards at all locations.

Location	Radar Facils	Transmitting Frequencies and Remarks (☞)
Washington, D.C. (Bedford, Va.)	ARSR & BCN	126.4, 127.6, 128.6, 269.2, 353.9, 380.3.
Washington, D.C. (Benson, N.C.)	ARSR & BCN	127.1, 128.05, 132.4, 385.5.
Washington (Chantilly Va.) Dulles Intl Arpt., D.C.	ASR & BCN	239; 108.7, 109.3, 119.7, 125.0, 126.1, 127.4, 127.9, 243.0, 322.5, 343.9, 350.2, 379.9.
Charleston, Kanawha Co. Arpt., W.Va.	ASR	227; 110.8, 119.8, 120.3, 124.1, 126.3, 243.0, 257.8, 354.0.
Washington, D.C.	ARSR & BCN	118.6, 119.4, 121.0, 123.9, 124.0, 124.7, 125.2, 125.8, 128.6, 133.55, 270.6, 285.4, 290.3, 317.4, 323.2, 327.0, 348.7, 353.6, 363.0, 380.3. ☞ Call Washington Center.
Washington National Arpt., D.C.	ASR PAR & BCN	224; 109.9, 118.1, 118.3, 119.1, 119.3, 120.1, 120.8, 126.55, 127.0, 134.1, 137.65, 142.74, 243.0, 257.6, 269.0, 269.6, 274.3, 294.5, 306.3, 307.0, 322.3, 338.2, 343.7, 363.6. ☞ Rnwy 36, ASR apchs not authorized.
Cincinnati, Greater Cincinnati Arpt., Ohio	ASR	109.9, 118.9, 118.3, 119.7, 121.0, 124.7, 126.2, 243.0, 257.8, 350.2. ☞ Gds 122.7 mc

INSTRUMENT LANDING SYSTEMS

Location	Localizer Freq (mc)	Localizer Ident	Glide slope freq (mc)	Apch brg (deg mag)	MM (alternating · & –) *nmi	LMM freq (kc) ident	OM (continuous dashes) *nmi	LOM freq (kc) ident	Remarks
DISTRICT OF COLUMBIA									
Washington National (rnwy 36) (L7)	109.9	I-DCA	333.8	003	0.6	(224 CA)	4.6		BC unusable.
Washington (Chantilly, Va.) Dulles Intl (rnwy 1R) (L7)	109.3	I-DIA	332.0	006	0.6	239 IA	4.6	346 DI	
Washington (Chantilly, Va.) Dulles Intl (rnwy 19R) (L7)	108.7	I-DLX	330.5	186	0.5	266 LX	3.6		
OHIO									
Cincinnati, Greater Cincinnati (rnwy 36) (L7).	109.9	I-CVG	333.8	360	0.5	209 VG	3.4	287 CV	
WEST VIRGINIA									
Charleston-Kanawha Co. (rnwy 23) (L7)	110.3	I-CRW	335.0	230	0.5	(227 RW)	4.3	303 CR	BC unusable.

AIR NAVIGATION RADIO AIDS

LOCATION	CLASS	IDENT	FREQUENCIES TRANSMITS	FREQUENCIES RECEIVES	REMARKS
DISTRICT OF COLUMBIA					
WASHINGTON	SABH	DC	332 V 243.0 255.4 272.7	(3) –3023.5 req◆	
Washington, Georgetown	MHW	GTN	323		
Washington [1]	L-*BVOR	DCA	111.0		
Washington National	AC(g.7)		224 118.1 118.3 119.1 119.3 120.1 120.8 126.55 127.0 127.7 243.0 257.6 269.0 308.3 307.0 343.1 363.8 322.3	(2) ◆	
Washington National	VHF/DF(twr)			118.1 118.3 119.1 119.3 120.8 122.5 122.7 127.0 134.1 137.65	
Washington (Chantilly, Va) Dulles Intl	C(g)		239 119.7 121.65 125.0 125.55 126.1 127.4 127.9 243.0 264.6 322.5 335.5 343.9 348.6 350.2 354.0 379.9	◆ 122.7	
Washington	Center		See page 50 for center frequencies		
KENTUCKY					
Falmouth [1]	L-BVOR	FLM	109.0	122.1	Cincinnati, Ohio FSS
York [1]	M-VORW	YRK	116.2		
OHIO					
CINCINNATI	SABRAZ	LUK	335 V 243.0 255.4	(3) –3023.5 req◆	47A 122N 224A 296N
Cincinnati [1]	M-*BVORTAC	CVG	112.9		
Cincinnati, Greater Cincinnati	AC(g.7)		317 118.3 119.7 121.0 121.3 124.7 126.2 243.0 257.8 350.3	(1) ◆ 122.7	
Cincinnati, Greater Cincinnati	VHF/DF			118.3 119.7 121.0 121.3 122.7 124.7 126.2	
Cincinnati, Lunken	C(g)		227 118.7 126.2 243.0 257.8	(2) ◆	
VIRGINIA					
Blackford [1]	L-BVOR	BLA	111.6	122.1	Bluefield, W.Va. FSS
BLACKSTONE	BMLZ	BKT	326 V 243.0 255.4 272.7	(3) –3023.5 ◆	64A 178N 272A 358N
Brooke [1]	L-BVORTAC	BRV	111.8		Wash., D.C. FSS
Cape Charles [1]	M-BVORTAC	CCV	112.2	122.1	Newport News FSS
Casanova [1]	L-BVORTAC	CSN	109.6	122.1	Wash., D.C. FSS
Chantilly, Dulles Intl					See Washington, D.C.
CHARLOTTESVILLE		CHO	V 243.0 255.4 272.7	(3) –3023.5 req◆	
Clifdale [1]	L-BVOR	CLD	116.0		Roanoke FSS
Cloverdale	MHW	CLV	359		
Dahlgren NAF	CM		375	(1)	
DANVILLE [1]	L-BVOR	DAN	111.0 V 243.0 255.4 272.7	(3) –3023.5 req◆	
Eclipse (N)	HW	NGU	209		
Flat Rock [1]	H-BVORTAC	FAK	112.4	122.1	Richmond FSS
Fentress ALF	MHW	NTU	356		
Fort Eustis, Felker AAF	MH	FAF	226		
Franklin [1]	L-BVOR-DME	FKN	110.6	122.1	Newport News FSS
Front Royal [1]	M-BVOR	FRR	113.5	122.1	Martinsburg, W.Va. FSS
Gordonsville [1]	H-BVORTAC	GVE	115.3 V–122.2 243.0 255.4	(3) –3023.5 ◆	
Harcum [1]	L-BVOR	HCM	108.8		Charlottesville FSS
Herndon [1]	M-*BVORTAC	HRN	116.3		Newport News FSS
Hopewell [1]	M-BVORTAC	HPW	117.3		Wash. D.C. FSS
					Richmond FSS

Air Navigation Aids (Continued)

AIR NAVIGATION RADIO AIDS—*Continued*

LOCATION	CLASS	IDENT	FREQUENCIES		REMARKS
			TRANSMITS	RECEIVES	
VIRGINIA—*Continued*					
Lawrenceville [1]	M-BVOR	LVL	112.9		Blackstone FSS
Leslie	MHW	LLE	335		
Linden [1]	M-BVORTAC	LDN	114.3		Wash., D.C. FSS
Lynchburg [1]	L-BVORTAC	LYH	109.2		Roanoke FSS
Lynchburg, Preston Glenn	AC(g)		287 118.0 120.7 243.0 257.8	(2) ◆	
Manakin	MHW	MNV	341		
Montebello [1]	M-BVOR	MOL	112.6	122.1	Charlottesville FSS
NEWPORT NEWS		PHF	V 243.0 255.4 272.7	(3) —3023.5 ◆	
Newport News, Patrick Henry	C(g)		317 118.7 243.0 257.8 348.6	(1) ◆ 122.7	Newport News FSS
Norfolk [1]	M-BVORTAC	ORF	116.8		
Norfolk Mun	AC(g)		388 121.1 257.8 348.6	(2) —3023.5 ◆	
Norfolk	Center		See page 50 for center frequencies		
Norfolk	VHF/DF			118.5 118.9 120.3 121.1 122.1 122.5 124.1 124.9 125.7 126.8 132.0	
Norfolk, Chambers Fld (N)	SMRLZ	NGU	269 126.2 142.02 142.74 243.0 340.2 360.2 346.8 352.4 384.4	◆	7A 97N 187A 277N
Oceana NAS	M-VOR	NTU	114.9		
Pulaski	SBMRAZ	PK	272 V—122.2 255.4	◆ 122.1	68A 160N 253A 340N Bluefield, W.Va. FSS
Pulaski [1]	M-BVOR	PSK	117.7		21A 111N 201A 291N
Quantico MCAS	MRLZ	NYG	251 135.9 243.0 255.4	(1) ◆	
Quantico MCAS	CM		203	(1)	38A 124N 196A 303N
RICHMOND	SBRAZ	RC	260 V 243.0 255.4 272.7	(3) —3023.5 ◆	
Richmond [1]	M-BVOR	RIC	114.1		
Richmond, Byrd Fld	AC(g)		201 118.2 119.0 119.5 119.9 126.2 257.8 307.2 348.6 381.5	(2) ◆ 243.0 257.8 305.4 348.6 381.5	
Richmond, Byrd Fld	UHF/DF				
ROANOKE (AB 0500–2200)	SABH	ROA	371 V 255.4 272.7	(3) —3023.5 req◆	
Roanoke [1]	L-BVORTAC	ROA	111.4		
Roanoke Mun (Woodrum Fld)	AC(g)		278 118.3 120.7 126.0 126.9 243.0 257.8 317.6 278.3	(2) —3023.5 req◆	
Roanoke, Woodrum [4]	L-VOR	ODR	109.0		Roanoke Apch Ctl
South Boston [1]	L-BVOR	SBV	110.4		Danville FSS
Springfield	MHW	SRI	353		
WEST VIRGINIA					
Beckley [1]	L-BVOR	BKW	109.8		Charleston FSS
BLUEFIELD (AAS) [1]	M-BVOR	BLF	113.3 V—135.9 243.0 255.4 272.7	◆ 122.1	
CHARLESTON [1]	M-BVORTAC	CRW	115.4 243.0 255.4 272.7	(3) —3023.5 req◆	
Charleston, Kanawha Co	AC(g)		227 119.8 123.3 124.1 126.2 243.0 257.8 348.6 354.0	(2) ◆	
Charleston, Kanawha Co	VHF/DF			119.8 120.3 122.5 124.1 126.2	
Clarksburg [1]	L-BVOR	CKB	115.1	122.3	Morgantown FSS
ELKINS	SBMRAZ	EN	245 V 243.0 255.4	(3) —3023.5 req◆	83A 174N 270A 354N
Elkins [1]	M-BVORTAC	EKN	114.5		
Henderson [1] [2]	L-BVORTAC	HNN	111.2	122.1	Huntington FSS
HUNTINGTON	BH	HTW	323 V 243.0 255.4	(3) —3023.5 req◆	
Huntington, Tri-State	AC(g)		253 118.5 120.9 243.0 257.8 307.0 348.6	(2) ◆	
Kessel [3]	L-VORW	ESL	110.8		
MARTINSBURG (AAS)	SBMRLZ	MB	209 V 243.0 255.4 272.7	(3) —3023.5 req◆	36A 102N 216A 282N
Martinsburg [1]	M-BVORTAC	MRB	113.8		
Martinsburg Mun	CI(g)		120.5 126.2 236.6 243.0 275.8	122.5 ◆ 236.6 243.0 275.8 305.4	(08-18 Tu-Sun) (0800-1800) Tue-Sun.
Martinsburg ANG	UHF/DF				
MORGANTOWN	SBMRLZ	MG	269 V 243.0 255.4 272.7	(3) —3023.5 req◆	36A 140N 216A 320N
Morgantown [1]	H-BVORTAC	MGW	112.7		
PARKERSBURG [1]	M-BVOR	PKB	114.2 V 243.0 255.4 272.7	(3) —3023.5 req◆	
Parkersburg	BJ		359		
Rainelle [1]	L-BVOR	RNL	108.8		Charleston FSS
WHEELING [1]	M-BVOR	HLG	112.2 V 255.4	(3) —3023.5 req◆	
Wheeling	MHW	HL	263		
Wheeling, Ohio County	CI(g)		284 118.1 243.0 257.8	(2) ◆	
White Sulphur Springs [4]	L-BVOR	SSU	108.4	122.1	Roanoke, Va. FSS

V=122.2, 126.7, 135.9 mc transmitted. ◆=Guards same VHF and UHF freqs facility transmits except 122.2 mc. (1)=3023.5 kc guarded. (2)=3023.5 kc; 122.5 mc. (3)=3023.5 kc; 122.1, 120.7, 135.9 mc, e.g. (3) 135.9 guards every frequency in group (3) except 135.9 mc. (g)=Tower equipped with 121.9 mc or (g.7)=Tower equipped with 121.7 mc for control of ground traffic. EMERGENCY FREQUENCY (121.5 mc) transmits and guards at all FSS, Towers (FAA and Military), Centers and DF Stations; this frequency is not tabulated in the list above. *=Automatic voice identification. NOTE: FIRST FREQUENCY LISTED IS THE NAVIGATIONAL AID CHANNEL; OTHERS ARE COMMUNICATIONS CHANNELS LISTED IN NUMERICAL ORDER WITHOUT REGARD FOR ASSIGNMENT. See Legend Page (Radar/Rdo-1) for VOR Monitoring Classification and Radio Class Designations.

AIR ROUTE TRAFFIC CONTROL CENTER (ARTCC) COMMUNICATIONS

ALL—Normal communications between ARTCC controllers and pilots of IFR aircraft, at all altitudes, will be conducted via direct controller-to-pilot communication channels using the appropriate ARTCC **SECTOR** discrete frequency. Pilots will be advised of the frequency to be used and when a frequency change is required.

VHF—Communications between ARTCC controllers and pilots of limited radio equipped aircraft (either civil or military VHF only) that do not have in-flight tuning capability will be conducted on the ARTCC **AREA** discrete (CAD) frequency, or by relay through the flight service station (FSS).

The VHF CAD frequency is normally available to and shared by all nonradar equipped sectors (low and intermediate altitudes—below 24,000) in each ARTCC. The use of radar in air traffic control requires the capability of instantaneous interference free controller-to-pilot communications since radar separation minima may be used; therefore, radar equipped sectors used to control IFR traffic operating below 24,000 feet are provided discrete frequency assignments with normal 100 kc channel protection in the 118.0-137.0 mc band and VHF CAD frequency/communications capability is not provided at these sectors.

Communications with limited equipped aircraft operating at FL 240 and above will be handled by relay through the FSS, or as directed by ATC.

UHF—Communications between ARTCC controllers and pilots of military aircraft that do not have in-flight tuning capability will be conducted by relay through the FSS, or as directed by ATC.

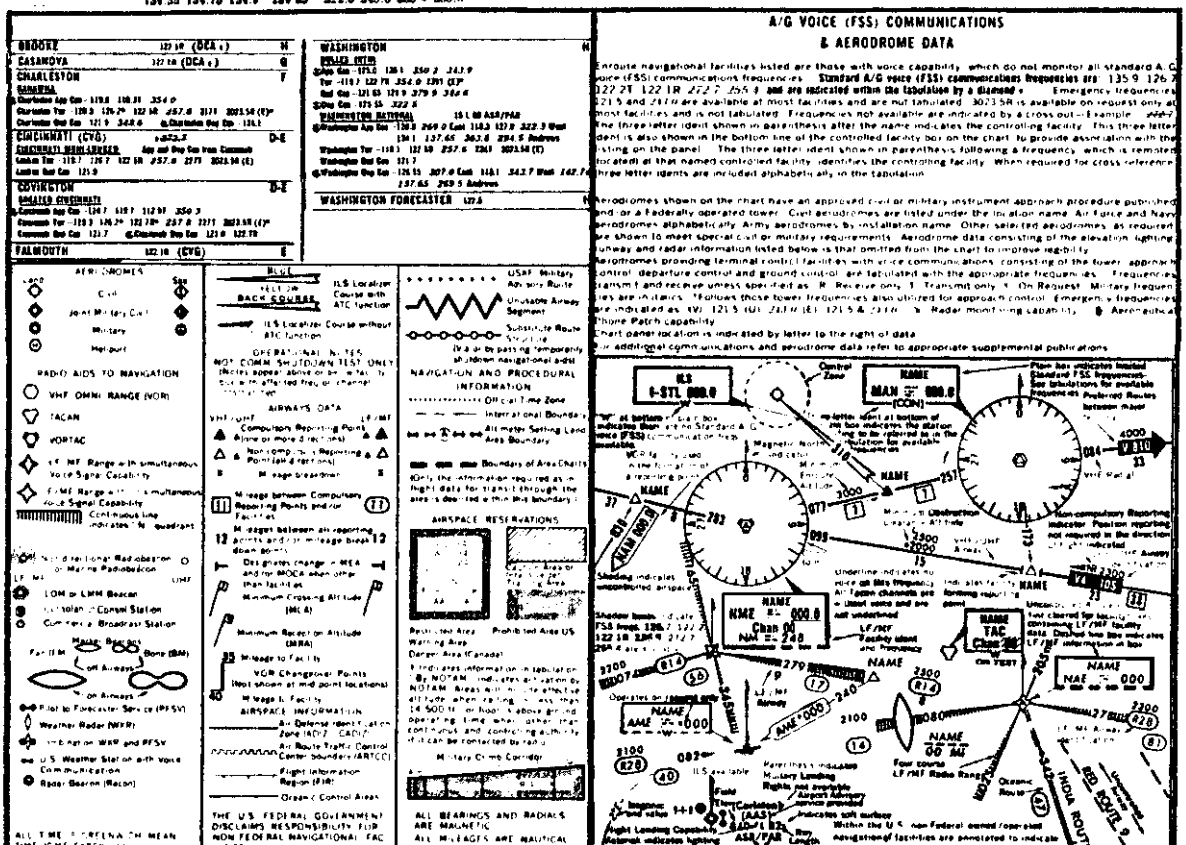
EMERGENCY FREQUENCIES—Direct controller-to-pilot communications capability on the emergency frequencies 121.5/243.0 mc is limited to the area (dependent upon the location/altitude of the aircraft) within the vicinity of the ARTC Center since these frequencies are installed for Center use at the local ARTC Center transmitting/receiving site only.

MISC—Communication frequency information for use above FL 240 can also be found on the high-altitude charts.

Air Traffic Control Communications Information and Procedures are contained in the **FAA FLIGHT INFORMATION MANUAL** and the **USAF/USN FLIGHT PLANNING DOCUMENT.**

Center Name	Center SECTOR Discrete Frequencies VHF (Low)				UHF (Low)				Center AREA Discrete Frequency
●INDIAN-APOLIS	118.8	120.1	123.6	124.2	269.0	269.4	269.6	281.4	124.0
	124.4	124.8	125.4	126.0	285.4	290.4	290.6	306.2	
	126.2	127.0	127.1	127.4	307.1	310.2	319.8	335.6	
	127.75	128.15	128.3	128.4	351.8	352.0	353.5	353.7	
	128.85	134.8	132.4	133.1	360.6	363.0	365.2	380.2	
	135.7	135.8			381.8				
	VHF (High)				UHF (High)				
	132.7	133.05	133.45	133.75	278.3	290.3	291.7	307.9	
	134.35	134.75	134.9	136.05	322.6	343.6	385.4	385.6	

Center Name	Center SECTOR Discrete Frequencies VHF (Low)				UHF (Low)				Center AREA Discrete Frequency
WASHINGTON	118.6	119.4	121.0	123.9	269.2	285.4	290.3	290.5	124.8
	124.0	124.7	125.2	125.8	317.4	317.7	323.2	327.0	
	126.4	127.1	127.6	128.05	348.7	353.8	353.9	360.9	
	128.5	128.6	132.15	132.4	385.4	385.5			
	135.5								
	VHF (High)				UHF (High)				
	127.25	133.0	132.65	133.65	293.1	379.6	385.5	351.9	
	133.85				352.0	363.0	380.2		



Enroute Chart Legend

NOTAMS (Notices to Airmen)

NOTE: Data printed entirely in bold-face type is considered permanent and usually will be cited only once; such data should be noted on charts and records. However, permanent airport items are normally cited twice and *permanent obstructions over 500' AGL are carried until they are depicted on* the appropriate aeronautical charts. Temporary data is continuously cited until the condition is no longer in effect. Radio facility restrictions are cited until cancelled by the associated station.

NOTE: Data is arranged in alphabetical order by State (and within the State by City or locality), except that Special Notices will precede regular listings. Where the City or locality name forms part of the facility name, the former is not repeated.

NEW OR REVISED DATA: New or revised data are indicated by underlining the first line of the affected item. The new information is not necessarily limited to the underlined portion, which is used only to attract attention to the new insert.

DISTRICT OF COLUMBIA

WASHINGTON AREA—SPECIAL NOTICE: Aircraft operating VFR be alert for all types of traffic from Washington National, Andrews AFB, Hyde Field, Rose Valley, and Washington-Virginia Airport. All acft flying in VFR conditions, departing or arriving Washington National, are requested to remain well clear of the Andrews AFB ctl zone. **Caution:** Jet dptrs from Andrews AFB make their climb out on the 007° radial of the Andrews omni, the 215° radial of the Baltimore VORTAC and the 187° radial of the Andrews omni. Jet apchs into Andrews AFB start their penetration 30 nmi S of Andrews AFB on the 187° radial of Andrews omni crossing the Andrews L/MF on *final at 2500' or below. Jet approaches into Andrews AFB start their* penetration on the Herndon VORTAC 097° radial to intercept the 007° radial of Andrews omni crossing the 334° radial of Andrews omni at or above 6000'.

WASHINGTON ARTCC: Cntr area discrete freq 124.5 and low alt freqs 128.15, 132.15, 135.5 mc comand Norfolk, Va. peripheral site.

WASHINGTON ARTCC: Radar services will be provided UHF equipped acft on arr freqs 363.6, 323.2, 317.4, 290.3 mc. Dptr freqs 348.7, 327.0, 285.4 mc. ARSR and BCN will be shut down due cntr relctn. Soon, low and intermediate alt radar and BCN service in South Boston/Roanoke Area will be unavbl indefinitely. Hi alt freqs 132.55, 279.6 mc inop. About Jun 30, cntr *will assume ctl of Norfolk, Va. ARTCC on flwg low alt freqs 119.6, 120.3,* 124.1, 124.9, 269.4, 291.6, 323.0, 354.1 mc.

WASHINGTON (CHANTILLY, VA.) DULLES INTL ARPT SPECIAL NOTICE: Proc. No. ILS-19R, amdt 3, efctv 11 May 1963. RVR not commissioned rnwy 19, basic minimums remain in effect.

WASHINGTON, DULLES INTL ARPT: Rnwys 1L-19R and 1R-19L have ontriline rnwy lgtg and narrow gauge touchdown lgtg both ends.

WASHINGTON (CHANTILLY, VA.) DULLES INTL ARPT: General Aviation Acft services lmtd due to constr, daigt hrs only unless prior arrangements Civil acft parking and servicing NE of trml bldg.

WASHINGTON (CHANTILLY, VA.) DULLES INTL ARPT TWR: PAR operg training status indefinitely

WASHINGTON, MT VERNON SPECIAL NOTICE: Low flying acft requested to avoid immediate vcnty Mt. Vernon estate lctd W bank Potomac River 10 mi S Washington Natl Arpt.

WASHINGTON NATL ARPT SPECIAL NOTICE: ADF Proc. No. 2, amdt. 7, efctv 20 Sept 1962, ADF-3, amdt. 9, efctv 19 Jan 1963 and TVOR-15, amdt. 9, efctv 9 Mar 1963 are amended as follows: SABH Ident DC vice LFR Ident DA. Auto cancellation of this notam will be the efctv date of the revised procedures appearing in the Federal Register.

WASHINGTON-NATIONAL ARPT: Metal blast fence installed 155' from apch end rnwy 15; fence 4' high extending 250' each side of rnwy cntrline. Obstn lgts 100' each side of center of fence.

WASHINGTON-NATIONAL ARPT: Unlgtd acft parked along all sides of trml ramp area. All acft use mrkd txwys only. ILS apch zone for rnwy 36 has obstn lgtd smoke stack protruding 23.3' above 7.1 transitional plane lctd 7710' from apch end of rnwy, 1667' left of cntrline .

WASHINGTON NATL ARPT TWR: ILS glide slope unusable below 200' AGL due roughness. PAR avbl on 15 mins notice during VFR wea conditions.

WASHINGTON RDO: TACAN operg test basis, unmonitored in vcnty Washington Monument. Ident: FAA Channel 17. DCA VOR unusable below 2500' beyond 35 nmi 010-020°; below 1500' beyond 30nmi 060-180°; below 1500' *beyond 35 nmi 180-210°; below 1500' beyond 20 nmi 210-230°;* below 2500' beyond 30 nmi 230-300°; below 2500' beyond 35 nmi 300-340°

KENTUCKY

FORT CAMPBELL SPECIAL NOTICE: Extn Low Level troop carrier acft oper within 75 nmi. Alt: 100-500' AGL. VFR only.

FORT KNOX SPECIAL NOTICE: 12.2 nmi NW (4.3 nmi E Brandenburg, Ky.) plant is processing highly inflammable and explosive compressed gas. Acft warned to avoid flying in this vcnty.

HOPKINSVILLE, FORT CAMPBELL SPECIAL NOTICE: Sport parachute *jumps in progress on wkends, 5 mi SSE of Hopkinsville-Christian Co. Arpt,* VFR, daigt hrs only from 7000'.

LOUISVILLE, BOWMAN FLD SPECIAL NOTICE: VOR procedure No. 1, amdt 3, efctv 12-17-60 is amended as follows: min alt over FM 1500' vice 1200'. If FM not received, C-D 800-1½ all acft. C-N 800-2 all acft; due to water tower in final apch area. Automatic cancellation of this notam will be the efctv date of the revised procedure appearing in the Federal Register.

LOUISVILLE RDO: About Aug 22, Bowman FM ident will be changed to dot dash dot.

LOUISVILLE, STANDIFORD FLD: All indg acft equipped with proper freq may expedite their handling by contacting apch on apch ctl freq regardless of weather.

OHIO

CINCINNATI, GREATER CINCINNATI ARPT: Soon, sequenced flashers *serving rnwy 36 will be extended to 28 white flashing lgts spaced at about* 100' intervals starting at the end of the apch lgtg sys. NE txwy clsd from ramp to diagonal txwy. Rnwy 4-22 open for taxi only except for jets. Caution, entire ramp area, due constr.

CINCINNATI, GREATER CINCINNATI ARPT TWB: May 1, ILS (rnwy 36) lctr and glide slope shut down until aprxly Jun 30 for mod. About Aug 22, Addyston FM ident will be changed to dot dash dot.

CINCINNATI, LUNKEN FLD SPECIAL NOTICE: About June 24 for aprox 10 days the courses of Cincinnati LFR will be unusable due to const in the area. The LFR apch procedure No. 1, Amdt 7, efctv Apr 20, 1962 will revert to an ADF procedure during this period.

CINCINNATI MUN/LUNKEN FLD: Levee constr S and E. New rnwy, txwy and hangar constr N and E.

CINCINNATI MUN, LUNKEN FLD TWR: About Aug 19, LFR courses will be unusable until aprxly Aug 29 due constrn in area.

CINCINNATI RDO: About Jun 24, LFR crse will be unusable until aprxly Jul 2 due constrn in area.

VIRGINIA

LINDEN RDO: TACAN azimuth and DME unusable below 3500' beyond 25 nmi 140-185°; below 5000' 180-225° acct reduced coverage.

WEST VIRGINIA

BECKLEY RDO: VOR unusable beyond 20 nmi 325-350° at 5000' acct extreme rough-ness, excluding 335° rad at Montgomery Int. Voice reception Charleston FSS unreliable below 7500' MSL 40 nmi radius Beckley VOR 030-180°. Reception satisfactory with acft over VOR or MBA.

CHARLESTON, KANAWHA CO ARPT: Air National Guard facilities and servicing avbl only 1300-2100Z Tues-Sat, clsd Sun and Mon; no tie-down or over-ngt parking. Rotating beam ceilometer installed on ridge aprxly 4500' from apch end rnwy 23. ILS apch zone for rnwy 23 has unlgtd trees above the 50:1 and 40:1 slope. Max penetration of 105' above the 40:1 slope lctd 10,600' to 11,500' from the end of rnwy 900' to 2000' rgt cntrline. *Lesser penetration of 65' above 50:1 slope lctd 3920' to 5260' from end of* rnwy 500' left to 700' rgt cntrline. Other penetration above 50:1 slope are obstn lgtd pole 4360' from end rnwy 110' left cntrline. Hills 3980 to 5160' from end rnwy 200' left to 360' rgt cntrline. Trees 6200 to 6500' from end rnwy 800 to 1140' left cntrline. Txwy B clsd to air carriers from ramp SE to first turnoff.

CLARKSBURG, BENEDUM ARPT: Use caution, constr in progress.

ELKINS RDO: LRCO comand. Rcvg 122.1 mc. Rcvd too late for inclusion ANRA page.

GLENDALE ARPT SPECIAL NOTICE: 740' (2025' MSL) lgtd twr erected 6.5 nmi N (360°T) at lat 40°03'41", long 80°43'03".

MARTINSBURG MUN ARPT: *8-inch lip on concrete threshold* lgt bases, both ends rnwy 17-35.

MARTINSBURG MUN ARPT TWR: Obstn lgtd GCA unit lctd aprxly 1260' W side cntr txwy and 400' S cntrline rnwy 08-26. 700' W cntrline rnwy 17-35.

MARTINSBURG RDO: VOR has occasional rapid course deflections of short duration.

MORGANTOWN MUN ARPT: Large hangar 35' high tmprly lctd 280' from E edge of rnwy. Hangar properly identified at ngt by obstn lgts. Caution, brick bldg tmprly lctd W edge of txwy N of trml bldg. Rnwy 11-29 permly clsd used as txwy only. N/S txwy clsd ngts. All acft restricted to paved surfaces, constr in progress.

PARKERSBURG RDO: DME operg test basis; channel 89. About Aug 22, FM ident will be changed to dot dash dot.

PENCE SPRINGS, HINTON-ALDERSON ARPT: Clsd.

WELCH MUN ARPT: Men, eqpmt off W end rnwy 9-27 removing dirt in preparation for future rnwy extension.

WHEELING-OHIO CO ARPT: Turf areas aprxly 100 x 150' on W sides of rnwys 3 and 34 at apch end of each rnwy to be used as warm-up pads and holding areas for light single-eng and twin-eng acft.

WHEELING, OHIO CO ARPT TWR: ILS glide slope unusable MM to end of rnwy due roughness.

WINFIELD, CLARK FLD: New arpt lctd 6 mi SE at lat 38°27'30", long 81°49'45". Elev: 600'. *Rnwy 2560' sod. Fuel, oil, maintenance acft storage,* land and seaplane rentals, boat dock and boat storage. Soft and rough.

DIRECTORY OF AIRPORTS—LEGEND

CITY AND AIRPORT NAME

City or Airport Name followed by :

(AF)—A civil airport with Air Force operations, reserve training, or other such activity thereon.

NOTE : Similar combinations of above citation of A, AFRes, ANG, CG, MC, N and NG indicate the same is applicable for Army, Air Force Reserve, Air National Guard, Coast Guard, Marine Corp, Navy and National Guard (Army) respectively.

(P)—A civil airport covered by an agreement between municipality and U.S. Government which permits use by transient military aircraft.

NOTES

1. Where lights are owned or maintained by FAA the site number and airway abbreviation are included in the city and airport name column, i.e. : Chadron, 15, CYS–HON.
2. USAF aircraft are permitted to use only those fields with AF, AFRes, A, ANG, CG, MC, N, NG, P, after the airport name.
3. When city and airport name is capitalized it indicates a Scheduled Airline Stop, i.e.: MOBILE, BATES FLD.
4. When city and airport names are identical, the airport name is omitted to conserve space.
5. When city is part of airport name, a dash will appear between city and airport, such as Venice-State.
6. Clearance is required prior to taxiing on a runway, taking off, or landing at a tower controlled airport.
7. When operating at an airport where the control tower is operated by the U.S. Government, two-way radio communication is required unless otherwise authorized by the tower. (When the tower is operated by someone other than the U.S. Government, two-way radio communication is required if the aircraft has the necessary equipment.)
8. When operating at an airport which is not tower controlled but at which a Flight Service Station (FSS) is located, two-way radio communication with the FSS is required when the aircraft has the necessary radio equipment. If the aircraft has receiver only, the pilot must maintain a listening watch on the appropriate frequency. These requirements are for the purpose of receiving Airport Advisory Service (AAS) and apply only when the "FSS" is indicated on the current sectional chart.
9. Only those airports which are open to the general public are listed in the Directory of Airports.
10. The Federal Government disclaims responsibility for non-Federal airports.
11. OBSTRUCTIONS: Because of space limitations only the more dangerous obstructions are indicated. Natural obstructions, like trees, for example, clearly discernible for contact operations, are frequently omitted. On the other hand, all pole lines within at least 15:1 glide angle are indicated.

LOCATION

Location is given in statute miles (rounded off to nearest mile) and/or direction from the center of referenced city, this is followed by geographical position to the nearest minute. The word "miles" has been eliminated due to space limitations.

If orientation features are less than ½ mile from the field, distance is not specified.

ELEVATION

Elevation is given in feet above mean sea level and is based on highest usable portion of landing area.

LONGEST RUNWAY AND FACILITIES

In this column are included the length and surfacing of the longest useable landing runway, the lighting and servicing facilities, weather reports and unicom available.

RUNWAYS

The length of the longest paved runway or non-paved strip is stated in *hundreds of feet*, using 70 as division point. If the length is not prefixed, the surface is sod, clay, gravel, etc.

h —runway is paved (concrete, asphalt or similar type of paving)

aw—allway field.

LIGHTS

B: Rotating Light (Rotating beacon)

(Green and white, split-beam and other types.) Omission of B indicates rotating light is either not available or not operating standard hours (sunset-sunrise).

NOTE: Code lights are not codified, and are carried in Remarks Column.

L: Field Lighting (when code L4–7 is indicated, lighting 4, 5, 6, 7 is available).

*An asterisk preceding an element indicates that it operates on *prior request only* (by phone call, telegram or letter). Where the asterisk is not shown, the lights are in operation or available sunset to sunrise by request (circling the field or radio call).

L—by itself indicates temporary lighting, such as flares, smudge pots, lanterns.

1—Portable lights (Electrical)

2—Boundary

3—Runway floods

4—Runway or Strip

5—Instrument approach (neon)

6—High intensity runway

7 or 7a—High intensity instrument approach

Because the obstructions on virtually all lighted fields are obstruction lighted, obstruction lights have not been included in the codification.

SERVICING

S1: Storage
S2: Storage, minor airframe repairs
S3: Storage, minor airframe and minor powerplant repairs
S4: Storage, major airframe and minor powerplant repairs
S5: Storage, major airframe and major powerplant repairs

WEATHER

W: Weather reports available from Weather Bureau or FAA communications station on field.

UNICOM

Unicom (Aeronautical Advisory Station transmitting and receiving, during the airport hours only, as follows):
U—122.8 mc (for airports *without* a control tower; and
X—123.0 mc (for airports *with* a control tower).

FUEL

Civil Fuel:
F1: 80 oct., at least
F2: 80/87 oct., and lower
F3: 91/96 oct., and lower
F4: 100/130 performance rating, and lower
F5: 115/145 performance rating, and lower
F6: Kerosene

REMARKS

1. "FEE" indicates landing charges for private or non-revenue producing aircraft. In addition, fees may be charged for planes that remain over a couple of hours and buy no services, or at major airline terminals for all aircraft.
2. "Rgt tfc N" indicates right turns should be made on landings and take-offs to N.
3. Limited--intended for private use, but use by public is not prohibited.
4. VASI indicates Visual Approach Slope Indicator available.

DISTRICT OF COLUMBIA

WASHINGTON, DULLES INTL (P)	4NW Chantilly; 38°57′, 77°27′	313	h115-BL6, 7a-S5-W-X	F5, 6	VASI rnwy 12
WASHINGTON-NATIONAL (AF, N)	3S; 38°51′, 77°02′	15	h69-BL6, 7a-S5-W-X	F5, 6	See footnote.

OHIO

CINCINNATI, GREATER CINCINNATI (P)	10SW; 39°03′, 84°40′	890	h86-BL4, 6, 7a-S5-W	F5-6	See footnote.

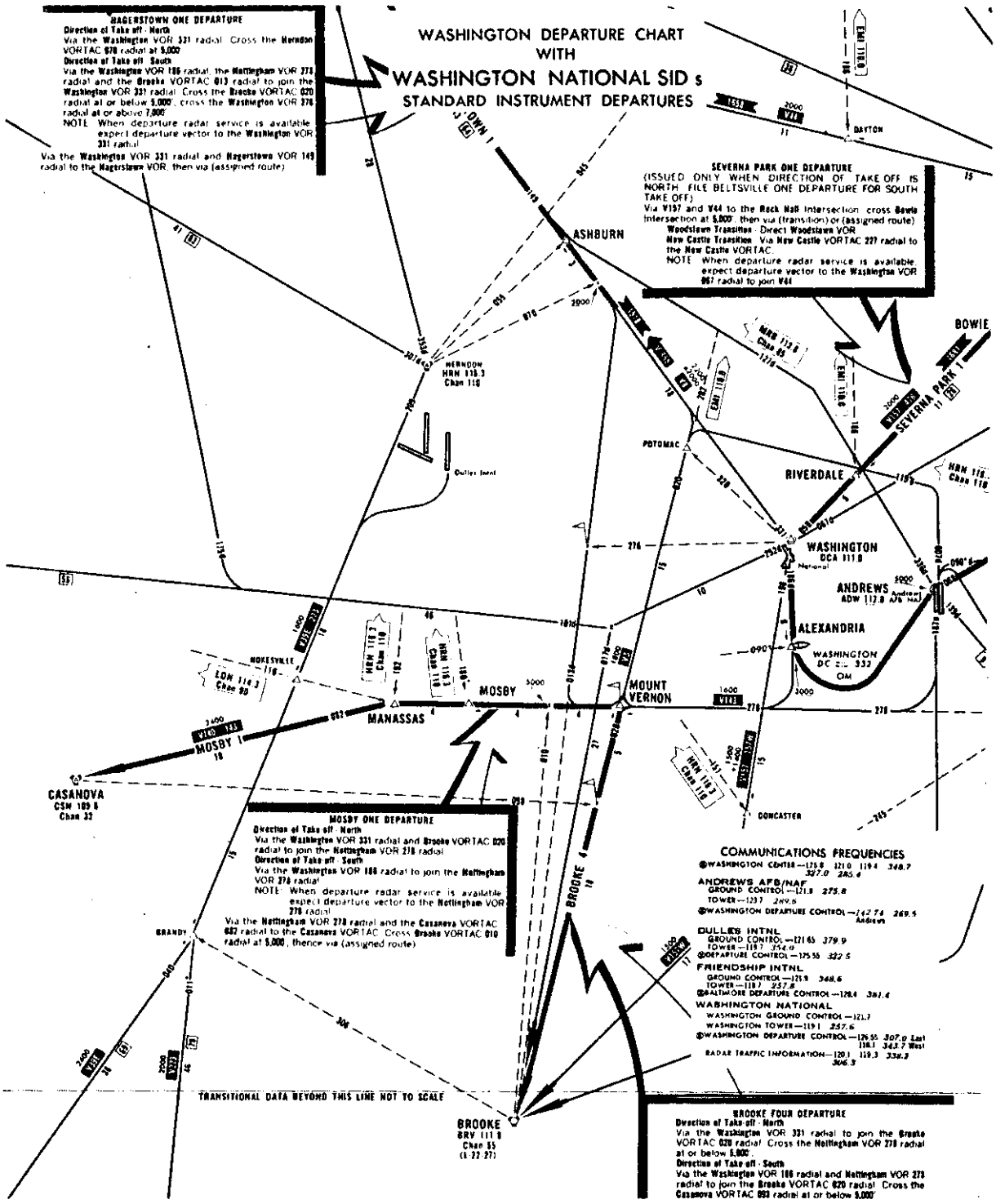
WEST VIRGINIA

CHARLESTON, KANAWHA COUNTY (ANG, NG)	3NE; 38°22′, 81°35	982	h56-BL4-6, 7a-S5-W-X	F4-6	See footnote.

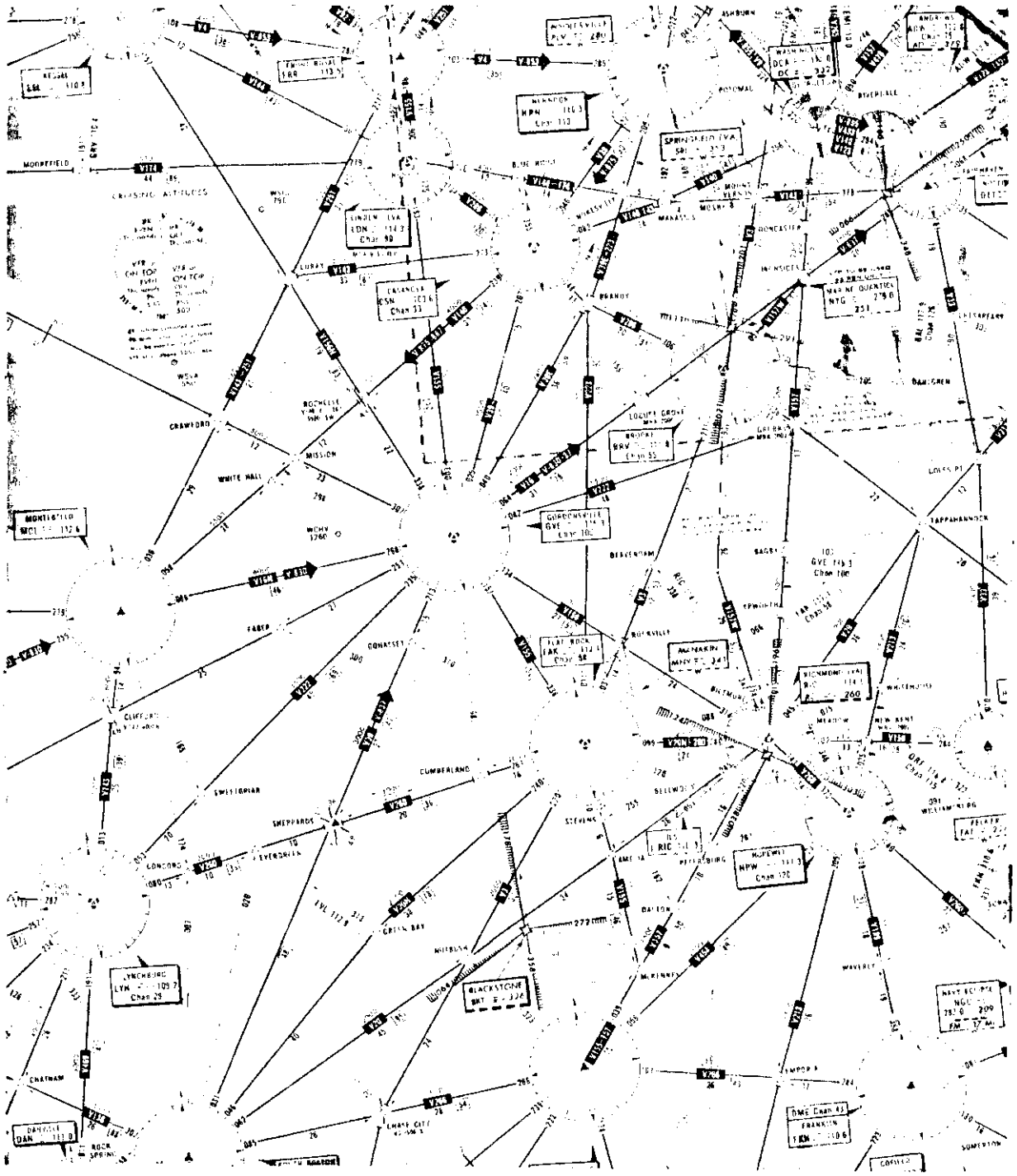
Washington-National (AF, N)—Twr clearance rqrd before entering tfc patn, lndg & tk-off. FOREIGN CLEARANCE BASE. Use paved areas, shoulders soft. Braking action reduced when rnwys are wet. ALL MILITARY SERVICES: Clsd all acft except: (a) acft carrying VIP & officers above rank of Maj Gen or Rear Admiral. (b) Scheduled MATS. (c) Flgt rqrg customs & immigration serv. (d) Navy & CG logistic support flgts. (CG logistic flgts not hangared at WNA req prior approval fr mgr, must be cleared with Comdt CG and will be flown VFR conditions only). No acft over 120,000 lbs w/o prior approval. CG & Navy acft taxi to MATS term N of admin bldg. Lmtd parking, taxiing W of taxiway 6. Taxiing E to taxiway 6 at discretion ctl twr only. All VFR inbnd acft intending to lnd, & who are equipped to do so, are requested to make initial ctc with VFR advisory service on 119.3, 120.1 mc. Twr W of rnwy 18-36 & btn txwys 3 & 4. ASDE lctd 38-50-54, 77-02-05. Space restrictions on limit tie downs for small acft to 30 positions. Pilots may expect no tie downs avbl at increased tfc periods and diversion to an alternate fld of their choice for parking will be required after 30 mins for passenger debarking. Large acft may also expect diversion from time to time for overngt parking.

Cincinnati, Greater Cincinnati (P)—Use runways; caution-due to non-visibility tower unable to determine if following areas are clear of obstructions and/or acft: Ramp areas adj to SE & SW portions of trml bldg, on ramp W of hangar, portions of NW ramp, and holding apron associated with rnwys 18 and 36. After lndg on rnwy in use acft taxi straight ahead to nearest int; no 180° turns prior to rcvg approval from twr; rnwy 13-31 converted to txwy. Flush lgts at green threshold bar, may occasionally be obscured by snow, grime or other foreign materials.

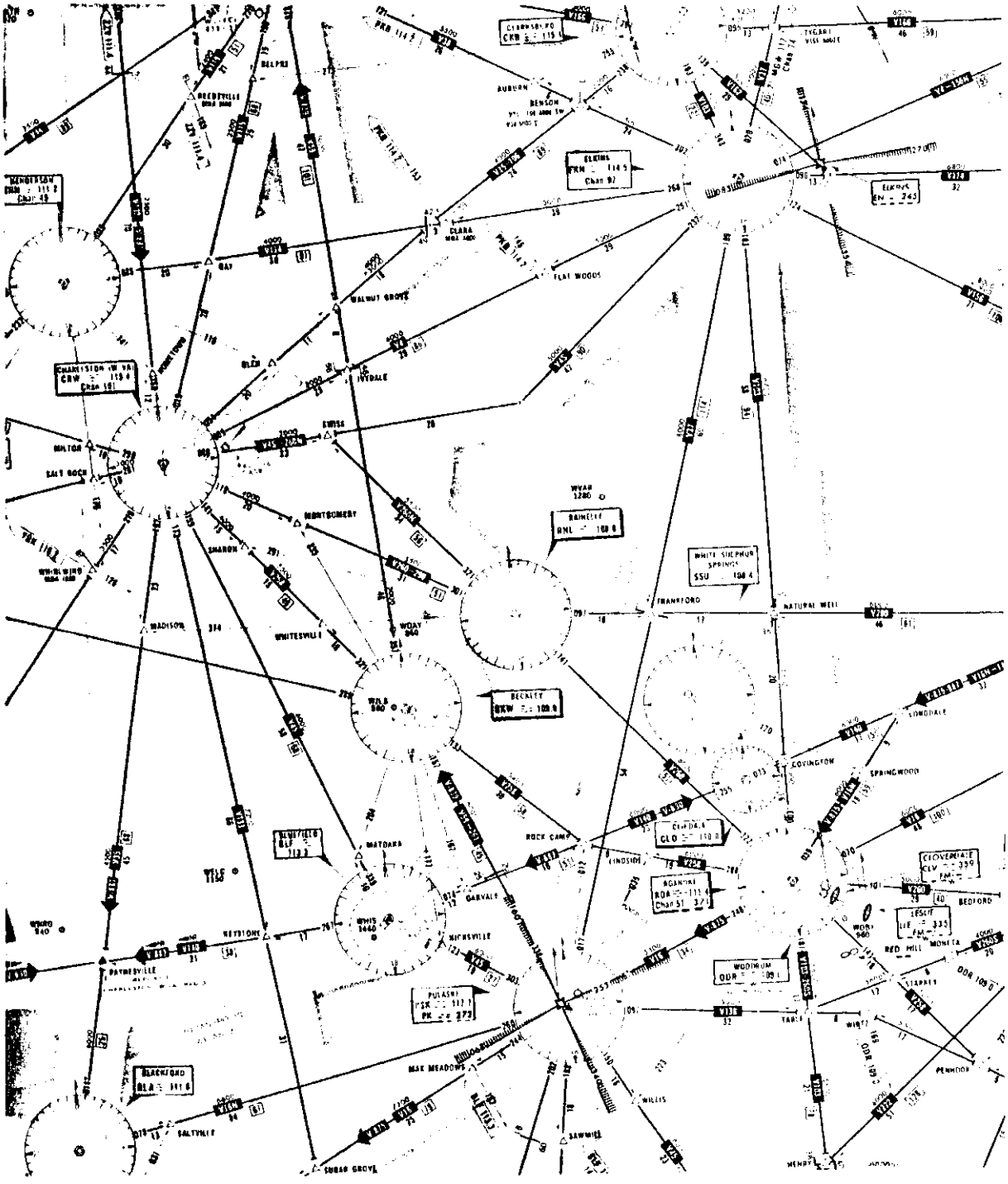
Charleston, Kanawha County (ANG, NG)—ANG transient facs avbl only 1300Z-2100Z Tues thru Sat. Due non-visibility, twr unable to determine if following areas are clear of obstns and/or acft: SE & SW ends of trml ramp and gate areas 2,3,4 All use of these areas is at pilot's discretion. All lndg acft equipped with the proper freq may expedite their handling by ctcg CRW apch ctl on 119.8 or 354.0 mc regardless of wea.



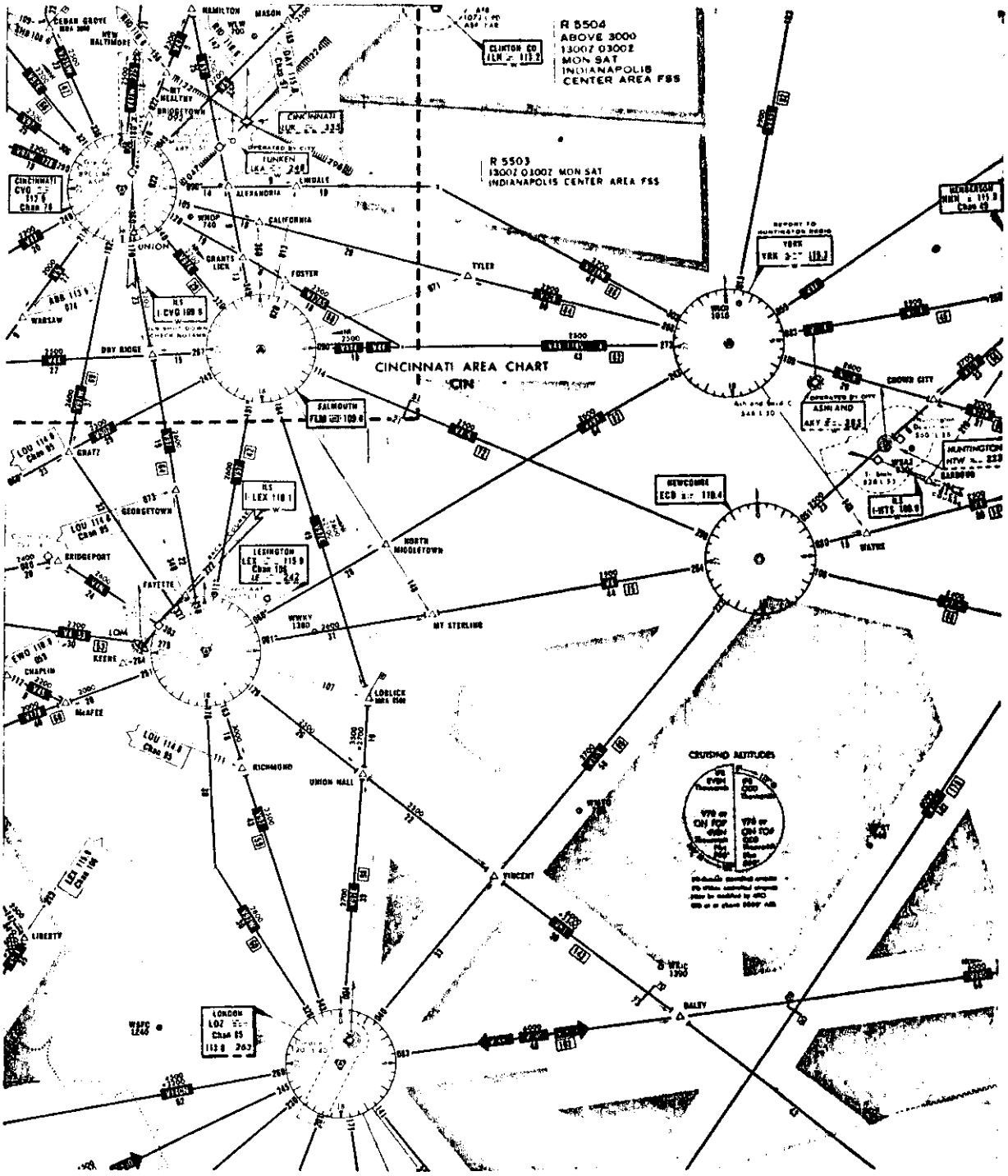
Washington Departure Chart with SIDs



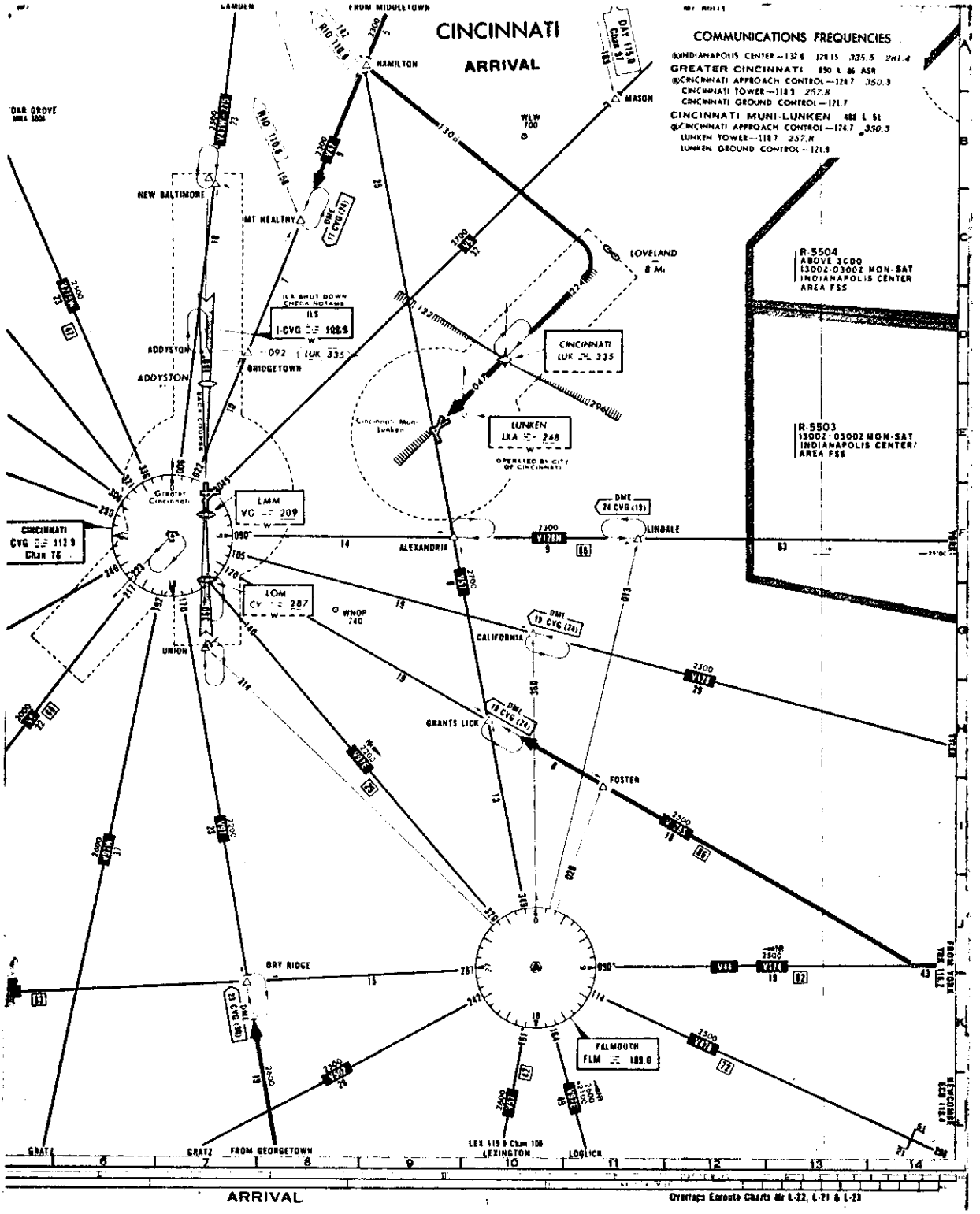
Washington-to-Moorefield Intersection Enroute Chart Segment



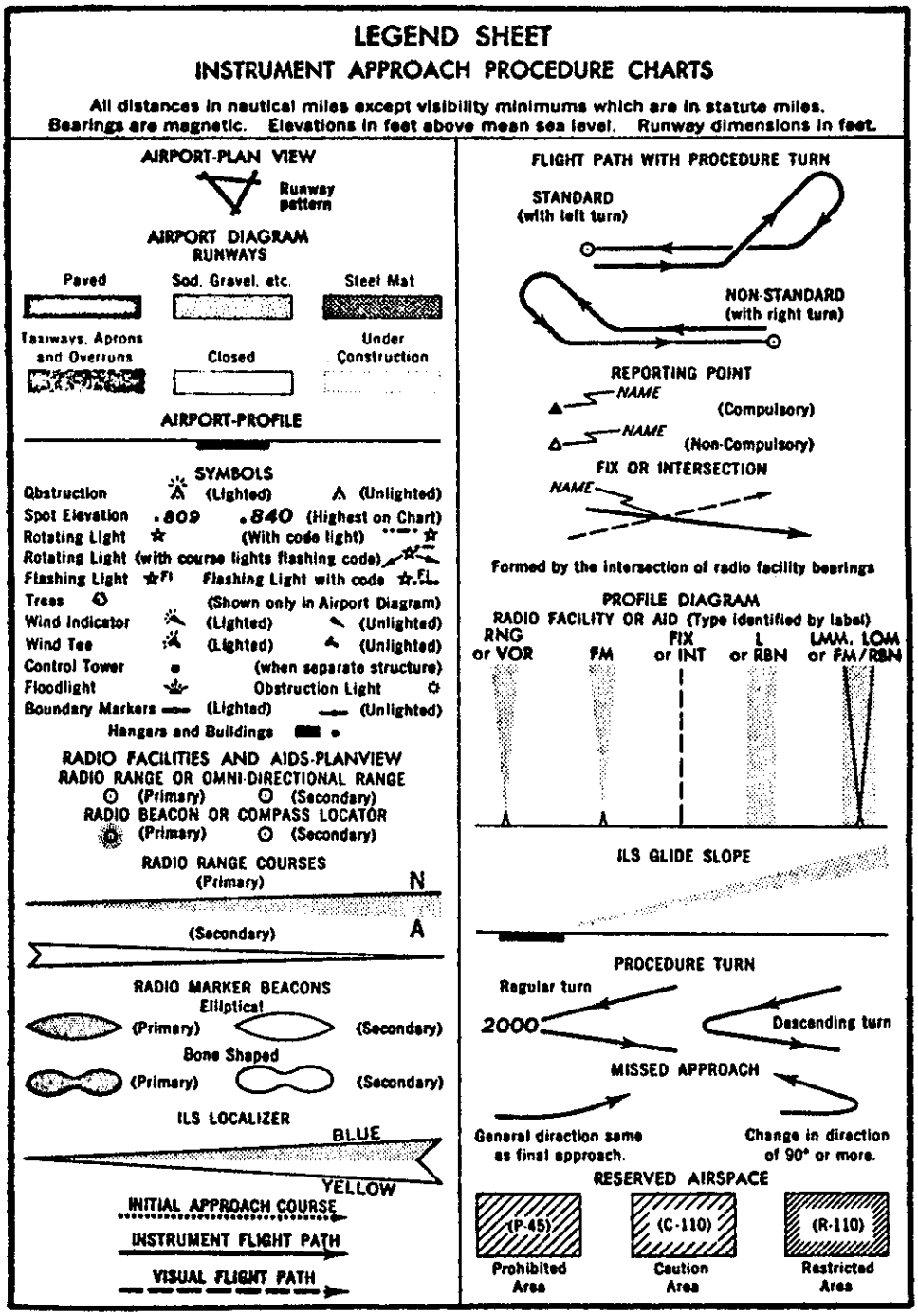
Moorefield-to-Henderson Intersection Enroute Chart Segment



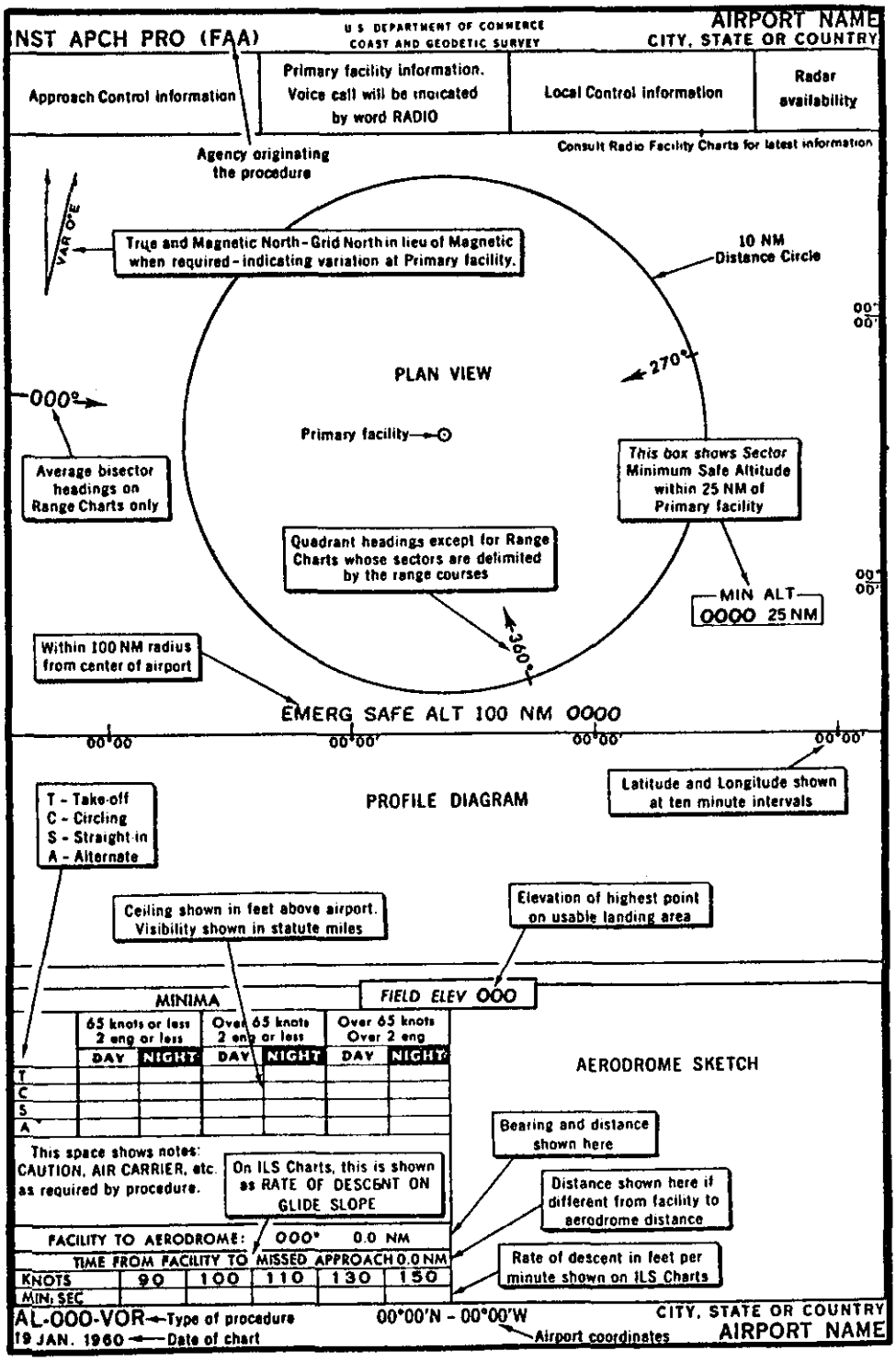
Henderson Intersection to Cincinnati Enroute Chart Segment



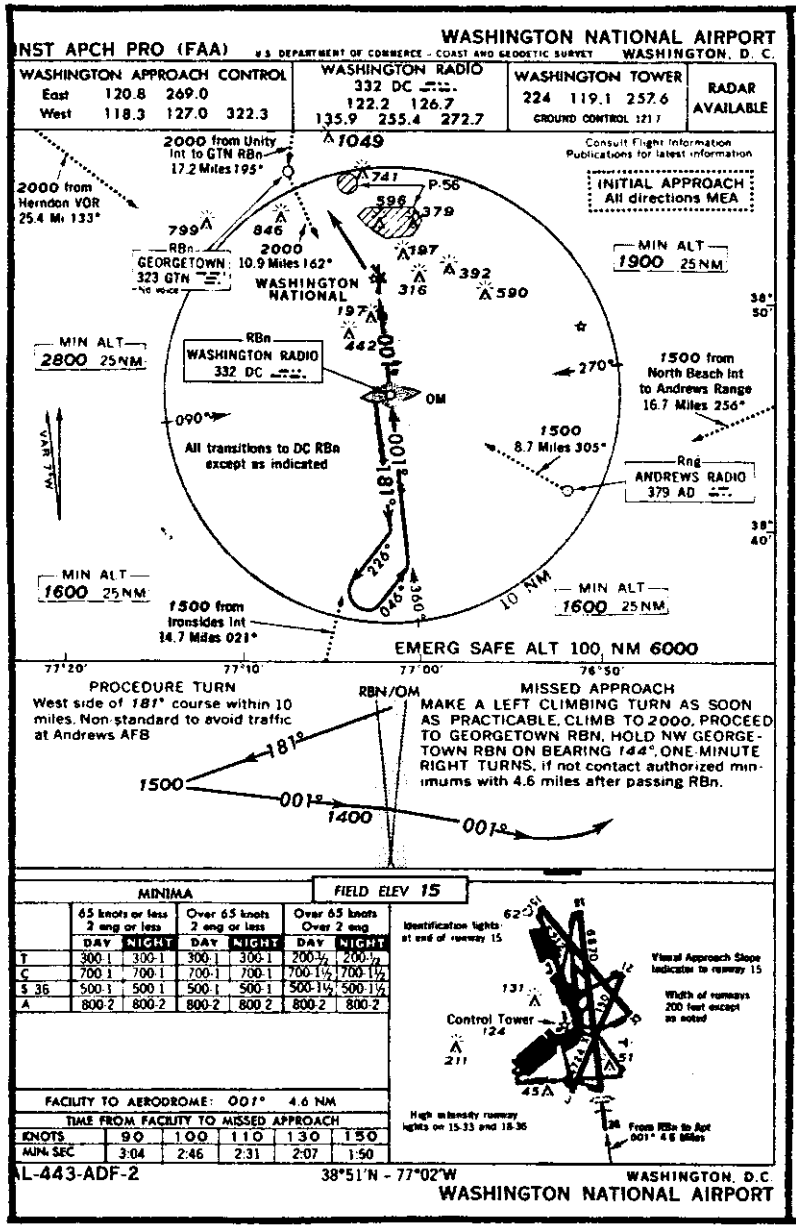
Cincinnati Arrival Chart

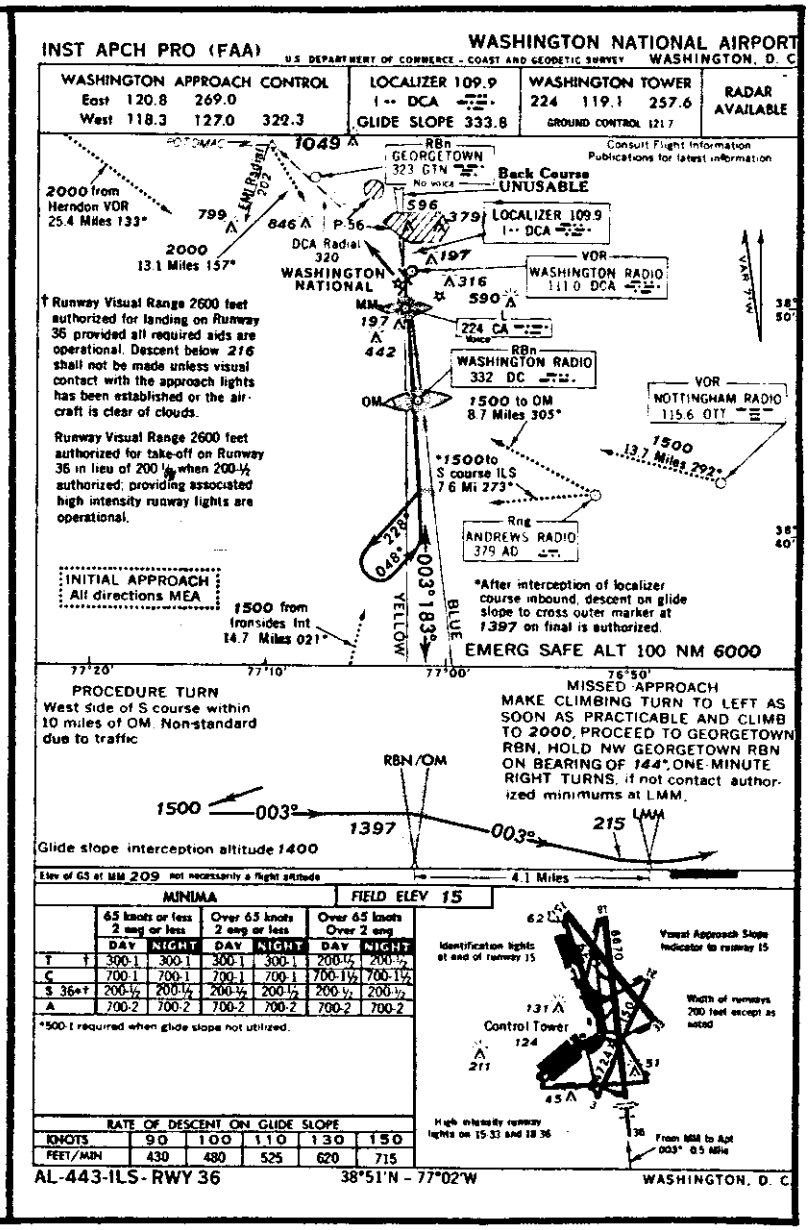


Instrument Approach Procedure Charts Legend Sheet

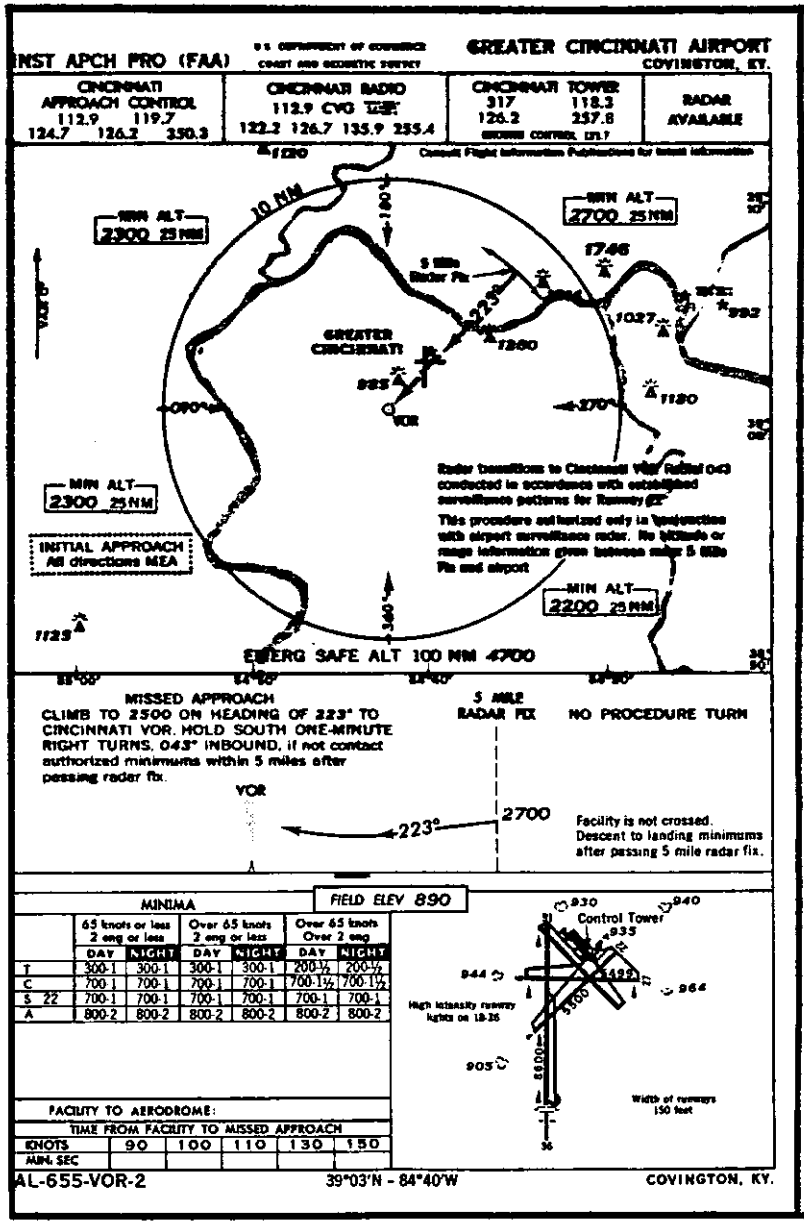


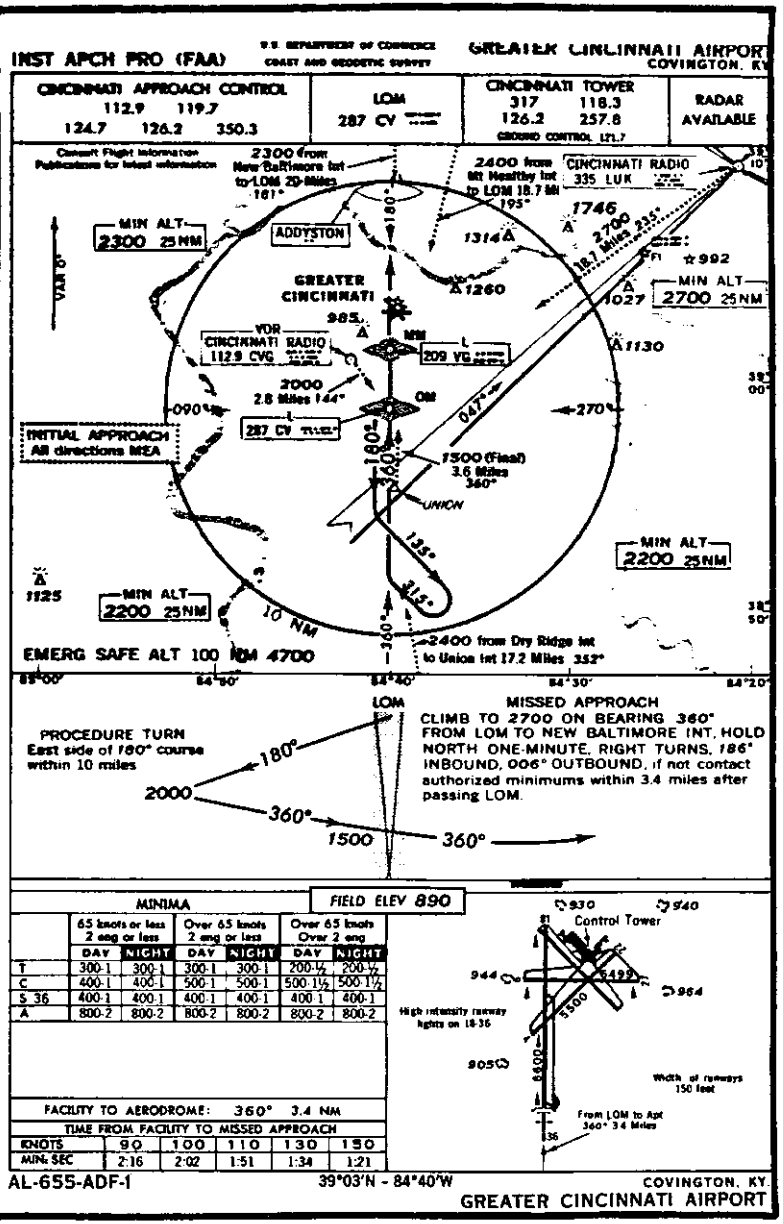
Instrument Approach Procedure Charts Legend Sheet (Continued)



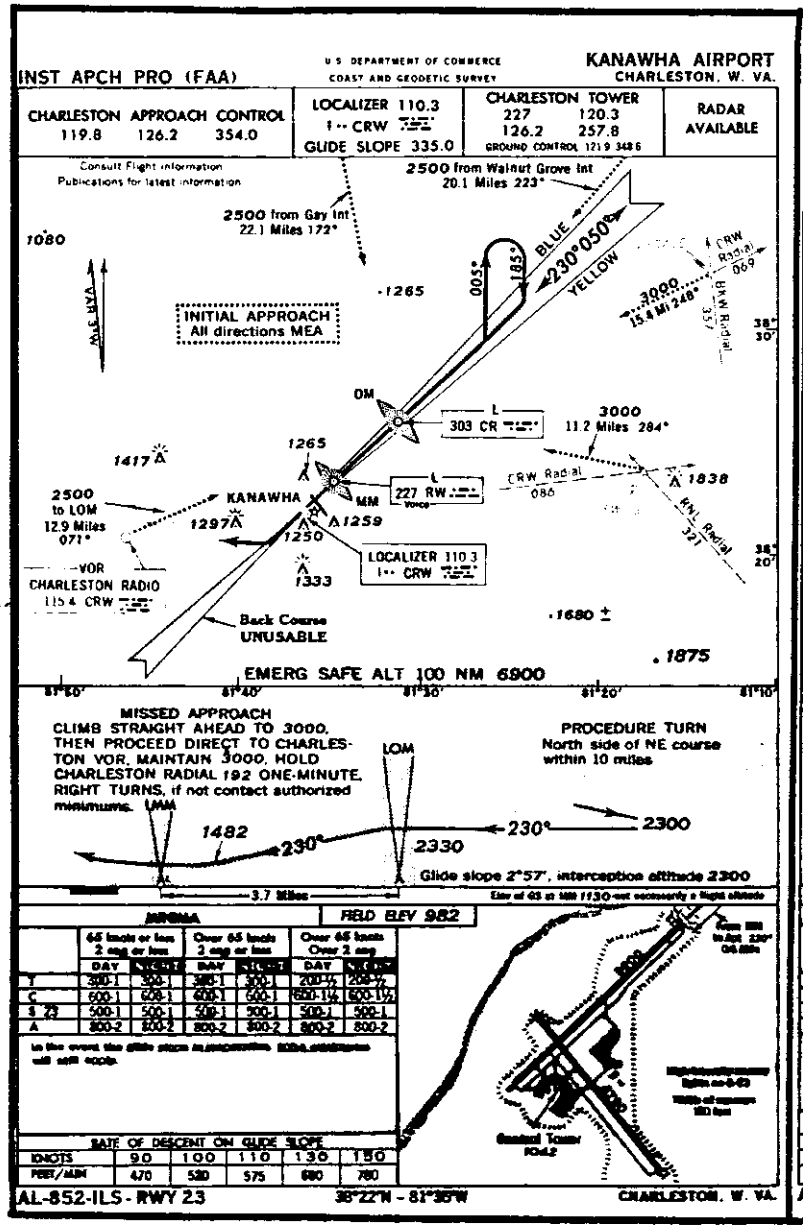


Washington National Airport Approach Charts





Greater Cincinnati Airport Approach Charts



Charleston, W.Va.—Kanawha Airport Approach Charts

Clearance Shorthand

The shorthand system given here is recommended by the Department of Flight Standards at the Federal Aviation Agency Training Center in Oklahoma City, Oklahoma. Applicants for the instrument rating may use *any* shorthand system, in any language, which insures accurate compliance with ATC instructions. No shorthand system is required by regulation and no knowledge of shorthand is required for the written examination; however, because of the vital necessity for safe coordination between the pilot and controller, clearance information receives appropriate stress in this study guide.

You, as an instrument pilot, should make a written record of all ATC clearances and instructions that consist of more than a few words; and any portions that are complex, or about which there is any doubt, should be verified by a repeat back. Safety demands that you receive correctly and do not forget any part of your clearance.

Occasionally ATC will issue a clearance that differs from the original request. In such cases, the pilot must be particularly alert to be sure that he receives and understands the new clearance given.

The following symbols and contractions represent words and phrases frequently used in clearances. Most of them are regularly used by ATC personnel. Learn them along with the location identifiers which you will use.

By using this shorthand, omitting the parenthetical words, you will be able, after some practice, to copy long clearances as fast as they are read.

Words and Phrases	*Shorthand*
ABOVE	ABV
ADVISE	ADV
AFTER (PASSING)	<
AIRPORT	A
ALL TURNS LEFT	↖
(ALTERNATE INSTRUCTIONS)	( )
ALTITUDE 6,000–17,000	60–170
AND	&
APPROACH	AP
FINAL	F
LOW FREQUENCY RANGE	R
OMNI	O
PRECISION	PAR
STRAIGHT-IN	SI
SURVEILLANCE	ASR
APPROACH CONTROL	APC
AT (USUALLY OMITTED)	
(ATC) ADVISES	CA
(ATC) CLEARS OR CLEARED	C
(ATC) REQUESTS	CR
BEARING	BEAR
BEFORE	>
BELOW	BLO
BOUND	B
EASTBOUND, etc	EB
INBOUND	IB
OUTBOUND	OB
CLIMB (TO)	↑
CONTACT	CT
CONTACT DENVER APPROACH CONTROL	DEN
CONTACT DENVER CENTER	(DEN
COURSE	CRS
CROSS	X
CROSS CIVIL AIRWAYS	≠
CRUISE	→
DELAY INDEFINITE	DLI
DEPART	DEP
DESCEND (TO)	↓
DIRECT	DR
EACH	ea
ENTER CONTROL AREA	⩓
EXPECT APPROACH CLEARANCE	EAC
EXPECT FURTHER CLEARANCE	EFC
FAN MARKER	FM
FLIGHT PLANNED ROUTE	FPR
FOR FURTHER CLEARANCE	FFC
FOR FURTHER HEADINGS	FFH
HEADING	HDG
HOLD (DIRECTION)	H-W
IF NOT POSSIBLE	or
INTERSECTION	XN
JOIN CIVIL AIRWAYS	⟹
(ILS) LOCALIZER	L
MAINTAIN OR MAGNETIC	M
(MAINTAIN) VFR CONDITIONS ABOVE:	

Words and Phrases	*Shorthand*
ALL CLOUDS	VFR
ALL HAZE	VFR H
ALL DUST	VFR D
ALL SMOKE	VFR K
ALL FOG	VFR F
NONSTANDARD PATTERN	⊂⊃
OMNI (RANGE)	○
OUTER COMPASS LOCATOR	LOM
OUTER MARKER	OM
OUT OF CONTROL AREA	△
OVER (Iden.)	OKC–0
RADAR VECTOR	R⌣V
RADIAL	⊖–
RANGE (LF/MF)	R
REMAIN WELL TO LEFT SIDE	LS
REMAIN WELL TO RIGHT SIDE	RS
REPORT DEPARTING	RD
REPORT LEAVING	RL
REPORT ON COURSE	R-CRS
REPORT OVER	RO
REPORT PASSING	RP
REPORT REACHING	RR
REPORT STARTING PROCEDURE TURN	RSPT
REQUEST ALTITUDE CHANGES EN ROUTE	RACE

Words and Phrases	*Shorthand*
REVERSE COURSE	RC
RUNWAY	RY
STANDARD JET PENETRATION	SJP
STANDBY	STBY
TAKEOFF (DIRECTION)	T→N
TOWER	Z
TRAFFIC IS	TFC
TRACK	TR
TURN LEFT AFTER TAKEOFF	LT
TURN RIGHT AFTER TAKEOFF	RT
UNTIL	/
UNTIL ADVISED (BY)	UA
UNTIL FURTHER ADVISED	UFA
VICTOR	V
WHILE IN CONTROL AREAS	△
WHILE IN CIVIL AIRWAYS	=

Example

An example of a clearance written in shorthand:

C STL–A V16 V9. M 150 TS. LT. DR DAL–OX DAL–O 30. RL 3, 4, 50.

Translated it reads: ATC clears (identify aircraft) to St. Louis Airport via Victor 16, Victor 9. Maintain one five thousand. Take off south. Turn left after takeoff. Proceed direct Dallas Omni. Cross Dallas Omni at 3,000. Report leaving 3, 4, and 5,000.

FLIGHT TIME ANALYSIS									
Check pts.		Cruise altitude	Ave. True Course	Ave. Drift Corr.	Ave. TAS kts.	W/V kts.	Ave. G/S	Dist. n. m.	Time
from	to								
DCA	CSN	Climb	* -	-	-	-	-	-	:21.0
CSN	LDN	8000							
LDN	EKN	8000							
EKN	HNN	8000							
HNN	YRK	8000							
YRK	CVG	8000							
ALTERNATE DATA									
CVG	YRK	5000							
YRK	CRW	5000							

*VARIOUS TRUE COURSES
USE DCA WINDS ALOFT DCA - EKN
USE CVG WINDS ALOFT EKN - CVG - CRW

INTERPOLATE WINDS AND TEMPERATURES WHEN NECESSARY

Fuel summary		
	time	gals
climb	:21	
cruise		
alternate		
reserve		
extra		
Total		

*THIS FORM IS NOT INTENDED FOR AN OPERATIONAL FLIGHT LOG. IT IS PROVIDED FOR AN ORDERLY PRESENTATION OF FLIGHT PLANNING DATA.

Sample Flight Time Analysis Sheet

FEDERAL AVIATION AGENCY REGIONAL OFFICES

ALASKAN REGION:
FAA Regional Headquarters
632 Sixth Avenue
Anchorage, Alaska

CENTRAL REGION:
FAA Regional Headquarters
4825 Troost Avenue
Kansas City, Missouri

EASTERN REGION:
FAA Regional Headquarters
John F. Kennedy International Airport
Federal Building
Jamaica, New York

EUROPE-AFRICA-MIDDLE EAST:
Federal Aviation Agency
American Embassy
24–32 Grosvenor Square
London W1, England

PACIFIC REGION:
FAA Regional Headquarters
P.O. Box 4009
Honolulu, Hawaii

SOUTHERN REGION:
FAA Regional Headquarters
P.O. 20636
3400 Whipple Street
East Point
Atlanta, Georgia

SOUTHWEST REGION:
FAA Regional Headquarters
P.O. Box 1689
Fort Worth, Texas

WESTERN REGION:
FAA Regional Headquarters
P.O. Box 90007, Airport Station
5651 West Manchester Avenue
Los Angeles, California

☆ U.S. GOVERNMENT PRINTING OFFICE : 1965 O - 786-900