
Federal Aviation Administration (DOT), Washington, D.C. Flight Standards Service.

74p.


HF-$0.76 HC-$4.43 PLUS POSTAGE

*Aircraft Pilots; Federal Legislation; *Resource Guides; *Study Guides; *Teacher Certification; Teacher Education; *Teachers; Tests

The Flight Standards Service of the Federal Aviation Administration developed the guide to assist applicants who are preparing for the Flight Instructor Certificate with Airplane Rating. The guide contains comprehensive study outlines and a list of recommended study materials and tells how to obtain those publications. It also includes sample test items with explanations of the correct answers and provides illustrations representative of those found on FAA written tests. The guide should be used by those seeking certification under the revised provisions of Federal Aviation Regulation, Part 61, which became effective November 1, 1973. (Author)
PREFACE

The Flight Standards Service of the Federal Aviation Administration has developed this guide to assist applicants who are preparing for the Flight Instructor Certificate with Airplane Rating.

This guide contains comprehensive study outlines and a list of recommended study materials and tells how to obtain those publications. It also includes sample test items with explanations of the correct answers and provides illustrations representative of those found on FAA written tests.

This guide is issued as Advisory Circular 61–72 and should be used by those persons seeking certification under the revised provisions of Federal Aviation Regulation, Part 61, which became effective November 1, 1973.

Comments regarding this publication may be directed to the U.S. Department of Transportation, Federal Aviation Administration, Flight Standards Technical Division, P.O. Box 25082, Oklahoma City, Oklahoma 73125.
## CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preface</td>
<td>iii</td>
</tr>
<tr>
<td>Introduction to Flight Instruction</td>
<td>1</td>
</tr>
<tr>
<td>Certification Requirements</td>
<td>1</td>
</tr>
<tr>
<td>The Written Tests</td>
<td>1</td>
</tr>
<tr>
<td>Taking the Tests</td>
<td>2</td>
</tr>
<tr>
<td>Recommended Study Materials</td>
<td>2</td>
</tr>
<tr>
<td>How to Obtain GPO Publications</td>
<td>4</td>
</tr>
<tr>
<td>Study Outline—Fundamentals of Instructing</td>
<td>7</td>
</tr>
<tr>
<td>Study Outline—Flight Instructor-Airplane Knowledge Areas</td>
<td>10</td>
</tr>
<tr>
<td>Sample Test Items</td>
<td>15</td>
</tr>
<tr>
<td>Additional Questions for Study</td>
<td>19</td>
</tr>
<tr>
<td>Appendices</td>
<td>21</td>
</tr>
<tr>
<td>Appendix A—Theory of Flight</td>
<td>22</td>
</tr>
<tr>
<td>Appendix B—Radio Navigation</td>
<td>30</td>
</tr>
<tr>
<td>Appendix C—Performance Computer</td>
<td>32</td>
</tr>
<tr>
<td>Appendix D—Crosswind Charts</td>
<td>33</td>
</tr>
<tr>
<td>Appendix E—Density Altitude Chart</td>
<td>35</td>
</tr>
<tr>
<td>Appendix F—Condor Aircraft</td>
<td>36</td>
</tr>
<tr>
<td>Appendix G—Bobwhite Aircraft</td>
<td>42</td>
</tr>
<tr>
<td>Appendix H—Weather Data</td>
<td>50</td>
</tr>
<tr>
<td>Appendix I—Airman's Information Manual Excerpts</td>
<td>63</td>
</tr>
<tr>
<td>Appendix J—Exam-O-Grams</td>
<td>74</td>
</tr>
</tbody>
</table>
INTRODUCTION TO FLIGHT INSTRUCTION

What is required to become a skilled and effective flight instructor? Although some people possess those traits desirable in an instructor in a greater degree than others, no one is born a natural instructor. Good flight instructors become so through study, experience, and hard work. Probably more than any other single factor, the flight instructor’s own attitude toward flight instruction determines what kind of job he will do.

After the prospective flight instructor has acquired his rating, it is imperative that he make a continuous effort to stay abreast of the latest trends in aviation, regulations, and practices. This is extremely important for the flight instructor because aviation is not static, it is dynamic and changing, and what holds true today may not necessarily apply tomorrow. The flight instructor must keep himself informed about new techniques, new equipment, new procedures, and regulatory changes.

Knowledge and understanding are seldom gained quickly or easily. This is particularly true in the diversified field of flight instruction. There can be no substitute for diligent study to attain basic knowledge, unremitting effort to develop competence, and continuous review to remain current in the many areas where technological change is the rule rather than the exception.

The purpose of this publication is to provide guidance to the applicant by outlining the scope of knowledge required. By using this guide, the applicant is better able to intelligently direct his study plan.

CERTIFICATION REQUIREMENTS

To be eligible for a Flight Instructor Certificate with an Airplane rating, the certification process requires that the applicant pass a Flight Instructor-Airplane Written Test and a Fundamentals of Instructing Written Test. However, if the applicant already holds a valid FAA Flight or Ground Instructor Certificate, he is not required to take the separate test on Fundamentals of Instructing when applying for an additional instructor certificate or rating.

It is not necessary to take the Fundamentals of Instructing test on the same day as the Flight Instructor-Airplane Written Test and it is immaterial which test is taken first. The certification process also requires the applicant to pass a practical test in which he must demonstrate his competency to instruct students during flight.

THE WRITTEN TESTS

The Fundamentals of Instructing and Flight Instructor-Airplane written tests are comprehensive because they must test an applicant’s knowledge in many subject areas. These areas include all the subjects required for both a private and commercial pilot certificate, as well as the Fundamentals of Instructing subject areas, such as, The Learning Process, Elements of Effective Teaching, Student Evaluation, Quizzing and Testing, Course Development, Lesson Planning, and Classroom Instruction Techniques.

The Fundamentals of Instructing written test contains 50 test items. Three hours is allowed for taking this test. The Flight Instructor-Airplane written test contains 100 test items, and the time allowed for taking this test is 5 hours. All test items are of the objective multiple-choice type, and each item can be answered by the selection of a single response as the correct choice. Each test item is independent of other test items, that is, the correct response of one test item does not depend upon, or influence, the correct response of another test item.

The applicant’s answer sheet is forwarded to the FAA Aeronautical Center for processing by ADP computers. Shortly thereafter, the applicant will receive an Airman Written Test Report which not only includes his score but lists, in code, those subject areas that he answered incorrectly. These codes refer to a
list of subject matter which accompanies the report. The applicant can thus determine those subject areas in which he should strengthen his knowledge. The flight examiner may quiz the applicant on those deficient subject areas during the practical test.

**TAKING THE TESTS**

Communication between individuals is a complicated process. Written tests involve communication through the use of the written word between the test writer and the person being tested. Considerable effort is expended to write each test item in a clear, concise manner. Applicants should carefully read the information and instructions as well as each test item.

Read the entire test item and be sure that the objective is understood before selecting an answer. After working the problem or analyzing the statements, look through the list of alternative answers and select the one which you believe to be most nearly correct.

There are no "trick" questions injected into the test with the intention of confusing the applicants. Only one answer is completely correct. The others are derived from incorrect computations, lack of knowledge, or common misconceptions of the subject. Examine each item and alternative answer carefully. Do not search for hidden meanings or read into the item something that is not there. The question and answers mean exactly what is stated and refer to the general rule rather than the exception to the rule.

To use the allowable time most efficiently, the applicant who experiences difficulty in answering a particular item should continue on and answer those items which are less difficult. Then reconsider those which were passed over.

**RECOMMENDED STUDY MATERIALS**

Professionalism in flight instruction is very important. One thing that enhances professionalism is the possession of a technical library. By obtaining study materials that are beneficial and appropriate to his preparation for certification, the prospective flight instructor will be laying the foundation upon which to build his aeronautical library for use throughout his career.

The following list of source materials outlines essential publications produced by the FAA but does not include all the useful and available material that is produced commercially. Other excellent textbooks, audio-visual training aids, and instructional materials may be obtained from various commercial bookstores and fixed-base operators engaged in flight training.

**AVIATION WEATHER.** AC 00-6. Reprinted 1969. ($4.00 GPO.) FAA 5.8/2: W 37. Contains information on weather phenomena for pilots and other flight operations personnel whose interest in meteorology is primarily in its application to flying.

**PLANE SENSE.** AC 20-5B (Free). This booklet helps acquaint the prospective airplane owner with some fundamentals of owning and operating an airplane. It is free upon request from the U.S. Department of Transportation, Publications Section, TAD-448.1, Washington, D.C. 20590.

**PRIVATE PILOT (AIRPLANE) FLIGHT TRAINING GUIDE.** AC 61-2A. Reprinted 1972. ($1.95 GPO.) FAA 5.3/2:P 64/4/964. Assists flight instructors in planning the flight training of primary students. It is designed for the use of instructors who do not follow a curriculum offered by a certificated flying school.

**FLIGHT TRAINING HANDBOOK.** AC 61-21. Reprinted 1969. ($2.10 GPO.) FAA 1.8:F 64/4. Provides information and direction in the introduction and performance of training maneuvers for student pilots, pilots who are requalifying or preparing for additional ratings, and for flight instructors. [This publication is being redeveloped and expanded and the revision will be available at the earliest possible date.]

**PILOT'S HANDBOOK OF AERONAUTICAL KNOWLEDGE.** AC 61-23A. ($5.30 GPO.) TD 4.408:P 64/5. Contains essential, authoritative information used in training and guiding private pilots, and covers all subject areas in which an applicant may be tested. Tells how to use the Airman's Information Manual, the data in FAA-approved airplane flight manuals, and the basic instruments for airplane attitude control.

**PRIVATE PILOT WRITTEN TEST GUIDE.** AC 61-32A. ($2.50 GPO.) TD 4.408:P 64/971. Provides information, guidelines, and sample test items to assist applicants for the Private Pilot Certificate in attaining necessary aeronautical knowledge.

**COMMERCIAL PILOT WRITTEN TEST GUIDE.** AC 61-28A. ($2.00 GPO.) TD 4.408:P 64/4. Reflects current operating procedures and techniques for use of applicants in preparing for the Commercial Pilot Airplane Written Test. [This publication is being redeveloped and will be available at the earliest possible date.]

**PILOT'S WEIGHT AND BALANCE HANDBOOK.** AC 91-23. ($1.25 GPO.) TD 4.408:P 64/3. This
handbook provides an easily understood text on aircraft weight and balance. It progresses from an explanation of basic fundamentals to the complete application of weight and balance principles in large aircraft operations.

WAKE TURBULENCE. AC 90-23D. (Free). Presents information on the subject of wake turbulence and suggests techniques that may help pilots avoid the hazards associated with wingtip vortex turbulence. It is free upon request from the U.S. Department of Transportation, Publications Section, TAD-443.1, Washington, D.C. 20590.

TERRAIN FLYING. AC 91-15. ($1.40 GPO.) This pocket-size booklet is designed by the FAA for private pilots. It contains observations, opinions, warnings, and advice from veteran pilots regarding flight over various types of terrain throughout the U.S.

FLIGHT INSTRUCTOR'S HANDBOOK. AC 61-16A. This handbook is designed to give guidance and information to pilots preparing to apply for flight instructor certificates, and for use as a reference by flight instructors. ($2.00 GPO.) Reprinted in 1972. TD 4.408:In 7/3.

DENALT PERFORMANCE COMPUTER (Fixed Pitch Propeller). Safety Education Series #8. ($0.50 GPO.) FAA 5.8/2:C 73/2. A density altitude computer for use in aircraft with fixed pitch propellers. It is intended to supplement and not replace manufacturer's published performance information.

DENALT PERFORMANCE COMPUTER (Variable Pitch Propeller). Safety Education Series #8. ($0.50). FAA 5.8/2:C 73/2. A density altitude computer for use in aircraft with variable pitch propellers. It is intended to supplement and not replace manufacturer's published performance information.

NATIONAL TRANSPORTATION SAFETY BOARD PART 430. (Free.) This publication deals with procedures required in the notification and reporting of accidents and lost or overdue aircraft within the United States, its territories, and possessions. It is free upon request from the National Transportation Safety Board, Publications Branch, Washington, D.C. 20591.

AIRMAN'S INFORMATION MANUAL (AIM). Presents, in four parts, information necessary for planning and conducting flights within the National Airspace System. Besides providing frequently updated airport and NAVAID data, AIM includes instructional and procedural information and is designed for use in the cockpit. To better serve the needs of the individual pilot, each Part is available on a separate annual subscription basis:


Part 2—Airport Directory. ($7.00 domestic; foreign mailing $1.75 additional, GPO): Issued semi-annually. TD 4.12: pt. 2/.

Part 3 and 3A—Operational Data and Notices to Airmen. ($22.00 domestic; foreign mailing $5.50 additional, GPO): Part 3 is issued every 56 days and Part 3A is issued every 14 days. TD 4.12: pt. 3/.


For additional information concerning AIM, see Appendix I, page 63.

VFR/IFR PILOT EXAM-O-GRAMS. These brief summaries provide concise information about certain concepts and procedures that are critical to aviation safety.

A list of the Exam-O-Gram which were available at the time of this publication appears on pages 74 and 75. These summaries are free and may be obtained by contacting U.S. Department of Transportation, Federal Aviation Administration, Flight Standards Technical Division, Operations Branch, AAC-240, P.O. Box 25082, Oklahoma City, Oklahoma 73125.

ADVISORY CIRCULARS. The FAA issues Advisory Circulars to inform the aviation public in a systematic way of non-regulatory material of interest. Advisory Circulars in the following subject categories are recommended for the Flight Instructor and can be obtained from:

U.S. Department of Transportation Publications Section, TAD-443.1 Washington, D.C. 20590

Subject Number and Subject Matter
00.................General
20.................Aircraft
60.................Airman
70.................Airspace
HOW TO OBTAIN GPO PUBLICATIONS

1. Order blanks should be used when ordering FAA publications from GPO. These blanks (such as shown on page 77 of this guide) are free and may be duplicated by the user or they may be ordered from:

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

2. Subscription and non-subscription items require separate order blanks.

3. The exact name and the Advisory Circular identification number should be included on the order blank in addition to the catalogue number, if available.

4. A check or money order for the exact amount is required. DO NOT SEND CASH.

5. If an order blank is not available, a letter may be used to request publications. In this case, be sure to enclose a self-addressed mailing label.

6. All prices are subject to change. Consult AC 00–2, "Advisory Circular Checklist and Status of Federal Aviation Regulations," for the current price of publications. It is very important that the correct amount be enclosed with the order.

In addition to the mail-order service provided by the Office of the Superintendent of Documents, several retail bookstores have been established throughout the country which constitute a part of the operations of the Superintendent of Documents. The public is encouraged to avail themselves of the services offered by these facilities as many of the more popular publications are stocked in these bookstores. These retail outlets are located at the following addresses:

Atlanta GPO Bookstore
Room 100 Federal Bldg.
275 Peachtree St., NE
Atlanta, Ga. 30303
Phone: 404-526-6947

Birmingham GPO Bookstore
Room 102A 2121 Bldg.
2121 Eighth Ave., N.
Birmingham, Ala. 35203
Phone: 205-325-6056

Boston GPO Bookstore
Room G25 John F. Kennedy Federal Bldg.
Sudbury St.
Boston, Mass. 02203
Phone: 617-223-6071
In addition, persons living within the metropolitan Washington, D.C., area may contact bookstores located at the following locations:

- Government Printing Office Bookstore
  710 North Capitol St.
  Washington, D.C. 20402
  Phone: 202-541-2091

- Department of Commerce Bookstore
  14th & Constitution Ave., NW
  Washington, D.C. 20230
  Phone: 202-967-3527

- USIA Bookstore
  1776 Pennsylvania Ave., NW
  Washington, D.C. 20547
  Phone: 202-632-9668

- Department of State Bookstore
  21st & C Sts., NW
  Washington, D.C. 20520
  Phone: 202-632-1437

- Pentagon Bookstore
  Main Concourse, south end
  Washington, D.C. 20310
  Phone: 202-541-2998
STUDY OUTLINE
FUNDAMENTALS OF INSTRUCTING

I. THE LEARNING PROCESS
   A. Definition of Learning.
   B. Characteristics of Learning.
      1. Learning is purposeful
      2. Learning comes through experience
      3. Learning is multifaceted
      4. Learning is an active process
   C. Laws of Learning.
      1. Law of readiness
      2. Law of exercise
      3. Law of effect
      4. Law of primacy
      5. Law of intensity
      6. Law of recency
   D. How People Learn.
      1. Perceptions
      2. Factors which affect perception
      3. Insights
      4. Motivation
   E. Levels of Learning.
   F. Learning Skills.
      1. Physical skills involve more than muscles
      2. Desire to learn
      3. Patterns to follow
      4. Perform the skill
      5. Knowledge of results
      6. Progress follows a pattern
      7. Duration and organisation of lesson
      8. Evaluation versus critique
      9. Application of skill
   G. Forgetting and Retention.
      1. Theories of forgetting
      2. Retention of learning
   H. Transfer of Learning.
   I. Habit Formation.
   J. Obstacles to Learning During Flight Instruction.
   K. The Instructor’s Role in Flight Training.

II. HUMAN BEHAVIOR
   A. Control of Human Behavior.
   B. Human Needs.
      1. Physical needs
      2. Social needs
      3. Egoistic needs
      4. Self-fulfillment needs
   C. Defense Mechanisms.
      1. Rationalization
      2. Flight
      3. Aggression
      4. Resignation
   D. The Instructor’s Role in Human Relations.
      1. Keep students motivated
      2. Keep students informed
      3. Approach students as individuals
      4. Give credit when due
      5. Criticise constructively
      6. Be consistent
      7. Admit errors

III. EFFECTIVE COMMUNICATION
   A. Basic Elements of Communication Process.
      1. Source
      2. Symbols
      3. Receiver
   B. Barriers to Effective Communications.
      1. Lack of common core of experience
      2. Confusion between the symbol and the thing symbolized
      3. Overuse of abstractions

IV. THE TEACHING PROCESS
   A. Preparation.
   B. Presentation.
   C. Application.
   D. Review and Evaluation.
V. TEACHING METHODS

A. Organizing Material.
1. Introduction
2. Development
3. Conclusion

B. Lecture Method.
1. Types of lectures
2. Teaching lecture
3. Preparing the teaching lecture
4. Suitable language
5. Types of delivery
6. Use of notes
7. Formal versus informal lectures
8. Advantages and disadvantages of the lecture

C. Guided Discussion Method.
1. Use of questions in a guided discussion
2. Planning a guided discussion
3. Student preparation for a guided discussion
4. Guiding a discussion—teacher technique

D. Demonstration Performance Method.
1. Explanation phase
2. Demonstration phase
3. Student performance and instructor supervision phases
4. Evaluation phase

E. The “Telling and Doing” Technique in Flight Instruction.
1. Instructor tells—teacher does
2. Student tells—student does
3. Student does—teacher evaluates

VI. THE INSTRUCTOR AS A CRITIC

A. Purpose of a Critique.

B. Characteristics of an Effective Critique.
   A critique should be:
   - objective
   - flexible
   - acceptable
   - comprehensive
   - constructive
   - well organized
   - thoughtful
   - specific

C. Methods of Critique.
1. Instructor—student critique
2. Student-led critiques
3. Small-group critiques
4. Individual student critique
5. Written critique
6. Self-critique

D. Ground Rules for Critiquing.

VII. EVALUATION

A. Oral Quizzing.
1. Characteristics of effective questions
2. Types of questions to avoid
3. Answering students’ questions

B. Written Tests.
1. Characteristics of a good test
2. Written test items
3. Effective item writing
4. Principles to follow

C. Performance Tests.
1. Uses of performance testing
2. Demonstrations of piloting ability

VIII. INSTRUCTIONAL AIDS

A. Theory Behind Use of Instructional Aids.
B. Reasons For Using Instructional Aids.
C. Guidelines For Use of Instructional Aids.
D. Types of Instructional Aids.
1. Chalkboard
2. Models
3. Charts
4. Projected material

E. Future Developments.

IX. FLIGHT INSTRUCTOR RESPONSIBILITIES

A. Professionalism.
1. Sincerity
2. Acceptance of the student
3. Personal appearance and habits
4. Demeanor
5. Safety practices and accident prevention
6. Proper language
7. Self-improvement

B. Helping Student Pilots Learn.
1. Providing adequate instruction
2. Demanding an adequate standard of performance
3. Emphasizing the “positive”
C. The Flight Instructor as a Practical Psychologist.
   1. Anxiety
   2. Normal reactions to stress
   3. Abnormal reaction to stress
   4. Instructor's actions regarding seriously abnormal students

D. Student Pilot Supervision and Surveillance.
E. Flight Instructor Endorsements.
F. Flight Test Recommendations.
G. Airplane Checkouts.
H. Refresher Training.

XI. PLANNING INSTRUCTIONAL ACTIVITY

A. Course of Instruction.
   1. Determination of standards and objectives
   2. Identification of blocks of learning

B. Syllabus.
   1. Sample ground training syllabus
   2. Sample flight training syllabus

C. Lesson Plan.
   1. Characteristics of a well-planned lesson
   2. How to use a lesson plan properly
   3. Lesson plan items
STUDY OUTLINE
FLIGHT INSTRUCTOR-AIRPLANE KNOWLEDGE AREAS

I. FEDERAL AVIATION REGULATIONS
   A. Parts 1 and 71: Definitions and Abbreviations, and Controlled Airspace.
      1. Air commerce
      2. Airport traffic area
      3. Calling
      4. Commercial operator
      5. Flight level
      6. Flight visibility
      7. Interstate air commerce
      8. Large aircraft
      9. Major alteration
     10. Major repair
     11. Pilot-in-command
     12. Second-in-command
     13. Federal airway
     14. Control area
     15. Continental control area
     16. Control zone
     17. Route segment
     18. Terminal control area
     19. Positive control area
      1. Required certificates/ratings
      2. Certificates and ratings issued
      3. Expired pilot certificates/reissuance
      4. Carriage of narcotic drugs/marihuana
      5. Duration of pilot certificates
      6. Duration of medical certificates
      7. General limitations
      8. Pilot logbooks
      9. Operations during medical deficiency
     10. Second-in-command qualifications
     11. Recent experience: Pilot-in-command
     12. Pilot-in-command proficiency check
     13. Falsification, reproduction, alteration
     14. Change of address
     15. Private pilot privileges/limitations
     16. Commercial pilot privileges/limitations
      1. Responsibility of pilot-in-command
      2. Pilot-in-command/more than one pilot
      3. Preflight action
      4. Flight crewmembers at stations
      5. Interference with crewmembers
      6. Careless or reckless operation
      7. Liquor and drugs
      8. Dropping objects
      9. Fastening of safety belts
     10. Parachutes and parachuting
     11. Portable electronic devices
     12. ATC transponder equipment requirements
     13. Civil aircraft: certificates required
     14. Aircraft airworthiness
     15. Aircraft operating limitations/markings
     16. Supplemental oxygen
     17. Instrument and equipment requirements
     18. Limited/restricted aircraft limitations
     19. Ferry flight with one engine inoperative
     20. Emergency exits for airplanes
     21. Aural speed warning device
     22. Emergency locator transmitters
     23. Report: aircraft identification/activity
      1. Waivers
      2. Operating near other aircraft
      3. Right-of-way rules
      4. Aircraft speed
      5. Acrobatic flight
      6. Aircraft lights
      7. Complying—ATC clearances/instructions
      8. ATC light signals
      9. Minimum safe altitudes; general
     10. Altimeter settings
     11. Flight plan; information required
     12. Operation—in vicinity of airport
     13. Operation—airport with control tower
     14. Operation—airport without control tower
15. Flight in terminal control areas
16. Temporary flight restrictions
17. Flight test areas
18. Restricted and prohibited areas
19. Positive control areas; route segments
20. Basic VFR weather minimums
21. Special VFR weather minimums
22. VFR cruising altitude or flight level
23. ATC transponder test/inspection

E. Part 91: General Operating and Flight Rules—Subpart C—Maintenance, Preventive Maintenance, and Alterations.
1. General maintenance and alterations
2. Maintenance required
3. Carrying persons after repair/alteration
4. Inspections/progressive inspections
5. Altimeter system tests/inspections
6. Maintenance records/transfer of records
7. Rebuilt engine maintenance records
8. ATC transponder test/inspection

1. Subpart A—General
2. Subpart B—Rules—ATCO certificate holder
3. Subpart C—Operating rules
4. Subpart D—Crewmember qualifications
5. Subpart E—Aircraft and equipment

II. NATIONAL TRANSPORTATION SAFETY BOARD—PART 430
A. General.
1. Applicability
2. Definitions
B. Initial Notification of Aircraft Accidents, Incidents, and Overdue Aircraft.
1. Immediate notification
2. Information to be given in notification
C. Preservation of Aircraft Wreckage, Mail, Cargo, and Records.
D. Reporting of Aircraft Accidents, Incidents, and Overdue Aircraft.

III. FAA ADVISORY CIRCULARS
A. Series 00—General.
B. Series 20—Aircraft.
C. Series 60—Airmen.

D. Series 70—Airspace.
E. Series 90—Air Traffic Control and General Operations.
F. Series 120—Air Carrier and Commercial Operators and Helicopters.
G. Series 150—Airports.

IV. AIRMAN'S INFORMATION MANUAL
1. Glossary of aeronautical terms
2. Airport lighting/marking/ aids
3. Air navigation radio aids
4. Visual approach slope indicator (VASI)
5. Controlled/uncontrolled airspace
6. Operating at non-tower airports
7. Special use airspace—prohibited, restricted, ISITA, alert areas
8. Automatic terminal information service (ATIS)
9. ATC departure/en route/arrival procedures
10. Radar traffic information service
11. Terminal radar program for VFR aircraft
12. Aeronautical advisory stations (UNICOM)
13. Radiotelephone phraseology/technique
14. Traffic/wind direction indicators
15. Obtaining weather information/briefing
16. Flight plans
17. ADIZ and designated mountainous areas
18. Medical facts for pilots
19. Good operating practices
1. Obtaining airport/heliport data
2. FSS/weather service telephone numbers
C. Part 3: Operational Data and Notices to Airmen.
1. Obtaining radio facility/FSS data
2. Special notices/special operations
3. Notices to Airmen (NOTAMS)
D. Part 4: Graphic Notices and Supplemental Data.
1. Terminal radar service areas (TRSA's)
2. Terminal area graphic notices
3. Restrictions to en route navigation aids
4. VOR receiver checkpoints
5. Parachute jumping areas
6. Heavy wagon and olive branch routes
V. AVIATION WEATHER

A. The Earth's Atmosphere.
   1. Composition
   2. Vertical structure
   3. The standard atmosphere
   4. Density

B. Temperature.
   1. Temperature measurement
   2. Heat and temperature
   3. Temperature aloft
   4. Temperature variation

C. Atmospheric Pressure and Altimetry.
   1. Atmospheric pressure measurements
   2. Sea level pressure
   3. Station pressure
   4. Pressure variations
   5. Pressure systems
   6. Altimeters

D. Wind.
   1. Basic theory of general circulation
   2. Convection
   3. Pressure gradient force
   4. Coriolis force
   5. Friction
   6. The jet stream
   7. Local and small scale winds
   8. Large wind system
   9. Wind, pressure systems, and weather
   10. Wind shear

E. Moisture.
   1. Measurements
      (a) Relative humidity
      (b) Dewpoint
   2. Change of state
   3. Condensation and sublimation products

F. Stability and Instability.
   1. Adiabatic process
   2. Lapse rates
   3. Stability determinations
   4. Effects of stability or instability

G. Clouds.
   1. Composition
   2. Formation and structure
   3. Types
   4. Recognition

H. Air Masses.
   1. Source regions
   2. Classification of air masses
   3. Air mass modification
   4. Summer and winter air mass weather

I. Fronts.
   1. Structures
   2. Types
   3. Frontal waves and occlusions
   4. Frontolysis and frontogenesis
   5. Associated weather

J. Turbulence.
   1. Convective currents
   2. Obstructions to wind flow
   3. Wind shear
   4. Clear air turbulence
   5. Categories of turbulence intensities
   6. Wake turbulence

K. Icing.
   1. Ice-producing cloud types
   2. Structural ice formation
   3. Types and intensities of in-flight structural icing
   4. Accretion rate of in-flight structural icing
   5. Effects of in-flight structural icing
   6. Structural aircraft icing and frost on the ground
   7. Structural anti-icing and deicing
   8. Instrument and powerplant icing
   9. Fuel and oil anti-icing

L. Thunderstorms.
   1. Conditions necessary for formation
   2. Structure
   3. Classification
   4. Hazards
   5. Information from radar
   6. Tornadoes
   7. Do's and don'ts of thunderstorm flying

M. Common IFR Producers.
   1. Fog
   2. Low stratus clouds
   3. Haze and smoke
   4. Blowing obstructions to vision
   5. Precipitation
   6. Obscured or partially obscured sky

N. The Nation's Aviation Weather Reporting System.
O. Weather Observations.
1. Surface weather observations
2. Pilot reports (PIREPS)
3. Weather radar observations
4. Upper air observations

P. Weather Charts.
1. Weather depiction charts
2. Surface weather charts
3. Constant pressure charts
4. Winds aloft charts
5. Radar summary charts
6. Prognostic surface and prognostic constant pressure charts
7. Prognostic significant weather charts

Q. Aviation Weather Forecasts.
1. Terminal forecasts (FT)
2. Area forecasts (FA)
3. Winds aloft forecasts (FD)
4. In-flight weather advisories
5. Severe weather outlooks (AC)
6. Severe weather forecasts (WW)
7. Surface analysis and prognoses

R. Services to Pilots.
1. FSS briefing
2. Automatic terminal information service
3. Pilots automatic telephone weather answering service (PATWAS)
4. Transcribed weather broadcasts
5. En route flight advisory service

VI. AIRPLANE OPERATION
A. General.
1. Preflight/postflight safety practices
2. Use of mixture/throttle/propeller control
3. Use of proper fuel grade/type
4. Fuel system operation
5. Fuel contamination—prevention/elimination
6. Wake turbulence—causes/precautions
7. Crosswind takeoff/landing
8. Proper loading of the aircraft
9. Recovery from critical flight situations
10. Aircraft operating limitations
11. High-altitude operations/pressurization
12. Use of supplemental oxygen and oxygen equipment
13. Midair collision avoidance precautions
14. Normal/crosswind takeoff/landing
15. Maximum performance takeoff/landing
16. Emergency landings
17. Maneuvering speed
18. Taxiing during strong surface winds
19. Flap operation
20. Retractable landing gear operation
21. Controllable pitch propeller operation
22. Supercharged engine operation
23. Multi-engine critical engine failure

B. Performance.
1. Takeoff charts
2. Rate-of-climb charts
3. Cruise charts
4. Maximum safe crosswind charts
5. Use of Denali computer
   (a) Fixed pitch propeller
   (b) Variable pitch propeller
6. Landing charts
7. Stall speed charts
8. Airspeed correction charts
9. Computing density/pressure altitudes
10. Effect of density altitude on performance
11. Critical performance speeds—“V” speeds
12. Effect of wind on aircraft performance
13. Bank/speed versus rate/radius of turns
14. Stall speed versus altitude or attitude
15. Stall speed versus indicated/true airspeed
16. Obstacle clearance takeoff/landing
17. Best angle/rate-of-climb
18. Computations of gross weight/useful load
19. Computation of center of gravity

VII. ENGINE OPERATION
A. Fuel injection/carburetor principles.
B. Reciprocating engine principles.
C. Engine starting/shutdown.
D. Detonation cause/effect.
E. Carburetor icing—cause/detection/elimination.
F. Manifold pressure versus RPM.
G. Carburetor heat effect on mixture.
H. Ignition or electrical systems/units.
I. Interpreting engine instruments.
J. Emergency—engine/systems/equipment/fire.

VIII. FLIGHT INSTRUMENTS AND SYSTEMS
A. Attitude indicator operation/errors.
B. Heading indicator operation/errors.
C. Turn indicator/coordinator.
D. Altimeter operation/errors.
E. Vertical speed indicator operation/errors.
F. Airspeed indicator operation/errors.
G. Vacuum systems/instruments.
H. Pitot-static systems/instruments.
I. Magnetic compass operation/errors.
J. Altimeter setting procedure/significance.
K. Pressure altitude significance/obtaining.
L. Gyroscopic principles.

IX. RADIO COMMUNICATIONS
A. VHF radio communications/phraseology.
B. Position reporting procedures.
D. FSS communications procedures.
E. Obtaining emergency assistance.
F. Lost procedure when radio is inoperative.
G. Use of proper communications frequencies.

X. INSTRUMENT FLYING PROCEDURES
A. Components of attitude instrument flying.
B. Pitch, bank, power control.
C. Straight-and-level flight.
D. Turns/tours to predetermined headings.
E. Constant rate climbs/descents/leveloffs.
F. Constant speed climbs/descents/leveloffs.
G. Magnetic compass turns.
H. Effect of changes in airspeed.
I. False sensations in flight.

XI. NAVIGATION
A. General.
   1. Sectional chart interpretation
   2. Relating chart symbols to regulations
   3. Pilotage/recognition of landmarks
   4. Determining courses/distances on charts
   5. Navigation computer principles
   6. Computing heading/courses
   7. Computing time, distance, speed, fuel
   8. Computing rates of climb/descent
   9. Computing wind directions/speed in-flight
   10. Computing off-course corrections
   11. Selecting VFR cruising altitudes
   12. Planning traffic pattern entry

B. Radio.
   1. Characteristics of VOR facilities
   2. Tuning VOR receivers
   3. Identifying VOR stations
   4. VOR interpretation/orientation
   5. Intercepting VOR radials
   6. Tracking VOR radials
   7. Groundspeed checks using VOR radials
   8. VOR frequency interference
   9. VOR test signals/VOR receiver checks
10. Characteristics of ADF facilities
11. Tuning ADF receivers
12. Identifying stations used for ADF
13. ADF/RMI interpretation/orientation
14. Intercepting ADF/RMI bearings
15. Tracking ADF/RMI bearings or "homing"
16. Marker beacons/outer compass locators

XII. AERODYNAMICS AND PRINCIPLES OF FLIGHT
A. Laws of motion.
B. Functions of the flight controls.
C. Principles of airfoils.
D. Wing planform.
   1. Area/span/chord
   2. Aspect ratio/taper/sweepback
   3. Effect of planform on stall patterns
E. Forces acting on an airplane.
F. Flight controls/axes of an airplane
G. Lift/drag during turns.
H. Lift versus angle of attack.
I. Lift/thrust versus air density.
J. Types/effect of flaps, spoilers, divebrakes.
K. Effect of flaps on lift/drag/trim.
L. Effect of ice/snow/frost on airfoils
M. Power versus climb/descent/level flight.
N. Gyroscopic precession.
O. Types and effect of drag—induced/parasite/profile.
P. Ground effect.
Q. Loads/load factors.
R. Stability—static and dynamic/longitudinal/lateral/directional.
S. Stalls/spins.
T. Relative wind/angle of attack.
U. Effect of wind during turns.
V. Torque effects—"P" factor.
SAMPLE TEST ITEMS

The following test items are presented to familiarize the applicant with the type of test items he may expect to find on both the Fundamentals of Instructing and the Flight Instructor-Airplane Written Tests. All the subjects on which the applicant will be tested are not included in these sample test items. Therefore, the ability to answer these items correctly should not indicate to the applicant that he is fully prepared to take either test.

The applicant should concentrate on the appropriate study outline provided in this guide. A knowledge of all topics listed in these outlines, not just mastery of the sample test items, should be used as the criterion for determining that he is properly prepared to take the appropriate test. Proper preparation requires considerable time and effort and the guidance of a competent instructor.

In some test items, reference is made to certain illustrations which are located in the appendices of this guide and are representative of those used with the Flight Instructor—Airplane—Written Tests.
FUNDAMENTALS OF INSTRUCTING
SAMPLE TEST ITEMS

1. The highest level of learning has been achieved when the student is able to—
   1—understand what has been taught.
   2—repeat back something that has been taught.
   3—apply the skill that has been learned.
   4—correlate what has been learned with other things previously learned.

Response 4 is the correct answer. Learning may be accomplished at any of several levels. The lowest level, rote learning, is the ability to repeat back something which one has been taught without understanding or being able to apply what has been learned. Progressively higher levels of learning are understanding what has been taught, achieving the skill to apply what has been learned and to perform correctly, and associating and correlating what has been learned with other things previously learned or subsequently encountered.

2. When a student cannot accept the real reason for his behavior, he may attempt to alleviate his feeling of guilt by relying on the defense mechanism called—
   1—flight.
   2—rationalization.
   3—aggression.
   4—resignation.

Response 2 is the correct answer. If a student cannot accept the real reason for his behavior, he may rationalize.

3. Which statement is true regarding effective communication?
   1—To be most effective as a communicator, an instructor should use abstract words as much as possible.
   2—The most effective communicator relies on a single, proven channel to transmit his ideas.
   3—Unless a common core of experience exists between the communicator and the receptor, effective communication will be difficult to achieve.
   4—Effective communication has taken place when the receiver acknowledges receipt of the information.

Response 3 is the correct answer. Probably the greatest single barrier to effective communication is the lack of a common core of experience between communicator and receptor. Communication can be effective only to the extent that the experiences—physical, mental, or emotional—of the people concerned are similar.

4. For presenting new material, the lecture method is excellent; it is most effective when—
   1—accompanied by training devices and visual aids.
   2—notes are used extensively.
   3—motor skills are to be taught.
   4—facts and ideas are to be formulated during the presentation.

Response 1 is the correct answer. The lecture method is suitable for presenting new material, for summarizing ideas, and for relationships between theory and practice. For example, it is suitable for the presentation of a ground school lesson on basic instrument flying. This method is most effective if accompanied by visual aids and training devices.

5. Flight instructors can minimize student anxiety by—
   1—giving brisk instruction.
   2—keeping the student busy while airborne.
   3—emphasizing the positive rather than the negative experiences of flying.
   4—terminating the flight period immediately upon detecting student fear.

Response 3 is the correct answer. Student anxieties can be minimized throughout training by emphasizing the benefits and pleasurable experiences which can be derived from flying, rather than continuously citing the unhappy consequences of faulty performance.
FLIGHT INSTRUCTOR-AIRPLANE KNOWLEDGE AREAS
SAMPLE TEST ITEMS

1. A flight instructor certificate expires at the end of the—

1—6th month after the month it was last issued or renewed.
2—12th month after it was issued or renewed.
3—24th month after the month in which it was last issued or renewed.
4—36th month after it was issued or renewed.

Response 3 is the correct answer. Refer to Federal Aviation Regulations, Part 61 (revised), which says:

"A flight instructor certificate
(1) Is effective only while the holder has a current pilot certificate and a medical certificate appropriate to the pilot privileges being exercised; and
(2) Expires at the end of the 24th month after the month in which it was issued or renewed."

2. Using the appropriate information on page 36 and the charts on page 37, determine the center of gravity of the Condor 410 under the following conditions:

Pilot and front passenger weight = 360.0 lbs.
Rear passenger weight = 120.0 lbs.
Baggage = 100.0 lbs.
Fuel = 63.5 gallons.
Oil = 12.0 quarts.

Under these conditions, the center of gravity would be located—

1—well within the CG envelope; the loading would be acceptable.
2—well forward of the forward CG limit; the loading would be unacceptable because the airplane would be dangerously nose-heavy.
3—well aft of the aft CG limit; the loading would be unacceptable because the airplane would be dangerously tail-heavy.
4—within the CG envelope, but the loading would be unacceptable because the maximum allowable gross weight would be exceeded.

Response 1 is the correct answer. Applying the given information to the loading graph, the following conclusions are made:

<table>
<thead>
<tr>
<th>Weight Moment/1000</th>
<th>Airplane empty weight</th>
<th>1,840.0</th>
<th>+63.7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pilot and front passenger</td>
<td>360.0</td>
<td>+13.0</td>
<td></td>
</tr>
<tr>
<td>Rear passenger</td>
<td>120.0</td>
<td>+8.4</td>
<td></td>
</tr>
<tr>
<td>Baggage</td>
<td>100.0</td>
<td>+10.4</td>
<td></td>
</tr>
<tr>
<td>Fuel (6.0 lbs. per gal.)</td>
<td>381.0</td>
<td>+18.2</td>
<td></td>
</tr>
<tr>
<td>Oil (7.5 lbs. per gal.)</td>
<td>22.5</td>
<td>-0.4</td>
<td></td>
</tr>
</tbody>
</table>

Totals | 2,823.5 | 113.3 |

Drawing a parallel line on the center of gravity moment envelope from left to right (2,823.5 lbs.) and a vertical line from bottom to top (113.3/1,000 lbs.-ins.), the center of gravity is located where the two lines intersect—at a point well within the center of gravity envelope.

3. Areas of forecast icing conditions aloft can be determined by referring to—

1—aviation sequence reports.
2—terminal forecasts.
3—weather depiction charts.
4—area forecasts.

Response 4 is the correct answer. Refer to AC 00-6, Aviation Weather, which states:

“Area forecasts include forecasts of cloud tops, icing, turbulence, and other hazards for use in preflight briefing”. The correct answer is further verified by the additional statement, “... includes a statement of expected icing conditions plus the height of the freezing level.”

4. Given:

Airplane gross weight | 3,000 lbs.
Pressure altitude | 5,000 feet
Ambient temperature | 66° F.
Headwind speed | 15 MPH
Runway | Hard surface
Flaps | 20°
Based on the given information and using the Take-off Data Performance Chart on page 38, the total distance required to clear a 50-foot obstacle would be approximately—

1—660 feet.
2—820 feet.
3—1,215 feet.
4—1,337 feet.

Response 4 is the correct answer. Applying the given information to the Take-off Data Chart, the total distance to clear a 50-foot obstacle at 5,000 feet with a 15 MPH headwind would be 1,215 feet (as listed on the chart). However, the temperature is 25° F. above standard for that altitude. According to the performance chart, the distance should be increased by 10% for each 25° F. above standard temperature for a particular altitude. With these facts established, the following computations verify the correct answer:

\[
\text{(A)} \ 1,215 \text{ feet (as listed on the chart)} \\
\times 1.10 \quad \text{ (temperature 25° F. above standard)} \\
\frac{121.50}{1,336.5 \text{ feet or 1,337 feet.}}
\]

5. Given:

\begin{align*}
\text{Distance off course} & : 8.5 \text{ miles} \\
\text{Distance flown} & : 51 \text{ miles} \\
\text{Distance to fly} & : 128 \text{ miles}
\end{align*}

To converge, the total correction angle would be—

1—4°.
2—10°.
3—14°.
4—24°.

Response 3 is the correct answer. Using a navigation computer, place the miles flown on the inner scale opposite the miles off course on the outer scale. Read the degrees to parallel on the outer scale opposite the speed arrow index (in this case, 10°). Then place the miles to be flown on the inner scale opposite the miles off course on the outer scale. Read the degrees to converge from parallel on the outer scale opposite the speed arrow index (in this case, 4°). By adding these two figures, the total correction to converge would be 14°.
ADDITIONAL QUESTIONS FOR STUDY

Because the following questions are offered for the sole purpose of encouraging student interest, answers and explanations are not included. Here again, the applicant should be aware that these questions do not cover all those subject areas found on the Fundamentals of Instructing or Flight Instructor-Airplane written tests.

1. What is the definition of “learning?”
2. During the learning process, most knowledge is acquired through which sense?
3. What is probably the dominant force which governs a student’s progress and ability to learn?
4. The teaching process can be broken down into how many steps?
5. What is the primary purpose of a critique?
6. What is the most important feature of any written test?
7. When can a written test be termed reliable?
8. What precautions should be taken when using instructional aids?
9. When a student demonstrates a lack of confidence in learning a new maneuver, what can an instructor do to alleviate this problem?
10. What is the purpose of integrated flight instruction?
11. Lesson plans and course syllabi should be followed exactly if maximum benefit is to be derived from their use. Is this statement true?
12. What factor should the instructor consider when determining the length and frequency of flight instruction periods?
13. What is the purpose of performance tests?
14. “Insights” and “perceptions” are involved in the learning process in what manner?
15. Why should an instructor avoid negative teaching?
16. Certain recency of experience requirements are mandatory prior to conducting night operations with passengers aboard. What are these requirements?
17. Under what circumstances may a private pilot receive compensation when acting as pilot in command of an aircraft?
18. What is the difference between control zones and control areas?
19. Are “Airport Traffic Areas” depicted on aeronautical charts?
20. What effect will a lower than standard temperature have upon an altimeter?
21. Rather than flowing directly from high pressure areas to low pressure areas, air tends to flow parallel to isobars and contours. Why?
22. Is cold dry air more dense than cold moist air?
23. How can one tell when an individual thunderstorm has reached its mature stage of development?
24. What is the most serious type of in-flight structural icing?
25. What is the difference between pressure altitude and density altitude?
26. What effect does high ambient temperature have on aircraft performance?
27. What should the absence of a VOR station indicate to a pilot?
28. When transponder equipped, how can a pilot alert ATC that radio communications failure has occurred?
29. How are wingtip vortices generated?
30. What is the difference between “hypoxia” and “hyperventilation?”
APPENDICES

The following material is presented to encourage further study in selected subject areas, and should be used for study purposes only. Because certain data may become obsolete, under no circumstances should any information herein be used for operational purposes.
APPENDIX A—Theory of Flight

POSITIVE STATIC STABILITY

- Ball in bowl
- Force moves ball
- Force removed, ball oscillates
- Ball eventually returns to original position

NEUTRAL STATIC STABILITY

- Ball resting on table
- Force moves ball
- Force removed, ball stops
- Ball remains in new position

NEGATIVE STATIC STABILITY

- Ball balanced on bowl
- Release of force permits ball to move
- Ball continues to move
- Ball will continue to move

Figure 1. Types of stability.

Figure 2. Relative wind—airfoil.
Figure 3. Forces acting on an airplane.
Figure 4. Bank versus airspeed.

Figure 5. Load factor chart.
APPENDIX A—Theory of Flight

Figure 6. Axes of rotation.

Figure 7. Flap configurations.
APPENDIX A—Theory of Flight

S = WING AREA, SQ. FT.

b = SPAN, FT.

c = AVERAGE CHORD, FT.

AR = ASPECT RATIO

AR = \( \frac{b}{c} \)

\( \frac{b^2}{s} \)

CR = ROOT CHORD, FT.

C_t = TIP CHORD, FT.

\( \lambda = \text{TAPER RATIO} \)

\( \lambda = \frac{C_t}{C_R} \)

\( \Lambda = \text{SWEEP ANGLE, DEGREES} \)

MAC = MEAN AERODYNAMIC CHORD, FT.

Figure 8. Descriptions of wing planform.
Figure 9. Stall patterns.

A. ELLIPTICAL

B. RECTANGULAR, $\lambda = 1.0$

C. MODERATE TAPER, $\lambda = 0.5$

D. HIGH TAPER, $\lambda = 0.25$

STALL PROGRESSION
Figure 10. Torque reaction.

Figure 11. Slipstream corkscrew effect.
Appendix A—Theory of Flight

1. Pilot or gust yaws plane to right

2. Resulting oscillations (controls free)

Figure 12. Dutch roll.

Figure 13. Gyroscopic precession reaction.
Figure 14. VOR orientation.
Figure 15. ADF orientation.
PROCEDURE TO FIND EXPECTED RATE OF CLIMB

1. Set wigs, attaratet to 2992 or 2000.
2. Libmat no, othcates pow Paissuat ALTITUDE.
3. Read AIR TEMP daeCtip 1.0111 VOW OiatSsd ad temperature glue! as
4. Rotate DENALI PERFORMANCE COMPUTER 'aid
teadrng nearest tour <wrens
in
temperatur
digree
tahrenhed
Alll TEMP avows in AIR TEMP adam
5. Read tde. PERCENT ROC oPoosrte nearest
PRESSURE ALTITUDE
6. This Figure rs the RATE OF WIMP to be impacted
from your soutane at vow present
ALTITUDE and TOOPERATUREcond4hons

NOTES:
+ Much greater than normal; check manufacturer's specifications.
- Less than normal distance; check manufacturer's specifications.
* General data not pertinent; check manufacturer's specifications.

The DENALT PERFORMANCE COMPUTER is intended to supplement
and NOT replace manufacturer's published performance information

Figure 16. DENALT performance computer.
EXAMPLE: 40 knot wind at 30° angle.
A 30° angle between wind and nose.
B 40 knots total wind velocity.
C 35 knot headwind component.
D 20 knot crosswind component.

Figure 17. Crosswind performance chart.
APPENDIX D—Crosswind Charts

MAXIMUM SAFE CROSSWIND VELOCITIES

Figure 18. Crosswind performance chart.
APPENDIX E—Density Altitude Chart

Set Altimeter to 29.92 in. Hg.
When Reading Pressure Altitude

<table>
<thead>
<tr>
<th>Altitude Setting in Hg</th>
<th>Altitude Correction</th>
</tr>
</thead>
<tbody>
<tr>
<td>28.0</td>
<td>1.825</td>
</tr>
<tr>
<td>28.1</td>
<td>1.725</td>
</tr>
<tr>
<td>28.2</td>
<td>1.630</td>
</tr>
<tr>
<td>28.3</td>
<td>1.535</td>
</tr>
<tr>
<td>28.4</td>
<td>1.435</td>
</tr>
<tr>
<td>28.5</td>
<td>1.340</td>
</tr>
<tr>
<td>28.6</td>
<td>1.245</td>
</tr>
<tr>
<td>28.7</td>
<td>1.150</td>
</tr>
<tr>
<td>28.8</td>
<td>1.050</td>
</tr>
<tr>
<td>28.9</td>
<td>955</td>
</tr>
<tr>
<td>29.0</td>
<td>865</td>
</tr>
<tr>
<td>29.1</td>
<td>770</td>
</tr>
<tr>
<td>29.2</td>
<td>675</td>
</tr>
<tr>
<td>29.3</td>
<td>580</td>
</tr>
<tr>
<td>29.4</td>
<td>485</td>
</tr>
<tr>
<td>29.5</td>
<td>390</td>
</tr>
<tr>
<td>29.6</td>
<td>300</td>
</tr>
<tr>
<td>29.7</td>
<td>205</td>
</tr>
<tr>
<td>29.8</td>
<td>110</td>
</tr>
<tr>
<td>29.9</td>
<td>20</td>
</tr>
<tr>
<td>29.92</td>
<td>0</td>
</tr>
<tr>
<td>30.0</td>
<td>-75</td>
</tr>
<tr>
<td>30.1</td>
<td>-165</td>
</tr>
<tr>
<td>30.2</td>
<td>-225</td>
</tr>
<tr>
<td>30.3</td>
<td>-350</td>
</tr>
<tr>
<td>30.4</td>
<td>-440</td>
</tr>
<tr>
<td>30.5</td>
<td>-530</td>
</tr>
<tr>
<td>30.6</td>
<td>-620</td>
</tr>
<tr>
<td>30.7</td>
<td>-710</td>
</tr>
<tr>
<td>30.8</td>
<td>-805</td>
</tr>
<tr>
<td>30.9</td>
<td>-895</td>
</tr>
<tr>
<td>31.0</td>
<td>-965</td>
</tr>
</tbody>
</table>

Figure 19. Density altitude chart.
APPENDIX F—Condor Aircraft

BEST COPY AVAILABLE

AIRCRAFT DESIGNATION: Condor 410.

ENGINE OPERATING LIMITATIONS: 260 HP at 2625 RPM.

FUEL SYSTEM: Fuel injection system (Fuel discharged into combustion chamber)
Recommended Fuel 100/130 Minimum Grade.
Usable Fuel All Flight Conditions 63.5 gallons.

OIL CAPACITY: Total 12 quarts. (moment -0.4)

PROPELLER: Constant-speed Hydraulically Controlled.

LANDING GEAR: Retractable Tricycle Landing Gear.
Hydraulic Actuators Powered By Engine Driven Hydraulic Pump.

WING FLAPS: Hydraulically Operated; Powered By Engine Driven Hydraulic Pump.

EMPTY WEIGHT: 1840 lbs. (moment 63.7)
MAXIMUM GROSS WEIGHT: 3000 lbs.

LOAD FACTOR:
Flaps Up + 3.8, -1.52
Flaps Dn. +3.5

RADIO EQUIPMENT:
1 VHF Communications Transceiver 118.0 to 135.95 MHz
1 VHF Localizer/VOR Receiver 108.0 to 117.9 MHz
1 ADF Receiver (fixed azimuth) 200 kHz to 1750 kHz

AIRSPEED LIMITATIONS:
Never exceed speed 225 mph CAS
Maximum structural cruising speed 190 mph CAS
Maximum maneuvering speed 132 mph CAS
Maximum gear operating speed 160 mph CAS
Maximum gear extended speed 160 mph CAS
Maximum flaps extended speed
Flaps 10° 160 mph CAS
Flaps 10° - 40° 110 mph CAS

MAXIMUM ALLOWABLE WEIGHT IN BAGGAGE COMPARTMENT - 120 LBS.

Figure 20. Owner's manual excerpts.
Figure 21. Loading graph.

Figure 22. Center of gravity envelope.
APPENDIX F—Condor Aircraft

![Take-off data](image1)

**Take-off data**

<table>
<thead>
<tr>
<th>Gross Weight</th>
<th>1250</th>
<th>1600</th>
<th>1900</th>
<th>2200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head Wind mph</td>
<td>0</td>
<td>10</td>
<td>20</td>
<td>30</td>
</tr>
<tr>
<td>Nominal</td>
<td>0</td>
<td>260</td>
<td>280</td>
<td>300</td>
</tr>
<tr>
<td>Ground Run</td>
<td>0</td>
<td>405</td>
<td>445</td>
<td>515</td>
</tr>
<tr>
<td>To clear 50° obstacle</td>
<td>0</td>
<td>495</td>
<td>520</td>
<td>555</td>
</tr>
<tr>
<td>Nominal</td>
<td>0</td>
<td>405</td>
<td>445</td>
<td>515</td>
</tr>
<tr>
<td>Ground Run</td>
<td>0</td>
<td>405</td>
<td>445</td>
<td>515</td>
</tr>
<tr>
<td>To clear 50° obstacle</td>
<td>0</td>
<td>405</td>
<td>445</td>
<td>515</td>
</tr>
</tbody>
</table>

**Climb data**

<table>
<thead>
<tr>
<th>Gross Weight</th>
<th>1250</th>
<th>1600</th>
<th>1900</th>
<th>2200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Best Climb IAS mph</td>
<td>94</td>
<td>130</td>
<td>170</td>
<td>210</td>
</tr>
<tr>
<td>Rate of Climb ft/min</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Fuel Used (gal)</td>
<td>82</td>
<td>130</td>
<td>170</td>
<td>210</td>
</tr>
<tr>
<td>Best Climb IAS mph</td>
<td>94</td>
<td>130</td>
<td>170</td>
<td>210</td>
</tr>
<tr>
<td>Rate of Climb ft/min</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Fuel Used (gal)</td>
<td>82</td>
<td>130</td>
<td>170</td>
<td>210</td>
</tr>
</tbody>
</table>

**Landing distance table**

<table>
<thead>
<tr>
<th>Gross Weight</th>
<th>1250</th>
<th>1600</th>
<th>1900</th>
<th>2200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approach IAS mph</td>
<td>94</td>
<td>130</td>
<td>170</td>
<td>210</td>
</tr>
<tr>
<td>Ground Roll</td>
<td>335</td>
<td>385</td>
<td>435</td>
<td>490</td>
</tr>
<tr>
<td>To clear 50° obstacle</td>
<td>415</td>
<td>490</td>
<td>565</td>
<td>645</td>
</tr>
</tbody>
</table>

**Figure 23.** Take-off data.

**Figure 24.** Climb data.

**Figure 25.** Landing distance table.

---

NOTE: Increase distances 10% for each 10°F above standard temperature for particular altitude.

NOTE: Reduce landing distances 10% for each 6 MPH headwind. Flaps 40° and power off.
### CRUISE PERFORMANCE

**NORMAL LEAN MIXTURE**

**Standard Atmosphere • Zero Wind • Gross Weight - 3000 Pounds**

#### 2500 FEET

<table>
<thead>
<tr>
<th>RPM</th>
<th>MP</th>
<th>BHP</th>
<th>MPH</th>
<th>%</th>
<th>TAS</th>
<th>MPH</th>
<th>63.5 Gal. (No Reserve)</th>
<th>80 Gal. (No Reserve)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2450</td>
<td>24</td>
<td>76</td>
<td>180</td>
<td>14.3</td>
<td>4.4</td>
<td>800</td>
<td>5.6</td>
<td>1010</td>
</tr>
<tr>
<td>23</td>
<td>71</td>
<td>177</td>
<td>13.4</td>
<td>4.7</td>
<td>835</td>
<td>6.0</td>
<td>1050</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>67</td>
<td>173</td>
<td>12.7</td>
<td>5.0</td>
<td>865</td>
<td>6.3</td>
<td>1090</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>63</td>
<td>169</td>
<td>11.9</td>
<td>5.3</td>
<td>900</td>
<td>6.7</td>
<td>1135</td>
<td></td>
</tr>
</tbody>
</table>

| 2300 | 24 | 68  | 174 | 12.8 | 4.9 | 860 | 6.2 | 1085                |
| 23  | 64  | 170 | 12.1 | 5.2 | 890 | 6.6 | 1120                |
| 22  | 61  | 166 | 11.4 | 5.6 | 925 | 7.0 | 1165                |
| 21  | 57  | 163 | 10.8 | 5.9 | 960 | 7.4 | 1210                |

| 2200 | 23 | 60  | 166 | 11.3 | 5.6 | 930 | 7.1 | 1175                |
| 22  | 56  | 163 | 10.7 | 6.0 | 965 | 7.5 | 1215                |
| 21  | 53  | 158 | 10.0 | 6.3 | 1005| 8.0 | 1265                |
| 20  | 49  | 154 | 9.4  | 6.7 | 1035| 8.5 | 1305                |

| 2100 | 22 | 52  | 157 | 9.9  | 6.4 | 1010| 8.1 | 1275                |
| 21  | 48  | 153 | 9.3  | 6.8 | 1045| 8.6 | 1320                |
| 20  | 45  | 148 | 8.7  | 7.3 | 1080| 9.2 | 1360                |
| 19  | 42  | 144 | 8.3  | 7.7 | 1105| 9.7 | 1390                |
| 18  | 39  | 139 | 7.8  | 8.1 | 1130| 10.2| 1420                |
| 17  | 35  | 133 | 7.5  | 8.7 | 1150| 10.7| 1445                |
| 16  | 32  | 126 | 6.9  | 9.2 | 1165| 11.6| 1460                |

#### 5000 FEET

<table>
<thead>
<tr>
<th>RPM</th>
<th>MP</th>
<th>BHP</th>
<th>MPH</th>
<th>%</th>
<th>TAS</th>
<th>MPH</th>
<th>63.5 Gal. (No Reserve)</th>
<th>80 Gal. (No Reserve)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2450</td>
<td>24</td>
<td>79</td>
<td>187</td>
<td>14.8</td>
<td>4.3</td>
<td>800</td>
<td>5.4</td>
<td>1010</td>
</tr>
<tr>
<td>23</td>
<td>74</td>
<td>183</td>
<td>14.0</td>
<td>4.5</td>
<td>830</td>
<td>5.7</td>
<td>1050</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>70</td>
<td>179</td>
<td>13.1</td>
<td>4.8</td>
<td>870</td>
<td>6.1</td>
<td>1095</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>65</td>
<td>175</td>
<td>12.3</td>
<td>5.2</td>
<td>905</td>
<td>6.5</td>
<td>1140</td>
<td></td>
</tr>
</tbody>
</table>

| 2300 | 24 | 71  | 180 | 13.3 | 4.8 | 860 | 6.0 | 1080                |
| 23  | 67  | 177 | 12.6 | 5.0 | 890 | 6.4 | 1125                |
| 22  | 63  | 173 | 11.8 | 5.4 | 925 | 6.8 | 1170                |
| 21  | 59  | 169 | 11.1 | 5.7 | 965 | 7.2 | 1215                |

| 2200 | 23 | 62  | 172 | 11.7 | 5.4 | 935 | 6.8 | 1175                |
| 22  | 58  | 168 | 11.0 | 5.8 | 970 | 7.2 | 1220                |
| 21  | 55  | 165 | 10.4 | 6.1 | 1005| 7.7 | 1265                |
| 20  | 51  | 160 | 9.8  | 6.5 | 1040| 8.2 | 1310                |

| 2100 | 22 | 53  | 163 | 10.1 | 6.3 | 1020| 7.9 | 1290                |
| 21  | 50  | 159 | 9.6  | 6.6 | 1055| 8.4 | 1330                |
| 20  | 46  | 154 | 9.0  | 7.1 | 1090| 8.9 | 1370                |
| 19  | 43  | 150 | 8.5  | 7.5 | 1115| 9.4 | 1405                |
| 18  | 40  | 145 | 8.1  | 7.9 | 1140| 9.9 | 1435                |
| 17  | 37  | 139 | 7.6  | 8.4 | 1160| 10.6| 1465                |
| 16  | 34  | 132 | 7.1  | 8.9 | 1175| 11.2| 1480                |
| 15  | 31  | 125 | 6.7  | 9.4 | 1180| 11.9| 1485                |

---

**Figure 26.** Cruise performance data.
### Cruise Performance

<table>
<thead>
<tr>
<th>RPM</th>
<th>MP</th>
<th>% BHP</th>
<th>TAS MPH</th>
<th>63.5 Gal (No Reserve)</th>
<th>80 Gal (No Reserve)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Endr. Miles</td>
<td>Range Hours</td>
<td>Range Miles</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Endr. Miles</td>
<td>Range Hours</td>
<td>Range Miles</td>
</tr>
</tbody>
</table>

#### 7500 Feet

- **7500 Feet**
- Normal Lean Mixture
- Standard Atmosphere • Zero Wind • Gross Weight-3000 Pounds

#### 10,000 Feet

- **10,000 Feet**
- Normal Lean Mixture
- Standard Atmosphere • Zero Wind • Gross Weight-3000 Pounds

---

**Figure 27. Cruise performance data.**
Fuel cannot be used from both tanks simultaneously.

**FUEL SYSTEM SCHEMATIC**

*Figure 28. Fuel system schematic.*
AIRCRAFT DESIGNATION: - Bobwhite 45H.
ENGINE OPERATION LIMITATIONS: - 240 HP at 2600 RPM.
FUEL SYSTEM: - Pressure Type Carburetor (Fuel discharged into induction system)
Recommended Fuel 91/96 Minimum Grade.
Fuel Capacity Standard Tanks 60 gallons.
Usable Fuel All Flight Conditions 55 gallons.
OIL CAPACITY: - Total 12 quarts.
PROPELLER: - Constant-speed Hydraulically Controlled.
LANDING GEAR: - Retractable Tricycle Landing Gear.
Electrically Operated.
Emergency Operation - Manual Handcrank to Lower Gear ONLY.
WING FLAPS: - Electrically Operated.
EMPTY WEIGHT: - 1,839 lbs. (moment 65.9)
MAXIMUM GROSS WEIGHT: - 2,900 lbs.
LOAD FACTOR: -
Flaps Up +4.4, -1.7
Flaps Dn + 1.5
RADIO EQUIPMENT: -
1 VHF Communications Transceiver 118.0 to 135.95 MHz
1 VHF Localizer/VOR Receiver 108.0 to 117.9 MHz
1 ADF Receiver (fixed azimuth) 200 kHz to 1750 kHz
AIRSPEED LIMITATIONS: -
Never exceed speed 210 mph CAS
Maximum structural cruising speed 175 mph CAS
Maximum maneuvering speed 142 mph CAS
Maximum gear extended speed 140 mph CAS
Maximum flaps extended speed 120 mph CAS
MAXIMUM ALLOWABLE WEIGHT IN BAGGAGE COMPARTMENT - 120 LBS.

Figure 29. Owner's Manual excerpts.
Add weight of items to be carried to the Licensed Empty Weight of the airplane. Add moment in thousands of pound-inches of these items to the total airplane moment in thousands of pound-inches found on the Center of Gravity Envelope.

**Figure 30.** Loading graph.

Any point falling within the envelope meets all balance requirements.

**Figure 31.** Center of gravity envelope.
NORMAL TAKE-OFF

TO CLEAR 50 FEET
ZERO WIND — GROSS WT. = 2900 LB.
PAVED LEVEL RUNWAY

Figure 32. Takeoff performance.
NORMAL LANDING

LANDING DISTANCE OVER 50 FT.
POWER OFF APPROACH
FLAPS — 30°, ZERO WIND
GROSS WEIGHT = 2900 LB.
PAVED LEVEL RUNWAY

--- STANDARD TEMPERATURE

Figure 33. Landing performance.
INSTRUCTIONS
FOR USE OF CRUISE PERFORMANCE DATA

NOTE: NO ALLOWANCES WERE MADE IN THE GRAPHS FOR RESERVES, NOR FOR VARIABLE FACTORS SUCH AS WINDS AND FUEL CONSUMED IN THE WARM-UP AND TAXIING; YOU MUST MAKE ALLOWANCES FOR THESE CONDITIONS AS THEY ACTUALLY EXIST, FROM ONE FLIGHT TO ANOTHER.

HORSEPOWER

TO DETERMINE THE HORSEPOWER BEING DEVELOPED, APPLY THE RPM AND MANIFOLD PRESSURE SETTINGS TO BE USED TO THE CRUISING HORSEPOWER CHART. NOTE THAT THE MANIFOLD PRESSURE REQUIRED TO OBTAIN A GIVEN HORSEPOWER WILL VARY WITH THE OUTSIDE AIR TEMPERATURE.

FUEL CONSUMPTION

TO DETERMINE THE RATE OF FUEL CONSUMPTION, APPLY THE HORSEPOWER BEING USED AND THE CRUISING ALTITUDE TO THE FUEL CONSUMPTION VS. HORSEPOWER CHART.

CRUISING AIRSPEED

TO DETERMINE THE CRUISING AIRSPEED THAT RESULTS FROM THE HORSEPOWER BEING USED, APPLY THE HORSEPOWER AND THE CRUISING ALTITUDE TO THE CRUISING OPERATION CHART.

DENSITY ALTITUDE

EXCEPT WHEN CONTRARY TO THE PROBLEM POSED IN SPECIFIC TEST ITEMS, CONSIDER INDICATED ALTITUDE, PRESSURE ALTITUDE, AND DENSITY ALTITUDE AS BEING IDENTICAL IN DETERMINING CRUISE CONTROL DATA FOR THE AIRPLANE.

Figure 34. Cruise performance instructions.
FUEL CONSUMPTION VERSUS HORSEPOWER

Figure 35. Fuel consumption.
CRUISING OPERATION

2900 LBS. GR. WT.

Figure 36. Cruising operation.
## APPENDIX G—Bobwhite Aircraft

### CRUISING POWER SETTINGS

<table>
<thead>
<tr>
<th>Bobwhite 45H</th>
<th>700 RPM</th>
<th>1100 RPM</th>
<th>1900 RPM</th>
<th>2500 RPM</th>
<th>3500 RPM</th>
<th>3900 RPM</th>
<th>4300 RPM</th>
<th>4700 RPM</th>
<th>5100 RPM</th>
<th>5500 RPM</th>
<th>6000 RPM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wet</td>
<td>HP at 700</td>
<td>HP at 1100</td>
<td>HP at 1900</td>
<td>HP at 2500</td>
<td>HP at 3500</td>
<td>HP at 3900</td>
<td>HP at 4300</td>
<td>HP at 4700</td>
<td>HP at 5100</td>
<td>HP at 5500</td>
<td>HP at 6000</td>
</tr>
<tr>
<td>Max</td>
<td>23.5</td>
<td>23.5</td>
<td>23.5</td>
<td>23.5</td>
<td>23.5</td>
<td>23.5</td>
<td>23.5</td>
<td>23.5</td>
<td>23.5</td>
<td>23.5</td>
<td>23.5</td>
</tr>
<tr>
<td>Min</td>
<td>20.1</td>
<td>20.1</td>
<td>20.1</td>
<td>20.1</td>
<td>20.1</td>
<td>20.1</td>
<td>20.1</td>
<td>20.1</td>
<td>20.1</td>
<td>20.1</td>
<td>20.1</td>
</tr>
<tr>
<td>Nom</td>
<td>22.4</td>
<td>22.4</td>
<td>22.4</td>
<td>22.4</td>
<td>22.4</td>
<td>22.4</td>
<td>22.4</td>
<td>22.4</td>
<td>22.4</td>
<td>22.4</td>
<td>22.4</td>
</tr>
</tbody>
</table>

**Figure 37.** Power settings.
APPENDIX H—Weather Data

SA21 031900

MLC SP B1103003RW--F 062/62/59/0605/973/TE47 MOVG NE NO GSTS CIG RGD
ADM M310TRW-F 63/62/1415/966/TE22 S MOVG N PK WND 12/18 22
DAL M1031505RW-F 72/67/1710G/963 PRESFR
FTW M170100035007 67/63/2713G28/966/RE25 WND SHFTD GRDLY-FTW=9/22 10/6
10/9 11/26
GSW 50E20070012RW- 038/63/63/2511/966/ TB 15 N=E-S MOVG NE OCNL
LTVICCG PK WND 24/30 35 EINOVG PRES UNSTY RE 658B19
ACT 250E4012 048/68/58/2614/968/ TE24 N MOVG NE TCU NE-SE
PK WND 23/26 15 RE15 WND 220V520
CLL E1507 060/74/71/1810/971/ RE25 PRESFR/-CLL/11/20
TPL E25010 63/55/3015/969
LFK SP E577 072/72/67/1210/975

SA NEAR WEST 031902

SPS E700250010 051/60/50/2618/970-SPS=11/2
HBR SP 15025050012 029/55/53/214/964
GAG S A5112R- 072/55/33/0322/974/PK WND 01/22 55/UA 1825 GAG-OKC
280/35 65/ ABV TOPS UNKN
CDS 50E250012 049/55/38/3212G20/969-CD5=11/11
MAF 450250020 075/3/920/2818/983-MAF 9/3 12/3
LBB 170E200012 049/51/33/3213/973-LBB=11/22
AMA SP M61095L--F 059/3C/34/017G973
DDC SP 50025050012 049/32/27/0215G27/983
GCK SP A805006ZL-F 108/33/30/0215/984-LEZL15 GCK=11/7
DHT W2X3/16S--BSF 082/31/31/320G30/978-DHT=12/1
TCC W0X1/4SF 115/32/31/361G25/987
HOB E400250025 43/18/3120G30/982 TCU NW-N

ADM SP 2008 30M37@10TRW-- 2614/964/T NE MOVG NE RW+ NE

---NOSUM 031928
E-FTW 9/22 DFW ARPT CLSD
E-FTW 10/6 DFW GP 17L-35R OTS
E-FTW 10/9 9-27 CLSD
E-FTW 11/26 F54 16-34 CLSD TIL 12/26
E-CLL 11/20 ILS BC 16 OTS

---NOSUM NEAR WEST 031928
E-SPS 11/2 LAW 1ST 1000 35 CLSD
E-CDS 11/11 Rwy LGTS PPO
E-MAF 9/3 E02 16-34 CLSD
E-MAF 12/3 LOC OTS 19-2100
E-LEB 11/22 THR 8 DSPLCD 550
E-GCK 11/7 LBL THR 21 DSPLCD 1230
DHT 12/1 GUY NDB OTS

Figure 38. Aviation weather reports.

Figure 39. NOTAM summaries.
Figure 40. Terminal forecasts.
BEST COPY AVAILABLE

APPENDIX H—Weather Data

FA031240
GSW FA 031240
15% MON-07Z TUE
OILK 07Z TUE-19Z TUE

NMEX OKLA TEX AND CSTL WTRS

HGTS ASL UNLESS NOTED

SYNS...CDFNT AT 13Z NR A GAG-CDS-MOUTH OF PECOS LN NL MOV EWD
ABT 15 KTS TO NR A FSM-TYR-PSX-MFE LN BY 07Z. MOIST SLY FLO
CONTG E OF FNT.

SIGCLDS AND WX...

NRN NMEX.
70-120 BKN TO OVC WITH SCT SNW SHWRS. MINS FQILY OBSCD ABV
70 AND ELSW CIGS LCLY BLO 1 THSD FT VSBY BLO 3 MIS IN SNW
SHWRS AND FOG. TOPS SHWRS 200. CLRGR WRN PIN ARND 18Z AND
ERN PIN AFT 00Z. OILK...VFR.

SRN HLF NMEX AND TEX W OF PECOS RVR.
CLR TO 100 SCT VRBL BKN. OILK...VFR.

OKLA TEX W OF CDFNT EXCP TEX W OF PECOS RVR.
CLDS 30-50 BKN TO OVC NWRN TEX BCMG OCNLY 10 OVC NRN OKLA.
CIGS LWRG IN SCT RAIN SHWRS WITH RAIN CHG TO SNW THIS AFTN AND
ERY TNGT. PINS OVR SRN TEX SCT CL'S 50 OR HIR. OILK...VFR
SRN PINS. MVFR TO OCNL IFR NRN TEX AND OVR OKLA.

OKLA TEX E OF CDFNT.
WDSPRD CLDS 10 TO 20 OVC WITH CIGS FQILY BLO 10 VSBY OCNLY
BLO 3 MIS FOG CNTRL AND ERSN TEX AND ERSN OKLA TIL 18Z. SCT
SHWRS AND A FEW TSTM'S ALG CSTL PLNS AND ALG AND ABT 130 MIS
E OF CDFNT WL SPRD OVR ALL OF AREA BY 18Z WITH TSTM ACTVTY
BCMGR Moore ININS DURG AFTN. PSILY SVR TSTM'S NRN TEX AND OKLA
THIS AFTN AND TNGT. TOPS BLDPS 200-250 BLDG RPDLY TO ABV
300 AFT 18Z. OILK...IFR.

CSTL WTRS.
SCT CLDS 20-30 WITH SCID SHWRS AND TSTM'S. TSTM TOPS 250-300
INCRG TO ABV 350 AFT 18Z. OILK...MOSTLY MVFR.

ICG...LGT TO LCLY MDI MXD ICGICIP ABV FRZ LVL. FRZ LVL SFC
NRN NMEX SLPG 140 SRN TEX.

Figure 41. Area forecast.
### APPENDIX H—Weather Data

<table>
<thead>
<tr>
<th>Valid</th>
<th>Weather Data Based On 3012001</th>
<th>Available For Use 8988-15081</th>
<th>Temps MEG ABV 24000</th>
</tr>
</thead>
<tbody>
<tr>
<td>STS</td>
<td>30 12</td>
<td>25</td>
<td>21 12</td>
</tr>
<tr>
<td>TUS</td>
<td>28 08</td>
<td>32</td>
<td>22 08</td>
</tr>
<tr>
<td>HOU</td>
<td>16 15</td>
<td>21 12</td>
<td>17 10</td>
</tr>
<tr>
<td>ICT</td>
<td>24 29</td>
<td>24 27</td>
<td>24 29</td>
</tr>
<tr>
<td>HLD</td>
<td>28 08</td>
<td>28 03</td>
<td>28 08</td>
</tr>
<tr>
<td>DOR</td>
<td>24 28</td>
<td>24 26</td>
<td>24 27</td>
</tr>
<tr>
<td>NLC</td>
<td>25 18</td>
<td>25 18</td>
<td>25 18</td>
</tr>
<tr>
<td>DUN</td>
<td>15 17</td>
<td>15 17</td>
<td>15 17</td>
</tr>
<tr>
<td>DAL</td>
<td>26 19</td>
<td>26 19</td>
<td>26 19</td>
</tr>
<tr>
<td>CRP</td>
<td>15 19</td>
<td>15 19</td>
<td>15 19</td>
</tr>
<tr>
<td>LOU</td>
<td>16 15</td>
<td>16 15</td>
<td>16 15</td>
</tr>
<tr>
<td>JPT</td>
<td>24 06</td>
<td>24 06</td>
<td>24 06</td>
</tr>
<tr>
<td>LRT</td>
<td>22 02</td>
<td>22 02</td>
<td>22 02</td>
</tr>
<tr>
<td>JAX</td>
<td>34 09</td>
<td>34 09</td>
<td>34 09</td>
</tr>
<tr>
<td>JF</td>
<td>35 25</td>
<td>35 25</td>
<td>35 25</td>
</tr>
<tr>
<td>JX</td>
<td>24 20</td>
<td>24 20</td>
<td>24 20</td>
</tr>
<tr>
<td>JFT</td>
<td>33 07</td>
<td>33 07</td>
<td>33 07</td>
</tr>
<tr>
<td>DTC</td>
<td>28 06</td>
<td>28 06</td>
<td>28 06</td>
</tr>
<tr>
<td>GRT</td>
<td>16 19</td>
<td>16 19</td>
<td>16 19</td>
</tr>
<tr>
<td>LSC</td>
<td>16 28</td>
<td>16 28</td>
<td>16 28</td>
</tr>
<tr>
<td>MNS</td>
<td>28 07</td>
<td>28 07</td>
<td>28 07</td>
</tr>
<tr>
<td>NIP</td>
<td>16 12</td>
<td>16 12</td>
<td>16 12</td>
</tr>
<tr>
<td>MDC</td>
<td>16 30</td>
<td>16 30</td>
<td>16 30</td>
</tr>
<tr>
<td>EIP</td>
<td>18 19</td>
<td>18 19</td>
<td>18 19</td>
</tr>
<tr>
<td>WIP</td>
<td>19 19</td>
<td>19 19</td>
<td>19 19</td>
</tr>
<tr>
<td>JLC</td>
<td>31 27</td>
<td>31 27</td>
<td>31 27</td>
</tr>
<tr>
<td>JMP</td>
<td>32 27</td>
<td>32 27</td>
<td>32 27</td>
</tr>
<tr>
<td>LM</td>
<td>31 12</td>
<td>31 12</td>
<td>31 12</td>
</tr>
<tr>
<td>LN</td>
<td>31 07</td>
<td>31 07</td>
<td>31 07</td>
</tr>
<tr>
<td>MJC</td>
<td>24 12</td>
<td>24 12</td>
<td>24 12</td>
</tr>
<tr>
<td>MNC</td>
<td>22 12</td>
<td>22 12</td>
<td>22 12</td>
</tr>
<tr>
<td>HOB</td>
<td>13 07</td>
<td>13 07</td>
<td>13 07</td>
</tr>
<tr>
<td>AJS</td>
<td>12 12</td>
<td>12 12</td>
<td>12 12</td>
</tr>
<tr>
<td>CJK</td>
<td>22 12</td>
<td>22 12</td>
<td>22 12</td>
</tr>
<tr>
<td>RLC</td>
<td>12 07</td>
<td>12 07</td>
<td>12 07</td>
</tr>
<tr>
<td>PRC</td>
<td>24 12</td>
<td>24 12</td>
<td>24 12</td>
</tr>
<tr>
<td>SPT</td>
<td>28 12</td>
<td>28 12</td>
<td>28 12</td>
</tr>
<tr>
<td>SLT</td>
<td>15 12</td>
<td>15 12</td>
<td>15 12</td>
</tr>
<tr>
<td>TEL</td>
<td>16 12</td>
<td>16 12</td>
<td>16 12</td>
</tr>
<tr>
<td>TUS</td>
<td>18 12</td>
<td>18 12</td>
<td>18 12</td>
</tr>
<tr>
<td>TUC</td>
<td>19 12</td>
<td>19 12</td>
<td>19 12</td>
</tr>
<tr>
<td>FT</td>
<td>3000</td>
<td>6000</td>
<td>9000</td>
</tr>
<tr>
<td>8000</td>
<td>12000</td>
<td>18000</td>
<td>24000</td>
</tr>
<tr>
<td>30000</td>
<td>34000</td>
<td>39000</td>
<td></td>
</tr>
</tbody>
</table>

---

57
BEST COPY AVAILABLE

APPENDIX H—Weather Data

MKC UA 1353 DURGD 35 NE MKC HEAVY TO MDT TURBC 100-40. LEAR TOPS OF EVERYTHING 170. BE100

MAF UA 1400 32N MAF MDT TURBC OCNL GRATER THAN MDT 110 B727

MLC UA 1700 VCNTY EUFAULA CIGS 10-18AGL CRB ICG C150

FTW UA 1705
   GNW GSW LGT-MDT TURBC 20 C500

DAL UA 2024 20E GSW SVR TURBC 330-370 B727

TUL UA 2033 24 SW TUL AND W AND SW R-- 8-12w AGL

DAL UUA 2058 TYR MDT TURBC A ALT MISG 5727

TYR UA 2107 10 S TYR MDT-SVR TURBC HAIL 90 CV60

Figure 43. Pilot reports.

NNNNZCZC
UBUS1 KGSW 0316A5
OKLA OKC UA
   OKC 1615 35W OKC LGT-MDT TURBC SVR WAVE EFFECT 370 G159
TEX AMA UA 1615 OVR AMA @140 HIR NW
   AMA UA 1621 DURGC NW BND LGR TURBC 240-260 @260 C500
   BGS PIREP 40 W FST 1600 2800V0 WND 2465 LGR-MDT CAT 330 OVR ELP
   BSM PIREP A0SW BSM 1622 15@60 CLR ABV CAT NONE 070 RF4
   FTW UA
   FTW UUA 1615 8S FTW SVR TURBC 50 PA31
   FWH PIREP 10S FWH 1620 SVR TURB 050 NAVAH0
   GLS UA 1624 DURGC NW BND TOPS GLS-HOU 140 ISOLD BLDP 180-200
   PSX UA 1606 AAP-PSX 12-15@ SCD W- REE PIREP 2SW GTH 1618 LO @ BLO 100@150 LGT-OCNL MDT TURBC
   NEG ICG 100 02
NMEX ABQ UA
   ABQ UUA 1627 100 W ABQ LGT TO MDT TURBC FL230-260 DC9,
   ABQ ABQ LGT TO MDT TURBC FL170-200 DC9
   CVS PIREP 50W CVS 1615 @220 F-111
   CVS PIREP OVR CVS 1605 52@110 F-111

Figure 44. Pilot report summaries.
WMS CNCL
ZCIC
OKC
NOT IN SYS
170 TWB 30148 GSW-SHV. SCT-BKN CLDS ABV 10 THSD WITH FEW
PACHES OF FOG LCLY LWRG VSBY BLO 3 MI TIL LATE MRNG. CONDS
WL LWR DURG AFTN TO ARND 2-3 THSD SCT-BKN AND WL BCM OVC AFDK.
CHC OF TSTMS IN SHV AREA AFTN.

Figure 45. TWB route forecasts.

NKC AC 031500
NKC AC 031599
VALID 031500-041200Z
SVR TSTMS...A FEW EXPCD THIS AFTN AND EVE S CNTRL AND ERN
OKLA WRN ARK CNTRL AND ERN TEX AND WRN LA.
GEN TSTMS...RT OF A LN G6E DRT BWD CDS GAG CNU CGI CBM PNS. ALSO
TO THE RT OF LN OMK LKV SFO.
QSBY
RL 1516

Figure 46. Severe weather outlook.

GSW WA 031950
031950-040200
AIRMET ECHO 5. FLT PRCTN. CNTRL AND ERN OKLA AND NERN TEX
GELY E OF END-LFN LN CIGS FQLY BLO 1 THSD FT VSBSYS FQILY
BLO 3 MI. CONDS IPVG TEX PTN BY 00Z BUT CONTG OKLA PTN PAST
02Z.

Figure 47. AIRMET.

GSW WS 032030
032030-040100
SIGMET FOXTROT 3. FLT PRCTN. ERN OKLA ERN TEX NMRS TSTMS. LN NMRS
TSTMS 2030Z 25 WD NR PNC 30E DAL TO CLL MOVG EWD 25 KT. CB TOPS
TO 400. TSTMS MOVG TO EXTRM ERN OKLA AND EXTRM ERN TEX BDR SECS
BY 01Z AND CONTG

Figure 48. SIGMET.
BULLETIN

TORNADO WATCH NUMBER 560
ISSUED 3.08 PM CST DEC 3 1973

A...THE NATIONAL WEATHER SERVICE HAS ISSUED A TORNADO WATCH FOR...

PORTIONS OF EASTERN TEXAS

THE THREAT OF TORNADOES AND SEVERE THUNDERSTORMS WITH LARGE HAIL AND DAMAGING WINDS WILL EXIST IN THESE AREAS FROM CURRENT UNTIL 7.00 PM CST THIS MONDAY AFTERNOON AND EVENING.

THE GREATEST THREAT OF TORNADOES AND SEVERE THUNDERSTORMS IS IN AN AREA 70 MILES...60 NAUTICAL EAST AND WEST OF A LINE FROM 45 MILES...40 NAUTICAL...NORTH OF TYLER TEXAS TO 25 MILES...20 NAUTICAL...EAST OF COLLEGE STATION TEXAS.

PERSONS IN OR CLOSE TO THE TORNADO WATCH AREA ARE ADVISED TO BE ON THE WATCH FOR LOCAL WEATHER DEVELOPMENTS AND FOR LATER STATEMENTS AND WARNINGS.

C...TORNADOES AND A FEW SVR TSTMS WITH HAIL SFC AND ALF TO 2 IN.

EXTRM TURBC AND SFC WND GUSTS TO 70K. A FEW CBS WITH MAX TOPS TO 550.

MEAN WIND VECTOR 21045

FIGURE 49. Severe weather forecast.

FIGURE 50. Radar summaries.
FIGURE 51. Surface weather map.
APPENDIX H—Weather Data

Figure 54. Prognostic charts, 12 and 24 hour.
PROGNOSTIC DISCUSSION FROM 0000Z DEC 3, 1973 DATA.

RE FAX 029 ... LFM indicates that short wave trof aloft associated with front off W cat is outrunning the front which should kill it. Strong onshore flow will keep RH hi for sustained scan spreading into the NW.

Separation of the cutoff low aloft in the SW from the remainder of the trof to the N is being enhanced.

Stronger flow aloft to the W of this low as compared to flow to the E favors further digging and thus SSW displacement of the effective sfc low. Low level SLY flow in advance of this sfc low combined with unstable Li will produce scan in sector plus overrunning sctn.

Peek wet associated with sfc low moving up out of Grt-Las envs to be lit and act.

RE FAX 039 ... PE shows short wv trof which comes in from off the W cat being directed SEWO by 36 hrs. This trof will assoc with some scans in NW and Central Rockies.

Sfc low forced into SW Can will fill because it is being directed SEWO away from the Divide.

The above mentioned short ov trof from the W in dropping SEWO should be able to nudge out the cutoff low aloft so that it moves NEWO forcing sfc low to move NEWO also. Unstable lower level SIT flow in sector should produce sctrs which PE does not show. In addition PE loops in cutting off scan to the rear of the cold front.....Rosenbloom

FIGURE 55. Prognostic charts, 36 and 48 hour.
Appendix H—Weather Data

Figure 56. Upper wind prognoses.

Figure 57. Severe weather outlook.
APPENDIX I—Airman’s Information Manual Excerpts

The Airman’s Information Manual has been designed primarily as a pilot’s operational and information manual for use in the National Airspace System of the United States (unless otherwise indicated). It is divided into four basic parts, each of which may be purchased separately. Frequency of issuance, area of coverage, annual subscription costs and highlights of the contents of each part follow.

Part 1—Basic Flight Manual and ATC Procedures


This part contains the basic fundamentals required to fly in the U.S. National Airspace System. Among other data it also contains adverse factors affecting Safety of Flight; Health and Medical Facts of interest to pilots; ATC information affecting rules, regulations and procedures; a Glossary of Aeronautical terms; Air Defense Identification Zones (ADIZ); Designated Mountainous Areas; and Emergency Procedures.

Annual Subscription: $7.00 for U.S., Canada and Mexico, plus $1.75 for other foreign mailing.

Part 2—Airport Directory

Issued: Semiannually (Mar. and Sept.). Coverage: Conterminous U.S., Puerto Rico and Virgin Islands (Note: similar information for Alaska and Hawaii appears in Alaska Supplement and Pacific Chart Supplement, respectively—See Special Notice Section, Part 3 for availability.)

Part 2 contains a Directory of all airports, seaplane bases, and heliports available for civil use. It includes all their services, except communications, in codified form. (Those airports with communications are also listed in Part 3.) A list of new and permanently closed airports which updates Part 2 is contained in Part 3. Also included in Part 2 are U.S. Entry and Departure Procedures, including Airports of Entry and Landing Rights Airports; and a list of Flight Service Station and National Weather Service Telephone Numbers.

Annual Subscription: $7.00 for U.S., Canada and Mexico, plus $1.75 for other foreign mailing.

Parts 3 and 3A—Operational Data and Notices to Airmen

Issued: Part 3, every 56 days and Part 3A, every 14 days (between issues of Part 3). Coverage: Part 3, Conterminous U.S., Puerto Rico and Virgin Islands (Note: Similar information for Alaska and Hawaii appears in Alaska Supplement and Pacific Chart Supplement, respectively—(For sale by National Ocean Survey, Distribution Division, C44, Riverdale, Md. 20840). Part 3A coverage is the same as Part 3 except that Notice-to-Airmen data for Puerto Rico and Virgin Islands appears in the International NOTAMS publication).

Part 3 contains an Airport-Facility Directory of all major airports with control towers and/or instrument landing systems; a tabulation of Air Navigation Radio Aids; Special, General, Area Notices; Notices to Airmen and FDC NOTAMS; a tabulation of New and Permanently Closed Airports (which updates Part 2), and supplemental data to Part 4.

Part 3A contains current Notices to Airmen considered essential to the safety of flight, and FDC NOTAMS as well as supplemental data to Parts 3 and 4.

Annual Subscription: $22.00 for U.S., Canada and Mexico, plus $5.50 for other foreign mailing.

Part 4—Glossary and Special Data


Part 4 contains a list of abbreviations used in the AIM; a tabulation of Parachute Jump Areas; locations of VOR Receiver Check Points (both Ground and Airborne); Restrictions to Enroute Navigation Aids; Preferred Routes; Area Navigation Routes; Special Notice—Area Graphics; Terminal Area Graphics; Olive Branch Routes and other data not requiring frequent change.

Annual Subscription: $9.50 for U.S., Canada and Mexico, plus $2.50 for other foreign mailing.

Where to Purchase AIM

The four basic parts described above are available from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402. Orders should be accompanied by check or money order made payable to the Superintendent of Documents.

Errors, Omissions, or Changes

Errors, omissions, or suggested changes should be forwarded to the Federal Aviation Administration, Flight Services Division, AAT-430, Washington, D.C. 20591.

Figure 59. General information.
Flight Service Stations (FSS) and Combined Station/Tower (CS/T) provide information on airport conditions, radio aids and other facilities, and process flight plans. CS/T personnel are not certificated for weather briefs; however, they provide factual data from weather reports and forecasts. Airport Advisory Service is provided at the pilot's request on 123.6 by FSSs located at airports where there are not control towers in operation. (See Part 1 ADVISORIES AT NON TOWER AIRPORTS.)

The telephone area code number is shown in parentheses. Each number given is the preferred telephone number to obtain general weather information. Automatic answering devices are sometimes used on listed lines to give general local weather information during peak workloads. To avoid getting the recorded general weather announcement, use the selected telephone number listed.

### Location and Identifier  
**Area Code Telephone**

<table>
<thead>
<tr>
<th>Location and Identifier</th>
<th>Area Code</th>
<th>Telephone</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ALABAMA</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anniston ANB</td>
<td>FSS (205)</td>
<td>831-2303</td>
</tr>
<tr>
<td>Birmingham BHM</td>
<td>FSS (205)</td>
<td>595-6151</td>
</tr>
<tr>
<td>Dothan DHN</td>
<td>FSS (205)</td>
<td>751-6633</td>
</tr>
<tr>
<td>Huntsville</td>
<td>WS (205)</td>
<td>772-9300</td>
</tr>
<tr>
<td>Mobile MOB (Bates)</td>
<td>FSS (205)</td>
<td>344-3610</td>
</tr>
<tr>
<td>Montgomery MGM (Dannelly)</td>
<td>FSS (205)</td>
<td>269-4368</td>
</tr>
<tr>
<td>Muscle Shoals MSL</td>
<td>FSS (205)</td>
<td>383-5541</td>
</tr>
<tr>
<td>Muscle Shoals MSL</td>
<td>FSS (205)</td>
<td>381-2500</td>
</tr>
<tr>
<td><strong>ARKANSAS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Harrison HRO</td>
<td>FSS (501)</td>
<td>874-3433</td>
</tr>
<tr>
<td>Jonesboro JBR</td>
<td>FSS (501)</td>
<td>874-3471</td>
</tr>
<tr>
<td>Little Rock</td>
<td>WS (501)</td>
<td>374-1546</td>
</tr>
<tr>
<td>Pine Bluff PBF (Grider)</td>
<td>FSS (501)</td>
<td>774-5682</td>
</tr>
<tr>
<td>Texarkana TXK</td>
<td>CS/T (501)</td>
<td>774-4151</td>
</tr>
<tr>
<td><strong>CALIFORNIA</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arcata ACV</td>
<td>FSS (707)</td>
<td>839-1545</td>
</tr>
<tr>
<td>Bakersfield BFL (Meadows)</td>
<td>FSS (805)</td>
<td>399-1787</td>
</tr>
<tr>
<td>Bishop</td>
<td>WS (714)</td>
<td>873-3213</td>
</tr>
<tr>
<td>Blythe BLH</td>
<td>FSS (760)</td>
<td>949-6151</td>
</tr>
<tr>
<td>Crescent City CEC (McNamara Field)</td>
<td>FSS (707)</td>
<td>464-2814</td>
</tr>
<tr>
<td>Daggett DAG</td>
<td>FSS (714)</td>
<td>254-2232</td>
</tr>
<tr>
<td>Eureka</td>
<td>WS (707)</td>
<td>442-2171</td>
</tr>
<tr>
<td>Fresno FAT (Air Terminal)</td>
<td>FSS (209)</td>
<td>251-4299</td>
</tr>
<tr>
<td>Imperial IPL</td>
<td>FSS (714)</td>
<td>352-6740</td>
</tr>
<tr>
<td>Los Angeles LAX (International)</td>
<td>FSS (213)</td>
<td>777-2772</td>
</tr>
<tr>
<td>Van Nuys</td>
<td>(213)</td>
<td>761-2213</td>
</tr>
<tr>
<td>Long Beach</td>
<td>(213)</td>
<td>639-2818</td>
</tr>
<tr>
<td>Burbank</td>
<td>(213)</td>
<td>542-3365</td>
</tr>
<tr>
<td>Fullerton</td>
<td>(714)</td>
<td>845-3211</td>
</tr>
<tr>
<td>Santa Ana</td>
<td>(714)</td>
<td>546-5901</td>
</tr>
</tbody>
</table>

* Indicates Pilot's Automatic Telephone Weather Answering Service (PATWAS) or telephone connected to the Transcribed Weather Broadcast (TWEB) providing transcribed aviation weather information.

* Indicates a restricted number, use for aviation weather information.

Call FSS for "one call" FSS/WS briefing service.

* Automatic Aviation Weather Service (AAWS).

**Figure 60.** FSS and WS telephone numbers.
Figure 61. Airport/facility directory sample.
CONNECTICUT—Continued

**NEW HAVEN**

**TWEEDE-NEW HAVEN (HVN) IFR 45E LRA**

13 H5S/2-20(2) (S-110, D-155, DT-276) BLS,6,8,11 S S F12,18,30

**REIL:** Rwy 2, 20


**New Haven Tower** 124.8 **Gnd Con 121.7**

**Westchester App Con** 125.35

**Westchester Dep Con** 125.35

**VFR Advisory Ctc Westchester App Con**

**ILS** 109.1 I-MHV Rwy 2 BC unusable

**New Haven (T) BVOR 110.0/MHV on fld

**Remarks:** Twr opers 0600–2400. Freq 121.5 not avbl. GS not monitored 2400–0600 Id.

**NORWICH (L) BVORTAC 109.8/ORW/122.1R**

**FSS:** PROVIDENCE

**Remarks:** Non-federal facility. Unmonitored 0000–0700.

**PUTNAM (H) BVORTAC 117.4/PUT**

**FSS:** WORCESTER

**TRUMBULL (H) BVORTAC 108.4/TMU/122 1R**

**FSS:** WINDSOR LOCKS

**WINDSOR LOCKS FSS** 121.5 122.2 122.3

**WINDSOR LOCKS**

**BRADLEY INTL (CDL) IFR 3W LRA FSS:** WINDSOR LOCKS on Flg 137 H95/6-24(3) (S-200, D-200, DT-350) BLS,6,8,10,11,14,15 S S F12,18,30 Ox1,2,3,4 U2 VASI: Rwy 24, 23 REIL: Rwy 24, 33 RVR: Rwy 6, 24 RVR: Rwy 6, 24 RVR: Rwy 6, 24


**Bradley Tower** 120.3 **Gnd Con 121.9**

**ATIS:** 114.9 (Arr) 371 (Dep)

**Radar Services:** Bradley App Con 121.2 123.85

**Bradley Dep Con 125.35**

**Stage II Arr 123.85 from W of LOC crs. Arr 121.2 from East of LOC crs. Dep 125.35.

**ILS 111.1 I-BDL Rwy 6 LOM: 388/BD**

**Remarks:** ATIS 114.9 opers 0600–0100. Other hrs ctc App Con 121.2.

**DELWARE**

**KENTON (L) BVORTAC 111.4/ENO/122.1R**

**FSS:** MILLVILLE

**NEW CASTLE (L) VORTAC 114.0/EWT**

**FSS:** PHILADELPHIA

**WATERLOO (L) BVORTAC 122.6/AIR/122.1R**

**FSS:** SALISBURY

**WILMINGTON**

**GEORGETOWN NDB MHW 323/GRN**

**FSS:** WASHINGTON

**DISTRICT OF COLUMBIA**

**GEORGETOWN NDB MHW 323/GRN**

**FSS:** WASHINGTON

**WASHINGTON**

**WILLIAMS Intl (IAD) IFR 21W (4 NW Chantilly, Va.) LRA**

**FSS:** WASHINGTON (DI)

**Rwy 313 H115/11-19R (S-200, D-200, DT-350) BLS,6,7A,8,10,13,14,15 SS F12,18,30 Ox1,2,3,4 U2 VASI: Rwy 15, 12, 19, 30 RVR: Rwy 1R-19L, 19R

**Remarks:** Fee. Itinerant ocft 12,000 lbs or less ctc FBO prior to Indg. 2 box VASI rwy 15 TCH 180°, RRP-175°; 2 box VASI rwy 19 TCH 185°, RRP-175°; 2 box VASI rwy 12 TCH 37°, RRP-950°; VASI rwy 30 TCH 83°, RRP-1600°. B-747 act can not pass another B-747 parked on same side of jet apron without the assistance of wing walkers.

**DuLles Tower 120.1**

**Gnd Con 121.9**

**ATIS:** 120.95

**Radar Services:** App Con 119.2 (180–359°) 126.1 (360–179°) 220.65

**Dep Con 125.5 120.45 125.05**

**Stage II** Arr 126.1 from NE, E, SE. Arr 119.2 from SW, W, NW Dep 125.5

**ILS 111.3 I-DLX Rwy 19R**

**110.1 I-5GC Rwy 19L**

**108.7 I-IAD Rwy 18 BC unusable LOM 346/1A**

**WASHINGTON NATIONAL (DCA) IFR 35**

**FSS:** WASHINGTON on flg 15 H69/18-36(4) (S-110, D-200, DT-360) BLS,6,7A,8,10,11,14,15 SS F12,18,22,30 Ox1,2 U2 VASI: Rwy 3, 15, 18, 21, 23 AVASI: Rwy 34 REIL: Rwy 3–21, 15–33, 18 RVR: Rwy 36 RVR: Rwy 16

**Remarks:** High-Density Traffic Airport—prior reservation required. Contact FSS for instructions. Coded transponder required for VFR and IFR. VFR reservation information avbl on ATIS. Turbulence opps ends rwy 21, 33 and 36. Rgt tcs rwy 15, 18, 21. Rwy 15 act on req all jet tcs, no runup in position prior to tcf, rolling tcs only. Special Air Traffic Rules—Part 93. Subpart C in effect. Twr unable to observe airborne act during his of darkness or lower alt sw of arpt due to railroad floodlights. REIL rwy 33 will be on at all times when arpt is in a north operation. Rwy 18–36 groved over first 300’ rwy 36 and 75’ each side of cntrl. Fee. VASI rwy 3 TCH 48’, RRP 1250°; VASI rwy 33 TCH 53°, RRP 1000°; AVASI rwy 34 TCH 195°, RRP 175°; VASI rwy 18 TCH 50°, RRP 950°. See Part 4 for noise abatement procedures. VASI rwy 15 TCH 59°, RRP 1100°; VASI rwy 21 TCH 53°, RRP 1000°.

**Washington Tower 119.1 120.75**

**ATIS:** 132.65

**Radar Services:** App Con 124.2 (East) 119.85 (West)

**Dep Con 118.1 (West) 126.55 (East)**

**TCA Group 1:** See NOS TCA chart

**ILS 109.9 I-DCA Rwy 36 BC unusable LOM: 332/DC**

**ILS-LDA 108.5 I-ASO Rwy 18**

**Washington VOR/DME 111.0/DCA on flg**

**NDB MH-SAB 500° 4.5NM to flg. (See Oxon, Md.)**

**VHF/Df Ctc twr.**

**Remarks:** LOM is Oxon, Md. NDB. Rwy 36 LOC unusable beyond 10NM beyond 20° East side of crs.

Figure 62. Airport/facility directory.
NOTICES TO AIRMEN

This part is issued every 14 days. It contains appropriate notices from the daily NOTAM Summary, and other items considered essential to flight safety.

This section contains Notices to Airmen that are expected to remain in effect for at least seven days. Temporary notices without published duration dates are normally carried twice unless resubmitted.

NOTE: Data preceded by a double diagonal (\(\sqrt{2}\)) are considered permanent and will be published one time only in this section. Data should be noted on charts and records.

NOTE: Notices are arranged in alphabetical order by State (and within the State by city or locality).

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

**NOTES FROM THE DAILY NOTAM SUMMARIES**

---

**ALABAMA**

+ **ALEXANDER CITY, THOMAS C. RUSSELL FLD**
  - Arpt: Rw 9-27 permy clsd.
+ **DOTHAN ARPT**: MALSR rwy 31 cmnd.
+ **TUSCALOOSA**: FSS remains operational, telephone number—(205) 758-3628.
+ **TUSKEESE MOTON FIELD ARPT**: Const in progress. Arpt clsd til aprxly Dec 1973. (8-73)

**ARIZONA**

+ **BISBEE MUNI AIRPORT**
  - Rw lgts 2-20 inop. (9-73)
+ **FLAGSTAFF RDO**: LRCO freq changed to 123.655 kHz.
+ **GRAND CANYON NATIONAL PARK ARPT**: ATCT deactivated until aprxly 1 June 74.
+ **GRAND CANYON NATIONAL PARK**: All pilots are requested to avoid flying below the canyon rim and to maintain a distance 500' above and horizontally from all scenic overlooks, parks, trails and Grand Canyon Village.
+ **PHOENIX, TURF ARPT**: 8 ft fence parallel and 45 ft N of centerline extending from threshold rwy 4 to 1300 ft down rwy.
+ **PIERCE FERRY ARPT**: Arpt abandoned.
+ **PRESCOTT MUNI ARPT**: Outiler 30' AGL clsd. First 1450' rwy 11 clsd.

**ARKANSAS**

- **EL DORADO, GOODWIN FLD**: Threshold rwy 22 dis-
  placed 113'. (6-73)
- **FORDYCE MUNI ARPT**: Rw 04 thr depld 100'. (8-73)
- **HELENA/WEST HELENA - THOMPSON - ROBBINS ARPT**: Rw 17-35 clsd UFN. (9-73)
+ **MARIANNA ARPT**: Arpt abandoned.

**CALIFORNIA**

+ **SPECIAL NOTICE**: Do not mistake dirt strip on large island, Lake Berryessa, lctd lat 39-34 long 122-13 for airport. Strip is unauthorized and unsafe.
+ **ANO NUEVO ISLAND**: Avoid low flying in the vicinity and over island. Biological research of wild life in progress.
+ **BIG BEAR CITY ARPT**: Rw 8-28 ident changed to 7-25. Rw length 5850 ft.
+ **BISHOP RDO**: VOR ident "BHE" OTS. (11-73)
+ **BLYTHE ARPT**: Intensive airline jet a/ct training in progress 24 hrs daily. Iubond a/ct report 20 miles out on 123-6 and guard 123-6 for arpt advisory service, UFN. Use other freqs for other purposes. Unicom is not for arpt advisory use.
+ **BRIDGEPORT, BRYANT FLD ARPT**: Rw lgts operg phone request, call 714-932-8551.
+ **CHINO ARPT**: Constr on arpt til aprxly Jan 1974.
+ **CRESCENT CITY, JACK McNAMARA FIELD**: MALSR rwy 11 cmnd.
+ **DINUBA, ALTA ARPT**: Rw lgts operg phone request, call 209-528-3024.
+ **FRESNO AIR TERMINAL**: Unlgtd 250' AGL crane lctd 5 NW of arpt til aprxly Jan 1975.
+ **MARYSVILLE-YUBA CO. ARPT**: ATCT freq change delayed. Lcl crf freq 120.7 will be retained til aprxly Feb 74 at which time 119.3 will be cmnd. (11-73)
+ **LOS ANGELES INTL ARPT**: ILS/OM "LAX" serv-
  ing rwy 25L shutdown til aprxly Dec 20. (8-73)
+ **MODESTO CITY-COUNTY ARPT**: Rwy 10R-28L clsd to acft over 12,500 lbs GWT. Turbojets requested to discontinue operations 2400-0500 lct and park N side of arpt. (12-73)
+ **AL SPRINGS MUNI ARPT**: VASI rwy 30 not to
  be used beyond 3 NM or Cathedral City due to high
  terrain. VASI opers 0000-2300 lct. VASI upper
  TCH 02', lower TCH 53', upper RRP 1000', lower

---

**Figure 63. Airman's Information Manual—Part 3A.**
Figure 64. Index of olive branch routes.
APPENDIX I—Airman's Information Manual Excerpts

CHICAGO TERMINAL CONTROL AREA
(GROUP I)

CHICAGO SCHAUERBORG

CEILING 7000' MSL

1000' AGL

10 NM

20 NM

30 NM

CONTACT CHICAGO APPROACH CONTROL ON 125.7 OR 363.8

CONTACT CHICAGO APPROACH CONTROL ON 119.0 OR 333.9

AVIATION ADMINISTRATION

Prepared by the National Ocean Survey at the direction of the Federal Aviation Administration

Figure 66. Terminal control area.
WICHITA FALLS TEXAS TERMINAL AREA-GRAPHIC NOTICE

THERE IS A HIGH VOLUME OF STUDENT JET OPERATIONS IN THE TERMINAL AREA. THE DARK ARROWS INDICATE JET IFR ARRIVAL AND DEPARTURE ROUTES THAT ARE MOST COMMONLY USED. RECOMMENDED VFR ARRIVAL AND DEPARTURE ROUTINGS ARE SHOWN BY THE LIGHT ARROWS. RECOMMEND VFR TRAFFIC STAY AT OR BELOW 2300 MSL IN VICINITY OF SHADED AREAS. CONTACT SHEPPARD APPROACH CONTROL ON 125.5 MHz 25 NM OUT FOR RADAR ADVISORY SERVICE.

FIGURE 67. Terminal area graphic notice.
Exam-O-Grams are brief and timely explanations of important aeronautical knowledge items. These items include concepts and procedures that are critical to aviation safety, common misconceptions among airman applicants, and areas which cause general difficulty in written tests.

Exam-O-Grams are developed on a continuing basis, only as needs arise, and not on a regularly scheduled basis. They are distributed free (one copy per request) to airman applicants, pilots, ground and flight instructors, educational institutions, airman training centers, flying clubs, and other interested groups and individuals. Exam-O-Grams may be reproduced without further permission from FAA.

### VFR EXAM-O-GRAMS

<table>
<thead>
<tr>
<th>No.</th>
<th>Title and Revision Date</th>
<th>No.</th>
<th>Title and Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>VFR Cruising Altitudes</td>
<td>35</td>
<td>UNICOM Frequencies and Uses</td>
</tr>
<tr>
<td>4</td>
<td>Preflight Planning for a VFR Cross-Country Flight (Series 1) - 1/74</td>
<td>36</td>
<td>Commonly Misunderstood Areas of Aeronautical Knowledge (Series 1) - 1/72</td>
</tr>
<tr>
<td>5</td>
<td>Preflight Planning for a VFR Cross-Country Flight (Series 2) - 10/71</td>
<td>37</td>
<td>Commonly Misunderstood Areas of Aeronautical Knowledge (Series 2) - 1/72</td>
</tr>
<tr>
<td>6</td>
<td>Preflight Planning for a VFR Cross-Country Flight (Series 3) - 3/71</td>
<td>38</td>
<td>Mixture Control --- Fuel/Air Ratio - 11/66</td>
</tr>
<tr>
<td>15</td>
<td>How to Use VOR (Series 1) - 8/64</td>
<td>39</td>
<td>Simple ADF for VFR Navigation - 8/67</td>
</tr>
<tr>
<td>16</td>
<td>How to Use VOR (Series 2) - 8/64</td>
<td>40</td>
<td>Visual Approach Slope Indicator (VASI) - 1/74</td>
</tr>
<tr>
<td>17</td>
<td>Common Misconceptions (Series 1) - 10/71</td>
<td>41</td>
<td>Controlled Airspace (Series 1) - 10/71</td>
</tr>
<tr>
<td>18</td>
<td>Lost Procedures -- Pilotage - 9/64</td>
<td>42</td>
<td>Controlled Airspace (Series 2) - 10/71</td>
</tr>
<tr>
<td>19</td>
<td>Emergency or Lost Procedures (Radio) - 1/74</td>
<td>43</td>
<td>ATM (Automatic Terminal Information Service) - 1/74</td>
</tr>
<tr>
<td>20</td>
<td>Ceiling and Visibility - 1/74</td>
<td>44</td>
<td>How High the Clouds? - 1/74</td>
</tr>
<tr>
<td>21</td>
<td>Flying into Unfavorable Weather - 7/69</td>
<td>45</td>
<td>Airspeeds and Airspeed Indicator Markings (Series 2) - 1/69</td>
</tr>
<tr>
<td>22</td>
<td>Potential Midair Collisions - 1/74</td>
<td>46</td>
<td>Aviation Weather Reports -- Remarks - 1/74</td>
</tr>
<tr>
<td>23</td>
<td>Interpreting Sectional Charts (Ser. 1) - 11/70</td>
<td>47</td>
<td>Ground Effect - 1/74</td>
</tr>
<tr>
<td>26</td>
<td>Common Misconceptions (Series 2) - 1/74</td>
<td>48</td>
<td>Midair Collisions (Series 3) - 1/74</td>
</tr>
<tr>
<td>27</td>
<td>The Effect of Wind on an Airplane - 1/74</td>
<td>49</td>
<td>Use of Oxygen in General Aviation Aircraft - 1/74</td>
</tr>
<tr>
<td>28</td>
<td>Factors Affecting Stall Speed - 9/65</td>
<td>50</td>
<td>Interpreting Sectional Charts (Series 2) - 1/74</td>
</tr>
<tr>
<td>29</td>
<td>Potential Midair Collisions (Series 2) - 1/74</td>
<td>51</td>
<td>Interpreting Sectional Charts (Series 3) - 4/71</td>
</tr>
<tr>
<td>33</td>
<td>Use of Performance Charts - 4/66</td>
<td>52</td>
<td>Sky Cover and Ceiling - 4/72</td>
</tr>
<tr>
<td>34</td>
<td>How to Obtain Proper Weather Briefing - 1/74</td>
<td>53</td>
<td>charts.</td>
</tr>
</tbody>
</table>

In this set of Exam-O-Grams the following issues have been deleted: Nos. 1, 3, 7, 8, 9, 10, 11, 12, 13, 14, 24, 25, 30, 31, and 32. They have been discontinued since the subject areas which they cover are now adequately treated in one or more of the following FAA publications:

- Pilot's Handbook of Aero. Knowledge, AC 61-23A
- Aviation Weather - AC 00-6
- Airman's Information Manual (annual subscription)
- Other pertinent FAA Advisory Circulars

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

The Advisory Circular Checklist and certain free Advisory Circulars may be obtained from:

U.S. Department of Transportation
Distribution Unit, TAD-443.1
Washington, D.C. 20590

Figure 69. List of VFR Exam-O-Grams.
Exam-O-Grams are brief and timely explanations of important aeronautical knowledge items. These items include concepts and procedures that are critical to aviation safety, common misconceptions among airman applicants, and areas which cause general difficulty in written tests.

Exam-O-Grams are developed on a continuing basis, only as needs arise, and not on a regularly scheduled basis. They are distributed free (one copy per request) to airman applicants, pilots, ground and flight instructors, educational institutions, airman training centers, flying clubs, and other interested groups and individuals. Exam-O-Grams may be reproduced in their entirety or in part, without further permission from the Federal Aviation Administration.

### IFR Exam-O-Grams

<table>
<thead>
<tr>
<th>No.</th>
<th>Title and Revision Date</th>
<th>No.</th>
<th>Title and Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Use and Abuse of Radar - 2/71</td>
<td>25</td>
<td>The ATC Transponder - 2/71</td>
</tr>
<tr>
<td>5</td>
<td>Aviation Weather Reports and Forecasts - 2/71</td>
<td>26</td>
<td>Runway Marking - 10/71</td>
</tr>
<tr>
<td>7</td>
<td>CDI Interpretation - 9/69</td>
<td>28</td>
<td>Category II Taxiway Holding Lines - 7/69</td>
</tr>
<tr>
<td>8</td>
<td>Minimum IFR Altitudes - 2/71</td>
<td>29</td>
<td>When an Alternate Airport is Not Required - 3/70</td>
</tr>
<tr>
<td>10</td>
<td>Altimetry - 12/67</td>
<td>30</td>
<td>VORTAC Area Navigation - 5/70</td>
</tr>
<tr>
<td>14</td>
<td>VOR Quiz - 8/65</td>
<td>32</td>
<td>Aircraft Performance Charts - 3/71</td>
</tr>
<tr>
<td>15</td>
<td>The Weather Depiction Chart is for You - 2/71</td>
<td>33</td>
<td>Runway and Displaced Threshold Lighting - 1/72</td>
</tr>
<tr>
<td>16</td>
<td>The Low Level Prognostic Chart - 4/73</td>
<td>34</td>
<td>IFR Departure Clearances - 9/71</td>
</tr>
<tr>
<td>17</td>
<td>The Radar Summary Chart - 2/71</td>
<td>35</td>
<td>Clearance Delivery Procedures - 1/72</td>
</tr>
<tr>
<td>18</td>
<td>Rate of Turn - 1/67</td>
<td>36</td>
<td>Lost Communications Procedures - Altitude Requirements - 1/72</td>
</tr>
<tr>
<td>19</td>
<td>Telephone Weather Briefing - 6/71</td>
<td>37</td>
<td>Lost Communications Procedures - Route Requirements - 9/72</td>
</tr>
<tr>
<td>21</td>
<td>IFR Weight and Balance Computations - 9/67</td>
<td>38</td>
<td>Lost Communications Procedures - Approach Requirements - 3/73</td>
</tr>
<tr>
<td>22</td>
<td>VOR Receiver Accuracy Check - 9-68</td>
<td>39</td>
<td>Enroute Chart Information - 4/73</td>
</tr>
<tr>
<td>23</td>
<td>Fundamental ADF Procedures - 1/71</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>The Attitude Indicator - 5/70</td>
<td>41</td>
<td></td>
</tr>
</tbody>
</table>

Exam-O-Grams Nos. 1, 3, 4, 9, 12, 13, and 20 have been deleted since the subject areas are adequately treated in other FAA publications. The material in Exam-O-Gram No. 1 is covered in AC 90-1A. This Advisory Circular, and certain other free Advisory Circulars, and the Advisory Circular Checklist may be obtained from: U.S. Department of Transportation Distribution Unit, TAD-443.l Washington, D.C. 20590
**Order Blank**


Date .................................................., 19...

Name ..........................................................

Street address .............................................

City ..................................................................

State .......................................................... Zip Code ............................................

<table>
<thead>
<tr>
<th>CATALOG NO.</th>
<th>QUANTITY DESIRED</th>
<th>TITLE OF PUBLICATION</th>
<th>PRICE PER COPY</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

FOR ADDITIONAL SPACE ATTACH ANOTHER SHEET. TOTAL AMOUNT ENCLOSED. $...

IMPORTANT
Please include your ZIP CODE when filling out the mailing label below.

---

U.S. GOVERNMENT PRINTING OFFICE
PUBLIC DOCUMENTS DEPARTMENT
WASHINGTON, D.C. 20402

OFFICIAL BUSINESS

IF UNDELIVERABLE, RETURN TO SENDER

POSTAGE AND FEES PAID
U.S. GOVERNMENT PRINTING OFFICE
375 SPECIAL FOURTH-CLASS RATE
BOOK

Name ..................................................................

Street address .............................................

City and State .............................................. ZIP Code .................