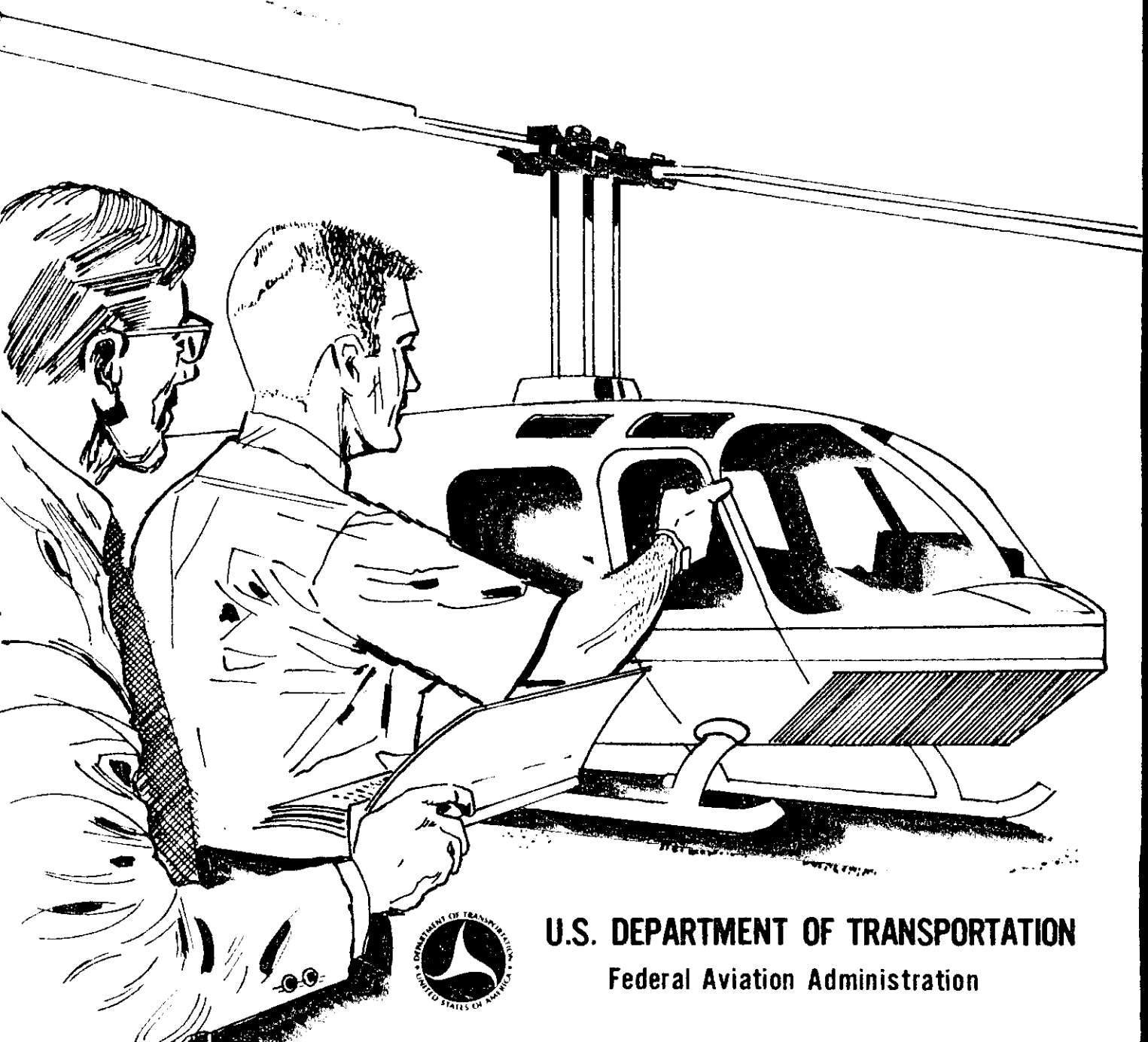
AC 61-74

FLIGHT INSTRUCTOR
Rotorcraft - Helicopter

Written Test Guide



U.S. DEPARTMENT OF TRANSPORTATION
Federal Aviation Administration

FLIGHT INSTRUCTOR ROTORCRAFT–HELICOPTER WRITTEN TEST GUIDE

1974

U.S. DEPARTMENT OF TRANSPORTATION

FEDERAL AVIATION ADMINISTRATION

Flight Standards Service

PREFACE

The Flight Standards Service of the Federal Aviation Administration has developed this Advisory Circular to assist applicants who are preparing for the Flight Instructor Certificate with a Rotorcraft—Helicopter Rating. This guide should be used by those persons seeking certification under the revised provisions of Federal Aviation Regulation, Part 61, which became effective November 1, 1973.

This publication contains comprehensive study outlines, lists recommended study materials, and explains how to obtain those materials. It also includes sample test items with explanations of the correct answers and provides illustrations and aeronautical data representative of that found on FAA written tests.

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.

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FLIGHT INSTRUCTOR
ROTORCRAFT—HELICOPTER
WRITTEN TEST GUIDE

INTRODUCTION

In developing a student into a safe and efficient pilot, a flight instructor must draw from a vast amount of aeronautical knowledge, skill, and experience. Since there is no quick and easy way to acquire these essentials, this guide has been developed primarily to provide a listing of those aeronautical subject areas in which a flight instructor must be knowledgeable. By judicious use of this guide, the applicant should be able to intelligently develop his study plan in preparing for the written tests.

CERTIFICATION REQUIREMENTS

The certification process requires the applicant to pass both a *Fundamentals of Instructing* and a *Flight Instructor—Rotorcraft/Helicopter Written Test.* These tests do not have to be taken on the same day, and it is immaterial which is taken first. The certification process also requires the applicant to pass a pilot flight test.

When applying for an additional instructor certificate or rating, the applicant is not required to take the *Fundamentals of Instructing* written test *if* he already holds a valid FAA Flight or Ground Instructor Certificate.

For *specific* information pertaining to flight instructor certification, review the applicable section of revised Federal Aviation Regulation, Part 61, which became effective November 1, 1973.

THE WRITTEN TESTS

Regulations require that a Flight Instructor applicant be tested in many subject areas. The Flight Instructor—Rotorcraft/Helicopter areas include all the subjects in which ground instruction is required for a (helicopter) private and commercial pilot certificate, as well as the following Fundamentals of Instructing subject areas: The Learning Process, Elements of Effective Teaching, Student Evaluation, Quizzing and Testing, Course Development, Lesson Planning, and Classroom Instructing Techniques.

The Fundamentals of Instructing written test contains 50 test items and 3 hours are allowed for taking this test. The Flight Instructor—Rotorcraft/Helicopter written test contains 60 test items, and 4 hours are allowed for taking this test. 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. 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. After processing, 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 do not reflect the total number of questions the applicant missed.* They merely refer to a Subject Matter Outline, which accompanies the report. The applicant can use these codes and the list to 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 conduct of the pilot flight test.

TAKING THE TESTS

In the written tests, communication between the test writer and an applicant involves the use of "the written language"—a very complicated process which requires careful consideration on the part of both writer and reader. Considerable effort is expended in writing each test item in a clear, concise manner. Applicants should carefully read the information and instructions as well as each test item.

Be sure the objective of the test item is fully understood before attempting to select an answer. Then work the problem or analyze the choices and select the answer believed to be most nearly correct.

There are no "trick" questions. Only one answer is completely correct. The alternate answers are derived from incorrect computations, or based upon common misconceptions or lack of knowledge about the subject. Do not search for hidden meanings or read into the item something that is not there. The questions and answers mean exactly what is stated and refer to the general rule rather than to the exception to the rule.

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

RECOMMENDED STUDY MATERIALS

Professionalism is necessary if instructors are to teach effectively. One thing that enhances professionalism is the possession of a technical library. By acquiring 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 an aeronautical library for use throughout his career.

Excellent textbooks, audio-visual training aids, and instructional materials are produced commercially and may be obtained from various commercial bookstores and certain fixed-base operators who are engaged in flight training.

The following publications are produced by the Federal Aviation Administration:

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

HELICOPTER PILOT WRITTEN TEST GUIDE—PRIVATE—COMMERCIAL. AC 61–73. This publication gives guidance to applicants preparing for the aeronautical knowledge requirements for a private or commercial pilot certificate with a helicopter rating. ($0.80 GPO.) SN. 5007-00265.

BASIC HELICOPTER HANDBOOK. AC 61–13A. This handbook provides detailed information for the applicant who is preparing for the private, commercial, or flight instructor pilot certificate with a helicopter rating. It is also useful as an aid when training students. ($1.90 GPO.) FAA 5.8/2:H 36.

PILOT'S HANDBOOK OF AERONAUTICAL KNOWLEDGE. AC 61–23A. This handbook contains essential, authoritative information used in training and guiding applicants for private pilot certification, flight instructors, and flying school staffs. ($5.30 GPO.) TD 4.408:P 64/5.

INSTRUMENT FLYING HANDBOOK. AC 61–27B. This handbook is designed primarily for airplane pilots, and provides basic information needed to acquire an FAA instrument rating. The helicopter flight instructor however, should find this handbook beneficial since it contains a wealth of information regarding basic flight instruments, radio navigation, air traffic control, etc. ($3.35 GPO.) TD 4./8:In 7/2/971.

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.

WAKE TURBULENCE. AC 90–23D. This circular alerts pilots to the hazards of aircraft trailing vortex wake turbulence and recommends related operational procedures. (FREE from FAA.)

TERRAIN FLYING. AC 91–15. This pocket-size booklet is designed primarily for the private pilot with an airplane rating. However, the helicopter pilot should find this booklet beneficial since it contains observations, opinions, warnings, and advice from veteran pilots regarding flight over various types of terrain. ($1.40 GPO.) TD 4.2:T 27.

PILOT'S WEIGHT AND BALANCE HANDBOOK. AC 91–23. 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. It also contains a section pertaining to helicopter weight and balance. ($1.25 GPO.) TD 4.408:P 64/3.

NATIONAL TRANSPORTATION SAFETY BOARD. NTSB PART 430. This publication deals with procedures required in the notification and reporting of accidents and lost or overdue aircraft in 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). This manual presents, in four parts, information necessary for planning and conducting flights within the U.S. 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 1—Basic Flight Manual and ATC Procedures. This part is issued quarterly. ($7.00 domestic; $8.75 foreign GPO.) TD 4.12:pt. 1/.

Part 2—Airport Directory. This part is issued semi-annually. ($7.00 domestic; $8.75 foreign GPO.) TD 4.12:pt. 2/.

Parts 3 and 3A—Operational Data and Notices to Airmen. Part 3 is issued every 56 days and Part 3A is issued every 14 days. ($22.00 domestic; $27.50 foreign GPO.) TD 4.12:pt. 3/.

Part 4—Graphic Notices—Supplemental Data. This part is issued quarterly. ($9.50 domestic; $12.00 foreign GPO.) TD 4.12:pt. 4/.

For additional information about each part of AIM, see page 65 of this guide.

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-Grams which were available at the time of this publication appears on pages 78 and 79. These summaries are free and may be obtained by contacting U.S. Department of Transportation, FAA Aeronautical Center, Flight Standards Technical Division, Operations Branch, AAC-240, P.O. Box 25082, Oklahoma City, Oklahoma 73125.

FEDERAL AVIATION REGULATIONS. Suggested Parts for study are:

Part 1, Definitions and Abbreviations. ($3.00 domestic; $3.75 foreign GPO.)

Part 27, Airworthiness Standards: Normal Category Rotorcraft. ($1.40 domestic GPO.)

Part 61, Certification: Pilots and Flight Instructors. ($5.05 domestic; $6.35 foreign GPO.)

Part 71, Vol XI; Designation of Federal Airways, Area Low Routes, Controlled Airspace, and Reporting Points. ($5.00 domestic; $6.25 foreign GPO.)

Part 91, General Operating and Flight Rules. ($11.30 domestic; $14.15 foreign GPO.)

Part 135, Air Taxi Operators and Commercial Operators of Small Aircraft. ($6.20 domestic; $7.75 foreign GPO.)

NOTICE

For the convenience of the user, the FAA is in the process of re-issuing the FARs as individual Parts. For information regarding the status of this conversion, obtain a copy of:

AC 00-2 (latest revision) Advisory Circular Checklist and Status of Regulations.

This checklist may be obtained free by requesting it from:

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

HELICOPTER FLIGHT MANUALS AND OWNERS MANUALS. These manuals may be obtained from individual aircraft manufacturing companies or from local dealers and distributors.

HOW TO OBTAIN GPO PUBLICATIONS

1. When ordering FAA publications sold by GPO, order blanks should be used. These blanks (such as shown on page 81) may be duplicated by the user. They are free and can be obtained by contacting:

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

2. Separate order blanks should be used when ordering subscription and nonsubscription publications.

3. The exact name of the publication and its advisory circular identification number should be included on the order blank.

4. A check or money order for the exact price of the publication 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.

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6. Use special delivery when needed.

7. All prices are subject to change. Refer to AC 00–2 (latest revision), "Advisory Circular Checklist and Status of Federal Aviation Regulations" for the current prices. It is very important that the *correct* amount be enclosed with the order.

Several bookstores have been established throughout the country as a public convenience. They 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.
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

Canton GPO Bookstore
Federal Office Bldg.
201 Cleveland Ave.
Canton, Ohio 44702
Phone: 216–455–4354

Chicago GPO Bookstore
Room 1463—14th Floor
Everett McKinley Dirksen Bldg.
219 South Dearborn St.
Chicago, Ill. 60604
Phone: 312–353–5133

Cleveland GPO Bookstore
Room 171 Federal Bldg.
1240 East 9th St.
Cleveland, Ohio 44199
Phone: 216–522–4934

Dallas GPO Bookstore
Room 1C46 Federal Bldg.—U.S. Courthouse
1100 Commerce St.
Dallas, Texas 75202
Phone: 214–749–1541

Denver GPO Bookstore
Room 1421
Federal Bldg.—U.S. Courthouse
1961 Stout St.
Denver, Co. 80202
Phone: 303–837–3965

Detroit GPO Bookstore
Room 229 Federal Office Bldg.
231 W. Lafayette Blvd.
Detroit, Mich. 48226
Phone: 313–226–7816

Kansas City GPO Bookstore
Room 144 Federal Office Bldg.
601 East 12th St.
Kansas City, Mo. 64106
Phone: 816–374–2160

Los Angeles GPO Bookstore
Room 1015 Federal Office Bldg.
300 North Los Angeles St.
Los Angeles, Ca. 90012
Phone: 213–688–5841

Milwaukee GPO Bookstore
Federal Bldg.
Room 190
517 E. Wisconsin Ave.
Milwaukee, Wisconsin 53202
Phone: 414–224–1300

New York GPO Bookstore
Room 1356
26 Federal Plaza
New York, N.Y. 10007
Phone: 212–264–3826

Philadelphia GPO Bookstore
Federal Office Bldg.
Room 1214
600 Arch St.
Philadelphia, Pa. 19106
Phone: 215–597–0677

San Francisco GPO Bookstore
Room 1023 Federal Office Bldg.
450 Golden Gate Ave.
San Francisco, Ca. 94102
Phone: 415–556–6657

Seattle GPO Bookstore
Federal Bldg.
Room 1056
909 First Ave.
Seattle, Wash. 98174
Phone: 206–442–4174

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

Forrestal Bookstore
Rm. 1–J–001
James H. Forrestal Bldg.
1000 Independence Ave., SW
Washington, D.C. 20407
Phone: 202–426–7937

Mail Orders may also be directed to:

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

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 multifaced
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 organization 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. Criticize 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—instructor technique

D. Demonstration—Performance Method

1. Explanation phase
2. Demonstration phase
3. Student performance and instructor supervision phase
4. Evaluation phase

E. The "Telling and Doing" Technique in Flight Instruction

1. Instructor tells—instructor does
2. Student tells—student does
3. Student does—instructor evaluates

F. Programed Instruction

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 critique
3. Small group critiques
4. Individual student critiques
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 student's 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 reactions 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. Aircraft Checkouts

H. Refresher Training

X. THE INTEGRATED METHOD OF FLIGHT INSTRUCTION

A. Definition

B. Objectives
   1. Development of habit patterns
   2. Accuracy of flight control
   3. Operating efficiency
   4. Emergency capability

C. Procedures

D. Precautions

E. Flight Instructor Qualifications

XI. PLANNING INSTRUCTIONAL ACTIVITY

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

B. Syllabus
   1. Sample private pilot ground training syllabus
   2. Sample private pilot 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—HELICOPTER 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. Ceiling
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. Terminal control area
18. Positive control area

B. Part 61: Certification: Pilots and Flight Instructors

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

C. Part 91: General Operating Rules—Subpart A—General

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. Portable electronic devices
11. ATC transponder equipment requirements
12. Civil aircraft: certificates required
13. Aircraft airworthiness
14. Aircraft operating limitations/markings
15. Instrument and equipment requirements
16. Limited/restricted aircraft limitations
17. Report: aircraft identification/activity

D. Part 91: General Operating and Flight Rules—Subpart B—Flight Rules

1. Waivers
2. Operating near other aircraft
3. Right-of-way rules
4. Aircraft lights
5. Complying—ATC clearances/instructions
6. ATC light signals
7. Minimum safe altitudes; general
8. Altimeter settings
9. Flight plan; information required
10. Operation—in vicinity of airport
11. Operation—airport with control tower
12. Operation—airport without control tower

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13. Flight in terminal control areas
14. Temporary flight restrictions
15. Flight test areas
16. Restricted and prohibited areas
17. Positive control areas; route segments
18. Basic VFR weather minimums
19. Special VFR weather minimums
20. VFR cruising altitude or flight level
21. 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/alterations
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

F. Part 135: Air Taxi Operators and Commercial Operators of Small Aircraft

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

H. Series 170—Air Navigation Facilities

IV. AIRMAN'S INFORMATION MANUAL

A. Part 1: Basic Flight Manual and ATC Procedures

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, ISJTA, 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

B. Part 2: Airport Directory

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. Olive branch routes

V. AVIATION WEATHER

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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
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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. GENERAL AERODYNAMICS

A. Airfoil

B. Chord Line

C. Relative Wind

D. Pitch Angle

E. Angle of Attack

F. Lift

G. Drag (airfoil)

H. Stall

I. Lift and Angle of Attack

J. Lift and Velocity of Airflow

K. Lift and Air Density

L. Lift and Weight

M. Thrust and Drag

VII. AERODYNAMICS OF FLIGHT

A. Powered Flight
1. Forces acting on the helicopter
(a) Hovering flight
(b) Vertical flight
(c) Forward flight
(d) Sideward flight
(e) Rearward flight
2. Torque
3. Auxiliary rotor
4. Gyroscopic precession
5. Dissymmetry of lift
6. Blade flapping
7. Coning
8. Axis of rotation
9. Coriolis effect
10. Translating tendency or drift
11. Ground effect
12. Translational lift
13. Transverse flow effect
14. Pendular action

B. Autorotation
1. Rotor RPM during autorotation
2. Flares during autorotation

VIII. LOADS AND LOAD FACTORS

A. Lift Components of a Turn

B. Loads

C. Load Factor

IX. FUNCTIONS OF THE CONTROLS

A. Collective Pitch Control

B. Throttle Control

C. Collective Pitch—Throttle Coordination

D. Antitorque Pedals

E. Heading Control

F. Cyclic Pitch Control

X. OTHER HELICOPTER COMPONENTS AND THEIR FUNCTIONS

A. Transmission System

B. Clutch

1. Centrifugal clutch
2. Friction or belt drive system clutch

C. Freewheeling Unit

D. Swash Plate Assembly

E. Main Rotor System

1. Fully articulated rotor systems
2. Semirigid rotor systems
3. Rigid rotor systems

XI. HELICOPTER OPERATIONS

A. General

1. Preflight/postflight safety practices
2. Use of proper grade/type fuel
3. Fuel system operation
4. Fuel contamination—prevention/elimination
5. Rotor and engine operating limitations
6. Helicopter operating limitations

B. Engine

1. Reciprocating engine principles
2. Engine starting/shutdown
3. Detonation cause/effect
4. Carburetor/fuel injection principles
5. Carburetor ice—cause/detection/elimination
6. Manifold pressure versus RPM
7. Interpreting engine instruments
8. Emergency—engine/systems/equipment/fire

C. Weight and Balance

D. Helicopter Performance

1. Effect of high density altitude on helicopter performance
   (a) Hovering flight
   (b) Takeoff
   (c) Rate of climb
   (d) Landing
2. Effect of gross weight on helicopter performance
3. Effect of wind on helicopter performance
4. Practical methods for predicting helicopter performance
   (a) Manifold pressure and payload
   (b) Manifold pressure and hovering ceiling
   (c) Payload and wind
   (d) Hovering and skid height
   (e) Hovering ceiling and gross weight
   (f) Service ceiling and gross weight

E. Some Hazards of Helicopter Flight

1. Retreating blade stall
2. Settling with power
3. Ground resonance
4. Abnormal vibrations
   (a) Low-frequency vibrations
   (b) Medium-frequency vibrations
   (c) High-frequency vibrations
5. Transition from powered flight to autorotation
6. Height-velocity curve
7. Antitorque system failure
   (a) Antitorque system failure in forward cruising flight
   (b) Antitorque system failure while hovering
8. Wake turbulence
9. Mid-air collisions

F. Precautionary Measures and Critical Conditions

1. General precautionary rule
2. Rotor RPM operating limits
3. Extreme attitudes and overcontrolling
4. Flight technique in hot weather
5. Effect of altitude on instrument readings
6. High-altitude pilot technique
7. Tall grass and water operations
8. Carburetor icing
   (a) Conditions favorable for carburetor icing
   (b) Indications of carburetor icing
   (c) Carburetor air temperature gage
   (d) Use of carburetor heat
   (e) Fuel injection

G. Flight Maneuvers

1. Hovering flight
2. Taxiing—air and surface
3. Takeoffs/approaches/landings
4. Slope takeoff/landing
5. Autorotations

6. Rapid deceleration/quick stop
7. Confined area/pinnacle operation
8. Ground reconnaissance

XII. FLIGHT INSTRUMENTS AND SYSTEMS

A. Attitude Indicator Operation/Errors

B. Heading Indicator Operation/Errors

C. Turn Indicator

D. Vertical Velocity Indicator Operation/Errors

E. Airspeed Indicator Operation/Errors

F. Altimeter 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

XIII. RADIO COMMUNICATIONS

A. VHF/UHF Radio Communications/Phraseology

B. Position Reporting Procedure

C. Tower/FSS/En route Advisories/Instructions

D. FSS Communications Procedures

E. Obtaining Emergency Assistance

F. Lost Procedure When Radio is Inoperative

G. Use of Proper Communications Frequencies

XIV. 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. Planning traffic pattern
6. Navigation computer principles
7. Computing heading/courses
8. Computing time, distance, speed, fuel
9. Computing rates of climb/descent
10. Computing wind direction/speed in-flight
11. Computing off-course corrections
12. Selecting VFR cruising altitudes

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, tracking ADF/RMI bearings
15. Use of compass locators

SAMPLE TEST ITEMS

The following test items are presented to familiarize the applicant with the type of questions he may expect to find on the *Fundamentals of Instructing* and the *Flight Instructor—Rotorcraft/Helicopter 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 the outlines, not just the 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, effort, and the guidance of a competent instructor.

In some of the following 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—Rotorcraft/Helicopter Written Tests.

FUNDAMENTALS OF INSTRUCTING

1. Without perception, can learning take place?

   1—Yes; learning takes place when one gives meaning to his *insights,* while perceptions merely involve the grouping of insights into meaningful wholes.

   2—Yes; real meaning (learning) comes from external stimuli, while perceptions come only from within.

   3—Yes, but only when motivation is strong enough to overcome the lack of perceptual cues.

   4—No; perceptions are the basis of all learning.

Response 4 is the correct answer.

Initially, all learning comes from perceptions which are directed to the brain by one or more of the five senses (sight, hearing, touch, smell, and taste). Real meaning comes only from within a person, even though the sensations which evoke these meanings result from external stimuli. Because the meaning which is derived from the information furnished by the senses may depend on many factors within each person concerned, and because perceptions are the basis of all learning, a knowledge of the factors which affects the perceptual process is very important to the instructor.

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—rationalization.

   2—flight.

   3—resignation.

   4—aggression.

Response 1 is the correct answer.

If a student cannot accept the real reason for his behavior, he may rationalize.

3. For presenting new material, the lecture method is excellent—and is most effective when

   1—notes are used extensively.

   2—motor skills are to be taught.

   3—accompanied by training devices and visual aids.

   4—facts and ideas are to be formulated during the presentation.

Response 3 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.

4. To be effective, a critique should
   1—focus on student performance.
   2—be subjective, dogmatic, and comprehensive in nature.
   3—reflect instructor likes, dislikes, and personal opinions.
   4—emphasize the negative aspects of student performance.

Response 1 is the correct answer.

The effective critique is focused on the student and his performance and should not reflect the personal opinions, likes, dislikes, or biases of the instructor.

5. A written test can be termed "valid" when it
   1—yields consistent results.
   2—measures what it is supposed to measure.
   3—is restricted and discriminatory in nature.
   4—consistently produces a narrow range of scores.

Response 2 is the correct answer.

A measuring instrument, including a written test, is valid when it actually measures what it is supposed to measure and nothing else.

FLIGHT INSTRUCTOR—ROTORCRAFT/HELICOPTER KNOWLEDGE AREAS

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 the month 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.

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 40 and the charts on page 41, determine the center of gravity on the Hurleycraft 135 under the following conditions:

Pilot weight	150 lbs.
Passenger weight	200 lbs.
Fuel	25 gals.

Under these conditions, the center of gravity would be located
   1—well within the CG limit; the loading would be acceptable.
   2—well aft of the aft CG limit; the loading would be unacceptable because the helicopter would be dangerously tail-heavy.
   3—well forward of the forward CG limit; the loading would be unacceptable because the helicopter would be dangerously nose-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:

	Weight	*Moment/1000*
Helicopter basic weight (8 qts. oil included)	935	94.3
Pilot and passenger	350	29.0
Fuel (6.0 lbs. per gal.)	150	16.0
TOTALS	1,435	139.3

Drawing a parallel line from left to right (139.3/1000 lbs.-ins.) and a vertical line from bottom to top (1,435 lbs.) on the center of gravity moment envelope, the CG is located where the two lines intersect—at a point well within the center of gravity envelope.

3. When a warm air mass is being modified by cooling from below, that air mass tends to be characterized, in part, by
   1—unrestricted visibility.
   2—rough air.
   3—smooth air.
   4—showery-type precipitation.

Response 3 is the correct answer.

Cooling from below, which increases the stability of an air mass, may result from (1) the advection of a warm air mass over a colder surface, or (2) radiational cooling of the surface under the air mass. In addition, smooth air is typically associated with stable air.

4. Given: Magnetic Heading ---------- 135°
Relative Bearing ---------- 055°

Based on the given information, the magnetic bearing to the station (radiobeacon) would be approximately

1—055°.
2—080°.
3—135°.
4—190°.

Response 4 is the correct answer.

By adding the magnetic heading (055°) to the relative bearing (135°), the magnetic bearing (190°) to the station is verified (MH+RB=MB).

5. While taxiing on the surface, the cyclic pitch stick should be used to control

1—helicopter heading.
2—any drifting movement.
3—rate of speed.
4—starting and stopping.

Response 2 is the correct answer.

During crosswind taxi, the cyclic should be held into the wind a sufficient amount to eliminate any drifting movement.

ADDITIONAL QUESTIONS FOR STUDY

Because the following questions are presented for the sole purpose of creating 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—Rotorcraft/Helicopter written tests.*

1. What is probably the dominant force which governs a student's progress and ability to learn?
2. What is the definition of "learning?"
3. Is there anything that an instructor can do to alleviate the problem of student airsickness?
4. How can an instructor minimize frustrations and help achieve good human relations when dealing with students?
5. Should an instructor admit errors?
6. What are some of the barriers to effective communications?
7. The teaching process can be broken down into how many steps?
8. Is it necessary to constantly keep a student aware of his progress?
9. A flight syllabus should be followed exactly if maximum benefit is to be derived from its use. Is this statement true?
10. What is the purpose of testing?
11. In an attempt to improve his student/instructor relationship, should an instructor accept lower student-performance standards?
12. What are the characteristics of a good test?
13. What precautions should be taken when using instructional aids?
14. Does the old adage, "Do as I say, not as I do!" have any merit in modern day teaching methods?
15. "Insights" and "perceptions" are involved in the learning process in what manner?
16. Certain recency of experience requirements are mandatory prior to conducting night operations with passengers aboard. What are these requirements?
17. May a private pilot receive compensation when acting as pilot in command of an aircraft?
18. What are the *basic* VFR weather minimums for helicopter operations within control zones?
19. May a helicopter be operated in a control zone under special VFR rules at night?
20. What is the difference between an Airport Traffic Area and an Airport Advisory Area?
21. Will a lower than standard temperature have any effect on an altimeter?
22. What causes air to tend to flow parallel to isobars and contours?
23. Which is more dense—cold dry air or cold moist air?
24. In what manner does high ambient temperature affect helicopter performance?
25. During confined area operations, what is the primary reason for making a low reconnaissance?
26. May a helicopter operate within a Group I Terminal Control Area without an operable transponder?
27. What should the absence of a VOR station identifier signify to a pilot?
28. When transponder equipped, how can a pilot alert ATC that radio communications failure has occurred?
29. Do helicopters generate "wingtip vortices?"
30. Should a helicopter pilot ever need to be concerned about "hypoxia?"

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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.

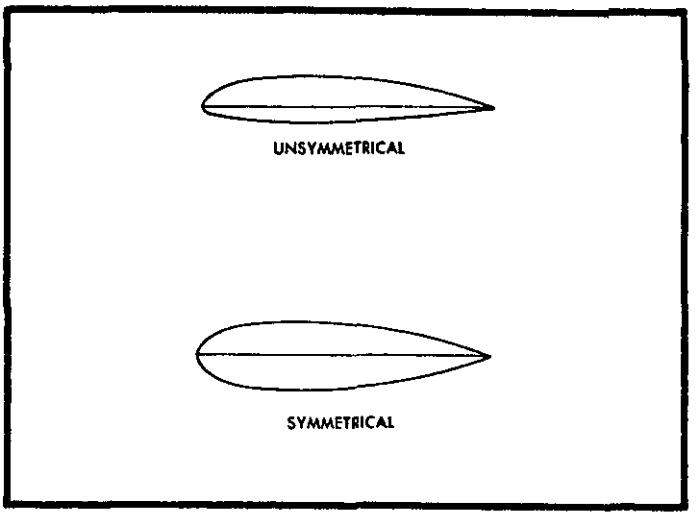

FIGURE 1. Airfoils.

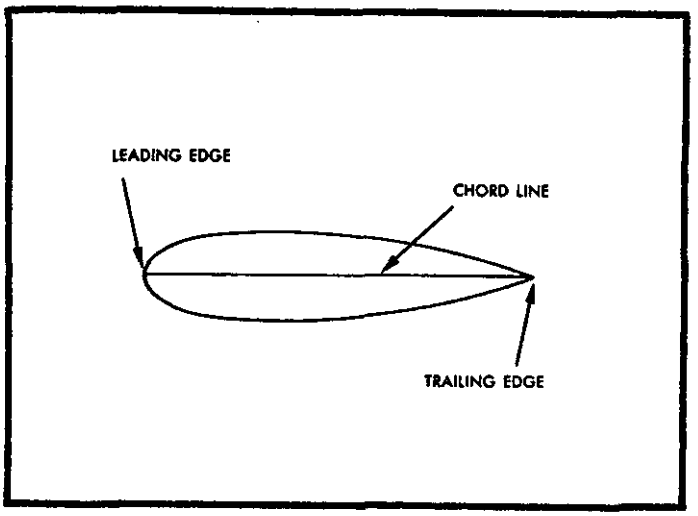

FIGURE 2. Chord line.

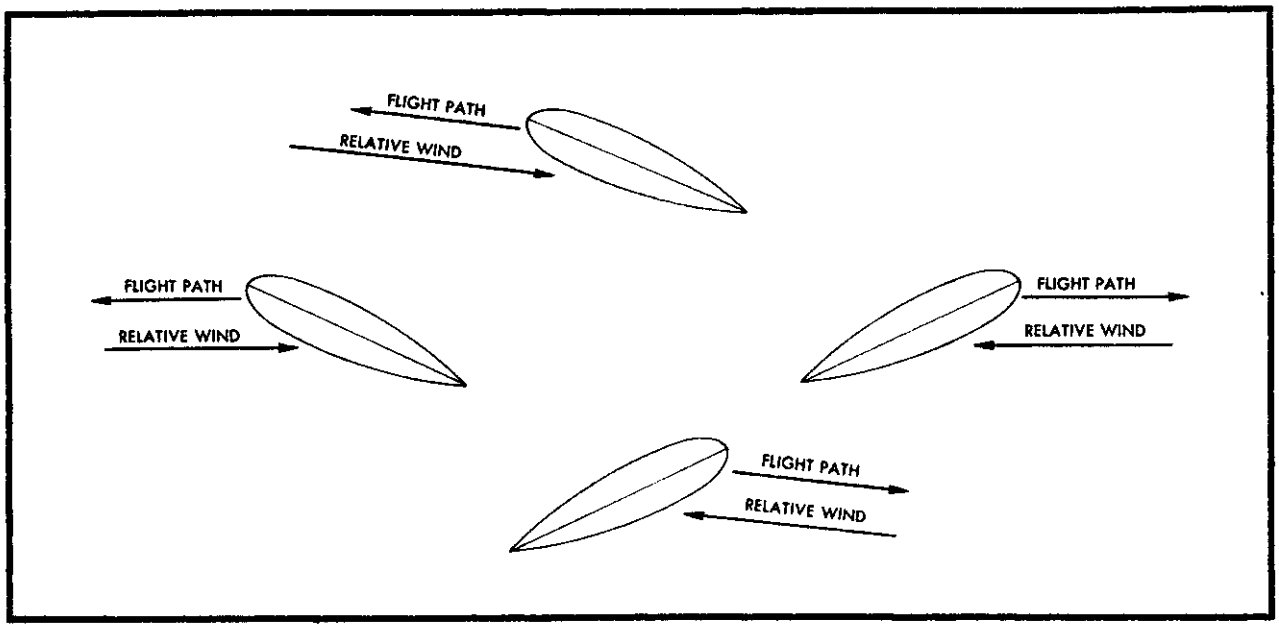

FIGURE 3. Relative wind.

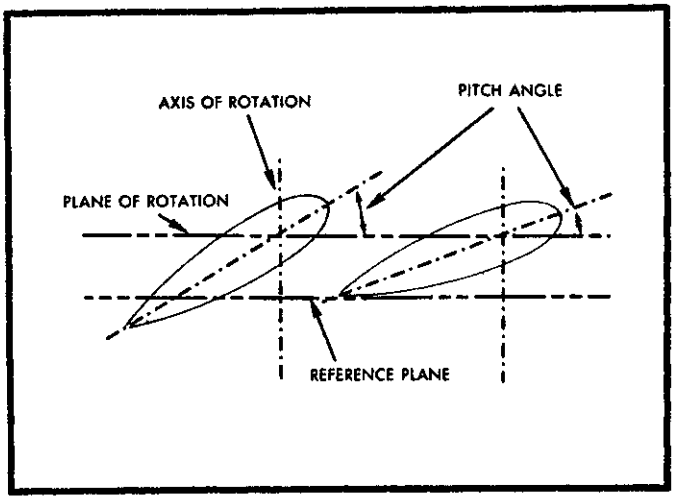

FIGURE 4. Rotor blade pitch angle.

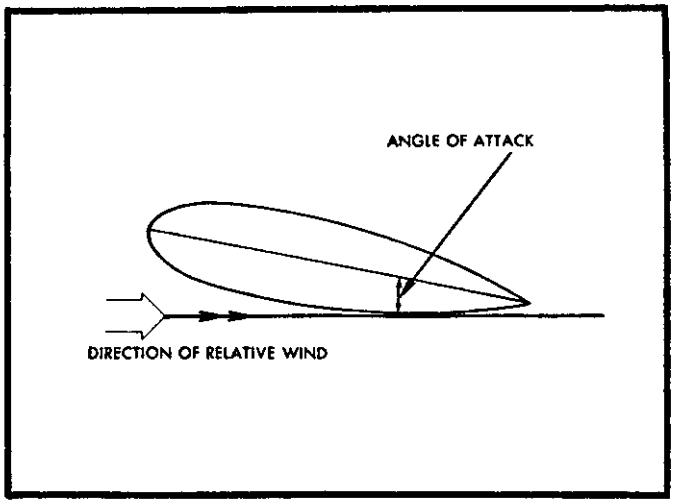

FIGURE 5. Angle of attack.

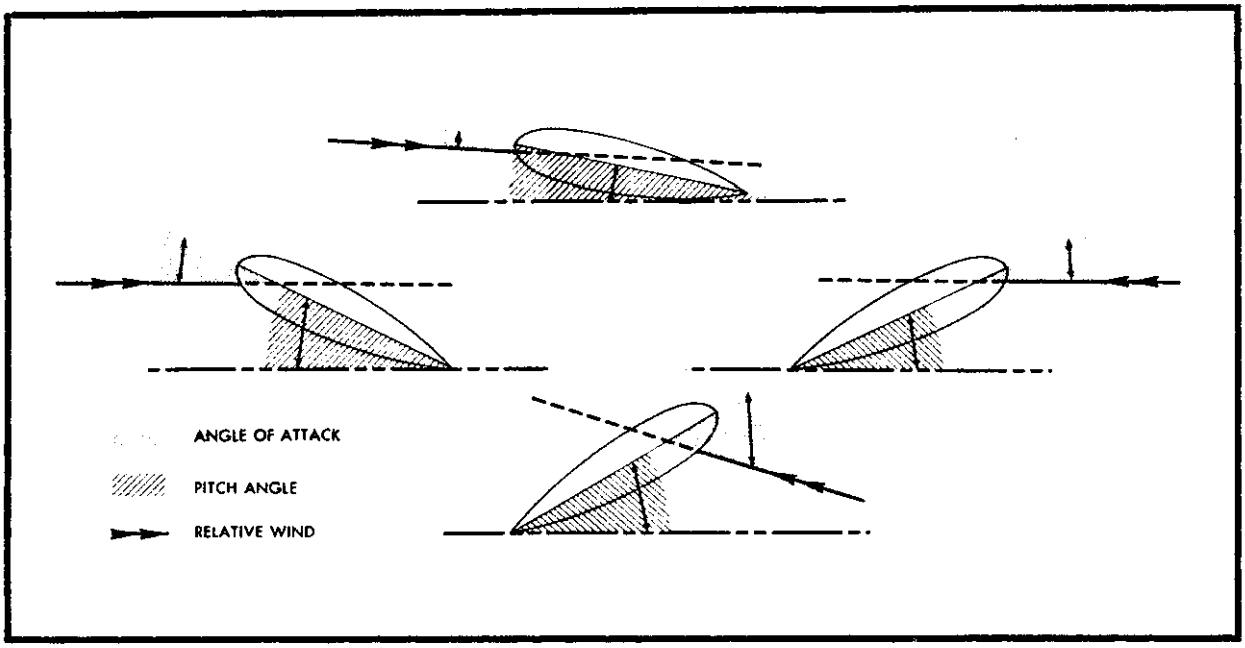

FIGURE 6. Angle of attack and rotor blade pitch angle relationship.

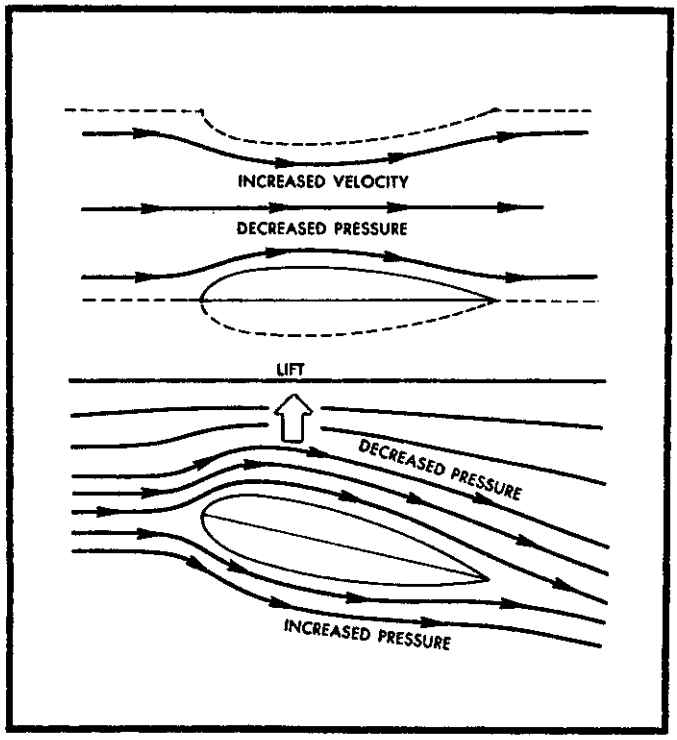

FIGURE 7. Bernoulli's principle.

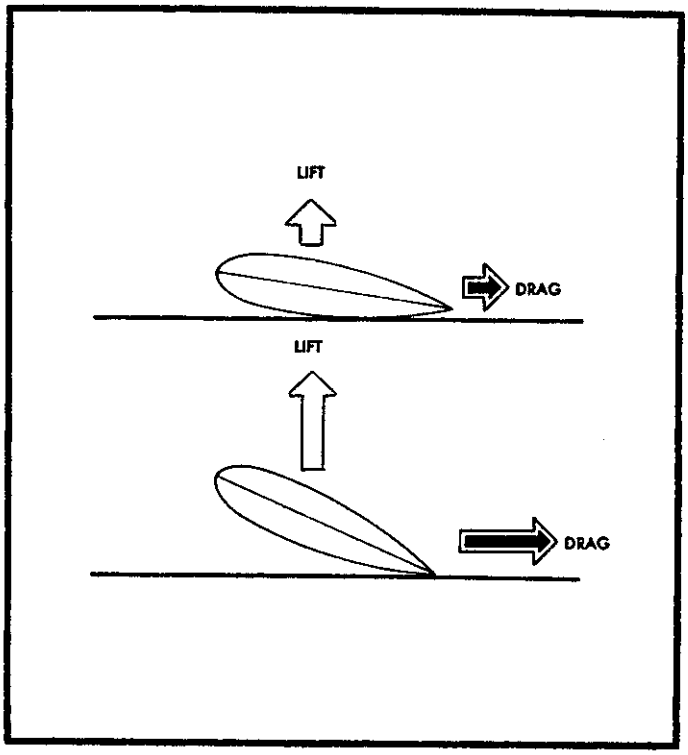

FIGURE 8. Angle of attack and lift and drag forces relationship.

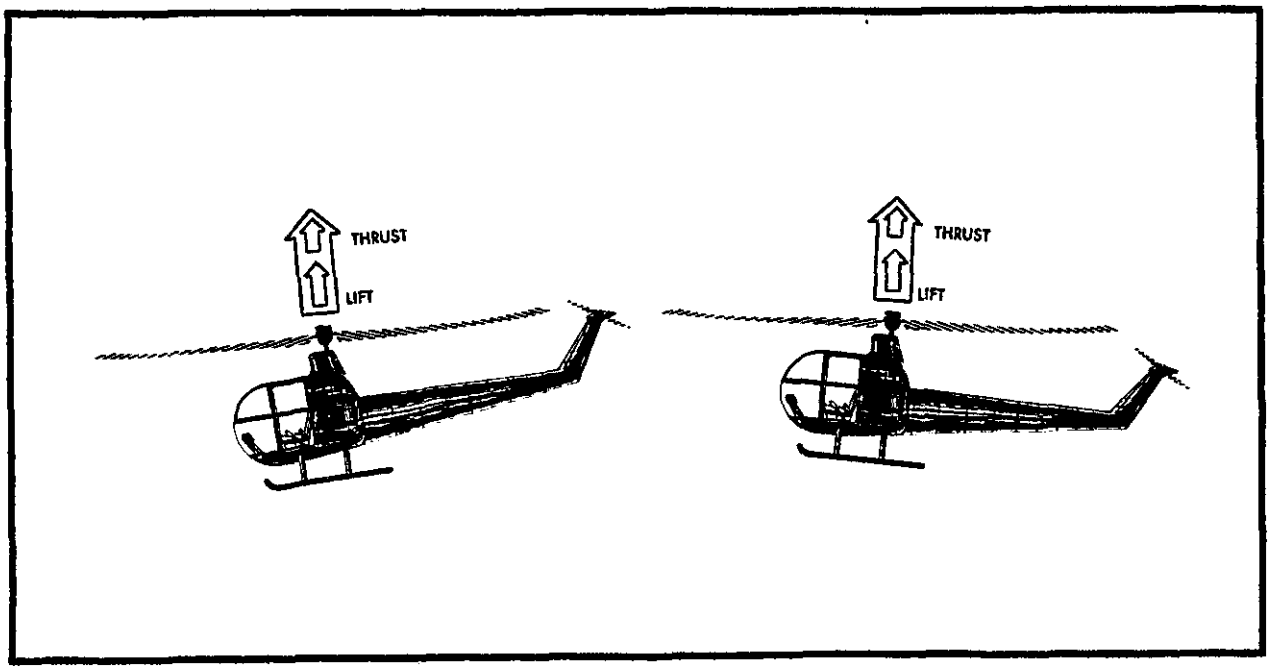

FIGURE 9. Total lift-thrust force and rotor disc relationship.

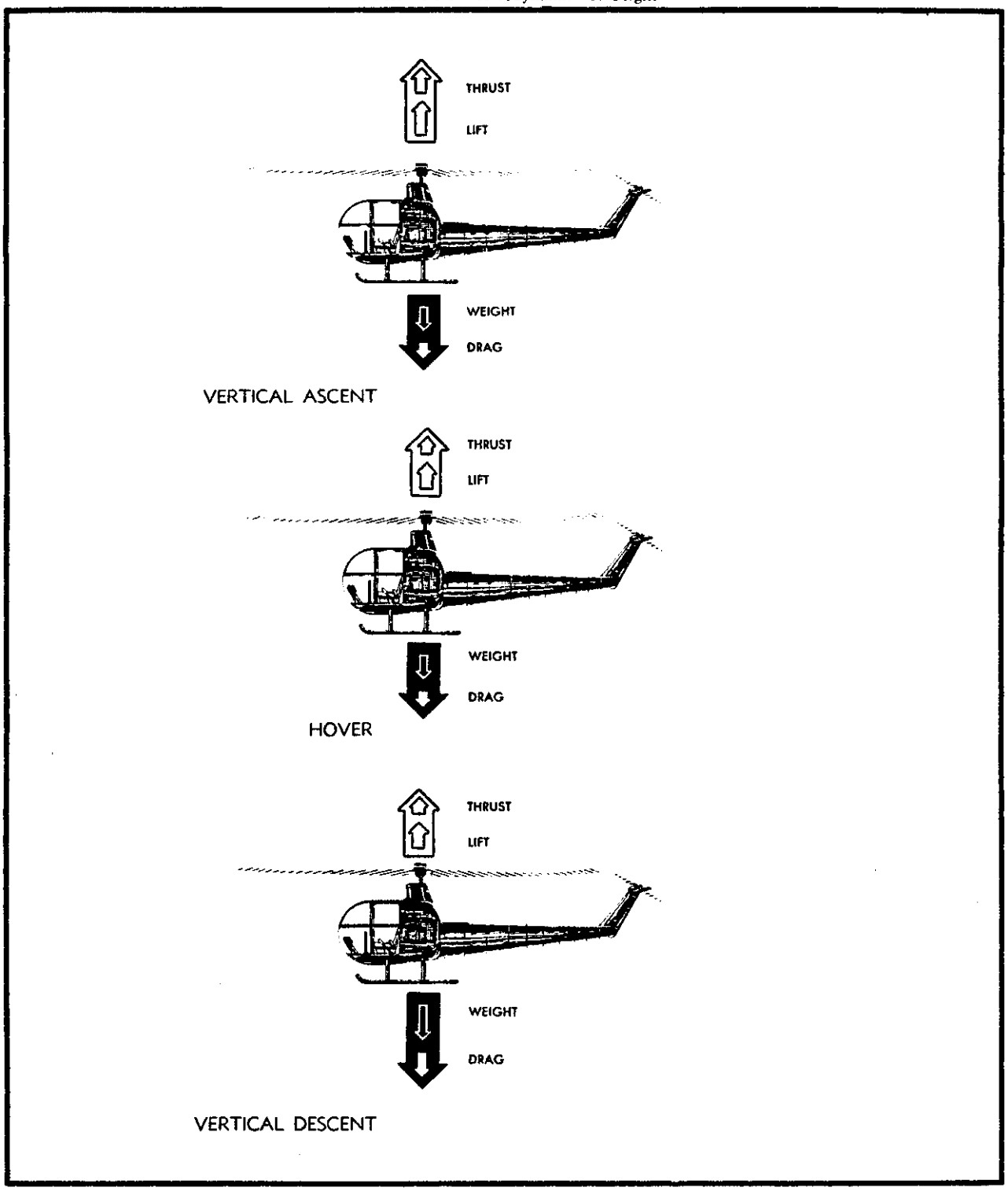

FIGURE 10. Hovering and vertical flight aerodynamic forces.

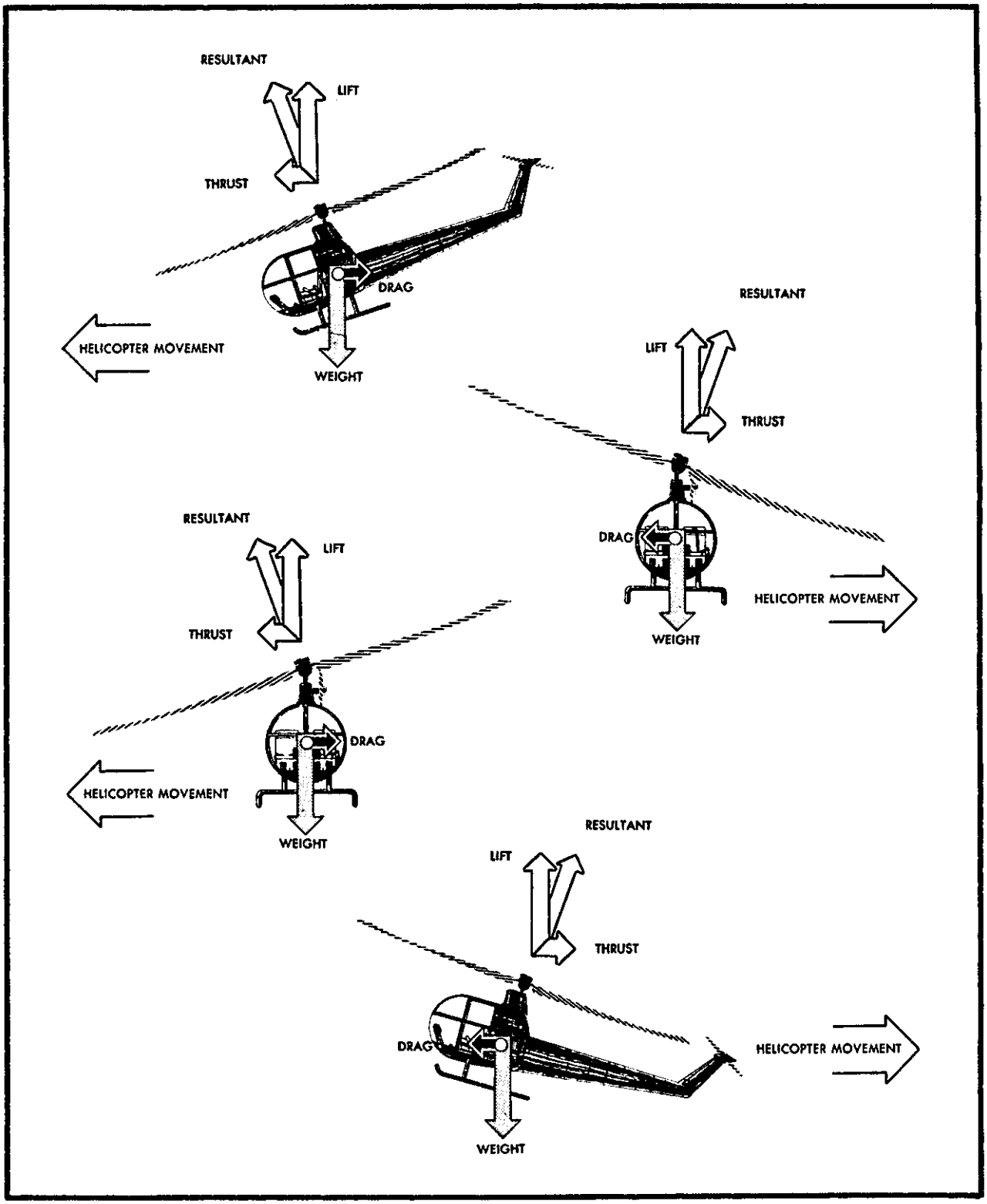

FIGURE 11. Forward, sideward, and rearward flight aerodynamic forces.

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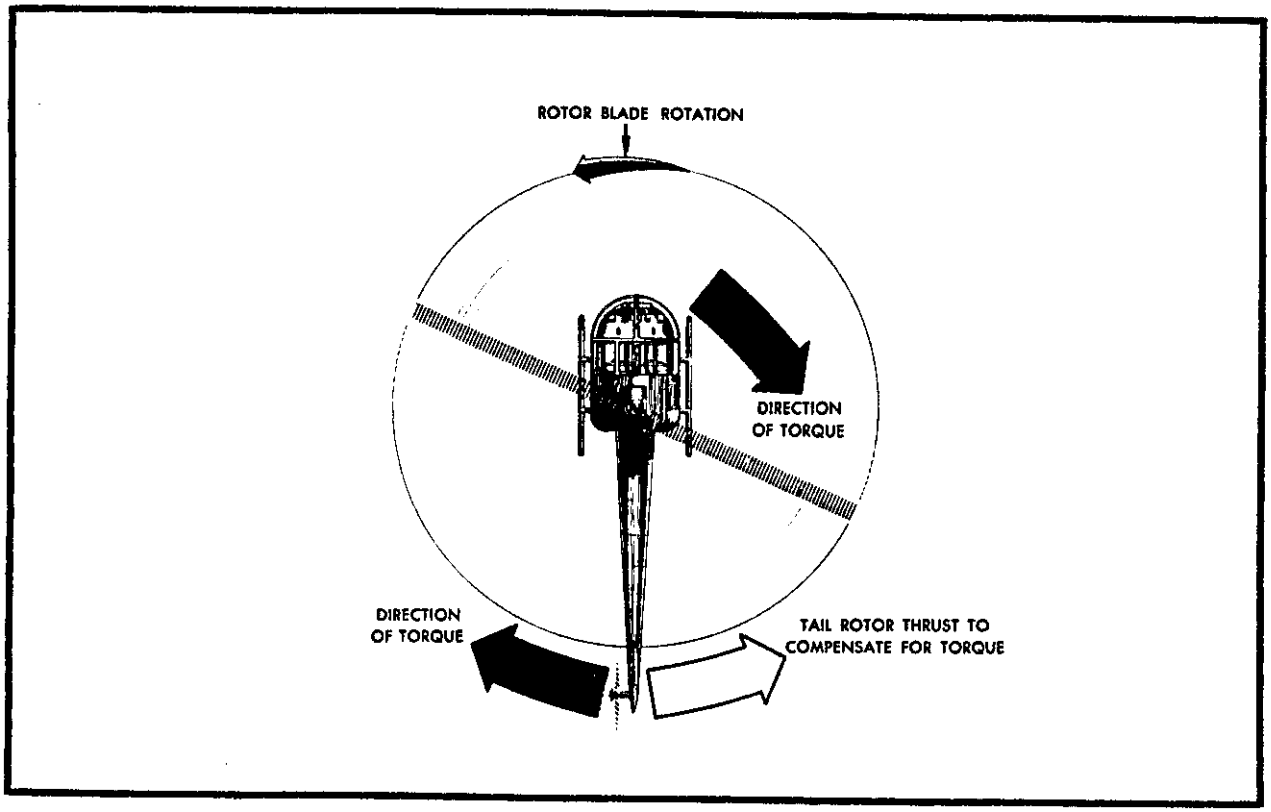

FIGURE 12. Effects of tail rotor thrust.

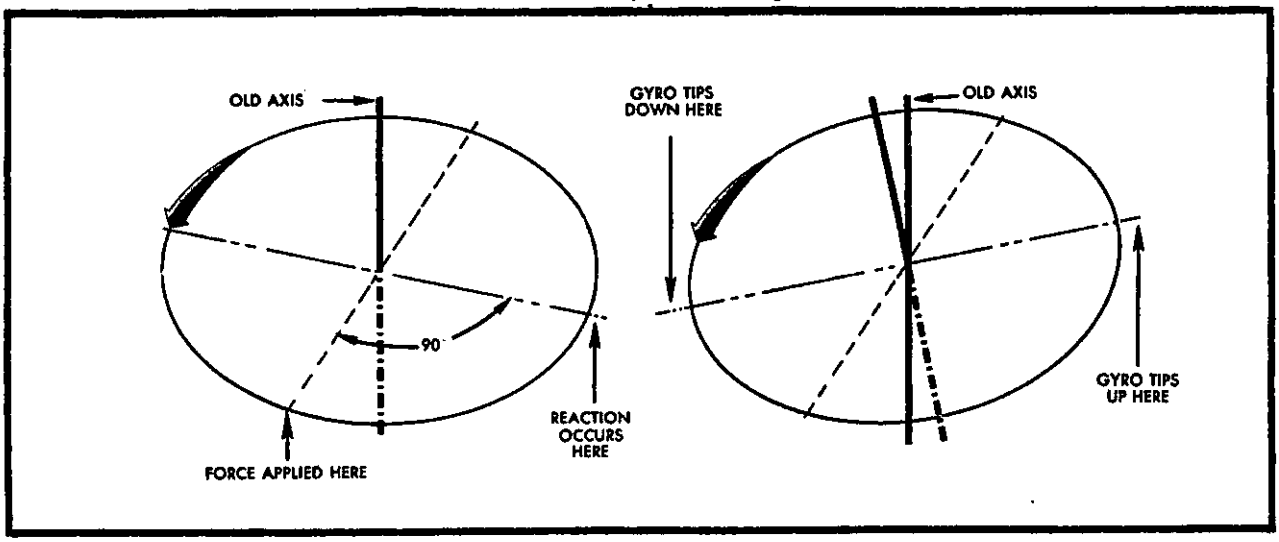

FIGURE 13. Gyroscopic precession principle.

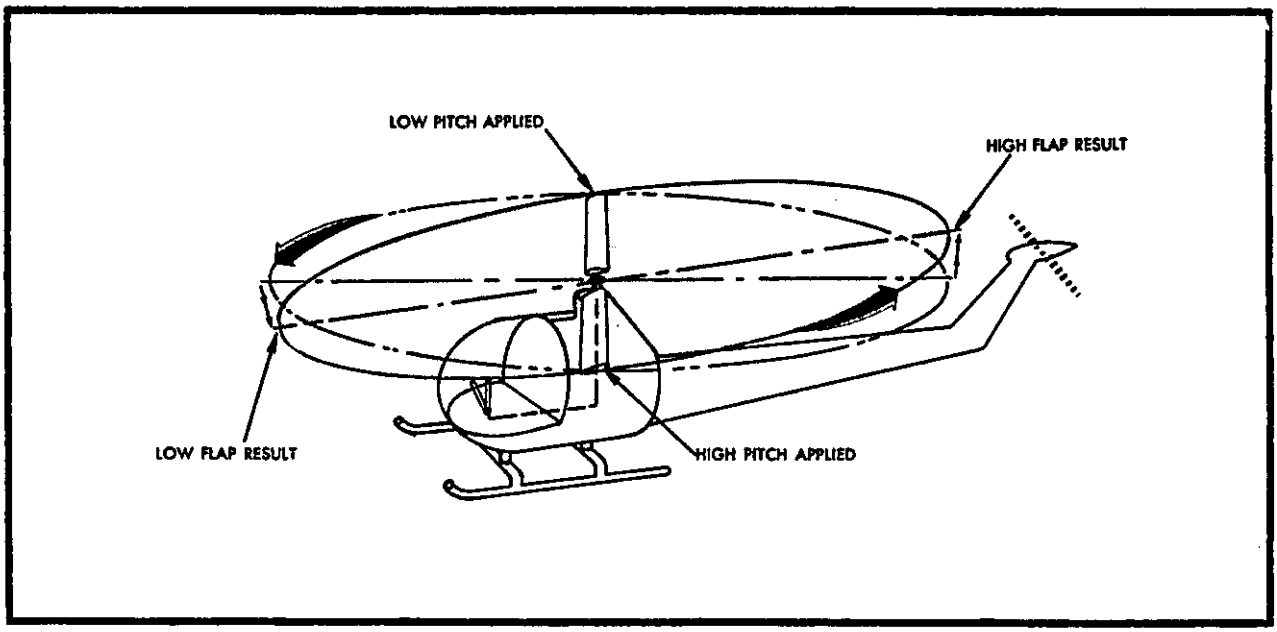

FIGURE 14. Rotor disc acts like a gyro.

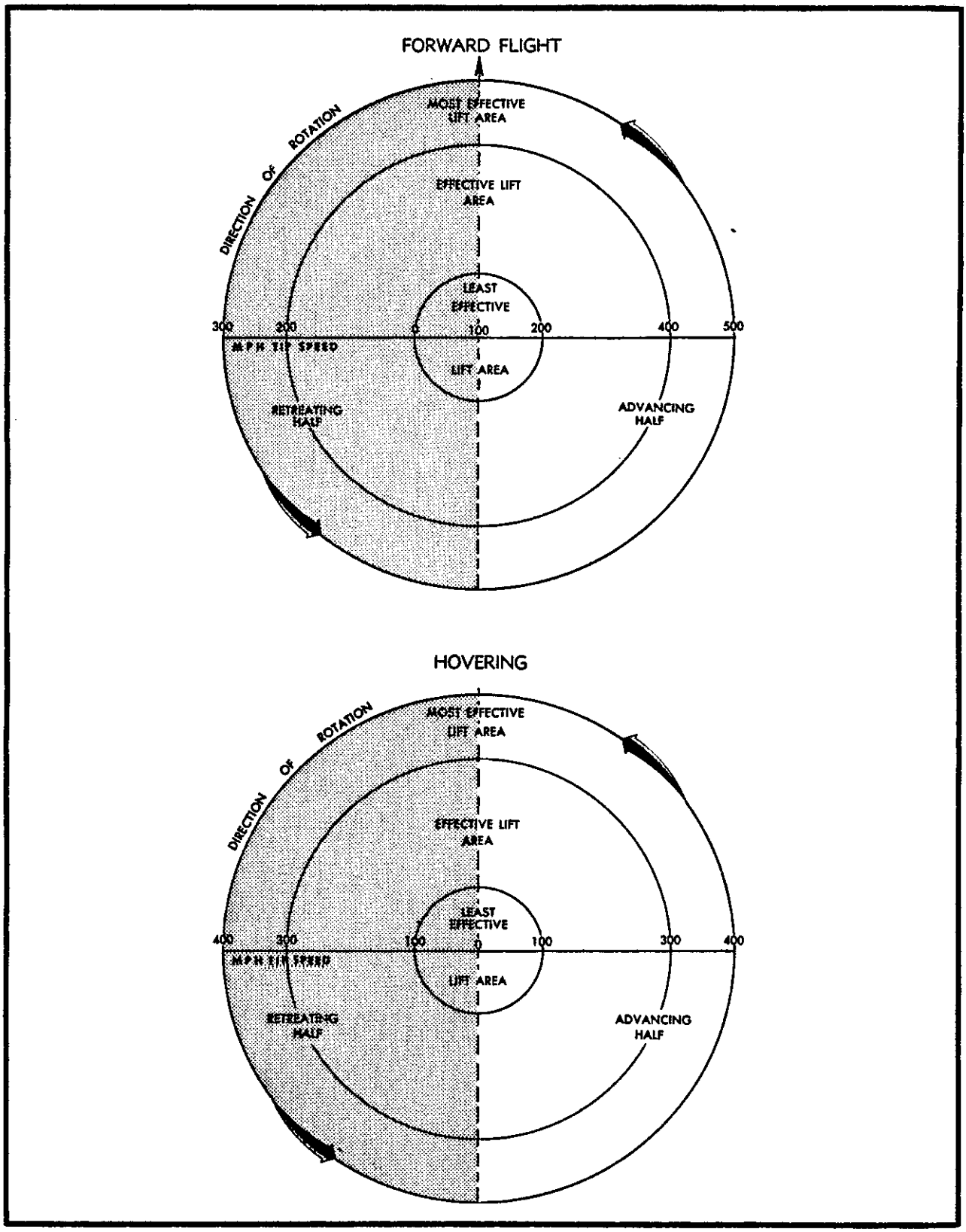

FIGURE 15. Rotor blade speeds.

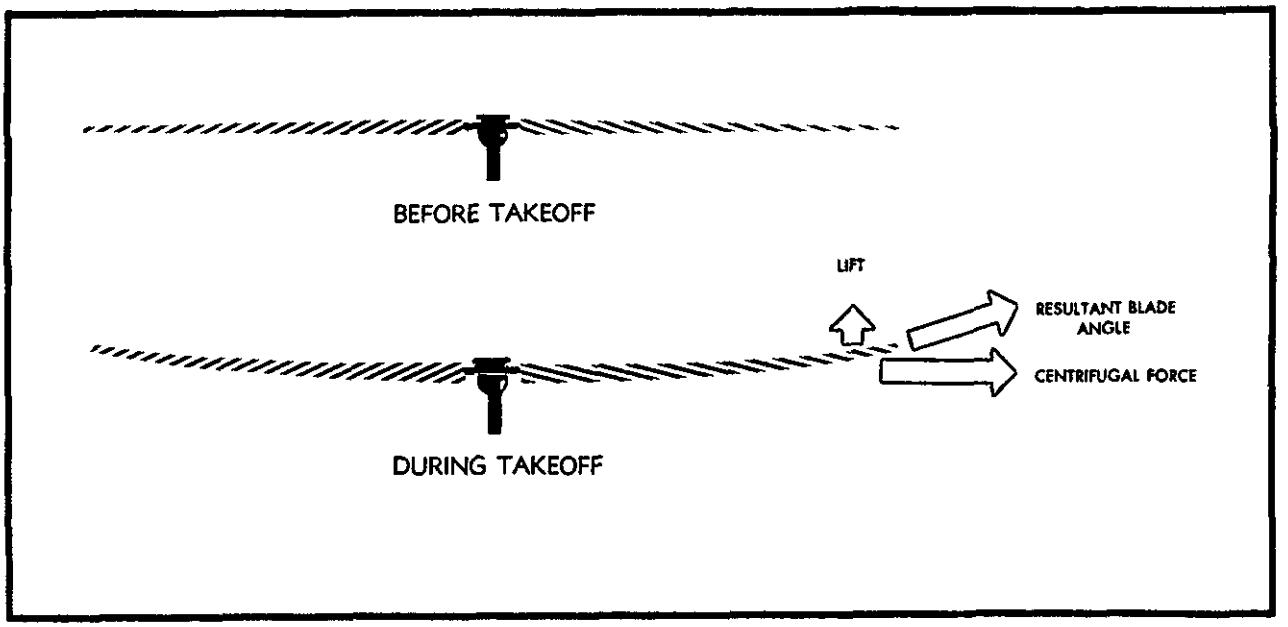

FIGURE 17. Blade coning.

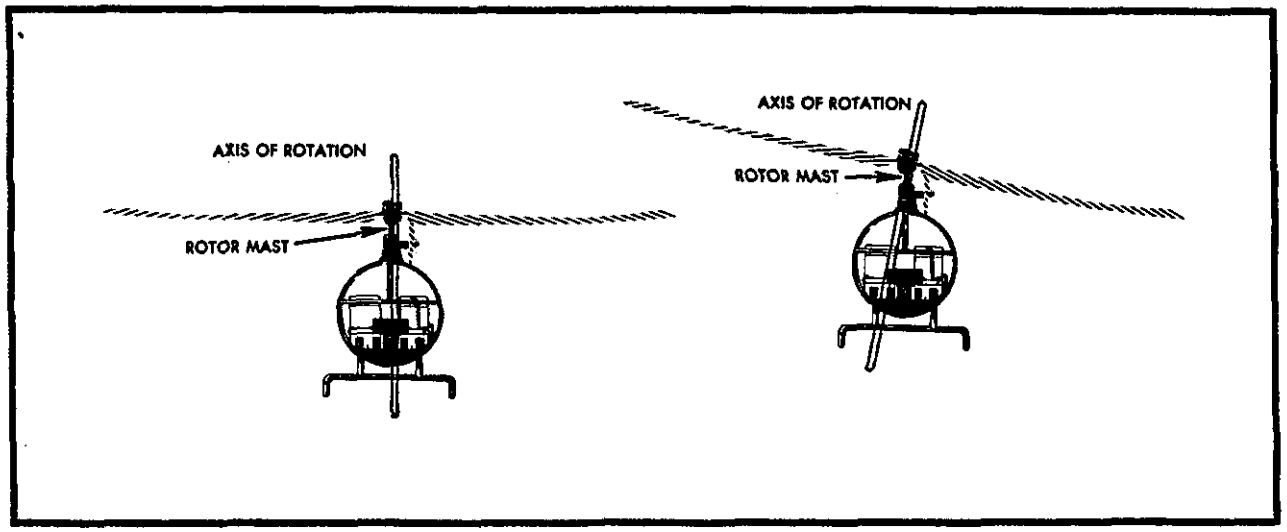

FIGURE 18. Axis of rotation.

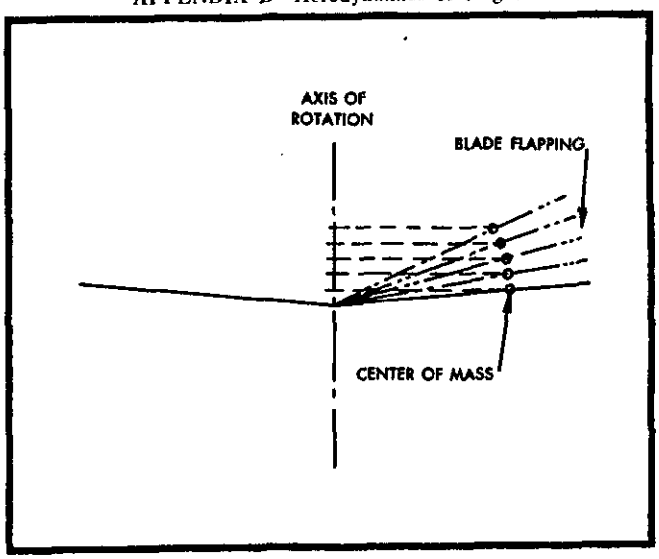

FIGURE 19. Coriolis effect.

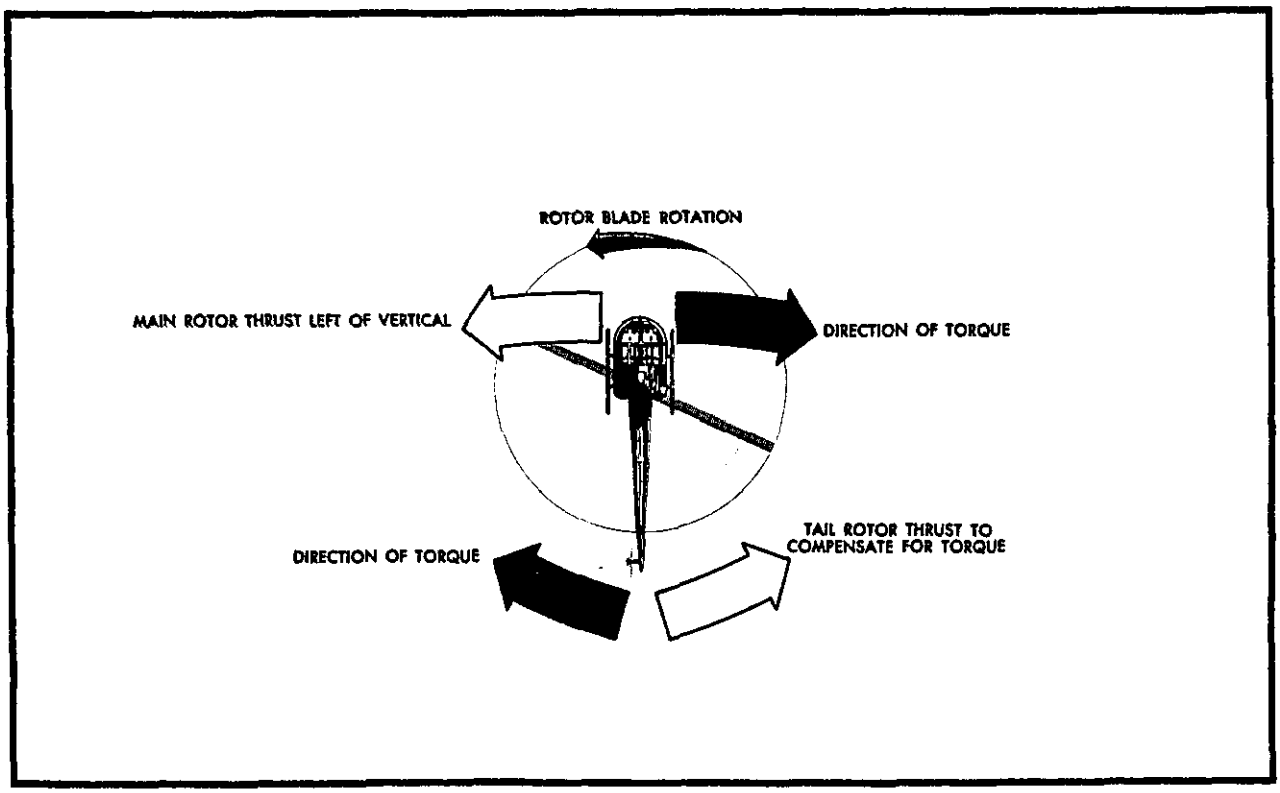

FIGURE 20. Translating tendency (drift).

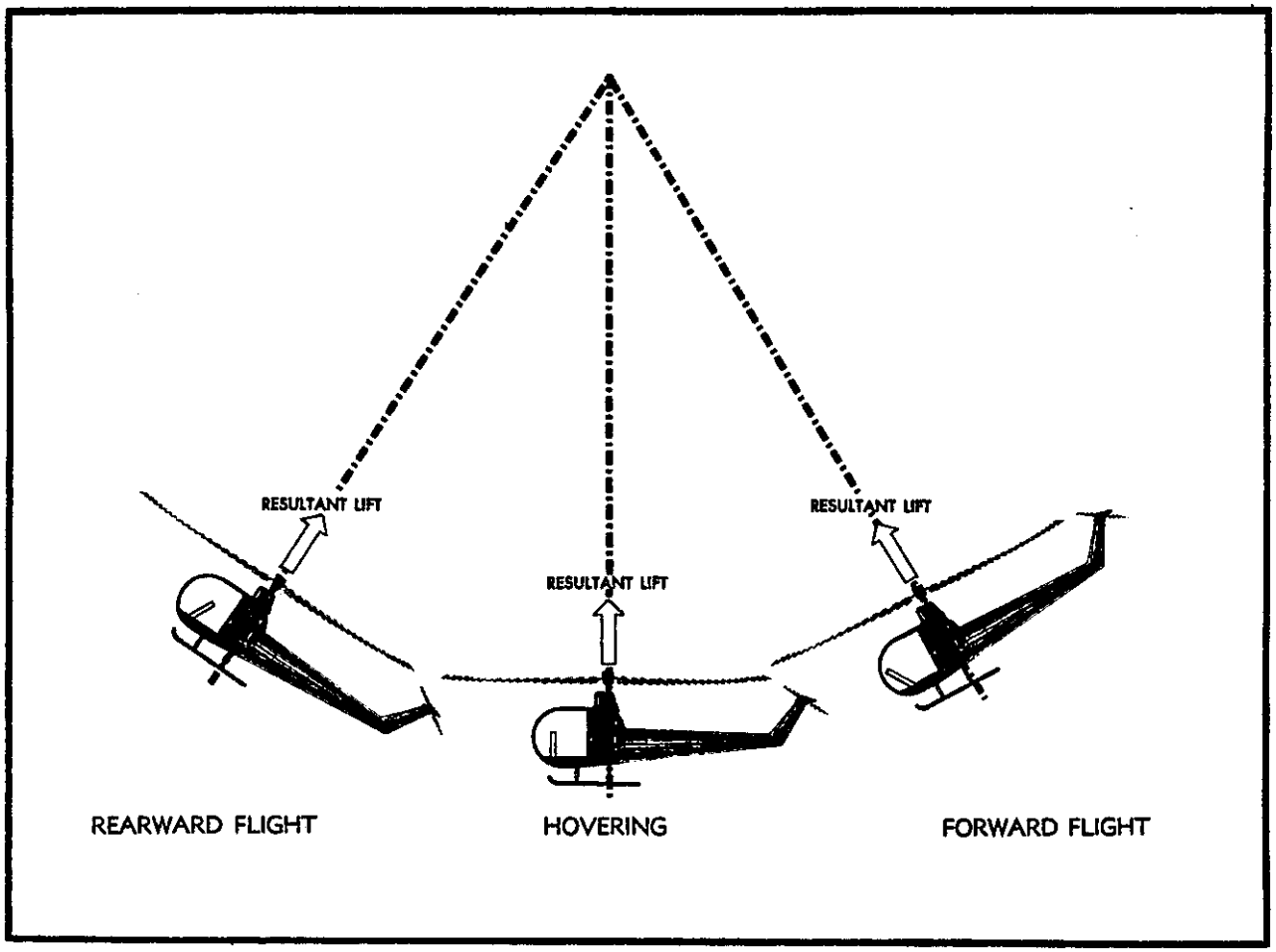

FIGURE 21. Pendular action.

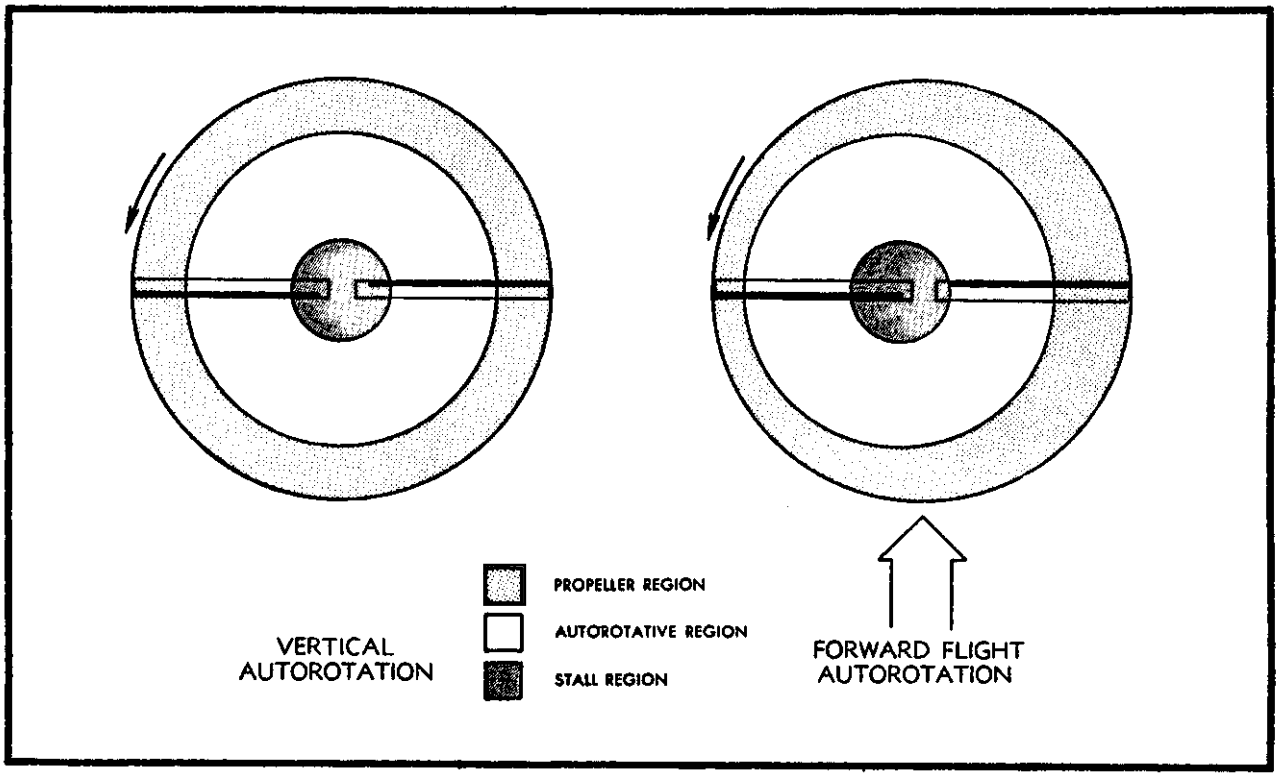

FIGURE 22. Rotor disc during autorotation.

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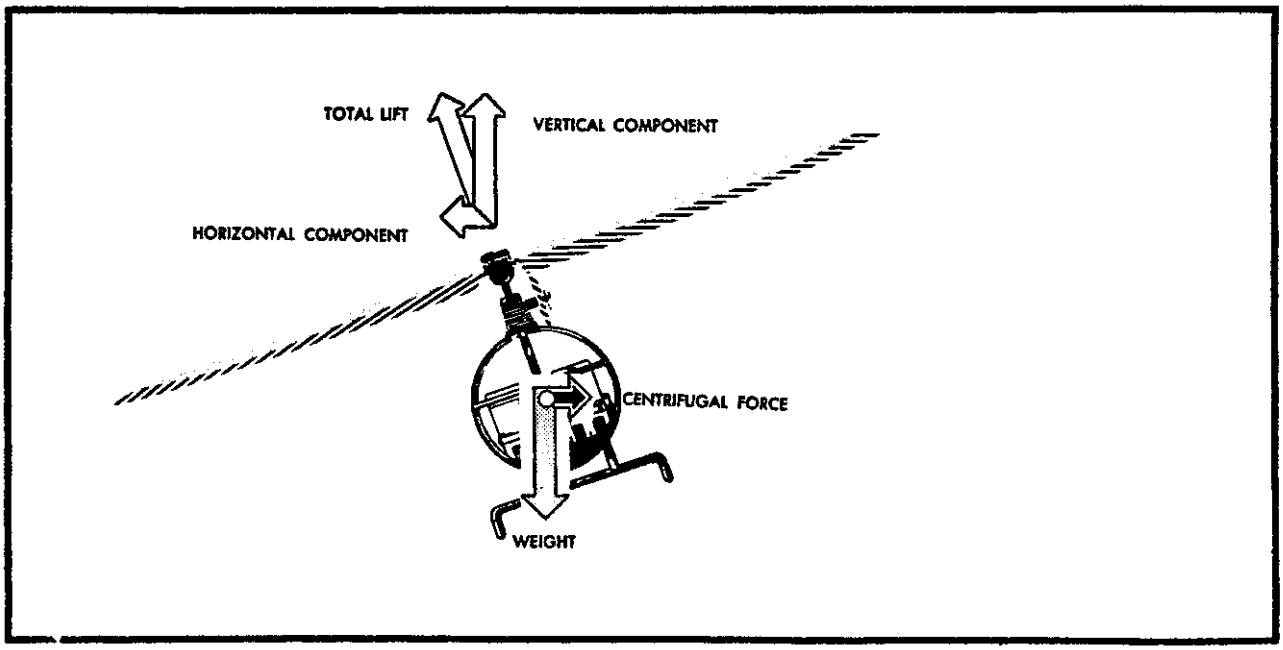


FIGURE 23. Forces acting on a helicopter during a turn.

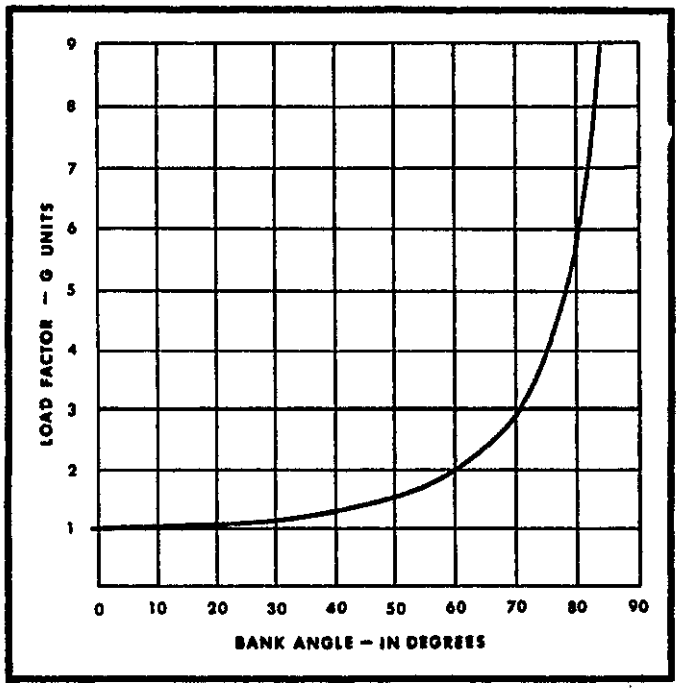


FIGURE 24. Load factor chart.

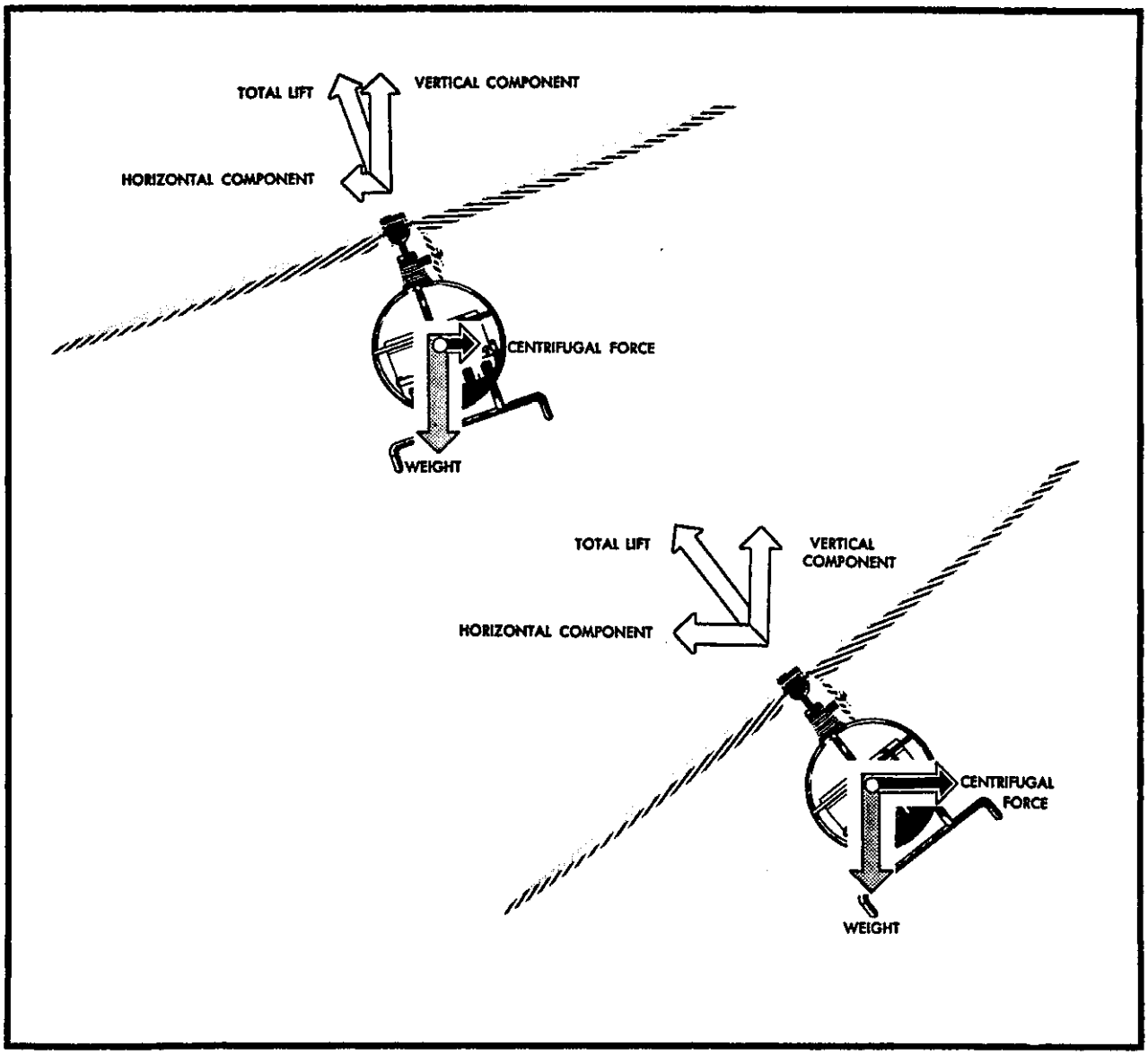


FIGURE 25. Total lift force and angle of bank relationship.

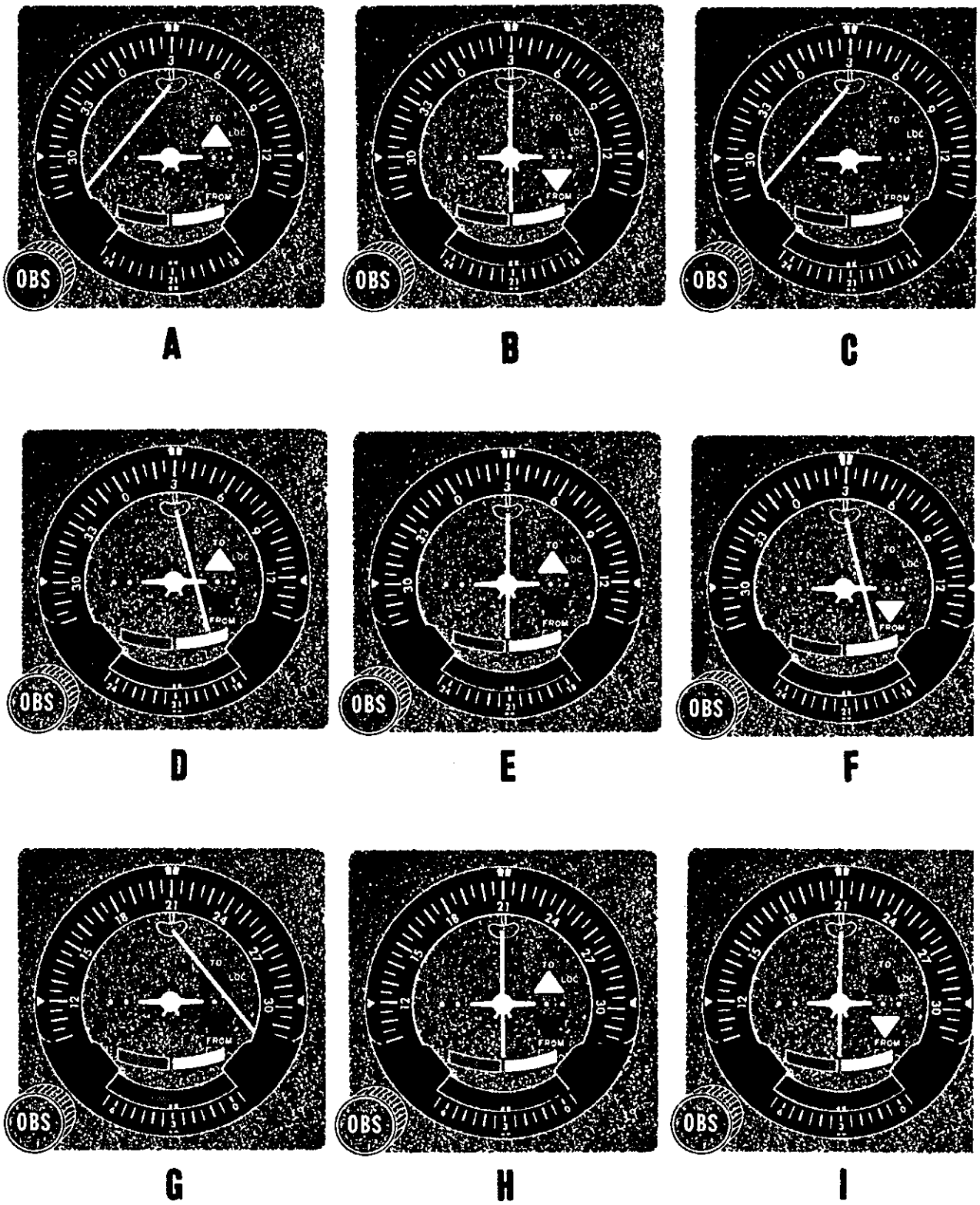


FIGURE 26. VOR orientation.

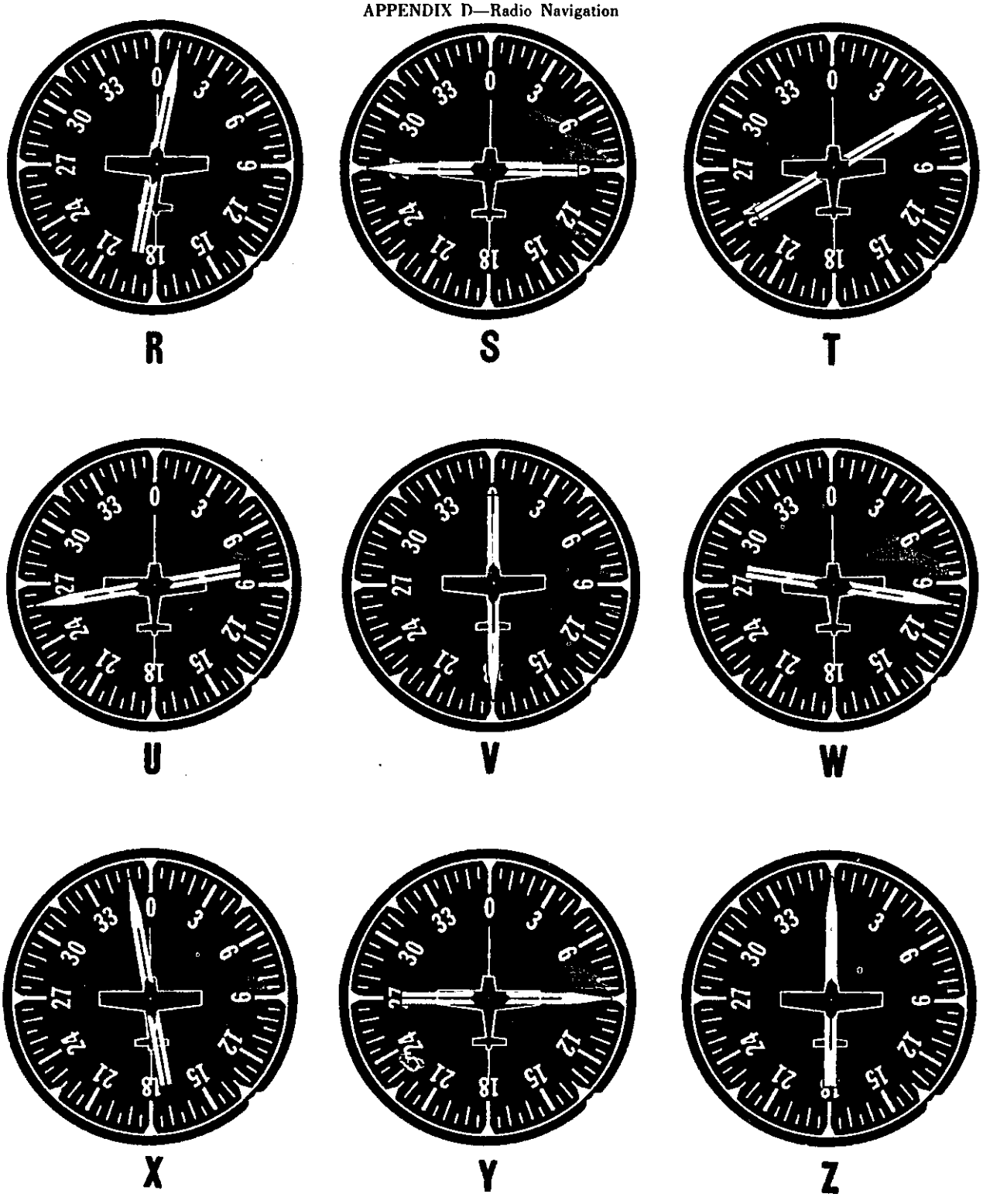


FIGURE 27. ADF orientation.

DESIGNATION: Hurleycraft 135

BASIC WEIGHT: 935 lbs. (8 qts. oil included); basic weight moment, 94.3

GROSS WEIGHT: 1,600 lbs.

POWERPLANT: Malle 180 - air cooled, four cylinder, opposed

FUEL SYSTEM: Fuel injection

Fuel octane rating - 100/130 (minimum)

Fuel capacity - 25 gallons (all usable)

OIL CAPACITY: 8 quarts

IGNITION SYSTEM: Dual magneto

MAIN ROTOR SYSTEM: Fully articulating (3 blades)

LANDING GEAR: Fixed gear, skid-type

RADIO EQUIPMENT:

1 VHF transmitter and receiver	118.0 - 136.0 MHz
1 VOR receiver	108.0 - 117.9 MHz
1 ADF receiver	200 - 415 kHz

LIMITATIONS:

Forward CG limit station	95.0
Aft CG limit station	100.0
Maximum manifold pressure	27.5" below 500 AGL
Maximum engine RPM	3,000 RPM
Never exceed speed (V_{NE})	90 MPH IAS
Maximum rotor speed	550 RPM
Minimum rotor speed	410 RPM

FIGURE 28. Owner's manual excerpts.

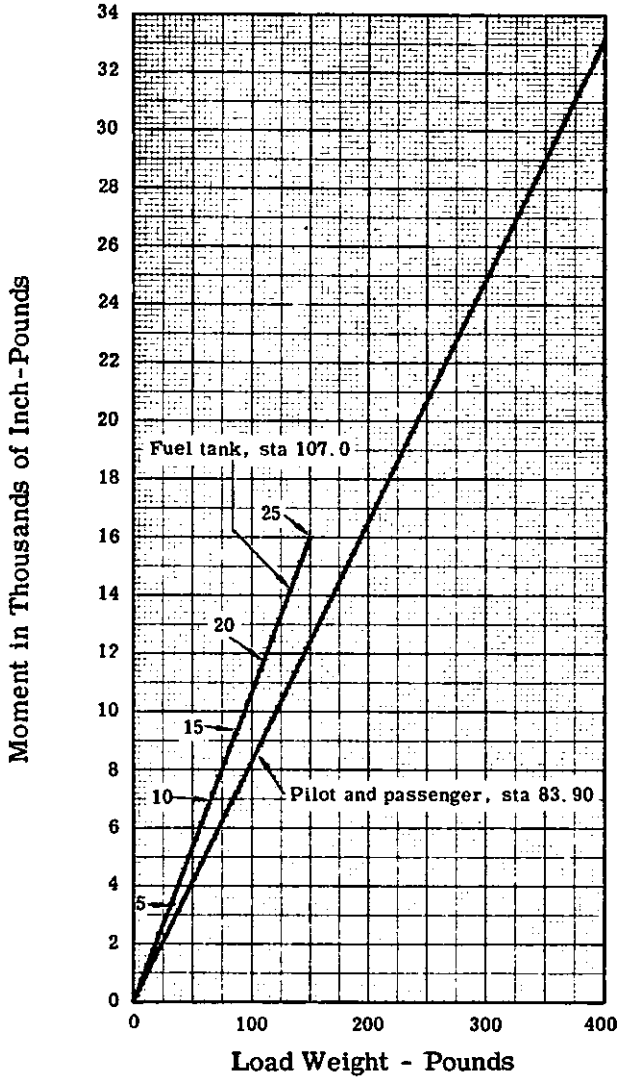


FIGURE 29. Loading chart.

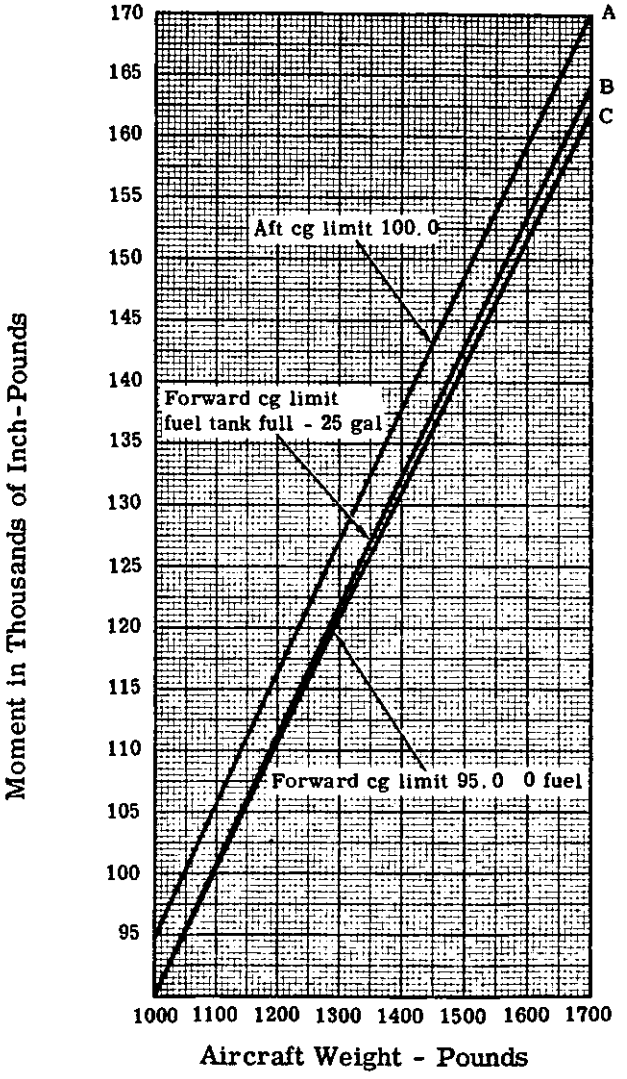


FIGURE 30. Center of gravity chart.

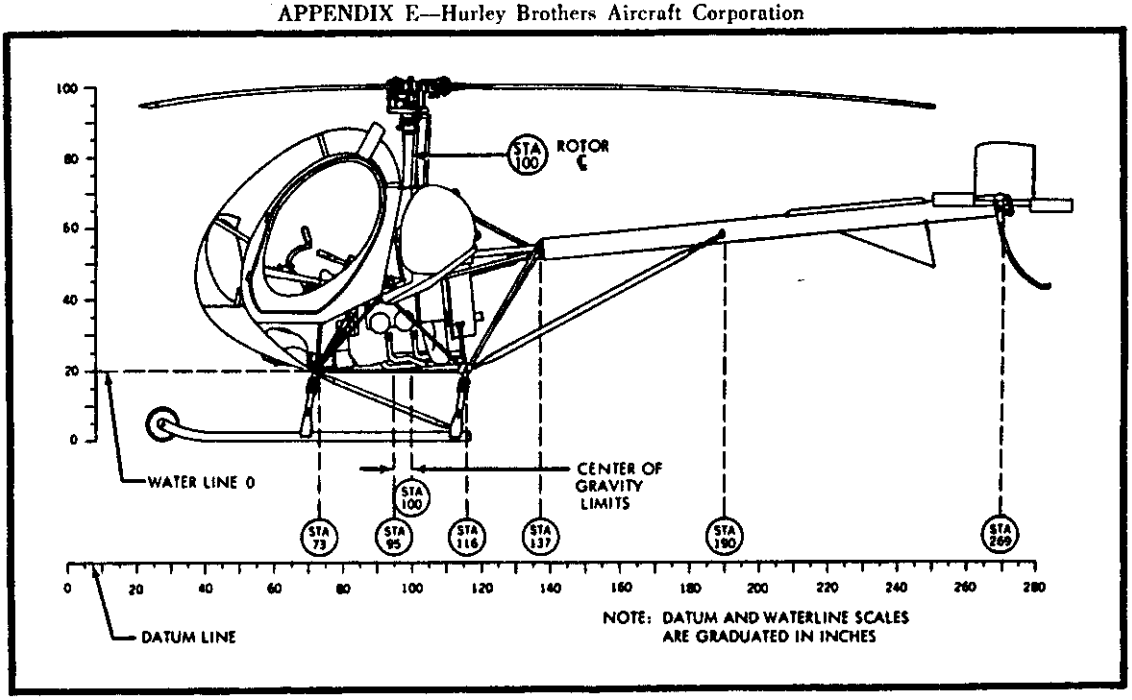


FIGURE 31. Balance diagram.

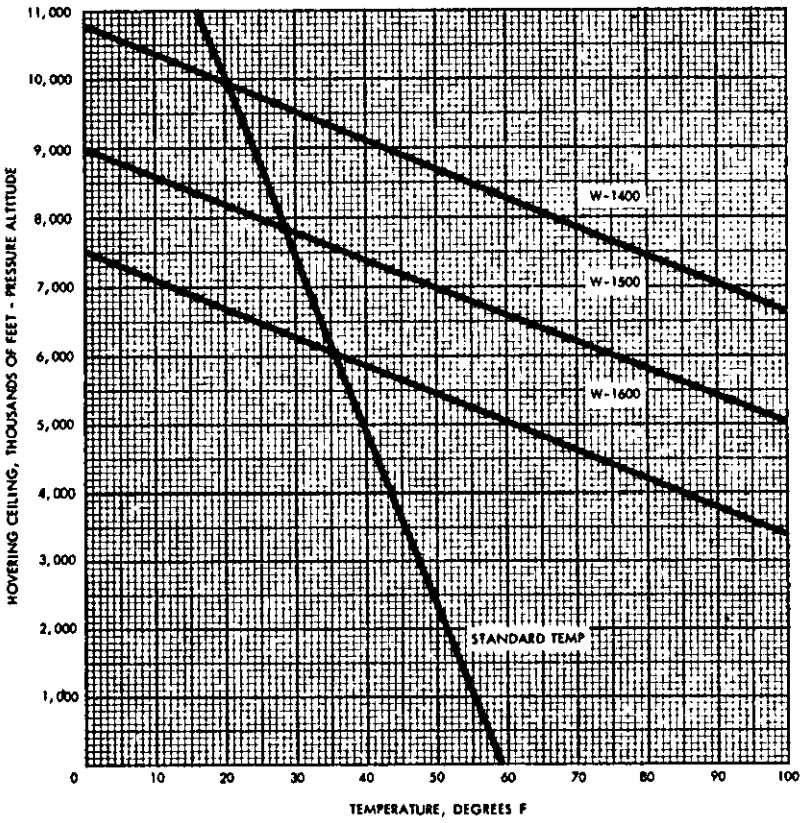


FIGURE 32. Hover ceiling chart vs. temperature (skid height 3 feet).

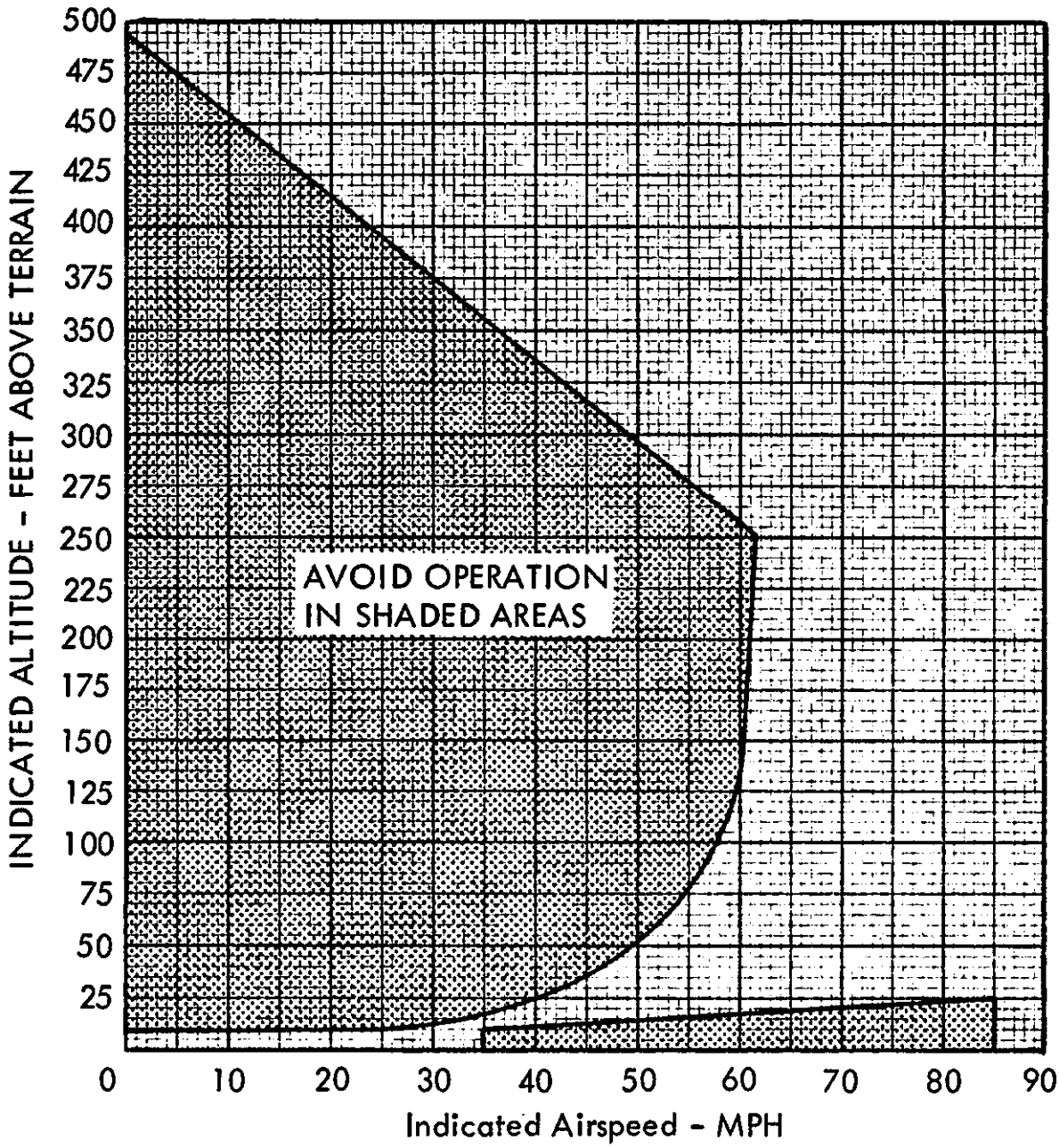


FIGURE 33. Height-velocity diagram.

MODEL: Bronco 27B

POWERPLANT: Siwel 540 - air cooled, six cylinder, opposed

FUEL SYSTEM: Float-type carburetor

Fuel octane rating - 100/130 (minimum)

Fuel capacity - 46.0 gallons (44.0 usable)

OIL CAPACITY: 8 quarts; moment arm (in.) + 1.0

IGNITION SYSTEM: Dual magneto

MAIN ROTOR SYSTEM: Semi-rigid

LANDING GEAR: Fixed, skid-type

RADIO EQUIPMENT:

1 VHF transmitter and receiver . . . 118.0 - 136.0 MHz

1 VOR receiver . . . . . 108.0 - 117.9 MHz

1 ADF receiver . . . . . 200 - 1750 kHz

1 Transponder . . . . . 4096 codes

OPERATING LIMITATIONS:

Weight; maximum approved gross - 2,850 lbs.

Airspeed; V_{NE} 110 MPH - sea level to 10,000 feet

above 10,000 feet - decrease V_{NE} 5 MPH

Altitude; maximum - 20,000 feet

Rotor; flight - maximum 360 RPM, minimum 310 RPM

Powerplant; maximum continuous power - 26.8 in. Hg.

MAP SL to 20,000 feet

Idling RPM - 1200

Operating RPM - 3000 to 3200

Cylinder head temperature - 246° C

FIGURE 34. Owner's manual excerpts.

Loading Data; Basic weight - 1,700 lbs.

Basic weight moment arm (in.), + 6.0

Center of gravity limits --

2,850 lbs., - 3 inches to + 3.2 inches

2,300 lbs., - 3 inches to + 4.0 inches

Straight line variation between above points

CENTER OF GRAVITY vs. GROSS WEIGHT CHART.

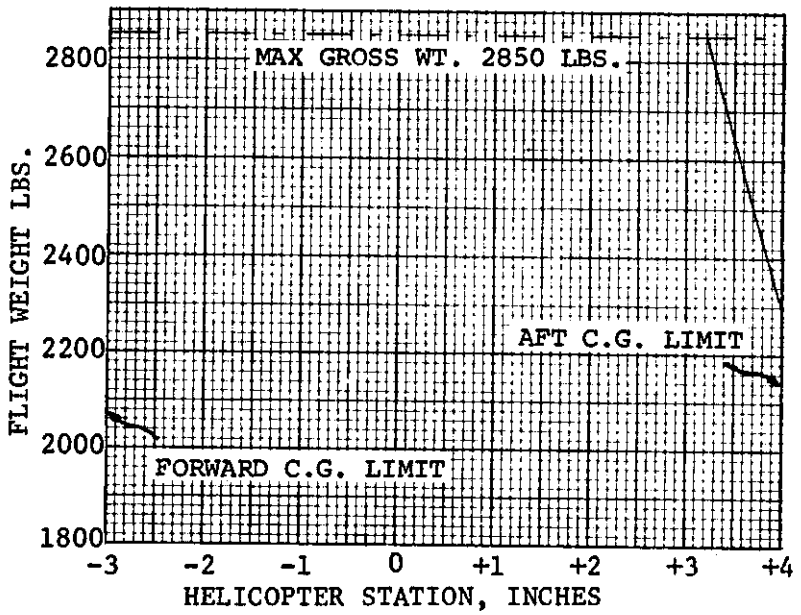


FIGURE 34. Owner's manual excerpts—cont'd.

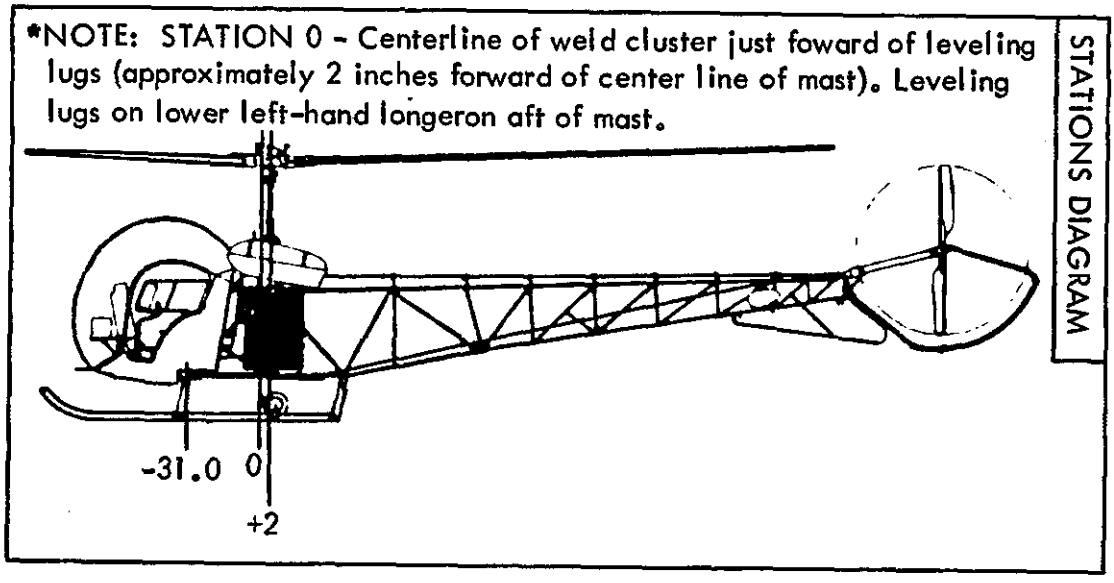


FIGURE 35. Stations diagram.

TAKE-OFF DISTANCE-FEET TO CLEAR 50 FOOT OBSTACLE AT 50 MPH 3200 RPM					
Gross Weight Pounds	Pressure Altitude Feet	At -13°F -25°C	At 23°F -5°C	At 59°F 15°C	At 95°F 35°C
2150	SL	373	401	430	458
	2000	400	434	461	491
	4000	428	462	494	527
	6000	461	510	585	677
	8000	567	674	779	896
2500	SL	531	569	613	652
	2000	568	614	660	701
	4000	611	660	709	759
	6000	654	727	848	986
	8000	811	975	1144	1355
2850	SL	743	806	864	929
	2000	770	876	929	1011
	4000	861	940	1017	1102
	6000	939	1064	1255	1538
	8000	1201	1527	-	-

FIGURE 36. Takeoff chart.

MAXIMUM RATE OF CLIMB R/C MAX. FEET PER MINUTE AT 50 MPH-3200 RPM									
Gross Weight Pounds	Pressure Altitude Feet	At -25°C -13°F		At -5°C 23°F		At 15°C 59°F		At 35°C 95°F	
		(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
2150	SL	1095	1235	1065	1210	1040	1190	1015	1145
	2,000	1065	1220	1040	1155	1015	1065	985	-
	4,000	1040	1085	995	-	910	-	830	-
	6,000	925	-	835	-	750	-	675	-
	8,000	770	-	685	-	600	-	530	-
	10,000	615	-	535	-	455	-	380	-
2500	SL	805	945	780	915	750	885	730	850
	2,000	780	915	750	855	725	775	705	-
	4,000	755	800	710	-	630	-	560	-
	6,000	650	-	565	-	485	-	410	-
	8,000	505	-	420	-	340	-	265	-
	10,000	360	-	275	-	195	-	120	-
2850	SL	560	685	535	660	500	625	470	580
	2,000	535	660	505	600	470	515	435	-
	4,000	505	545	455	-	375	-	295	-
	6,000	400	-	315	-	235	-	155	-
	8,000	260	-	175	-	95	-	15	-
	10,000	115	-	35	-	-	-	-	-

NOTE:
(1) Continuous Power
(2) Two Minute Power Rating

FIGURE 37. Rate of climb chart.

TOTAL LANDING DISTANCE IN FEET OVER 50 FOOT OBSTACLE POWER-OFF AT 50 MPH					
Gross Weight Pounds	Pressure Altitude Feet	At -25°C -13°F	At -5°C 23°F	At 15°C 59°F	At 35°C 95°F
2150	SL	243	253	265	277
	2000	253	267	278	293
	4000	264	278	294	319
	6000	278	293	310	327
	8000	293	310	330	350
2500	SL	248	258	270	282
	2000	258	272	283	298
	4000	269	283	299	314
	6000	283	298	315	332
	8000	298	316	335	355
2850	SL	282	294	307	320
	2000	293	309	322	338
	4000	306	322	340	357
	6000	322	340	358	378
	8000	340	359	380	403

FIGURE 38. Landing chart.

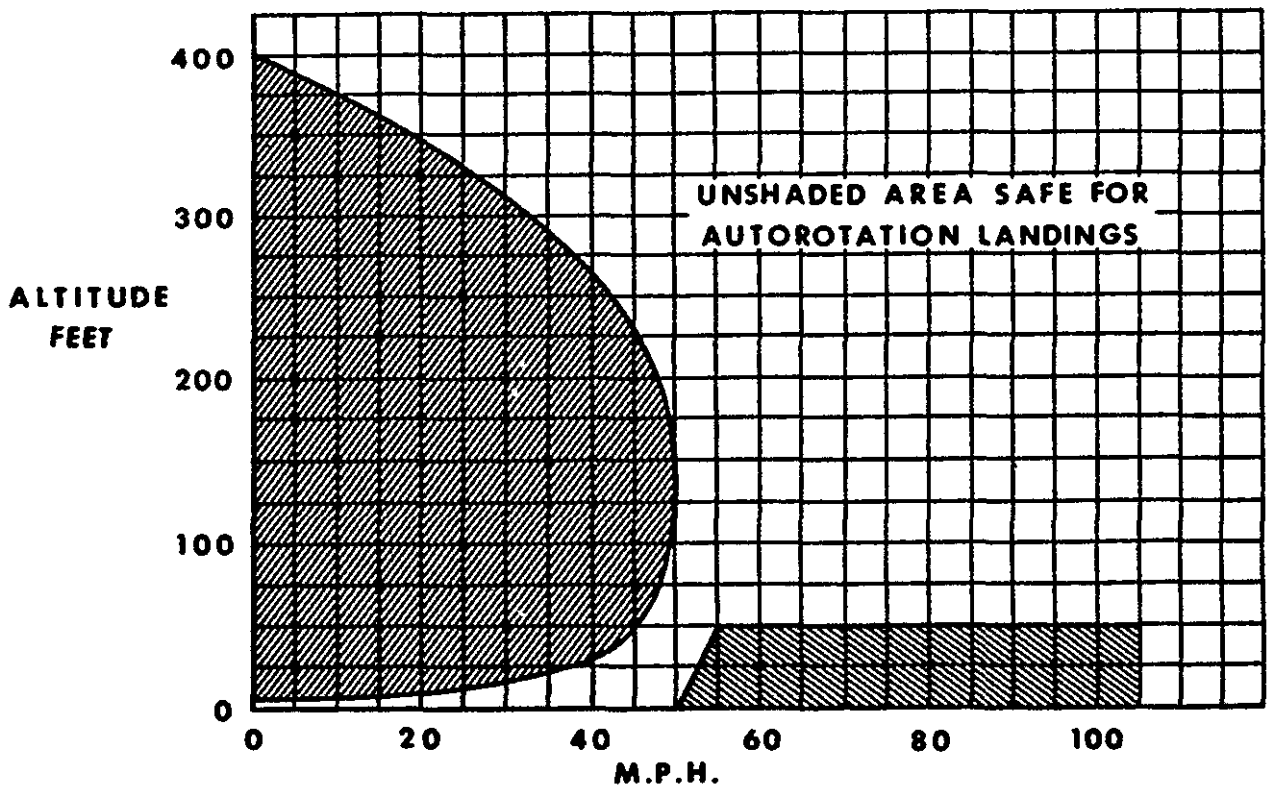


FIGURE 39. Height-velocity diagram.

```
     SA21 031900
MLC SP B11⊙30⊕3RW--F 062/62/59/0605/973/TE47 MOVD NE NO GSTS CIG RGD
ADM M3⊕1TRW-F 63/52/1415/966/TB22 S MOVG N PK WND 12/18 22
DAL M10⊙15⊕5RW-F 70/67/1710G19/963 PRESFR
FTW M17⊙100⊙300⊕7 67/63/2713G28/966/RE25 WND SHFTD GRDLY→FTW↘9/22 10/6
10/9 11/26
GSW 5⊙E20⊙70⊕12TRW- 038/63/63/2511/966/ TB15 N-E-S MOVG NE OCNL
LTGICCG PK WND 24/30 33 BINOVC PRES UNSTDY RE⊘3B19
ACT 25⊙E40⊙12 048/68/58/2614/968/ TE24 N MOVD NE TCU NE-SE
PK WND 23/26 15 RE15 WND 220V300
CLL E15⊕7 060/74/71/1810/971/RB45RE55 PRESFRF/→CLL↘11/20
TPL E25⊕10 63/55/3015/969
LFK SP E5⊕7 072/72/67/1210/975


   SA NEAR WEST 031902
SPS E70⊙250⊕10 051/60/50/2618/970→SPS↘11/2
HBR SP 15⊙25⊙25⊙⊙12 029/55/53/2514/964
GAG S A5⊕12R- 072/35/33/0322/974/PK WND ⊘1/22 55/UA 1825 GAG-OKC
28⊕35 E65⊕ ABV TOPS UNKN
CDS 5⊙⊙25⊙⊙12 049/55/38/3212G20/969→CDS↘11/11
MAF 45⊙25⊙⊙20+ 075/53/20/2818/983→MAF ↘9/3 12/3
LBB 17⊙E20⊙⊙15 046/51/33/3513/973→LBB↘11/22
AMA SP M6⊙10⊕5L--S--F 059/36/34/0117G27/973
DDC SP M5⊕3ZRW-F 104/32/27/E0215G25/983
GCK SP A8⊙50⊕5ZL-F 108/33/30/0215/984/LEZLB45 ⊙V⊕→GCK↘11/7
DHT W2X3/16S--BSF 082/31/31/3520G30/978→DHT↘12/1
TCC W⊘X1/4SF 115/32/31/3615G25/987
HOB E4⊙⊙25⊙⊙25 43/18/3120⊘G30/982 TCU NW-N


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

FIGURE 40. Aviation weather reports.

```
→NOSUM⊘31928
 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 ⊘31928
E→SPS 11/2 LAW 1ST 1000 35 CLSD
E→CDS 11/11 RWY LGTS PPO
→MAF 9/3 E02 16-34 CLSD
→MAF 12/3 LOC OTS 19-2100
E→LBB 11/22 THR 8 DSPLCD 550
E→GCK 11/7 LBL THR 21 DSPLCD 1280
→DHT 12/1 GUY NDB OTS
```

FIGURE 41. NOTAM summaries.

```
FT 031040
DAL 031111 C10⊕ 1614G. 17Z C18⊕ 1818G30 SLGT CHC C10⊕2TRW. 19Z
    C30⊕ 1818G32 OCNL C10⊕2TRW CHC C5X1/2T+RW+A 3335G60. 00Z CFP
    C20⊕ 3315G CHC C10⊕2TRW. 05Z MVFR..
GSW 031111 C10⊕ 1614G. 17Z C18⊕ 1818G30 SLGT CHC C10⊕2TRW. 19Z
    C30⊕ 1818G32 OCNL C10⊕2TRW CHC C5X1/2T+RW+A 3335G60. 00Z CFP
    C20⊕ 3315G CHC C10⊕2TRW. 05Z MVFR..
ACT 031111 C10⊕7 1415G VRBL C6⊕3F. 17Z C18⊕ 1716G SLGT CHC C10⊕2TRW.
    19Z C25⊕ 1816G CHC C6X1TRW+ 3330G45. 01Z CFP C25⊕ 3315G CHC
    C12⊕2TRW. 05Z MVFR..
CLL 031111 C6⊕3F 1612 OCNL C3X1/2F. 16Z C12⊕ 1614G. 18Z C30⊕ 1814G.
    21Z 35⊕C100⊕ 1814G OCNL C10⊕2TRW+. 05Z MVFR..
LFK 031111C6⊕4F VRBL C3X1/2F. 16Z C12⊕ 1514. 18Z C25⊕ 1814G OCNL
    C10⊕1TRW+ 3225G45. 05Z MVFR..
TYR 031111 C6⊕ 1512 OCNL C4⊕2F. 16Z C12⊕5F 1714. 18Z C25⊕ 1814G
    CHC C8X1TRW+ 3330G50. 05Z MVFR..
GGG 031111 C6⊕ 1110 OCNL C4⊕2F. 16Z C12⊕5F 1714. 18Z C25⊕ 1814G
    CHC C8X1TRW+ 3330G50. 05Z MVFR..
MLC 031111 C20⊕ 1812G22 CHC C10⊕1TRW. 02Z CFP C15⊕ 3613 CHC C7⊕2R-F.
 05Z IFR..
ADM 031111 C20⊕ 1812G23 CHC C10⊕1TRW. 00Z CFP C15⊕ 3614 CHC C7⊕2R-F.
 05Z IFR..

   FT NEAR WEST 031043
SPS 031111 C15⊕ 1718G. 15Z C25⊕ 1818G32 OCNL C10⊕1TRW+ CHC C5X1/2
    T+RW+A 3435G60. 19Z CFP C18⊕ 3416G CHC C10⊕2TRW. 23Z C25⊕ 3515G
    CHC C15⊕3RW-. 05Z MVFR..
GAG 031111 C40⊕ 1713G23. 13Z CFP C15⊕ 3615G25 CHC C7⊕2R-F. 05Z IFR..
MAF 031111 250⊕ 3012. 18Z 100⊕250-⊕ 3218G30. 01Z 250-⊕ 3315.
 05Z VFR..
LBB 031111 C40⊕ 3214 ⊕V⊕ CHC RW-. 16Z C30⊕ 3315G30 CHC RW-.
 21Z 15⊕C25⊕ 3618 CHC RW-. 03Z C15⊕ 0218 CHC C10⊕3R-S-. 05Z IFR..
AMA 031111 C40⊕ 3415 CHC RW-. 16Z C25⊕ 3615G30 CHC RW-. 21Z C15⊕
 0118 OCNL C10⊕3R-S-. 03Z C10⊕5S- 0318 OCNL C5X1/2S-F. 05Z IFR..
DDC 031111 C10⊕ 3618G28 CHC C5⊕2R- OR S-. 17Z C50⊕ 3615G25 BRF SW-.
 00Z C50⊕ 3615 ⊕V⊕.
GCK 031111 C12⊕ 3618G28 CHC C5⊕2S-. 17Z C50⊕ 3615G25 BRF SW-.
 00Z C50⊕ 3615 ⊕V⊕.
TCC 031111 C40⊕. 12Z CFP C30⊕6R- 3620. 13Z 10⊕C20⊕5S-F 3620 VRBL
 C5X1/2SF. 19Z 10⊕C25⊕ 3420 OCNL C10X1SW-. 23Z 30⊕ 3415. 02Z O.
 05Z VFR..
HOB 031111 C120⊕. 17Z 50⊕120⊕ 3320G30. 02Z O. 05Z VFR..
INK 031111 250⊕ 3112. 18Z 250-⊕ 3318G30. 01Z 250-⊕ 3315. 05Z VFR..


DAL FT AMD 1 031811 1815Z C12⊕5RW-F 1815G20 CHC C5X1/2T+RW+A
 3335G60. 20Z CFP C20⊕ 3315G CHC C10⊕2TRW. 05Z MVFR..


GSW FT AMD 1 031811 1815Z C12⊕5RW-F 1815G20 CHC C5X1/2T+RW+A
 335G60. 20Z CFP C20⊕ 3315G CHC C10⊕2TRW. 05Z MVFR..
```

FIGURE 42. Terminal forecasts.

FA031240
GSW FA 031240
13Z MON-07Z TUE
OTLK 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 WL 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. MTNS FQTLY OBSCD ABV 70 AND ELSW CIGS LCLY BLO 1 THSD FT VSBY BLO 3 MIS IN SNW SHWRS AND FOG. TOPS SHWRS 200. CLRG WRN PTN ARND 18Z AND ERN PTN AFT 00Z. OTLK...VFR.

SRN HLF NMEX AND TEX W OF PECOS RVR.
CLR TO 100 SCT VRBL BKN. OTLK...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. PTNS OVR SRN TEX SCT CLDS 50 OR HIR. OTLK...VFR SRN PTNS. MVFR TO OCNL IFR NRN TEX AND OVR OKLA.

OKLA TEX E OF CDFNT.
WDSPRD CLDS 10 TO 20 OVC WITH CIGS FQTLY BLO 10 VSBY OCNLY BLO 3 MIS FOG CNTRL AND ERN TEX AND ERN OKLA TIL 18Z. SCT SHWRS AND A FEW TSTMS ALG CSTL PLNS AND ALG AND ABT 150 MIS E OF CDFNT WL SPRD OVR ALL OF AREA BY 18Z WITH TSTM ACTVTY BCMG MORE INTNS DURG AFTN. PSBLY SVR TSTMS NRN TEX AND OKLA THIS AFTN AND TNGT. TOPS BLDPS 200-250 BLDG RPDLY TO ABV 300 AFT 18Z. OTLK...IFR.

CSTL WTRS.
SCT CLDS 20-30 WITH SCTD SHWRS AND TSTMS. TSTM TOPS 250-300 INCRG TO ABV 350 AFT 18Z. OTLK...MOSTLY MVFR.

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

FIGURE 43. Area forecasts.

FDUS3 KWBC 301945
DATA BASED ON 301200Z

VALID 011200Z FOR USE 0900-1500Z. TEMPS NEG ABV 24000

FT	3000	6000	9000	12000	18000	24000	30000	34000	39000
ABI		2016+12	2019+09	2017+04	2016-11	2117-23	222038	232247	242656
ABQ			2014+12	2224+03	2236-12	2241-24	234340	234550	236258
ALS				2325+03	2244-12	2249-24	225340	225650	237359
AMA		2414	2422+11	2324+05	2126-11	2228-24	222839	222948	233957
ATL	3013	3018+11	3020+07	2920+01	2923-13	3027-25	313441	313750	304059
BHM	3009	2914+13	2814+08	2714+02	2814-12	3018-25	312540	312849	293059
BLD	1512	1816+03	2239+01	2248-04	2260-17	2273-29	238843	239752	730261
BNA	2710	2820+11	2826+06	2831+00	2835-14	2938-26	304441	304550	294259
BOI		1620+01	2127-05	2346-11	2165-25	2173-35	218147	219154	219359
BRO	1416	1517+11	1514+06	1510+01	9900-10	2305-22	251237	271946	293557
CRP	1519	1619+11	1615+06	1611+02	9900-10	2308-22	251538	272047	293357
DAL	1817	2218+12	2116+08	2114+02	1911-11	2211-23	241439	251648	241757
DEN			2420+11	2539+02	2344-13	2350-25	235841	236451	237959
DRT	1517	1519+11	1619+09	1716+04	1913-10	2215-22	241938	252347	273456
DSM	1225	1619+05	2116+03	2519-01	2839-13	2852-25	296741	297650	298560
ELP		1906	2010+10	2017+04	2121-10	2223-23	232439	242649	244457
GCK		2518+12	2523+11	2424+05	2328-11	2332-24	233640	243950	254857
GJT			2010+07	2234-01	2262-15	2270-26	227842	228551	720061
HLC		2518+10	2422+11	2424+04	2428-11	2434-24	244340	254850	265558
HOU	1615	1712+10	1710+06	1507+02	9900-11	2505-23	271238	271647	282157
ICT	2420	2427+12	2429+11	2427+04	2422-11	2526-24	253240	263649	264058
IND	0412	3012+04	2823+01	2833-04	2951-16	2960-27	307142	307650	307658
INK		1910+10	2015+11	2017+05	2020-10	2120-23	222038	232348	253956
JAN	2406	2206+13	2106+07	1905+02	9900-12	3007-24	321639	301948	272760
JAX	3409	3412+12	3511+07	3510+01	3311-12	3217-25	322540	313249	294459
JFK	3231	3244-10	3151-12	3059-15	3082-23	7902-33	791846	791651	790054
JOT	0828	0405+04	2914+00	2829-04	2851-16	2960-27	297342	308150	309059
LIT	2323	2424+13	2420+08	2417+03	2513-11	2816-24	302339	292649	282859
LOU	3207	2918+06	2826+02	2835-03	2948-15	2955-27	306342	306750	306558
LRD	1419	1521+11	1618+07	1614+02	1907-10	2210-22	241737	262246	293556
MEM	2517	2620+13	2620+08	2619+02	2720-12	2923-24	302940	303149	283259
MIA	0707	0912+10	0810+06	0609+02	3608-10	3116-22	303137	303946	294857
MKC	1918	2224+10	2426+08	2526+02	2730-11	2838-24	284840	285249	285659
MOB	9900	1305+12	1305+07	1306+02	9900-12	3207-24	311739	302248	273359
MSY	1208	1310+11	1210+06	1209+01	9900-12	3205-23	311538	292147	273158
OKC	2218	2425+13	2426+10	2324+04	2119-11	2219-24	242039	242248	242458
PRC			2231+04	2241-02	2249-14	2259-26	237142	237751	228061
SAT	1520	1621+12	1618+07	1714+02	1908-10	2211-22	241738	262147	282856
SAT	1520	1621+12	1618+07	1714+02	1908-10	2211-22	241738	262147	282856
SGF	2226	2430+12	2529+08	2526+03	2625-11	2830-24	293840	294149	294259
SHV	2115	2214+12	2111+07	1909+02	1806-11	2605-23	291239	281548	262059
SLC		1815	1919+02	2246-07	2271-19	2282-30	229344	720253	710961
STL	1412	2211+10	2520+06	2730+00	2845-13	2951-25	305941	306149	305959
TLH	0305	9900+12	9900+07	9900+02	9900-12	3211-24	312139	302848	294059
TUS		2008+15	2017+07	2125+01	2233-12	2238-24	234540	234850	225760

FIGURE 44. Winds aloft forecasts.

```
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
6NW 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-- 8-12@ AGL

DAL UUA 2058 TYR MDT TURBC A ALT MISG B727

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

FIGURE 45. Pilot reports.

```
NNNNZCZC
UBUSI KGSW 031645
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 LGT TURBC 240-260 @260 C500
     BGS PIREP 40 W FST 1600 280@V@ WND 2465 LGT-MDT CAT 330 OVR ELP
     BSM PIREP 40SW 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 NAVAHO
     GLS UA 1624 DURGC NW BND TOPS GLS-HOU 140 ISOLD BLDPS 180-200
     PSX UA 1606 AAP-PSX 12-15@ SCTD RW-
     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.
     40E 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 46. Pilot report summaries.

```
WMS CNCL
ZCZC
 OKC
 NOT IN SYS
17Ø TWEB 3Ø14Ø8 GSW-SHV. SCT-BKN CLDS ABV 1Ø THSD WITH FEW
PATCHES 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 47. TWEB route forecasts.

```
MKC AC Ø31500
MKC AC Ø31500
VALID Ø31500-Ø41200Z

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 60E DRT BWD CDS GAG CNU CGI CBM PNS. ALSO
TO THE RT OF LN OMK LKV SFO.
OSTBY
RL 1516
```

FIGURE 48. Severe weather outlook.

```
GSW WA Ø31950
Ø31950-Ø40200

AIRMET ECHO 5. FLT PRCTN. CNTRL AND ERN OKLA AND NERN TEX
GENLY E OF END-LFK LN CIGS FQTLY BLO 1 THSD FT VSBYS FQTLY
BLO 3 MI. CONDS IPVG TEX PTN BY ØØZ BUT CONTG OKLA PTN PAST
02Z.
```

FIGURE 49. AIRMET.

```
GSW WS Ø31425
Ø31425-Ø31900

SIGMET FOXTROT 1. FLT PRCTN. WRN OKLA WRN TEX SCTD EMBDD TSTMS.
ALG AND ABT 100 MI W OF ENID BROWNWOOD LN SCTD EMBDD TSTMS. CB
TOPS TO 300. TSTMS MOVG EWD 20 KT AND CONTG PAST 19Z
```

FIGURE 50. SIGMET.

```
MKC WW 032108
MKC 032108

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 51. Severe weather forecast.

```
SDUS KNKA 031957
AMA 1932 AREA3R-S/NC 334/120 62/165 223/100 284/122 ELEMENTS 2232
MT 220 AT 347/72    S WRN HLF AND MSTLY R- ERN HLF
 112 12111 12111 10000 000 0


OKC 1933 LN10 TRW++/NC 348/100 332/50 185/80 10W 2625 CELLS 2035
MT 320 AT 337/40
AREA4 TRW+/NC 290/125 120/130 200W CELLS 2035 MT 300 AT 119/53
 1440 0641 114411 014421 +22


HDO 19-8% 43  3TRW+/NC 45/210 105/130 66/70 CELLS 2130 MT 280
AT 61/120 MSTLY TRW
AREA 3R-/NEW 335/95 D55 MT 200 UNIFORM
 01100 00000 00004 00002 00000
```

FIGURE 52. Radar summaries.

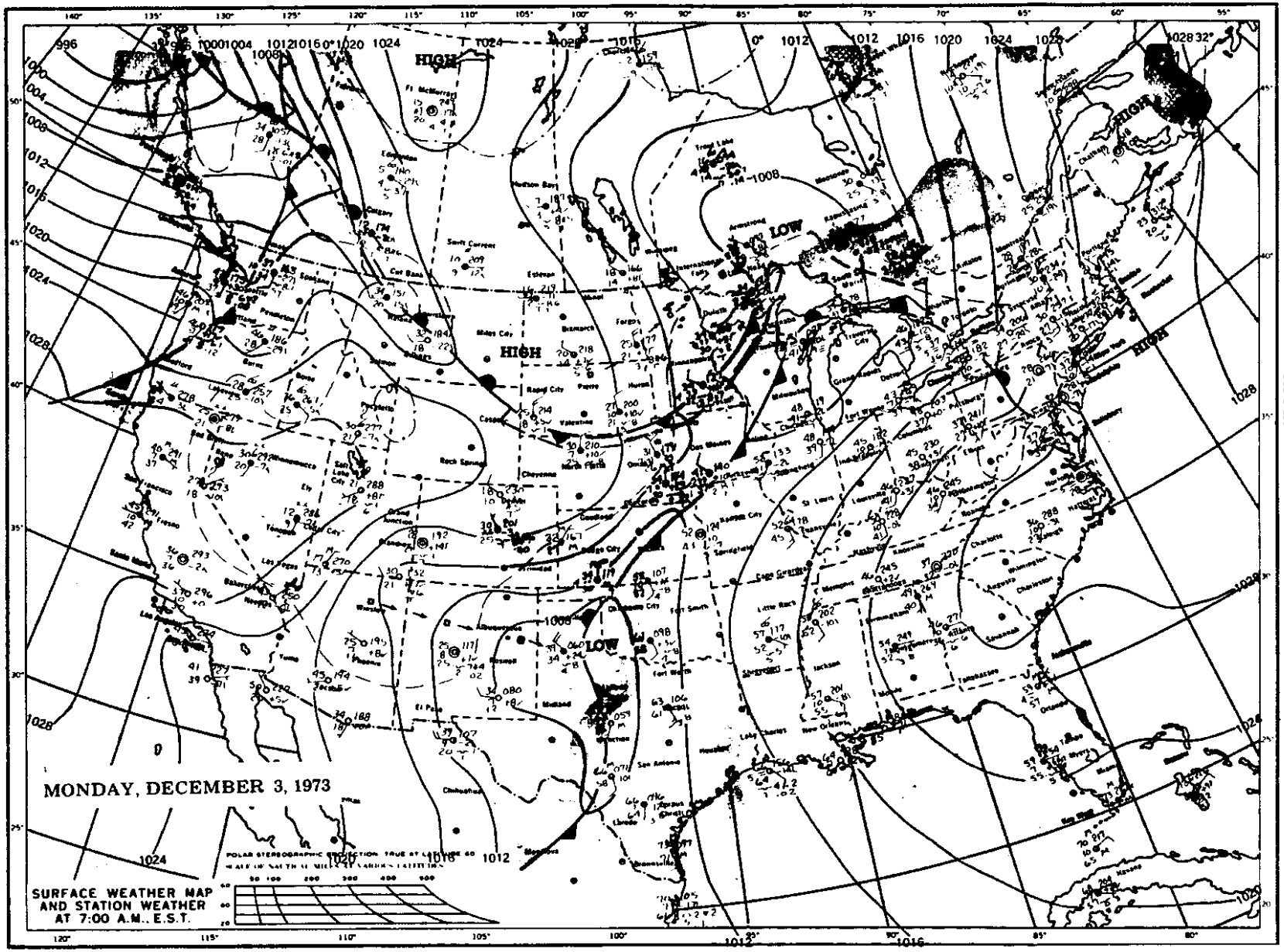


FIGURE 53. Surface weather map.

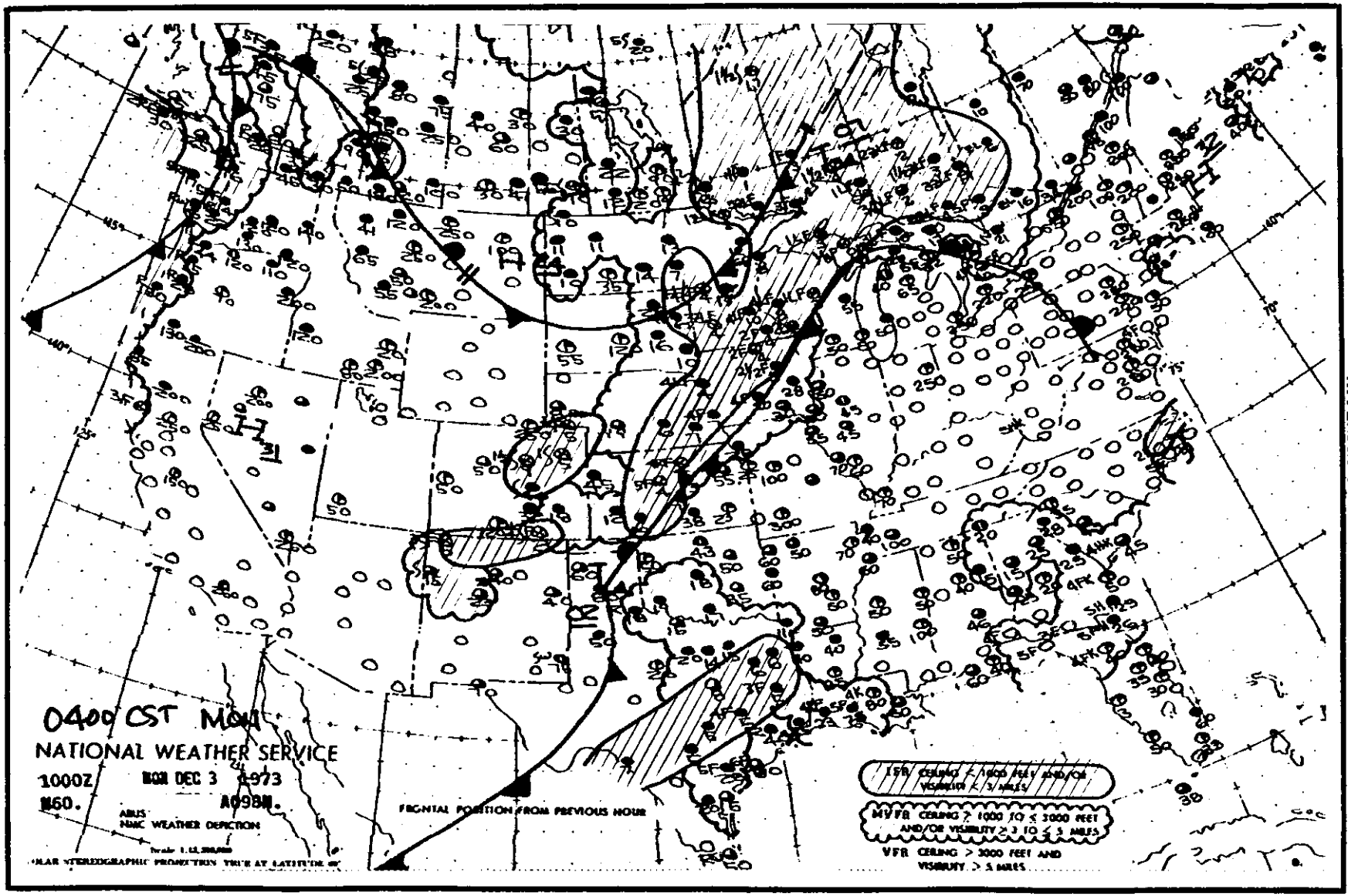


FIGURE 54. Weather depiction map.

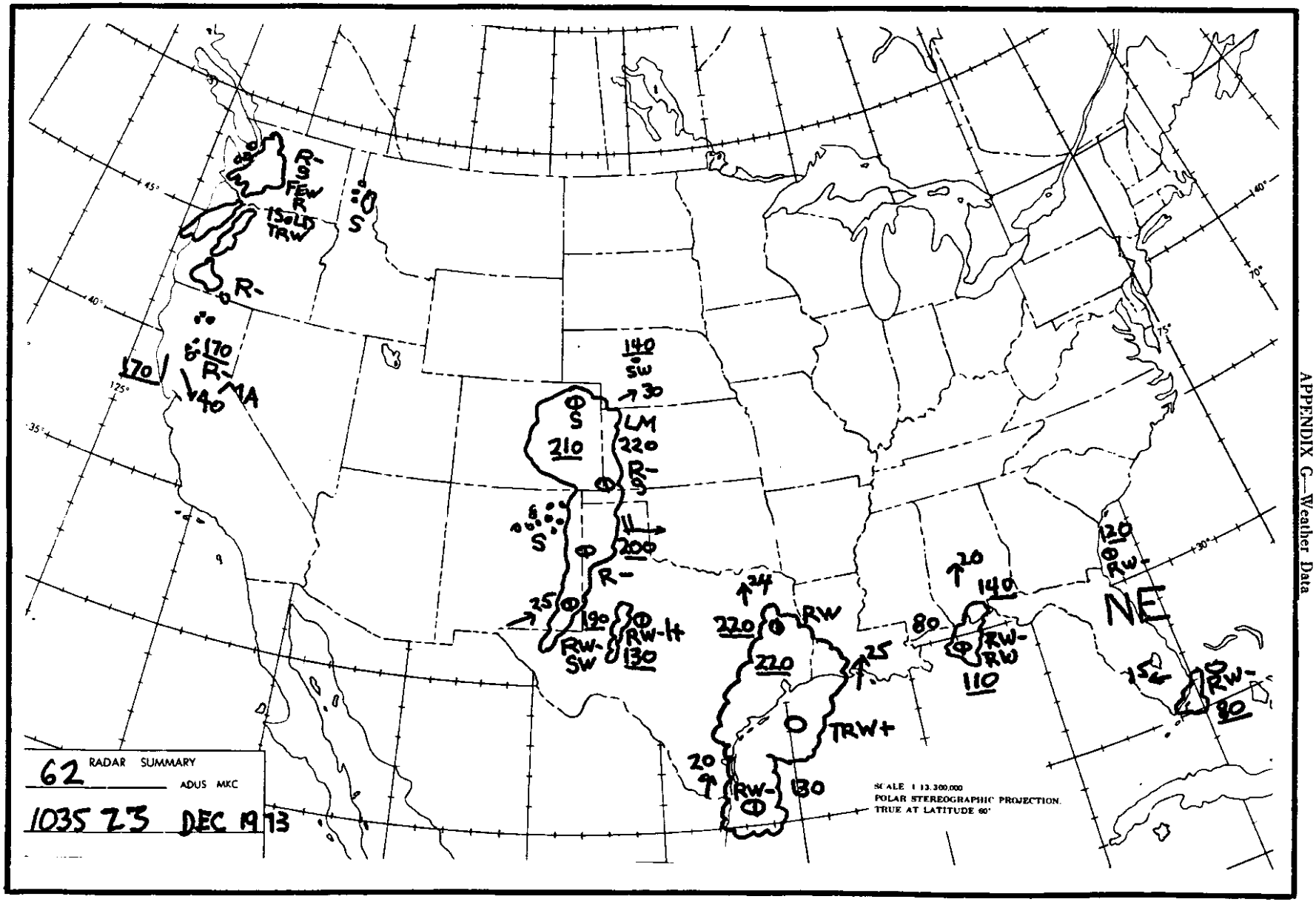


FIGURE 55. Radar summary chart.

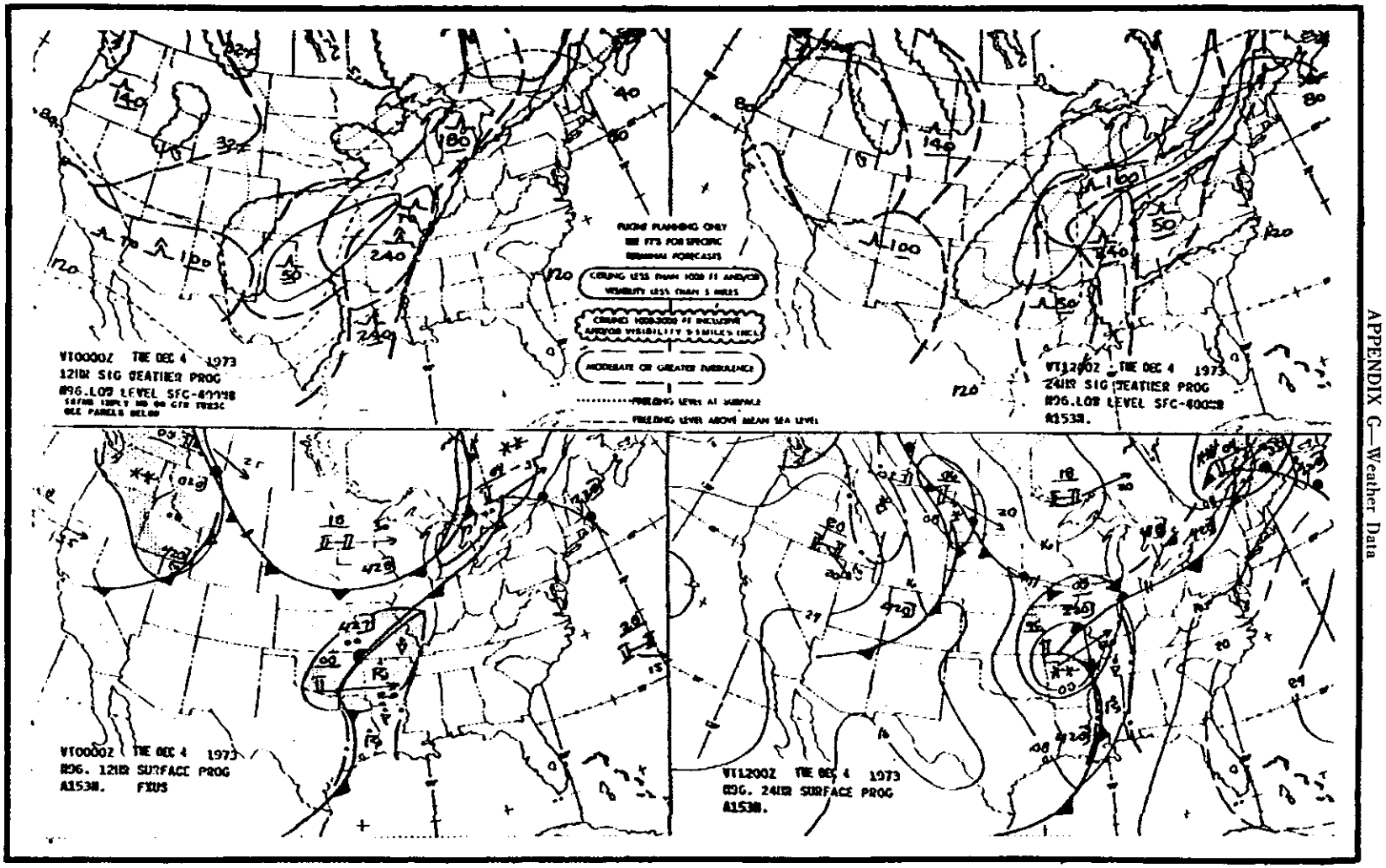


FIGURE 56. Twelve and 24 hour prognostic charts.

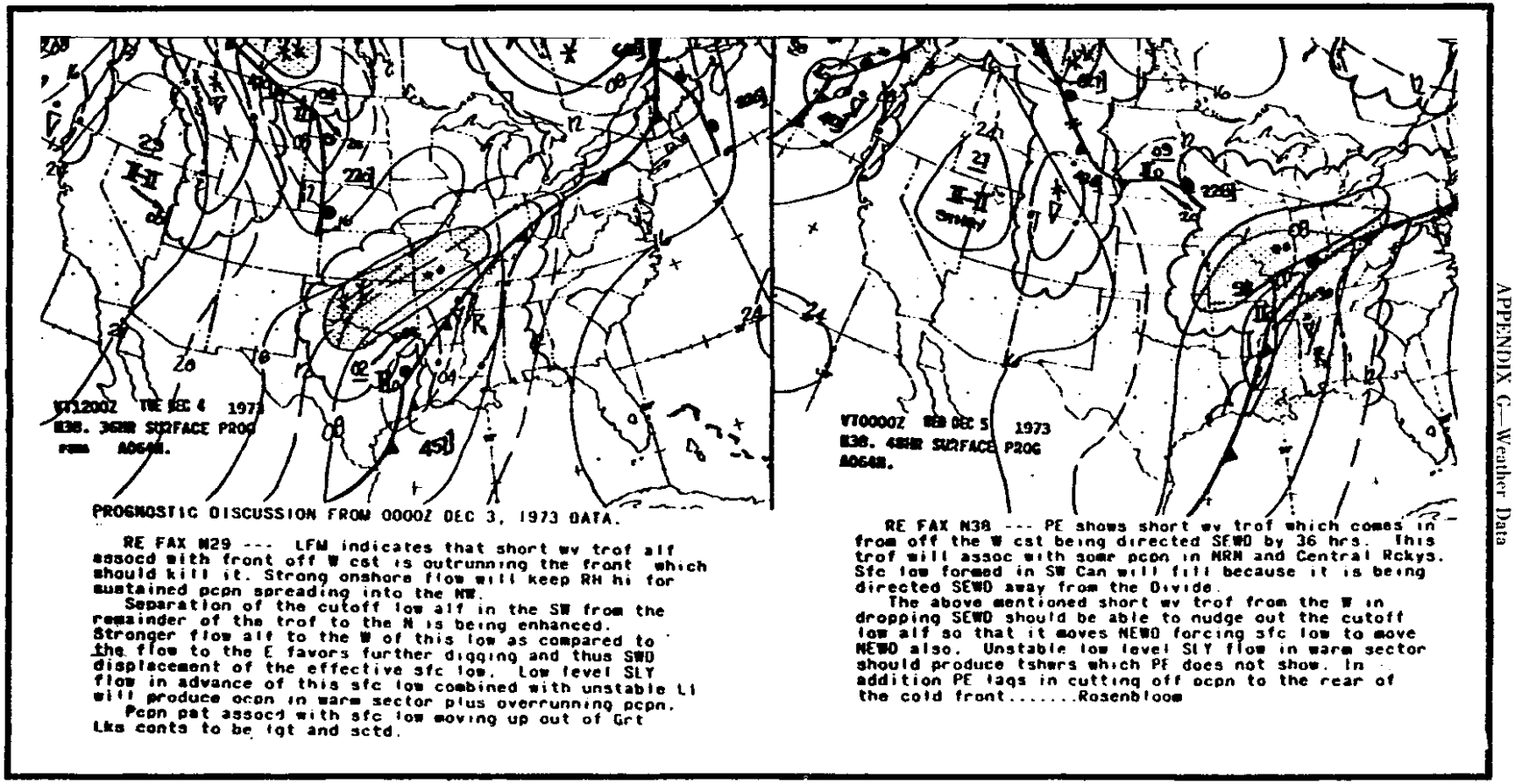


FIGURE 57. Thirty-six and 48 hour prognostic charts.

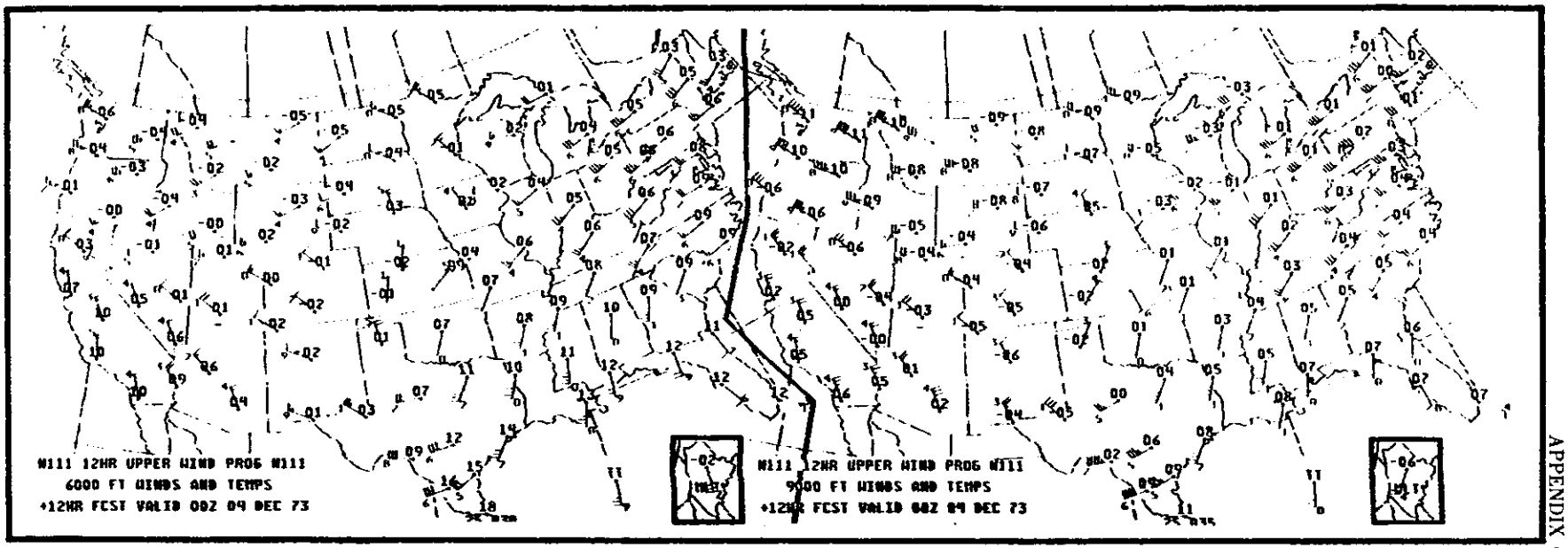


FIGURE 58. Upper wind prognoses chart.

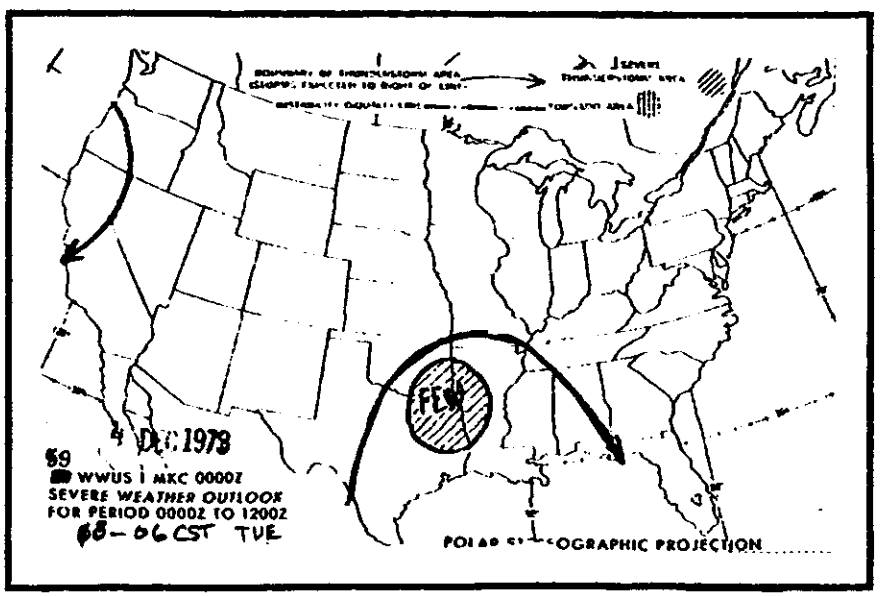
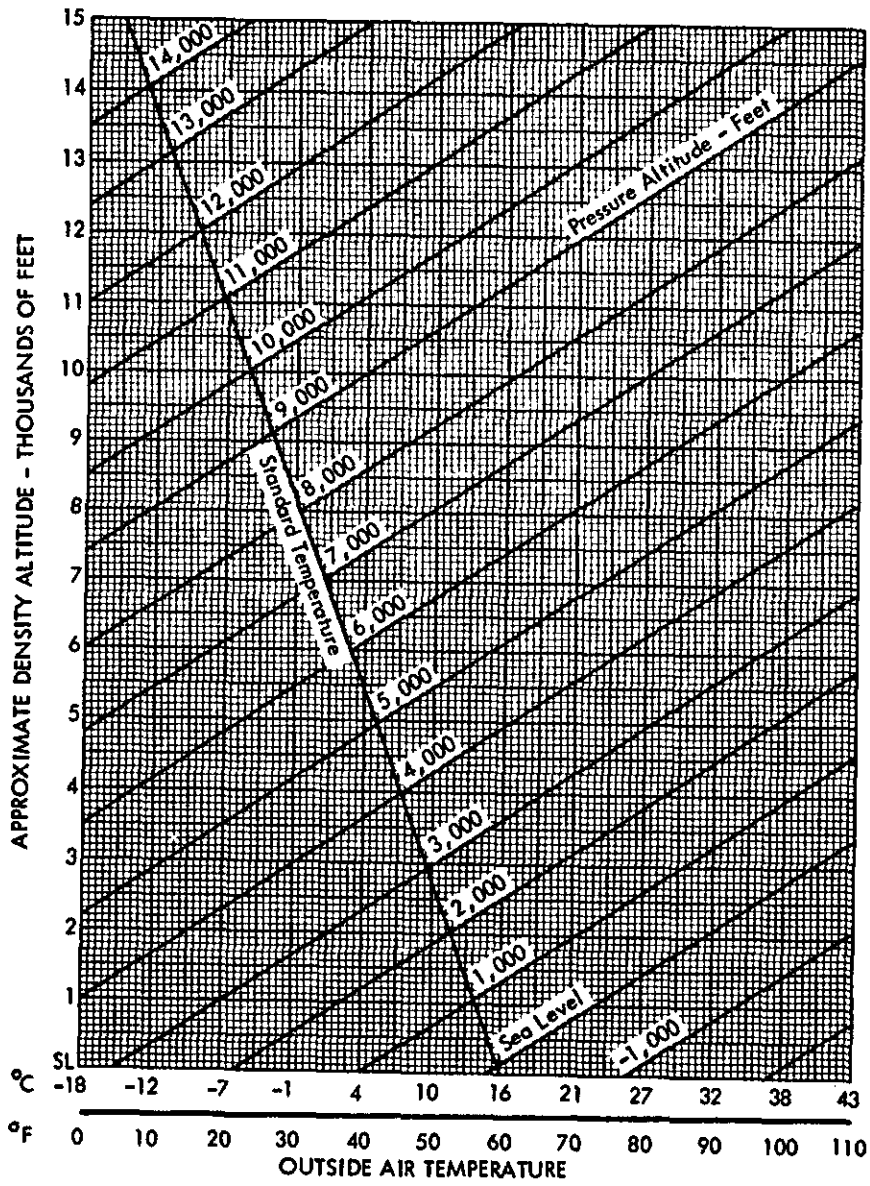


FIGURE 59. Severe weather outlook chart.

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



Altitude Setting in Hg.	Altitude Correction
28.0	1,825
28.1	1,725
28.2	1,630
28.3	1,535
28.4	1,435
28.5	1,340
28.6	1,245
28.7	1,150
28.8	1,050
28.9	955
29.0	865
29.1	770
29.2	675
29.3	580
29.4	485
29.5	390
29.6	300
29.7	205
29.8	110
29.9	20
29.92	0
30.0	-75
30.1	-165
30.2	-225
30.3	-350
30.4	-440
30.5	-530
30.6	-620
30.7	-710
30.8	-805
30.9	-895
31.0	-965

FIGURE 60. Density altitude.

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

Issued: Quarterly (Feb., May, Aug., Nov). *Coverage:* Entire U.S. unless otherwise indicated.

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 listing 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—Graphic Notices and Supplemental Data

Issued: Quarterly (Jan., April, July, Oct.). *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—(For sale by National Ocean Survey, Distribution Division, C44, Riverdale, Md. 20840).

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 NavigationRoutes; 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.

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

FIGURE 61. 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 pilot weather briefers; 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 flight weather information. Automatic answering devices are sometimes used on listed lines to given general local weather information during peak workloads. *To avoid getting the recorded general weather announcement, use the selected telephone number listed.*

★ 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/WSO briefing service.

Automatic Aviation Weather Service (AAWS).

Location and Identifier		Area Code	Telephone
ALABAMA			
Anniston ANB	FSS	(205)	831-2303
Birmingham BHM	FSS	(205)	595-6151▬
	FSS	(205)	595-2101★
Dothan DHN	FSS	(205)	794-6683
Huntsville	WS	(205)	772-9308◆
Mobile MOB (Bates)	FSS	(205)	344-3610
	WS	(205)	342-2762◆
Montgomery MGM (Dannelly)	FSS	(205)	269-4368
	WS	(205)	265-0589◆
Muscle Shoals MSL	FSS	(205)	383-6541▬
	FSS	(205)	381-2500★
ARIZONA			
Douglas DUG (Bisbee-Douglas)	FSS	(602)	364-8458
Flagstaff	WS	(602)	774-2851
Phoenix PHX (Sky Harbor)	FSS	(602)	261-4295▬
Prescott PRC	FSS	(602)	445-2160
Tucson TUS	FSS	(602)	792-6359▬
Winslow	WS	(602)	289-3592
Yuma YUM	FSS	(602)	726-2601▬
ARKANSAS			
El Dorado ELD (Goodwin)	FSS	(501)	863-5128
Fayetteville FYV (Drake)	FSS	(501)	HI 2-8277
Ft. Smith FSM	CS/T	(501)	MI 6-7868/69
		(501)	782-0343▬
	(answered in Fayetteville)		
	WS	(501)	646-5731
ARKANSAS (Con't)			
Harrison HRO	FSS	(501)	EM 5-3433
Jonesboro JBR	FSS	(501)	WE 5-3471
	(0600-2200 Other hrs. Memphis)		
Little Rock	WS	(501)	374-1546◆
Pine Bluff PBF (Grider)	FSS	(501)	JE 5-0652
Texarkana TXK	CS/T	(501)	774-4151▬
CALIFORNIA			
Arcata ACV	FSS	(707)	839-1545
Bakersfield BFL (Meadows)	FSS	(805)	399-1787▬
(No wea bcst avbl 2300-0500 lcl time)			
Bishop	WS	(714)	873-3213
			(0545-1915)
Blythe BLH	FSS	(714)	948-6151
Crescent City CEC (McNamara Fld)	FSS	(707)	464-2514
(0600-2200 other hrs Arcata)			
Daggett DAG	FSS	(714)	254-2223
Eureka	WS	(707)	442-2171◆
Fresno FAT (Air Terminal)	FSS	(209)	251-8269▬
Imperial IPL	FSS	(714)	352-8740
Los Angeles LAX (International)	FSS	(213)	776-2727▬
		(213)	670-1000▬
Van Nuys		(213)	781-5213▬
Long Beach		(213)	639-2618▬
		(714)	542-3585▬
Burbank		(213)	845-3211▬
Fullerton		(714)	879-8381
Santa Ana		(714)	546-5901

FIGURE 62. FSS and WS telephone numbers.

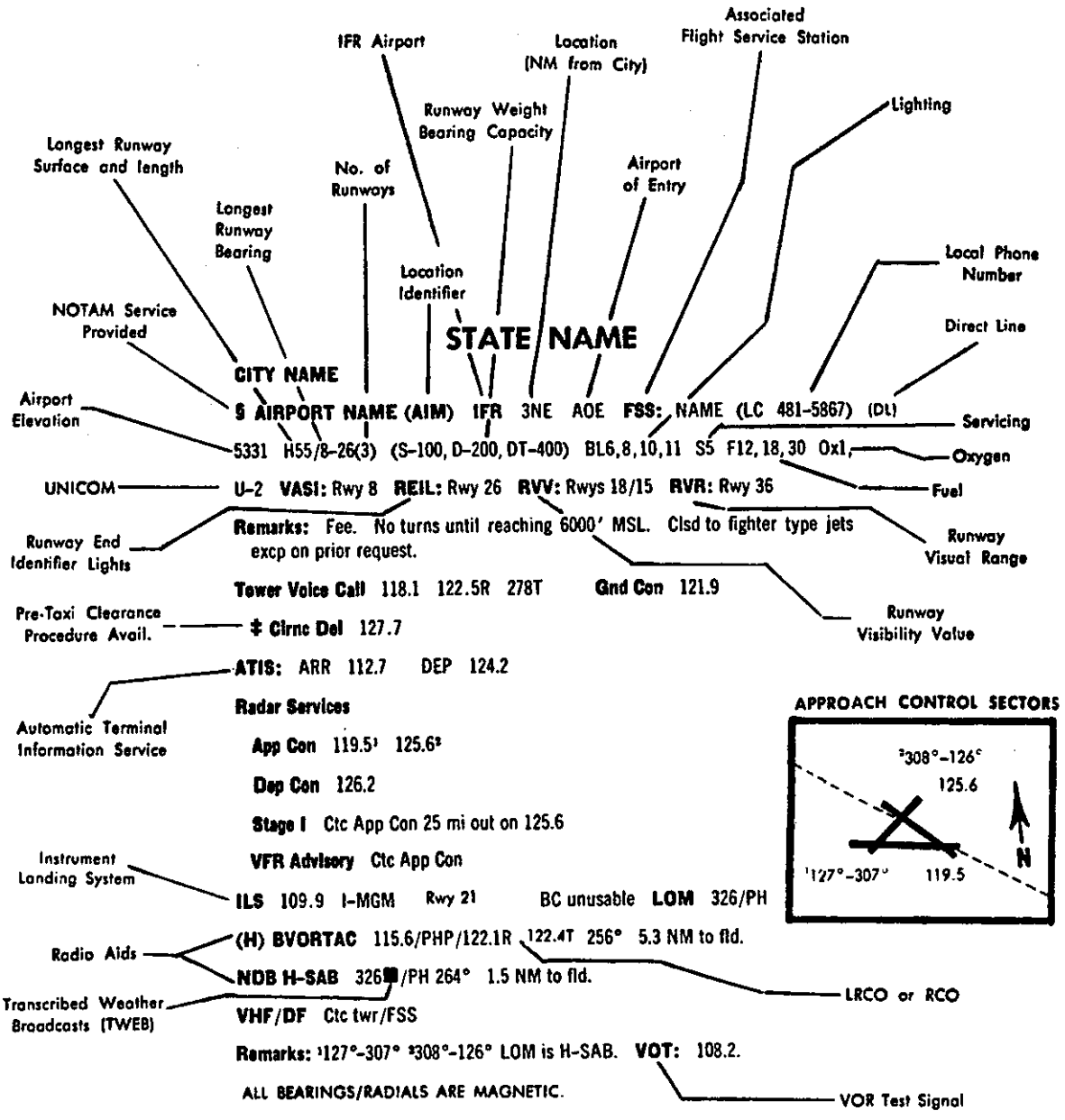


FIGURE 63. Airport/facility directory sample.

NEW JERSEY—*Continued*

ATLANTIC CITY NAFEC—(Continued)

Radar Services:
Atlantic City App Con 124.6 108.6T
Atlantic City Dep Con 119.55
Stage II Ctc apch ctl within 20NM
ILS 109.9 I-PMN Rwy 4
Atlantic City (L) VORTAC 108.6 ACY on fld
VHF/DF Ctc App Con

BERGEN NDB MHW 241/BUQ **FSS:** TETERBORO

CHATHAM NDB MHW 254/CAT **FSS:** TETERBORO

COLTS NECK (L) VORTAC 115.4/COL **FSS:** TETERBORO

COYLE (H) BVORTAC 113.4/CYN/122.1R **FSS:** MILLVILLE

LAKEHURST NDB HW 396/NEL **FSS:** PHILADELPHIA

McGUIRE (T) VOR 110.6/WRI **FSS:** PHILADELPHIA

MILLVILLE FSS 121.5 122.1R 122.2 122.7 123.6

MILLVILLE (L) BVORTAC 115.2/MIV **FSS:** MILLVILLE

§ MORRISTOWN MUNI (MMU) *IFR* 3E **FSS:** TETERBORO (LC JE8–2196)
187 H60/5–23(2) (S–30) BL5,6,11 S5 F12,18,30 U2 **REIL:** Rnwy 5
Remarks: Attended 0700–2300 lcl time Mon-Fri, 0800–2200 Sat, Sun and holidays. Fee. Turbojet operns prohibited rnwy 12; turbojet tkof prohibited rnwy 30. No touch & go lndg or intersection tkof permitted rwy 30. Arpt clsd to jet acft 2100–0700 lcl Mon-Sat, 2100–1300 Sat, Sun and 1500–0700 lcl on Sun and Mon lcl time. GWT of NE 2000' of rwy 5–23 is D–80.
Morristown Tower 118.1 **Gnd Con** 121.7
Radar Services:
Newark App Con 126.7 (090–269°) 127.6 (270–089°)
Newark Dep Con 119.2 127.6
ILS 110.3 I–MMU Rwy 23 **LOM:** 212/MM
Remarks: Twr opers 0630–2230. No voice on ILS. LOC unusable below 500' MSL and below 2500' beyond 17NM; BC unusable below 2000' MSL beyond 15NM, and ILS unmonitored 2300–0700 lcl.

§ NEWARK INTL (EWR) *IFR* 3S LRA **FSS:** TETERBORO (DL)
18 H98/4R–22L(3) (D–350, DT–650) BL6,7A,8,10,11,14,15 S5 F12,18, 34 **REIL:** Rwy 22R, 29 **VASI:** Rwy 22R, 29 **RVR:** Rwy 4L, 4R, 22L
Remarks: Coded transponder required for IFR. Rwy 4R threshold displaced 1200'. Rwy 22L threshold displace 1600'. Rwy 4L–22R grooved full length. Rwy cntrline lgts may oper reduced intensity; increased upon request. VASI rwy 22R TCH 64' RRP 1212'. VASI rwy 29 TCH 65', RRP 1272'. Jet acft prior apvl only.
Newark Tower 118.3 **Gnd Con** 121.8
‡ Clrnc Del 118.85
ATIS: (Arr) 115.7T (Dep) 110.0T
Radar Services:
App Con 127.6 (270–089°) 126.7 (090–269°) 125.5 125.85 127.3 128.55
Dep Con 119.2
TCA Group 1: See NOS TCA chart
ILS 108.7 I–EWR Rwy 4L BC unusable **LOM:** 241/EW
108.7 I–LSQ Rwy 22L **LOM:** 241/BUQ
108.7 I–EZA Rwy 4R **LOM:** 204/EZ
Newark NDB H–SAB 379■/EWR 058° 1.0NM to fld.
VHF/DF Ctc twr.
Remarks: Rwy 22L LOM rwy 22L is Bergen NDB. **VOT:** 110.0.

PALISADES PARK NDB MHW 233/PAD **FSS:** NEW YORK

PATERSON NDB MHW 347/PNJ **FSS:** TETERBORO

RAINBOW NDB SBH 363/RNB **FSS:** MILLVILLE

ROBBINSVILLE (H) BVORTAC 113.8/RBV/122.1R **FSS:** N. PHILADELPHIA

SEA ISLE (H) BVORTAC 114.8/SIE/122.1R **FSS:** MILLVILLE

SOLBERG (L) BVORTAC 112.9/SBJ/122.1R **FSS:** TETERBORO

SPARTA (H) BVORTAC 115.7/SAX **FSS:** TETERBORO

NEW JERSEY—*Continued*

STILLWATER (L) BVORTAC 109.6/STW/122.1R **FSS:** TETERBORO

TETERBORO FSS 121.5 122.0 122.2 122.7

§ TETERBORO (TEB) *IFR* 1SW LRA **FSS:** TETERBORO on Fld 9 H70/1–19(2) (S–50, D–80) BL6,12 S5 F12,18,34 Ox1 U–2
Remarks: Fee. P-line NE. Rwy 1 threshold displaced 770'. Jets follow published noise abatement procedures available on req. All acft avoid hospital 1.7 mi N of rwy 1–19. Clsd to motorless acft and unctld acft activity except by prior permission. Touch and go lndg prohibited Mon-Fri 0900–2100 lcl and Sat 1200–1900 lcl, helicopters excluded.
Teterboro Tower 119.5 **Gnd Con** 121.9
Radar Services:
Newark App Con 126.7 127.6 127.3 128.55
Newark Dep Con 119.2 127.6
ILS 108.9 I–TE8 Rwy 6 BC unusable **LOM:** 219/TE

TRENTON
§ MERCER COUNTY (TTN) *IFR* 5NW **FSS:** PHILADELPHIA (LC. 882–1590)
213 H60/6–24(3) (S–32, D–56) BL5,6,11,12 S5 F12,18,30 U2 **REIL:** Rwy 6
Remarks: Fee. P-line rwy 6. 920' displaced threshold rwy 6.
Trenton Tower 120.7 **Gnd Con** 121.9
Radar Services:
Philadelphia App Con 120.15 (270–089°) 123.8 109.3T
Philadelphia Dep Con 119.0 128.55 (090–269°)
ILS 111.3 I–TTN Rwy 6 BC unusable **LOM:** 369/TT

WHITMAN NDB MHW 222/PDP **FSS:** PHILADELPHIA

WOODSTOWN (L) BVORTAC 112.8/OOD **FSS:** MILLVILLE

NEW MEXICO

ALBUQUERQUE FSS 121.5 122.1R 122.2 122.3

§ ALBUQUERQUE INTL (ABQ) *IFR* 3SE LRA **FSS:** ALBUQUERQUE on Fld
5352 H134/8–26(4) (S–100, D–200, DT–350) BL5,6,8,10 S5 F12,18,34,40 Ox1,2,3,4 U–2 **VASI:** Rwy 8 **RVR:** Rwy 35
Remarks: Rnwy 8 threshold displaced 599'. Tkofs rnwy 3 prohibited except for emgcy conditions on fld. Tkofs rnwy 35 limited to convention acft no larger than DC–3; others may request rwy 35 tkofs from ABQ Twr. J-bar and A-gear rwys 8–26 and 17–35. Arresting cables rwy 35 1500' from threshold, rwy 17 1007' from threshold, rwy 26 1053' from threshold, rwy 8 200' from displaced threshold. VASI rwy 8 TCH 50', RRP 1150'.
Albuquerque Tower 118.3 122.5R 119.2 **Gnd Con** 121.9
Clrnc Del 119.2
ATIS: 110.3
Radar Services:
Albuquerque App Con 124.4 (on or North V–12) 121.1 (South V–12) 122.5R 134.1 113.2T
Albuquerque Dep Con 124.4 (on or North V–12) 121.1 (South V–12) 122.5R
TRSA See graphic in AIM Part 4
ILS 110.3 I–ABQ Rwy 35 **LOM:** 278/AB
Albuquerque (H)BVORTAC 113.2/ABQ 077° 9.6 NM to fld.
Albuquerque NDB SABH 230■/ABQ 355° 2.6NM to fld.
Remarks: VOT unreliable all areas of arpt except runup areas for rwy 8. **VOT:** 111.0.

ANTON CHICO (L) BVORTAC 110.0/ACH/122.1R **FSS:** LAS VEGAS

ARTESIA NDB MHW 414/ATS **FSS:** CARLSBAD
Remarks: Non-federal facility.

CARLSBAD FSS 121.5 122.1R 122.2 123.6

CARLSBAD (L) BVORTAC 116.3/CNM **FSS:** CARLSBAD

FIGURE 64. 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 checkmark (✓) 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 information is not necessarily limited to the underlined portion, which is used only to attract attention to the new insert.

ALABAMA

✓SAMSON-POWELL FIELD ARPT: Arpt permly clsd.

TUSCALOOSA: FSS remains operational, telephone number—(205) 758-3628.

TUSKEGEE—MOTON FIELD ARPT: Const in progress. Arpt clsd til aprxly May 1974. (3-73)

ALASKA

SPECIAL NOTICE: Pilots flying aircraft equipped with SCR-718 altimeters will assure that the altimeter is turned off within 200 NM of Clear, Alaska and Thule, Greenland.

For complete information on Alaska consult the Alaska Supplement.

ARIZONA

BISBEE MUNI ARPT: Rwy lgts 2-20 inop. (8-73)

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 1500' above and horizontally from all scenic overlooks, parks, trails and Grand Canyon Village.

PRESCOTT MUNI ARPT: Obstrn 30' AGL lctd ¼ NM SSW of TDZ rwy 3 unlgtd. First 1450' rwy 11 clsd.

ARKANSAS

EL DORADO, GOODWIN FLD: Threshold rwy 22 displaced 413'. (6-73)

FORDYCE MUNI ARPT: Rwy 04 thr dsplcd 100'. (8-73)

✓HOPE, MUNI ARPT: For fuel at ngt call 501-777-0900.

CALIFORNIA

SPECIAL NOTICE: Do not mistake dirt strip on large island, Lake Berryessa, lctd lat 38-34 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: Arpt bcn lgt inop. (12-73)

BISHOP RDO: VOR ident "BIH" OTS. (11-73)

BLYTHE ARPT: Intensive airline jet acft training in progress 24 hrs daily. Inbound acft 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.

✓CHINO ARPT: Right traffic rwys 3 and 8.

CHINO ARPT: Constr on arpt til aprxly Jan 1974.

✓CHINO: Control zone hrs cont.

FRESNO AIR TERMINAL: Unlgtd 250' AGL crane lctd 5 NW of arpt til aprx Jan 1975.

IMPERIAL RDO: VOR shutdown 0800-1700 Jan 7-Jan 11, 1974.

MARYSVILLE-YUBA CO. ARPT: ATCT freq change delayed til aprxly Feb 74. (1-74)

LOS ANGELES INTL ARPT: ILS/OM "I-LAX" serving rwy 25L shutdown. (1-74)

MODESTO CITY-COUNTY ARPT: Rwy 10R-28L clsd to acft over 12,500 lbs GWT. Turbojets requested to discontinue operations 2400-0500 lcl and park N side of arpt. (12-73)

✓OAKLAND-METROPOLITAN OAKLAND INTL ARPT: ATIS freq 108.7 changed to 128.5.

✓ONTARIO INTL ARPT: Tower freq 125.9 changed to 120.6.

✓RED BLUFF, MUNI ARPT: Rwy lgts operg dusk-2200 after ctc FSS.

REDDING, SKY RANCH ARPT: 4' drop off SE end rwy 12-30 not marked or lgtd. (10-73)

SALINAS MUNI ARPT: Const on fld. Rwy 13-31 clsd til aprxly Feb 74. Check NOTAMS for current info. (9-73)

SAN CLEMENTE FLIGHT RESTRICTION: FAR Section 91.95 prohibits acft operns below 4000' MSL within a one mile radius of the San Mateo Point Loran Station/Oceanside VORTAC 300 radial 12.5 NM.

SALINAS MUNI ARPT: ILS ident "I-SNS shutdown til aprxly 1 Mar 74. (11-73)

FIGURE 65. Airman's Information Manual—Part 3A.

NEW JERSEY—CONTINUED

RIDGEFIELD PARK, LAMBROS ADJ S 40°50'45'' 74°01'45'' FSS: TETERBORO
00 H120X120 S3 F12, 15
REMARKS: ARPT ATTENDED DALGT NIGHTS BY PRIOR REQ.

NEW MEXICO

ALBUQUERQUE, HELISPOT RANCHOS DE ALBUQUERQUE 5N 35°09'26'' 106°38'23'' FSS: ALBUQUERQUE
5020 3960X2640
REMARKS: ARPT UNATTENDED.

HELISPOT RANCHOS DE ALBUQUERQUE See ALBUQUERQUE

LAS CRUCES CITY 1NE 32°19'15'' 106°46'00'' FSS: EL PASO
3990 H80X100
REMARKS: ARPT UNATTENDED.

NEW YORK

BUFFALO, PRIOR AVIATION 5E 42°56'49'' 78°44'05'' FSS: BUFFALO
690 H75X75 BL4 S4 F12, 18, 30 U-2
REMARKS: LANDING FEE.

EAST 34TH STREET See NEW YORK

EDISON See LAGRANGE

GARDEN CITY, ISLAND 1NE 40°44'30'' 73°36'35'' FSS: ISLIP
100 H350X125 S5 F18, 30 U-3
REMARKS: ARPT ATTENDED MON-FRI 0700-2400 SAT-SUN 0900-1700. LANDING FEE.

HILTON 2SW 43°16'09'' 77°49'55'' FSS: BUFFALO
330 H50X20 F12, 18
REMARKS: ARPT ATTENDED DAYLIGHT.

ISLAND See GARDEN CITY

LAGRANGE, EDISON 41°41'10'' 73°51'15'' FSS: POUGHKEEPSIE
240 25X25
REMARKS: ARPT UNATTENDED.

METROPORT EAST 60TH STREET See NEW YORK

NEW YORK, EAST 34TH STREET 40°44'33'' 73°58'21'' FSS: TETERBORO
10
REMARKS: ARPT UNATTENDED. LANDING FEE. LCTD 5NE OF LAGUARDIA ARPT. DIMENSIONS AND SFC UNKNOWN.

NEW YORK, METROPORT EAST 60TH STREET ADJ E 40°45'36'' 73°57'26'' FSS: TETERBORO
5 F12, 30 U-3
REMARKS: ARPT ATTENDED MON-FRI 0800-2100 SAT-SUN 0800-2000. LANDING FEE.

NEW YORK, PAN AM METROPORT ADJ W 40°45'36'' 73°57'26'' FSS: ISLIP
6 H35X35 F18, 34
REMARKS: ARPT ATTENDED 0800-2000. LANDING FEE. LGTD WITH FLOOD 6 PERIMETER LGTS.

NEW YORK CITY, PORT AUTHORITY-WEST 30TH ST. MIDTOWN. (JRA) 40°45'16'' 74°00'27'' FSS: TETERBORO
7 H80X80 F18, 30
REMARKS: ARPT ATTENDED 0800-2000. LANDING FEE.

PAN AM METROPORT See NEW YORK

PORT AUTHORITY-WEST 30TH ST. MIDTOWN. See NEW YORK CITY

PRIOR AVIATION See BUFFALO

RAMAPO HOSPITAL See SPRING VALLEY

SPRING VALLEY, RAMAPO HOSPITAL 2N 41°08'30'' 74°02'05'' FSS: TETERBORO
520 H60X60

SYRACUSE, TIMBELLO 4E 43°03'00'' 76°04'00'' FSS: UTICA
400 H100X100 S5 F12
REMARKS: ARPT ATTENDED 0700-2100. 150' PLINE 2500' N, 40' PLINE 1000' E AND 1425' TWR 12MISE LGTD/MRKD.

TIMBELLO See SYRACUSE

NORTH DAKOTA

TIOGA MUNI 1SE 48°23'00'' 102°54'00'' FSS: MINOT
2261 S5 F12, 18
REMARKS: ARPT ATTENDED 0800-DAYLIGHT.

OHIO

BROWNIES LEBANON See LEBANON

BURKE LAKEFRONT See CLEVELAND

CANTON, STARK COUNTY SHERIFF 40°50'25'' 81°18'30'' FSS: CLEVELAND
1132 H125X80

CLEVELAND, BURKE LAKEFRONT ADJ N 41°31'02'' 81°41'04'' FSS: CLEVELAND
585 H60X60 B
REMARKS: LANDING FEE. LNDG FEE BASED ON WEIGHT OF ACFT.

CLEVELAND HOPKINS INTL 10SW 41°24'37'' 81°50'56'' FSS: CLEVELAND
792 H50X50 B
REMARKS: LANDING FEE.

DAYTON 39°45'56'' 84°12'30'' FSS: DAYTON
750 H200X200 *BL*4 S3 F18, 30
REMARKS: ARPT ATTENDED MON-FRI 0800 1700.

HOLIDAY INN See ZANESVILLE

LEBANON, BROWNIES LEBANON 3S 39°23'48'' 84°12'30'' FSS: DAYTON
879 H30X30 (S-3) L*4 S5 F12, 18
REMARKS: ARPT ATTENDED DALGT. FOR RWY LGTS PHONE 513-933-1836.

MASSILLON HELIPORT #8 ADJ N 40°47'55'' 81°31'42'' FSS: CLEVELAND
935 H50X50
REMARKS: ARPT UNATTENDED.

STARK COUNTY SHERIFF See CANTON

ZANESVILLE, HOLIDAY INN 5E 39°57'54'' 81°54'22'' FSS: ZANESVILLE
860 H75X75
REMARKS: ARPT UNATTENDED.

OKLAHOMA

ARDMORE DOWNTOWN 1SE 34°09'00'' 97°08'00'' FSS: MC ALESTER
840 H80X80 B F12, 18
REMARKS: ARPT ATTENDED MON-SAT DAWN-DUSK. OVERHEAD LGTS OPERATE DUSK-DAWN.

CIMARRON TRAINING PLATFORM See OKLAHOMA CITY

FAIRGROUND See OKLAHOMA CITY

OKLAHOMA CITY, CIMARRON TRAINING PLATFORM 4SW 35°29'15'' 97°49'00'' FSS: OKLAHOMA CITY
1350 H30X30 B S5 F12, 18
REMARKS: ARPT ATTENDED 0700 1800.

OKLAHOMA CITY, FAIRGROUND 3SW 35°28'28'' 97°34'16'' FSS: OKLAHOMA CITY
1210 H50X48
REMARKS: ARPT ATTENDED 0900-1700. P-LINE IN RWY H1 APCH. TFC ENTER AND DEPART FM EAST BTN MARKED POLES ON E SIDE OF MAY AVE, ALSO ALONG DRAINAGE DITCH RUNNING NNW OF HELIDAD.

OKLAHOMA CITY, OPUBCO 35°28'10'' 97°31'10'' FSS: OKLAHOMA CITY
1285 H97X97
REMARKS: ARPT UNATTENDED.

OPUBCO See OKLAHOMA CITY

SURREY HILLS See YUKON

FIGURE 66. Heliport directory.

PARACHUTE JUMPING AREAS

The following tabulation lists all reported parachute jumping sites in the United States. Unless otherwise indicated, all activities are conducted during daylight hours and under VFR conditions. The busiest periods of activity are normally on weekends and holidays, but jumps can be expected at anytime during the week at the locations listed. Activities conducted on military facilities are not included in this list.

All times are local and altitudes MSL unless otherwise specified.

Refer to Federal Aid Regulations 105 for required procedures relating to parachute jumping.

Note: (c) indicates Parachute Jump Area is charted.

LOCATION	DISTANCE AND RADIAL FROM NEAREST VOR/VORTAC	MAXIMUM ALTITUDE	REMARKS
ALABAMA			
Bayou La Batre, Ray Arpt	12 NM; 217° Brookley	12,500	
(c)Clanton, Gragg Fld	23 NM; 338° Maxwell	12,500	Weekends and holidays
Harvest	9 NM; 297° Huntsville	13,500	
Headland Muni Arpt	8 NM; 070° Dothan	15,000	Weekdays 1200–SS; Sat-Sun, and holidays SR–SS.
Warrior	11 NM; 350° Birmingham	12,500	
ARIZONA			
(c)Casa Grande Muni Arpt	12 NM; 047° Casa Grande	13,500 AGL	SR-2400
Safford Muni	40.4 NM; 318° San Simon	14,000	Weekends, occasional weekdays on fld
Sports Centre	23 NM; 318° Phoenix	15,000	
Yuma, Laguna AAF	10 NM; 025° Yuma	15,000	Fridays only
ARKANSAS			
Camp Robinson	15.5 NM; 331° Little Rock	2,500 AGL	Mon-Fri 0800–2300
Texarkana	9 NM; 160° Texarkana	13,000 AGL	0800–SS lcl weekends and occasional weekdays
CALIFORNIA			
(c)Antioch Arpt	13 NM; 102° Concord	12,500	Daily.
Crescent City Arpt	6.5 NM; 001° Crescent	15,000	Weekends and holidays SR–SS
(c)Elsinore, Skylark Fld	22 NM; 130° Ontario	14,000	1 SM radius—0800–SS daily
Lancaster, Hawkins Arpt	8.7 NM; 039° Palmdale	20,000	Daylgt hrs. Arpt clsd during drops
(c)Livermore	22 NM; 073° Oakland		
(c)Lincoln	29 NM; 359° Sacramento	15,000	SR–SS daily
(c)Perris Valley Arpt	18 NM; 107° Ontario 16 NM; 121° Riverside	9,000	
(c) Pope Valley	20 NM; 056° Santa Rosa	12,500	
Riverdale, Cal West Para Center	24 NM; 170° Fresno	12,500	

FIGURE 67. Parachute jumping areas.

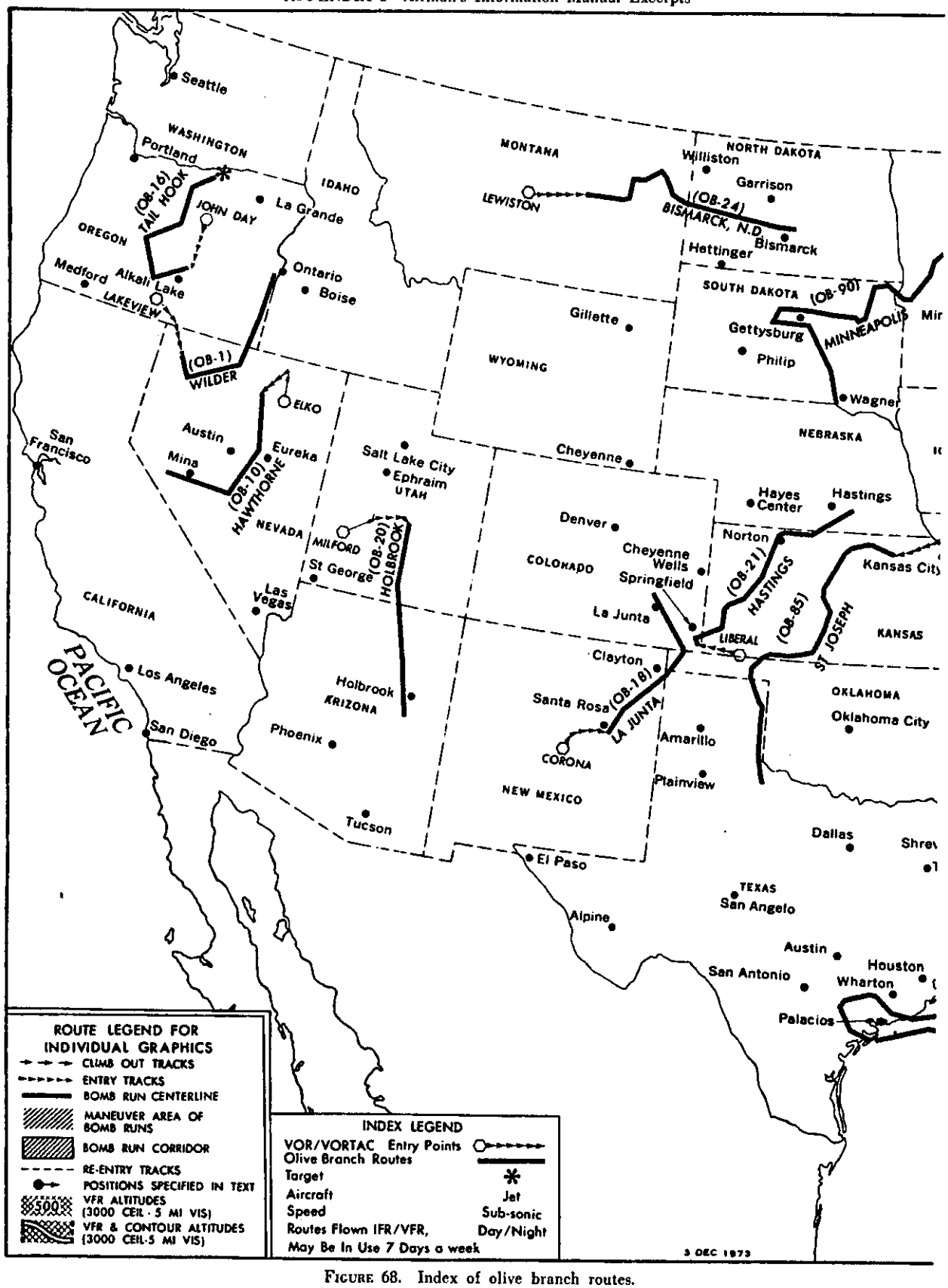
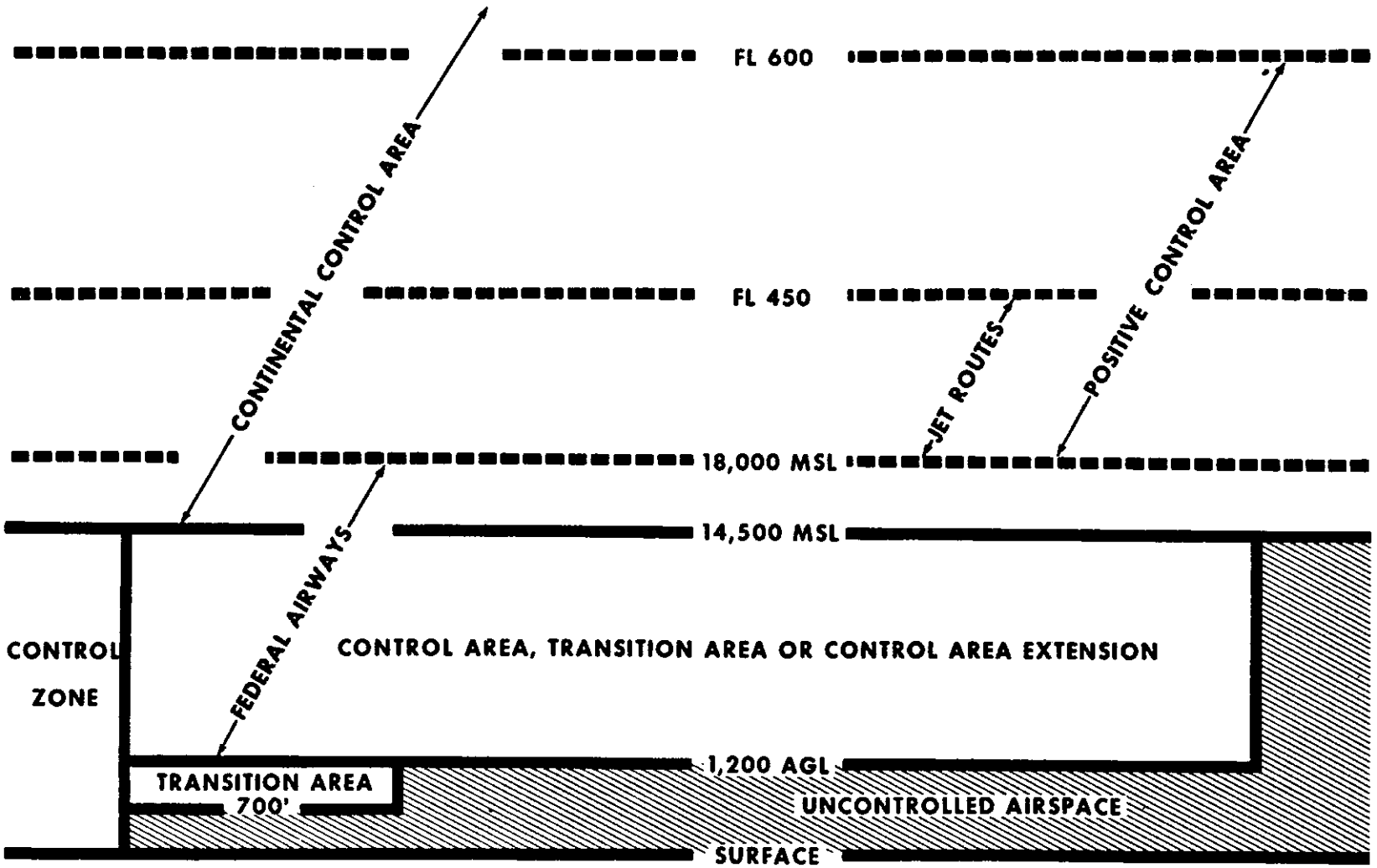


FIGURE 68. Index of olive branch routes.

FIGURE 68. Index of olive branch routes—cont'd.



NOTE: The above depicts the normal vertical limits of the various airspace segments.

FIGURE 69. Vertical extent of airspace segments.

DALLAS-FT WORTH TERMINAL CONTROL AREA (GROUP 1)

Effective date: 0901 GMT JAN.13, 1974

CEILING 8000' MSL

Prepared by the National Ocean Survey at the direction of the FEDERAL AVIATION ADMINISTRATION

80/50 --Ceiling of TCA in hundreds of feet MSL

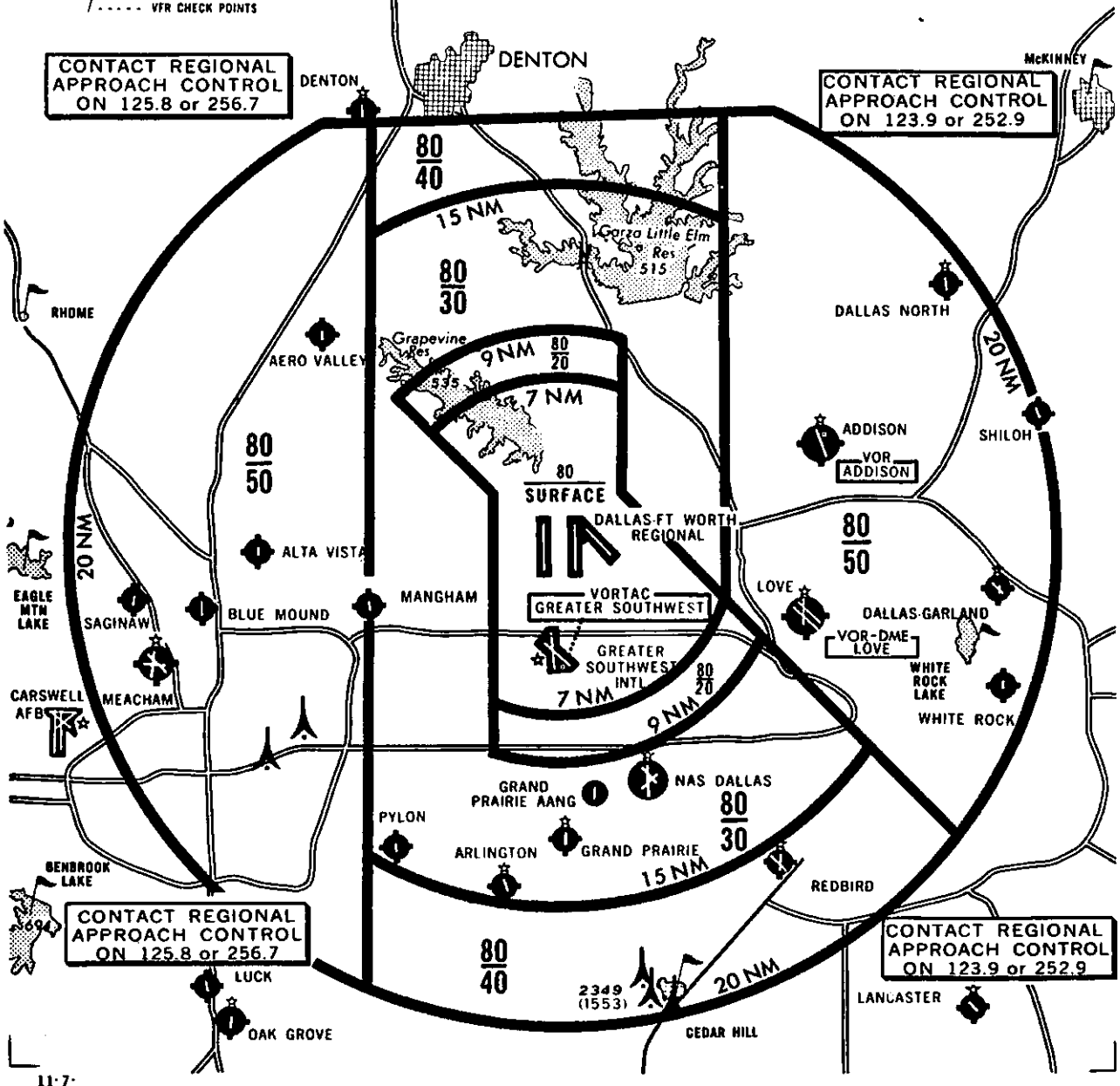
80/50 --Floor of TCA in hundreds of feet MSL

SEE VFR TERMINAL AREA CHART FOR ADDITIONAL VFR CHECK POINTS AND CONTROL ZONE INFORMATION

Note: Nautical mile distances are arcs from REGIONAL Arpt

----- VFR CHECK POINTS

THIS MAP NOT TO BE USED FOR NAVIGATIONAL PURPOSES. Use instead the Dallas-Ft. Worth VFR Terminal Area Chart, available from authorized NOS aeronautical chart agents or from the Distribution Division (C-44), National Ocean Survey, Riverdale, Md. 20840.



11-7-

FIGURE 70. Terminal control area.

TAHOE VALLEY AIRPORT TERMINAL AREA-GRAPHIC NOTICE

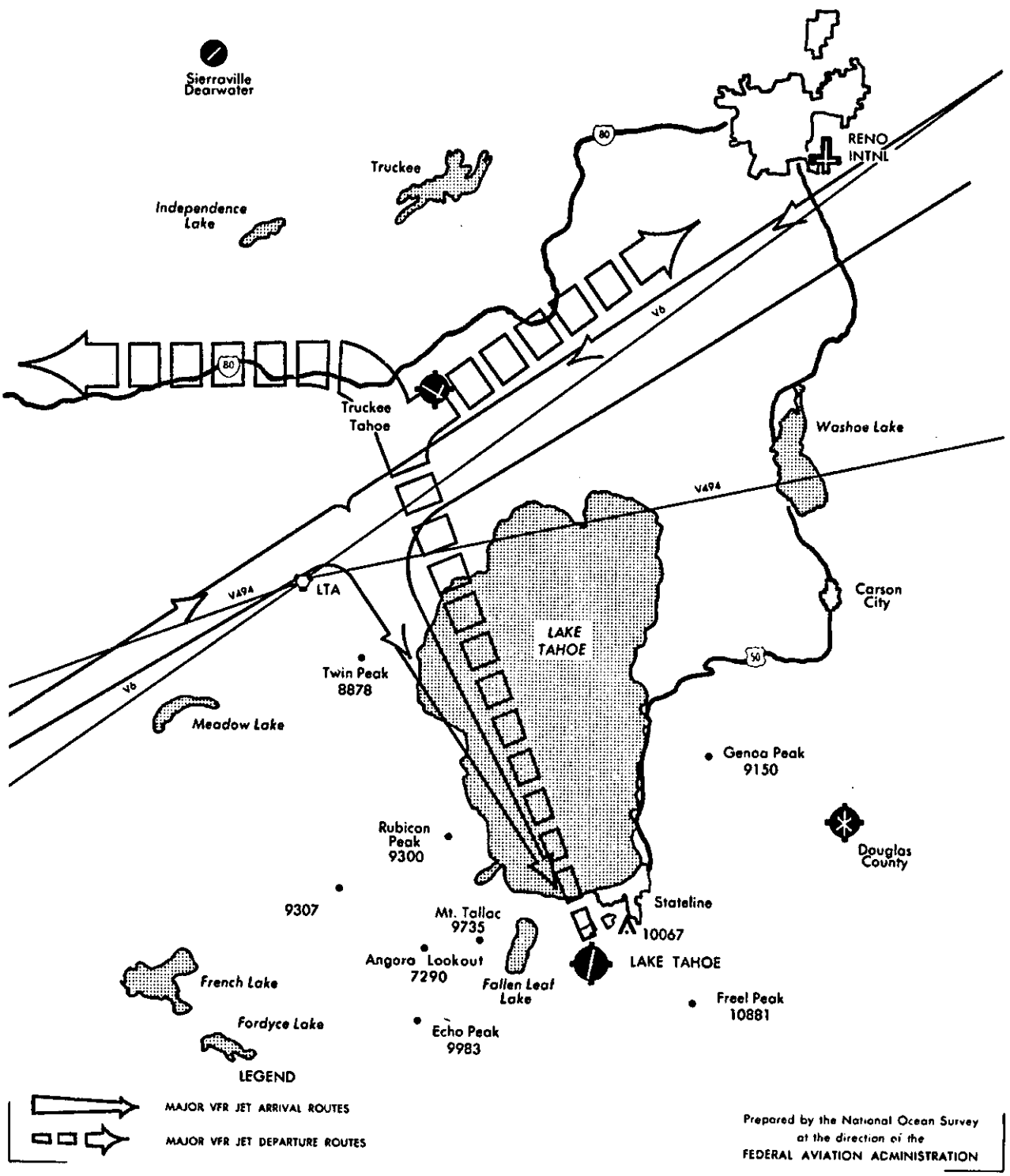


FIGURE 71. Terminal area graphic notice.

TOLEDO, OHIO, TOLEDO EXPRESS ARPT
FIELD ELEV. 684' MSL

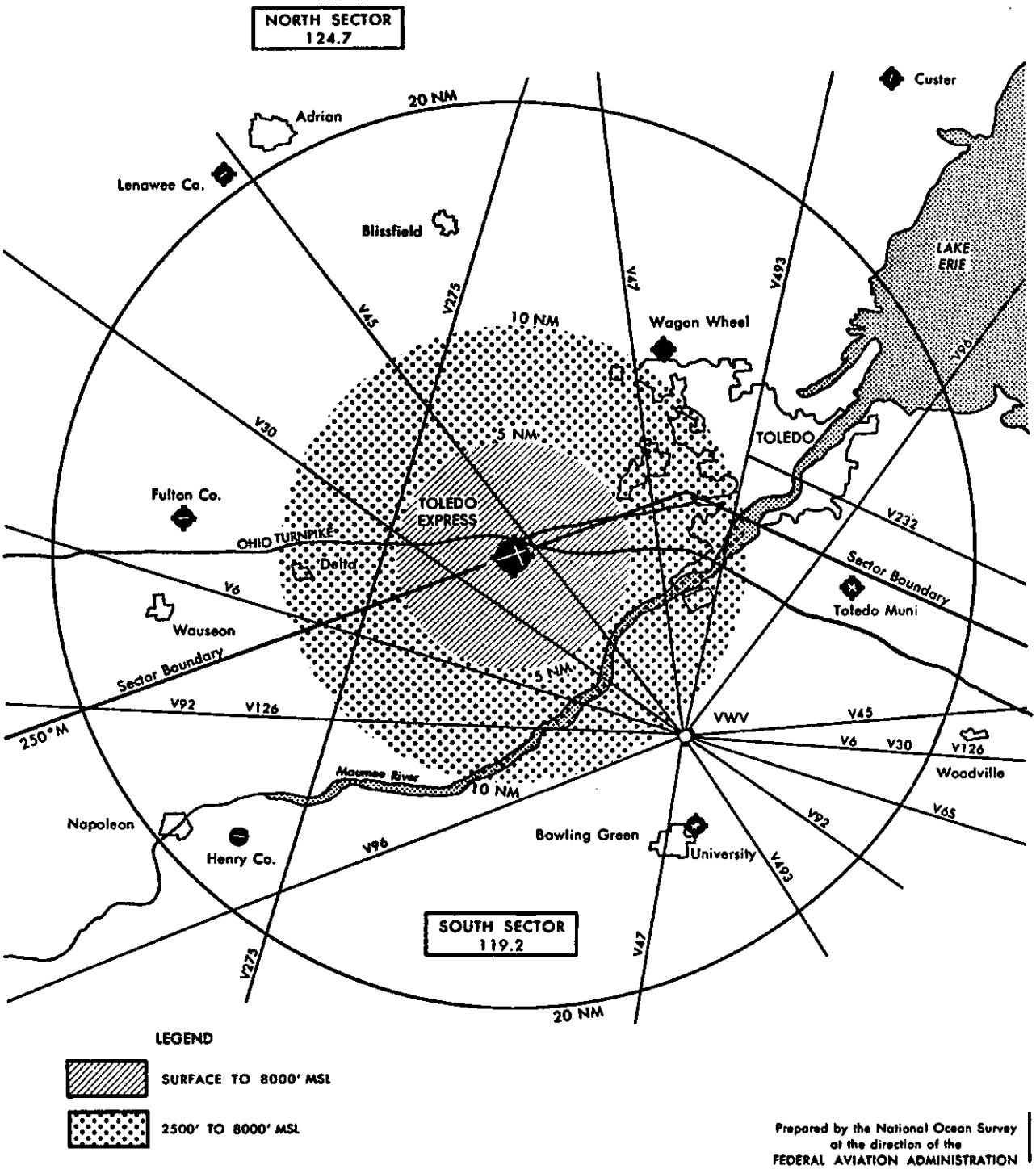


FIGURE 72. Terminal radar service area.

DEPARTMENT OF TRANSPORTATION
Federal Aviation Administration

VFR PILOT EXAM-O-GRAMS

1/74

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.

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VFR EXAM-O-GRAMS

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

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:

FIGURE 73. List of VFR exam-o-grams.

DEPARTMENT OF TRANSPORTATION
Federal Aviation Administration

IFR PILOT EXAM-O-GRAMS

4/73

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IFR EXAM-O-GRAMS

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

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:

FIGURE 74. List of IFR exam-o-grams.

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