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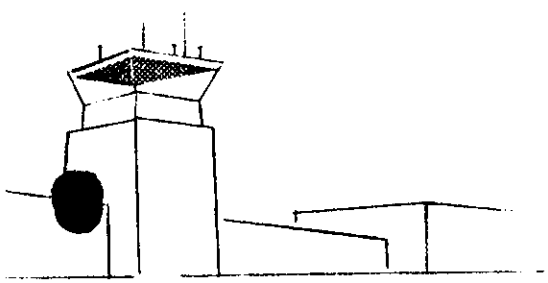
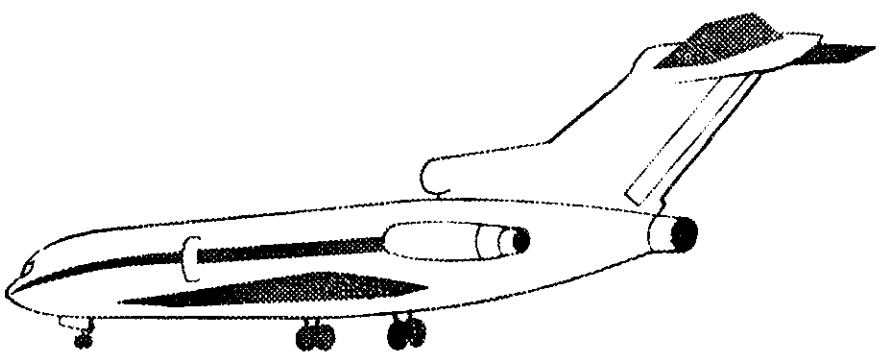
AIRCRAFT DISPATCHER

written test guide

DEPARTMENT OF TRANSPORTATION

FEDERAL AVIATION ADMINISTRATION





AIRCRAFT DISPATCHER WRITTEN TEST GUIDE

Revised 1969

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

PREFACE

This guide is prepared by the Flight Standards Service of the Federal Aviation Administration to assist applicants preparing for the Aircraft Dispatcher Written and Practical Tests. It describes the type and scope of knowledge covered in the tests, lists reference materials available from the U.S. Government Printing Office, and presents sample questions. As a convenience to applicants, those portions of the Federal Aviation Regulations concerning general eligibility and aeronautical experience requirements for the certificate have been included. Applicants should be aware, however, that regulations are subject to amendment. Any question regarding the currency of these quoted excerpts may be checked with the appropriate FAA office.

This guide supersedes FAA Advisory Circular AC 65–4, *Aircraft Dispatcher Examination Guide.*

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APPENDIX

INTRODUCTION

The Aircraft Dispatcher is an important member of the airline operation team and must be able to speak the language of the operating crews as well as that of management. He shares responsibility with the pilot for flight planning details that affect the safe conduct of the planned operation. After dispatching the flight, he performs important coordination functions involving the aircraft and other departments of the airline. He also provides the pilot with advisory information affecting the safe progress of the flight.

The Aircraft Dispatcher should, therefore, possess knowledge across the broad spectrum of airline operation as reflected in the section of this guide titled "Aeronautical Knowledge Covered by the Written Test." It is recognized that certain topics concerning domestic flight operations have no counterpart in international flight operations and vice versa; however, the applicant who is fully educated in the subject areas listed will be adequately prepared for the written test.

AIRCRAFT DISPATCHER CERTIFICATE REQUIREMENTS

Certification requirements for the Aircraft Dispatcher Certificate are reprinted from the Federal Aviation Regulations, Part 65, effective November 1, 1962.

§ 65.51 Certificate required.

(a) No person may serve as an aircraft dispatcher (exercising responsibility with the pilot-in-command in the operational control of a flight) in connection with any civil aircraft in air commerce unless he has in his personal possession a current aircraft dispatcher certificate issued under this subpart.

(b) Each person who holds an aircraft dispatcher certificate shall present it for inspection upon the request of the Administrator or an authorized representative of the National Transportation Safety Board, or of any Federal, State, or local law enforcement officer.

§ 65.53 Eligibility requirements: general.

To be eligible for an aircraft dispatcher certificate, a person must—

(a) Be at least 23 years of age;

(b) Be able to read, speak, and understand the English language, or have an appropriate limitation placed on his certificate;

(c) Comply with §§ 65.55, 65.57, and 65.59.

§ 65.55 Knowledge requirements.

(a) An applicant for an aircraft dispatcher certificate must pass a written test on—

(1) The regulations of this chapter that apply to the duties of an aircraft dispatcher;

(2) The general system of collecting and disseminating weather information;

(3) Interpreting aviation weather reports, including abbreviations and symbols, as prescribed in Department of Commerce Weather Bureau Circular N, "Manual of Surface Observations," as amended;

(4) The fundamentals of meteorology as applied to aircraft operations, particularly as to—

(i) Surface and upper air weather maps and general characteristics of air masses, pressure systems, and frontal systems, including their symbols and nomenclature;

(ii) Cloud forms and their significance; and

(iii) Icing, turbulence, thunderstorms, fog and low ceilings, winds aloft, pressure pattern flying, the influence of terrain on meteorological conditions, and general principles of forecasting and analysis;

(5) Principles of aircraft navigation with particular respect to instrument operation and procedures;

(6) Communications facilities and procedures;

(7) Air navigation facilities and procedures; and

(8) Air traffic control procedures.

(b) A report of the test is sent to the applicant. A passing grade is evidence, for a period of 24 months after the date the test is given, that the applicant has complied with this section.

§ 65.57 Experience requirements.

An applicant for an aircraft dispatcher certificate must present documentary evidence satisfactory to the Administrator that he has the experience prescribed in any one of the following paragraphs:

(a) A total of at least 2 of the 3 years before the date he applies, in scheduled air carrier operations, scheduled military aviation operations, or any other aircraft operations that the Administrator finds provides equivalent experience—

(1) As a pilot member of a flight crew;

(2) As a flight radio operator or ground radio operator;

(3) As a flight navigator;

(4) As a meteorologist;

(5) Performing the duties of an aircraft dispatcher or his assistant; or

(6) Performing other duties that the Administrator finds provide equivalent experience.

(b) A total of at least 2 of the 3 years before the date he applies, as an air route traffic controller or a certificated air traffic control tower operator.

(c) A total of at least 1 of the 2 years before the date he applies as an assistant in dispatching scheduled air carrier aircraft performing the duties of an aircraft dispatcher under the direct supervision of a certificated dispatcher.

(d) Within 90 days before the date he applies, successful completion of a course of instruction approved by the Administrator as adequate for the training of an aircraft dispatcher.

An applicant is entitled to credit any combination of experience in paragraph (a), or paragraphs (a) and (b), of this section, if the aggregate of that experience is at least 2 years.

§ 65.59 Skill requirements.

An applicant for an aircraft dispatcher certificate must pass a practical test—

(a) With respect to any one type of large aircraft used in air carrier operations, on—

(1) Weight and balance limitations;

(2) Performance operating limitations;

(3) Using cruise control charts;

(4) Fuel and oil capacities and rates of consumption; and

(5) Using the operations manual;

(b) On the characteristics of air routes and airports with particular reference to—

(1) Landing areas;

(2) Lighting facilities; and

(3) Approach and landing facilities and procedures;

(c) On the use and limitations of sensitive-type altimeters;

(d) On applying available weather forecasts and reports to determine whether a flight can be made safely;

(e) On using the *Airman's Information Manual;*

(f) On dispatching and assisting a flight under adverse weather conditions; and

(g) On emergency procedures.

AIRCRAFT DISPATCHER QUALIFICATION TESTS

The Written Test

Nature of the test

The Aircraft Dispatcher Written Test is a single-section type, which permits a practical or operational approach to the problems that arise in planning and conducting transport flight operations.

The multiple choice questions in this guide are developed from typical situations involving preflight, inflight, and postflight duties of the Aircraft Dispatcher.

Material furnished the applicant for use during the test includes the following:

Significant Weather Map; Constant Pressure Charts; Regional Forecasts; Area Forecasts; Terminal Forecasts; Sequence Reports; Segments of Enroute Charts; Instrument Approach and Landing Charts; excerpts from *Airman's Information Manual;* Aircraft Particulars; Minimum Equipment List for Dispatch.

Taking the test

The written test may be taken at FAA General Aviation and Air Carrier District Offices of the Flight Standards Service, and at certain other designated places. After completing the test, the answer sheet and papers used for computations or notations will be surrendered to the proctor before leaving the test room.

Test grades are mailed to applicants on AC Form 8060–37, Airman Written Examination Report. The report also contains coded indicators of the knowledge areas which presented difficulty in the test. These coded indicators are related to an enclosed Written Examination Subject Matter Outline for quick and easy identification of knowledge deficiencies. The study outline contained in this guide is similar to the outline which the applicant receives with AC Form 8060–37. An applicant who receives a failing grade must present the appropriate AC Form 8060–37 for retesting.

The applicant should keep in mind the following points when taking the test:

1. Each question or problem should be carefully read, without looking at the possible answers. The applicant should clearly understand the problem before formulating the steps toward its solution.

2. He should then determine which of the alternatives most nearly corresponds with the answer he has formulated. The answer chosen should completely solve the problem.

3. From the answers given it may appear that there is more than one possible answer; however, only one answer is correct and complete. The other answers are either incomplete or derived from popular misconceptions.

4. If a particular test item proves difficult, it is best to proceed to another question. When the less difficult questions have been answered, the others should then be reconsidered.

5. There are no "trick" questions in the test.

The Practical Test

Prior to certification, the applicant must complete the practical test described in FAR 65.59. Whereas the written test is broad and general in scope, the practical test focuses attention on the specifics of the dispatching problem at the local level. The applicant must be thoroughly familiar with the contents of a typical air carrier operations manual for a particular aircraft. He must also know how to use the *Airman's Information Manual* and be aware of the characteristics of air routes and airports. He may be asked to complete the simulated dispatch of a flight over a route in his dispatch area and be prepared to provide a thorough weather briefing on the proposed operation.

Retesting after Failure

An applicant who fails the Aircraft Dispatcher Written or Practical Test may apply for retesting after 30 days following the date he failed the test; or upon presenting a statement from a

certificated and appropriately rated ground instructor, or a certificated Aircraft Dispatcher certifying that he has given the applicant at least 5 hours of additional instruction in each of the subjects failed and now considers that the applicant is ready for retesting.

AERONAUTICAL KNOWLEDGE COVERED BY THE WRITTEN TEST

I. REGULATIONS

A. Certification: Airmen Other Than Flight Crewmembers—FAR 65.

1. Subpart A—General.
2. Subpart C—Aircraft Dispatchers.

B. General Operating and Flight Rules—FAR 91.

1. Subpart A—General.
2. Subpart B—Flight Rules.

C. Certification and Operations: Air Carriers and Commercial Operators of Large Aircraft—FAR 121.

1. Subpart B—Certification Rules for Domestic and Flag Air Carriers.
2. Subpart E—Approval of Routes: Domestic and Flag Carriers.
3. Subpart G—Manual Requirements.
4. Subpart I—Airplane Performance Operating Limitations.
5. Subpart K—Instrument and Equipment Requirements.
6. Subpart M—Airman and Crewmember Requirements.
7. Subpart N—Crewmember and Aircraft Dispatcher Training Program.
8. Subpart P—Aircraft Dispatcher Qualifications and Duty Time Limitations: Domestic and Flag Air Carriers.
9. Subpart Q—Flight Time Limitations: Domestic Air Carriers.
10. Subpart R—Flight Time Limitations: Flag Carriers.
11. Subpart T—Flight Operations.
12. Subpart U—Dispatching and Flight Release Rules.
13. Subpart V—Records and Reports.

II. FLIGHT PLANNING

A. Weather information.

1. Survey—surface weather map:
   a. Winds and pressure distribution.
   b. Air masses and stability.
   c. Fronts.
   d. Factors affecting visibility.
   e. Forecasting weather movement.
   f. Interpretation of map symbols.
2. Survey—enroute weather conditions:
   a. Regional (FN) and area (FA) forecasts:
      (1) Times and periods of issuance.
      (2) Interpretation of contents.
   b. PIREPS:
      (1) Turbulence.
      (2) Icing.
      (3) Cloud layers.
      (4) Hazardous conditions.
   c. Constant pressure charts—standard heights of 700, 500 and 300 mb. surfaces:
      (1) Location of jet streams.
      (2) Areas of clear air turbulence.
3. Survey—terminal weather conditions:
   a. Terminal forecasts (FT_1 and FT_2):
      (1) Times and periods of issuance.
      (2) Interpretation of contents.
   b. Hourly sequence reports and NOTAMS:
      (1) Teletypewriter symbols.
      (2) Use in weather forecasting.
      (3) Interpretation of NOTAM code.
   c. Winds aloft forecasts (FD):
      (1) Times and periods of issuance.
      (2) Interpretation of contents.

B. Route and altitude selection.

1. Choice of airways:
   a. Standard instrument departures.
   b. Airway structure.
   c. Terminal area departure and arrival charts—interpretation of chart symbols.
2. Minimum IFR altitudes.
3. Enroute and terminal radio aids:
   a. VHF omnirange and DME.
      (1) Frequency allocation.
      (2) General operating principles.

(3) Classification.
b. Homing facilities and fan markers:
(1) Frequency allocation.
(2) Classification.
c. Instrument landing system (ILS):
(1) Frequency allocation.
(2) General operating principles.
(3) Components.
d. Radar facilities.
(1) Ground control approaches:
a. Precision Approach Radar (PAR).
b. Surveillance Approach (ASR).
(2) Arrival, departure, and enroute radar traffic control.

C. Flight time analysis.
1. Computations:
a. Flight time.
b. Fuel requirements including reserve.
c. Mach number terminology.
d. Enroute fuel management.

D. Aircraft loading.
1. Observance of weight limitations.
a. Takeoff gross weight.
b. Landing gross weight.
c. Zero fuel weight.
d. Operating weight (empty weight plus operating load).
2. Calculation of Center of Gravity location and observance of C.G. operating range.

E. Aircraft performance—all types.
1. Consideration of operating variables:
a. Runway length.
b. Runway gradient.
c. Field elevation.
d. Wind.
e. Temperature.
2. Takeoff flight path:
a. Takeoff distance.
b. Takeoff speeds (V speeds).
c. Obstruction clearance requirements.
3. Enroute limitations on aircraft weight:
a. All engines operating.
b. One engine inoperative.
c. Two engines inoperative.
4. Landing distance and weight limitations:
a. Destination airport.
b. Alternate airport.
5. Characteristics of high-performance aircraft:
a. Critical Mach number.
b. Subsonic, transonic, supersonic ranges.
c. Compressibility effects.

F. Instruments and equipment—all operations.
1. Minimum equipment requirements for dispatch.
2. Flight and navigational equipment.
3. Oxygen requirements—crew, passengers.
4. Emergency equipment:
a. Hand fire extinguishers—required number.
b. Fire extinguishing systems.
c. First aid equipment.
d. Means for emergency evacuation.
e. Miscellaneous—crash ax, emergency lighting, etc.

III. OPERATIONS.

A. Air Traffic Control Procedures and Air Traffic Rules.
1. Altitude and route assignment:
a. Minimum enroute altitude (MEA).
b. Altimeter setting information.
c. Altitudes and flight levels.
d. Determination of lowest usable flight level.
e. Airway routes and intersections.
2. Separation Standards:
a. Vertical.
b. Longitudinal.
c. Lateral.
d. DME.
3. Procedures for—
a. Departing aircraft.
b. Enroute aircraft.
c. Holding aircraft.
d. Arriving aircraft—instrument approaches.
e. Emergency radio failure.
4. Clearances and instructions—standard phraseologies.
5. Radar procedures for—
a. Departing aircraft.
b. Arriving aircraft approaches—ASR and PAR.
c. Enroute aircraft.
d. Loss of communications.
6. Airport traffic procedures:
a. Clearances, instructions, information.
b. Weather information.
c. Separation minima.
d. Airport lighting.
e. Use of runways.

B. Enroute navigation techniques.
1. Dead reckoning:
a. Chart reading.
b. Measuring course and distance.
2. Radio Navigation:
a. Fixes by bearing plots.
b. Off course corrections.
3. Compressibility effects on TAS.
4. Determination of wind experienced—resultant heading and ETA correction.
5. Airspeed adjustments to maintain schedule.

C. Enroute operational procedures.
1. Operation in icing conditions.
2. Cruising control techniques and power settings.
3. Reclearances involving weather changes.
4. Exercising emergency authority.

D. Instrument approach procedures.
1. Types of facilities used:
a. ADF.
b. VOR-DME.
c. ILS.
d. TACAN.
e. Radar.
f. VASI.
2. Types of approaches:
a. Straight in.
b. Circling.
c. Visual.
3. Elements of the approach:
a. Initial approach altitude.
b. Procedure turn.
c. Final approach.
d. Missed approach.
e. Holding.
4. Interpretation of instrument approach procedure charts.
5. Lighting aids.

IV. POSTFLIGHT

A. Debriefing the flight crew.
1. Unusual weather encountered.
2. Irregular operation of radio aids.
3. Aircraft mechanical reports.
4. Future schedule coordination of aircraft and crew.

B. Filing of required records and reports.

REFERENCE MATERIALS

The following list of publications and materials is provided as a basic guide for the benefit of persons who wish to prepare for the written test. Textbooks and other reference materials are also available from many commercial publishers. It is the responsibility of each applicant to obtain the study materials appropriate to his needs.

FEDERAL AVIATION REGULATIONS:

Part 65, Certification: Airmen Other Than Flight Crewmembers—$0.35.

Part 91, General Operating and Flight Rules—$0.70.

Part 121, Certification and Operations: Air Carriers and Commercial Operators of Large Aircraft—$1.50.

FLIGHT INFORMATION PUBLICATIONS

Airman's Information Manual—This publication presents, in three parts, all information necessary for the planning and conduct of a flight in the U.S. Airway system. It is designed to be used in the cockpit for preflight and inflight operations by pilots, and contains both instructional and procedural information. The AIM replaces the former *Airman's Guide*, the *Directory of Airports, and Seaplane Bases*, and the *Flight Information Manual*. The subscription consists of:

Part 1—Basic Flight Manual and ATC Procedures. Issued quarterly ($2.50; Foreign $3.25).

Part 2—Airport Directory. Issued semiannually ($4.00; Foreign $5.00).

Part 3—Operational Data. Issued every 28 days, and

Part 3A—Notices to Airmen. Issued every 14 days. ($18.00; Foreign $23.00).

Terminal Air Traffic Control—7110.8 and *En Route Air Traffic Control*—7110.9. These FAA Handbooks, with quarterly supplements, prescribe air traffic control procedures and phraseology for use by personnel providing terminal and enroute air traffic control services. Although written for the air traffic controller, the handbooks are excellent for the study of standard communication procedures by others who need to be familiar with them. (Free from FAA).

STUDY MANUALS

Aviation Weather, AC 00-6 ($2.25). An excellent reference treating all phases of meteorology of interest to the Aircraft Dispatcher. Aviation weather reports and forecasts are also covered in detail with respect to format and content.

Air Navigation, AF Manual 51-40, Volume I ($4.00). This U.S. Air Force publication is an excellent reference for basic navigation.

Aircraft Performance—Reciprocating and Turboprop Engine Aircraft, AF Manual 51-9 ($1.50). This U.S. Air Force publication contains much material having civil aviation applications.

CHARTS

Instrument Approach Procedure Charts (10¢ per airport set). Individual charts give detailed information on procedure for each type of approach at the airport.

Enroute Charts (25¢ each). These charts provide the necessary aeronautical information for enroute instrument navigation (IFR) in the established airway structure.

Low-Altitude Area Charts (10¢ each). These charts supplement the Enroute Charts by giving departure, arrival, and holding procedures at principal airports.

Aeronautical Charts (30¢ each). These charts include World Aeronautical Charts, Sectional Charts, and Local Area Charts.

HOW TO OBTAIN REFERENCE MATERIALS

The study materials listed, except the charts and Air Traffic Control procedures, may be obtained by remitting check or money order to:

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

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

Distribution Division (C 44)
U.S. Coast and Geodetic Survey
Rockville, Maryland 20852

FAA Handbooks 7110.8, Terminal Air Traffic Control and 7110.9 En Route Air Traffic Control may be obtained by writing to:

Department of Transportation
Federal Aviation Administration
Distribution Unit, TAD–484.3
Washington, D.C. 20590

To cover the cost of foreign mailing for those publications not showing a foreign price, add 25 percent to the publication's listed price. Remittances from a foreign country may be made by International Money Order or draft on a United States bank payable to the issuing Agency.

SAMPLE TEST

The following sample test is similar in format to the official FAA written test. It is important to remember, however, that these test items do not direct attention to all of the topics on which you will be tested in the official test. For this reason, you should concentrate on the section entitled "Aeronautical Knowledge Covered by the Test." A knowledge of all of the topics presented in the outline—not just the ability to answer these few sample test items—should be your goal as you prepare for the written test.

The increased performance of present day transport category aircraft requires greater emphasis on high-altitude meteorology, high-speed aerodynamics, and turbine equipment. Applicants should, therefore, expect to encounter test items dealing with these areas in the written test.

Answers to the sample test items are given at the end of the test, along with a detailed analysis, or explanation, of each test item.

> NOTE—The reader should be aware that the sample test items are based on regulations and procedures in effect at the time of final editing of this guide. Similar test items in the official FAA written tests should always be answered in terms of current regulations and procedures.

SITUATION

You are a certificated Aircraft Dispatcher employed by an airline whose central dispatch office is located at the Chicago-O'Hare International Airport in Illinois. The company is an air carrier, authorized to operate in scheduled transportation under pertinent regulations as a domestic and flag carrier.

The domestic route structure provides service to metropolitan areas on the east coast of the United States, while the international structure provides service to west European terminals. Domestic routes are served by four-engine reciprocating powered aircraft and three-engine turbine powered aircraft. International routes are served by four-engine turbine powered aircraft.

You report to the Operations Office at 0700 Central Standard Time on June 11 (1300 GMT). One of your first duties is to survey weather conditions in the dispatch area.

* * * * * * * * * * * * *

1. You review the Chicago Area Forecast (Figure 1—Appendix). Which of the following statements is correct?
   1—Freezing level is between 3,000 and 5,000 feet throughout the area.
   2—Cold front over central U.S. is moving eastward at 15–20 knots.
   3—Cold front will move out of area by 01Z on Wednesday.
   4—Low ceilings and poor visibilities will persist over the area after frontal passage.
2. The central part of the U.S. is under the influence of a *maritime/TROPICAL* air mass (Figure 2—Appendix). Which conditions are associated with this type of air mass?
   1—Stratiform cloud patterns with poor visibilities.
   2—Dry air with showery precipitation.
   3—Stable air at all levels with moderate turbulence in lower levels.
   4—Warm, moist, conditionally unstable air with widespread thunderstorms.
3. Terminal Forecasts for Albany (ALB) and New York (JFK) are listed below.
   FT1 11Z–23Z
   ALB C6⊕SF 16ØØZ 6⊖C1Ø⊕7 23ØØZ C7⊕4F VRBL C4⊕2F.
   JFK C4⊕2FH 15ØØZ C8⊕4H 111Ø 18ØØZ C1Ø⊕5H 1212 OCNL L–.

Which of the statements below correctly interpret portions of these reports?

A. Surface wind velocity at ALB is expected to be more than 10 knots during the period.
B. After 1500Z at JFK, the visibility is expected to be 4 miles in haze.
C. After 2300Z at ALB, ceiling is expected to vary between 400 and 700 feet.
D. Wind at JFK after 1800Z is 012°/12 knots.

1—A and D
2—B and C
3—A and C
4—B and D

4. The 1300 GMT aviation weather report for JFK appears as follows:

JFK M5⊕2F 186/58/55/Ø9Ø6/ØØ7

Which of the statements is correct regarding this report?

1—Ceiling is measured 500 feet overcast.
2—Temperature/dewpoint spread is 3°C.
3—Altimeter setting is 1018.6 millibars.
4—Wind is 009°/06 knots.

5. In order to maintain qualifications for dispatching duty under the operating rules of FAR Part 121, you are required to make—

1—at least a one-way trip over the dispatch area within the preceding 6 months.
2—at least a one-way trip over the dispatch area within the preceding 12 calendar months.
3—a round trip over the dispatch area every 12 calendar months.
4—a round trip over the dispatch area every 6 months.

6. At 0630 CST, you receive the following message via company radio from your Flight 60 which is enroute from New York to Chicago:

"Shutdown No. 3 engine due low oil pressure. Position: Cleveland VORTAC at 0625 CST—30,000 feet—proceeding to ORD."

The pilot's decision to proceed to ORD, rather than land at CLE (which is operational) is—

1—good judgment since the flight has passed the half-way point.
2—not good judgment since CLE is the nearest airport in point of time.
3—a direct violation of regulations.
4—valid, if—upon consideration of certain factors—he considers such action to be as safe as landing at CLE.

7. The distance from CLE to ORD is 271 n.m. Assuming a one-engine inoperative TAS of 405 knots and a headwind component of 25 knots, Flight 60 should arrive ORD at—

1—0659 CST.
2—0701 CST.
3—0708 CST.
4—0705 CST.

8. Upon completion of the trip, the pilot of Flight 60 is required to—

1—submit a written report to the nearest FAA office within 7 days.
2—make a verbal report to the Chief Pilot regarding this incident.
3—appear at the nearest FAA office within 48 hours with a written report of the incident.
4—submit a written report to the Operations Manager stating his reasons for proceeding to ORD.

* * * * * * * * * * * * *

You are directed to complete flight planning arrangements for your company's Flight 55 which is scheduled to depart Chicago-O'Hare International Airport for John F. Kennedy International Airport, New York, N. Y., at 0830 CST.

* * * * * * * * * * * * *

9. The aircraft assigned for Flight 55 has been scheduled for a routine inspection by the Maintenance Department. Prior to operation of Flight 55, what procedure must be followed by the Maintenance Department in this situation?

1—Prepare airworthiness release only if alterations have been made.
2—Make entry in aircraft log only if maintenance has been performed.
3—Prepare airworthiness release or make appropriate entry in aircraft log.
4—Release verbally to Operations Department.

* * * * * * * * * * * * *

You are to complete the flight time analysis form in the Appendix, Figure 18. Appropriate chart segments for this routing between ORD and JFK are also included in the Appendix, Figures 7, 8, and 9.

NOTE.—The flight time analysis form used in Figure 18 is not intended to be an operational form. It is used here for an orderly presentation of flight planning data. Similar forms are made available to applicants when they take the official written test. Applicants may use these forms or any other flight planning form of their selection.

* * * * * * * * * * * * *

10. The computed flight time from ORD to JFK is—

1—2 hours, 26 minutes.
2—2 hours, 29 minutes.

3—2 hours, 33 minutes.
4—2 hours, 37 minutes.

11. The weight of the fuel required for this IFR flight, including 3,000 pounds of "extra" fuel, is—
1—11,160 pounds.
2—12,510 pounds.
3—12,950 pounds.
4—13,430 pounds.

12. The following weight limitations apply to this aircraft:

Maximum takeoff gross weight	107,000 pounds
Maximum landing gross weight	92,360 pounds
Maximum zero fuel weight	87,360 pounds
Basic operating weight	61,200 pounds

Based on your previous fuel calculations, what is the maximum allowable zero fuel weight for this particular flight?
1—86,870 pounds.
2—92,360 pounds.
3—87,360 pounds.
4—84,500 pounds.

13. Based on the weight limitations in the previous test item, what is the maximum allowable payload for this aircraft?
1—25,300 pounds.
2—23,600 pounds.
3—26,160 pounds.
4—19,640 pounds.

14. The actual payload for this flight is as follows:
80 passengers at 165 pounds each
Cargo and baggage: 7,200 pounds
Compute the actual takeoff gross weight of Flight 55.
1—107,000 pounds.
2— 92,360 pounds.
3—100,000 pounds.
4— 94,110 pounds.

15. Loading personnel advise you that they wish to put a box of cargo which weighs 960 pounds in the forward belly compartment. Dimensions of the box are 4 feet long, 4 feet wide, and 3 feet high. Determine the minimum compartment floor loading of the box.
1—50 pounds/square foot.
2—60 pounds/square foot.
3—70 pounds/square foot.
4—80 pounds/square foot.

16. You determine the position of the Center of Gravity (C.G.) to be 436.6 inches aft of the datum line. The Mean Aerodynamic Chord (MAC) is 164 inches and the leading edge of the MAC (LEMAC) is 395.6 inches aft of the datum line. What is the C.G. location in terms of percentage of MAC?
1—25% MAC.
2—27% MAC.
3—29% MAC.
4—33% MAC.

17. O'Hare Tower clears Flight 55 for takeoff on runway 32R, reporting the wind as 350°/30 knots. What is the crosswind component of the wind in this situation (Variation 2°E.)?
1—25 knots from the left.
2—15 knots from the right.
3—18 knots from the left.
4—10 knots from the right.

18. What direction reference and speed units are used by Control Tower personnel to report surface winds?
1—True direction and nautical miles per hour.
2—Magnetic direction and statute miles per hour.
3—Magnetic direction and nautical miles per hour.
4—True direction and statute miles per hour.

19. The flight receives and acknowledges ATC clearance to JFK. The ATC clearance provides—
1—adequate separation from all traffic.
2—authorization to proceed under specified traffic conditions in controlled airspace.
3—authorization for flight in uncontrolled airspace.
4—priority over all other traffic.

20. Flight 55 departs OBK Vortac for PMM Vortac on V84 (Appendix, Figure 7). The Minimum Enroute Altitude between OBK and Sturgeon Intersection is 2,500 feet. Which of the following phrases correctly defines the MEA?
1—Assures adequate signals to determine specific VOR fixes.
2—Provides enroute obstruction clearance and assures navigation signal reception within 50 miles of a VOR.
3—Provides enroute obstruction clearance for IFR flight.
4—Assures adequate navigation signal coverage and obstruction clearance between airway radio fixes.

21. Flight 55 reports over PMM at 1500 GMT. Compute the True Airspeed (TAS) using the following information:

Pressure altitude	21,000 feet
Indicated airspeed (IAS)	177 knots
Airspeed position and instrument correction	+6 knots
Outside air temperature (indicated)	−20°C.
Temperature correction	6°
Compressibility correction	2 knots

The TAS is—

1—235 knots.
2—240 knots.
3—248 knots.
4—252 knots.

22. The Mach number for the TAS computed in the previous test item is—

1—0.39.
2—0.41.
3—0.43.
4—0.45.

23. In connection with Mach number terminology, which of the statements below do you consider accurate?

1—Mach number is the ratio of the speed of sound relative to standard sea level conditions.
2—A specific Mach number determines speed directly, regardless of air temperature.
3—The true airspeed of a Mach number varies directly with air temperature.
4—The true airspeed of a Mach number varies inversely with air temperature.

24. Flight 55 reports over Windsor (QG) on J70 at 1540 GMT (Figure 8—Appendix). Assuming takeoff from ORD at 1430 GMT, the flight is operating—

1—5 minutes early.
2—on time.
3—8 minutes late.
4—10 minutes late.

25. Compute the average wind experienced between PMM and QG based on the following data:

Time over PMM	1505 GMT
Time over QG	1540 GMT
Average Compass Heading to maintain course	102°
Average Magnetic Course	096°
Average TAS	250 Knots
Variation	2°W.
Deviation	0°

1—160°/30 knots.
2—180°/22 knots.
3—190°/26 knots.
4—200°/30 knots.

26. On the basis of the wind computed in the previous test item, with no change in TAS, the average compass heading between QG and ERI should be approximately (variation 4°W., deviation 4°W.)—

1—104°.
2—108°.
3—110°.
4—112°.

27. The ETA at ERI, using the previously computed wind, is—

1—1602 GMT.
2—1604 GMT.
3—1606 GMT.
4—1608 GMT.

28. Assume a tailwind component of 35 knots through the distance from QG to HUO. Compute the TAS which must be maintained in order to arrive over the Hugenot Vortac at 1654 GMT. (Figure 9—Appendix.)

1—268 knots.
2—271 knots.
3—274 knots.
4—277 knots.

29. Which of the statements below is correct with respect to Air Traffic Control Procedures?

1—Aircraft operating IFR on a Federal airway must always be flown along the centerline of the airway.
2—Standard separation is assured between all aircraft operating on IFR flight plans.
3—Increasing or decreasing the true airspeed by 10 knots constitutes a change in flight plan.
4—Clearances authorizing "VFR Conditions-on-top" are issued to IFR flights at the discretion of the Controller only.

30. Choose the statements below which correctly interpret certain data on the ILS instrument approach chart for runway 4R at John F. Kennedy International Airport (Figure 10, Appendix).

A. Decision Height (DH) is 756 feet.
B. RVR 2,000 feet is a landing minimum for four-engine turbojets.

C. Distance from outer marker to runway 4R threshold is 2.7 miles.
D. VASI is available on all runways.
E. ATIS is available on 109.5
F. Ground control frequency is 121.9.

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

31. The station elevation at a particular airport is 3,000 feet. What is the approximate pressure altitude at the airport which is reporting an altimeter setting of 30.50 inches (Figure 12—Appendix)?

1—2,000 feet.
2—2,100 feet.
3—2,250 feet.
4—2,400 feet.

32. Select the "All Engine Distance to 35 ft." for a three-engine jet aircraft based on the conditions listed below (Figure 13—Appendix):

Takeoff gross weight ------ 145,000 pounds
Temperature (OAT) ------ 80°F.
Wind (Headwind) -------- 20 knots
Runway slope ---------- 1% Down

1—3,100 feet.
2—3,400 feet.
3—3,700 feet.
4—4,300 feet.

33. Refer to Figure 14 in the Appendix and determine the maximum permissible gross weight at brake release using the data below:

Anti-skid ON, nose brakes ON,
C.G. ---------- aft 14%, flaps 15°
Runway length available ---------- 8,500 feet
Wind (Headwind) ---- 20 knots
Runway slope -------- 1% Up
Average takeoff EPR -- 1.90
Airport pressure altitude ---------- 2,000 feet
Outside air temperature +80°F.

1—158,500 pounds.
2—155,000 pounds.
3—156,500 pounds.
4—151,000 pounds.

34. Refer to Figure 15 in the Appendix. Compute the trip time and trip fuel for a three-engine jet aircraft based on the following data:

Trip distance -- 1,400 nautical ground miles
Landing gross weight ------ 130,000 pounds
Average wind (Headwind) - 30 knots
Altitude ------- FL 290
Outside air temperature -- −30°C.

1—3:00 and 28,400 pounds.
2—2:50 and 25,200 pounds.
3—3:20 and 32,300 pounds.
4—3:12 and 31,000 pounds.

35. Refer to Figures 16 and 17 in the Appendix. Compute the airplane gross weight at 1745 GMT under the following conditions:

Takeoff ---------- 1600 GMT
Start climb weight -------- 150,000 pounds
Cruising level ---------- 30,000 feet
Climb temperature (Dev. from ISA) ------- +20°C.
Temperature at cruise level ---------- −35°C.
Cruise condition ---------- .82 Mach

1—134,840 pounds.
2—132,840 pounds.
3—130,460 pounds.
4—128,450 pounds.

36. Assume a tailwind component of 30 knots during climb and a 65 knot tailwind component during cruising flight. What ground distance has been covered during the time interval involved in the previous test item?

1—778 nautical miles.
2—832 nautical miles.
3—878 nautical miles.
4—916 nautical miles.

37. Compute the flight time estimate for Jet Flight 300 between JFK and LPPT based on the following average values:

	Mach or TAS	*Temp. (True)*	*Comp. Wind*	*Dist.*
Climb	380 kts.	—	+15	230
Cruise	.81	−50°C	+30	2,600
Descent	320 kts.	—	+20	120

The flight time is—

1—6 hours, 03 minutes.
2—6 hours, 12 minutes.
3—6 hours, 08 minutes.
4—6 hours, 16 minutes.

38. Average four-engine fuel flow values for Jet Flight 300 are as follows:

Climb ---------- 26,600 pounds/hour
Cruise ---------- 17,000 pounds/hour
Descent ---------- 3,800 pounds/hour

The enroute fuel required to destination is—

1—103,700 pounds.
2—105,230 pounds.
3—106,920 pounds.
4—107,830 pounds.

39. The airplane weights pertaining to Jet Flight 300 are as follows:

Maximum allowable takeoff gross weight ---------- 314,000 pounds
Maximum allowable landing gross weight ---------- 209,000 pounds
Maximum allowable zero fuel weight ---------- 182,100 pounds
Basic operating weight ---- 139,200 pounds

You calculate the reserve fuel requirement for the flight to be 27,550 pounds. If you plan a maximum gross takeoff, what is the Zero Fuel Weight of Jet Flight 300, based on the enroute fuel requirement in test item 38 and the above specified reserve fuel?

1—181,220 pounds.
2—183,770 pounds.
3—196,150 pounds.
4—208,770 pounds.

40. Based on the airplane weights listed in test item 39 and your previous calculations, the maximum allowable payload for Jet Flight 300 is—

1—42,900 pounds.
2—26,900 pounds.
3—41,780 pounds.
4—42,020 pounds.

41. The following statements refer to the Significant Weather Chart between the Surface and the 400-millibar level (Figure 4—Appendix). Select the correct statements.

1—Barometric pressure at the "LOW" center (51°N./14°W.) is 984 millibars.
2—Freezing level over LPPT (39°N./9°W.) is 5,000 feet.
3—Heavy icing and moderate turbulence in cloud tops is expected in the vicinity of 20°W. on the great circle route.
4—Few CB's with tops between 15,000 and 30,000 feet are expected in the vicinity of 20°W. on the great circle route.

42. Assume that a flight is maintaining a pressure altitude of 31,000 feet on the great circle route between Newfoundland and Portugal (Figure 5—Appendix). After reaching 20°W., the true altitude of the flight would—

1—decrease.
2—remain constant.
3—increase.
4—increase, then decrease.

43. The approximate wind direction and speed at the 300-millibar level (Figure 5—Appendix) over Ocean Weather Station "KILO" at 45°N./16°W. is—

1—230°/35 knots.
2—050°/40 knots.
3—200°/30 knots.
4—020°/50 knots.

44. Refer now to the Tropopause/Vertical Wind Shear Chart (Figure 6—Appendix). A jet flight, maintaining Flight Level 270 on the great circle route between Newfoundland and Portugal would be flying—

1—above the tropopause on the entire route.
2—below—then above the tropopause.
3—below the tropopause on the entire route.
4—above the tropopause between 44°W. and 36°W.

45. In the vicinity of Newfoundland, the temperature lapse rate between the tropopause and the 150-millibar level is—

1—3°/1,000 feet.
2—1°/1,000 feet.
3—2°/2,000 feet.
4—almost isothermal.

ANALYSES OF ANSWERS TO SAMPLE TEST ITEMS

1—(2)

Choice 1—Incorrect; freezing level is expected to be between 13,000 and 15,000 feet.

Choice 2—Correct as stated under the synopsis.

Choice 3—Incorrect; cold front will move beyond the area by 1300Z on Wednesday as indicated in the outlook.

Choice 4—Incorrect; ceilings and visibilities will *improve* after frontal passage.

2—(4)

Reference is Aviation Weather, Chapter 9—*Air Masses.*

3—(2)

Note that surface wind speeds of less than 10 knots are not reported in FT's.

4—(1)

Choice 2—Incorrect; temperature/dew point spread is 3°F.

Choice 3—Incorrect; altimeter setting is 30.07 inches.

Choice 4—Incorrect; wind is 090°/06.

5—(2)

The reference is FAR 121.463.

6—(4)

See FAR 121.565.

7—(3)

The time is 43 minutes for 271 n.m. at the groundspeed of 380 knots.

8—(4)

See FAR 121.565.

9—(3)

See FAR 121.709.

10—(4)

Flight time from ORD to JFK is 2 hours and 37 minutes.

11—(2)

The time and fuel summary is reproduced below:

Enroute	2:37/7,020 lbs.
Alternate	0:38/1,140 lbs.
Reserve	0:45/1,350 lbs.
Extra	1:40/3,000 lbs.
TOTAL	5:40/12,510 lbs.

12—(1)

In this case, the maximum allowable takeoff gross weight is limited by the maximum landing weight. If all of the "*alternate/reserve/extra*" fuel is carried, the zero fuel weight is reduced to the value shown.

	Pounds
Maximum allowable takeoff gross weight	99,380
Fuel to destination	7,020
Maximum landing gross weight	92,360
Alt./res./extra (total)	5,490
Zero fuel weight (this flight)	86,870

13—(3)

The maximum allowable payload represents the difference between the maximum zero fuel weight and the basic operating weight as shown below:

	Pounds
Maximum zero fuel weight	87,360
Basic operating weight	61,200
Maximum allowable payload	26,160

14—(4)

Actual payload is the combined weight of the passengers and cargo/baggage. Actual takeoff gross weight is resolved as follows:

	Pounds
Basic operating weight	61,200
Actual payload	20,400
Zero fuel weight	81,600
Alt./Res./Extra fuel	5,490
Landing gross weight	87,090
Fuel to destination	7,020
Actual takeoff gross weight	94,110

15—(2)

Minimum floor loading is achieved by distrib-

uting the weight over the largest floor area. In this case—the product of the length and width of the box is 16 sq. ft. Weight (960 pounds) divided by the area, or "footprint" of the box (16 sq. ft.), results in the minimum floor loading of 60 pounds per square foot.

16—(1)

Solution is outlined below:

	Inches
C.G. (aft of datum)	436.6
LEMAC (aft of datum)	395.6
C.G.	41.0
MAC	164.0

$$\text{C.G. (\% MAC)} = \frac{41}{164} \times 100 = 25\%$$

17—(2)

Computer solution yields a crosswind component of 15 knots from the right. You may also refer to Figure 11 in the Appendix to plot the problem.

18—(3)

Runways are numbered with reference to magnetic north. Magnetic wind direction is therefore more meaningful to the pilot who is approaching to land or preparing to takeoff. Wind speeds are reported in nautical miles per hour.

19—(2)

Reference Airman's Information Manual.

20—(4)

The MEA provides *both* navigation signal coverage and obstruction clearance between radio fixes.

21—(4)

Note that signs are *not* given for temperature and compressibility corrections. You should be aware that the outside air temperature indicator reads too warm and the airspeed indicator reads too *high* due to the effects of compressibility. The solution is outlined below:

	Knots
IAS	177
Position and instrument correction	+6
CAS	183
Compressibility correction	−2
EAS	181
Outside air temperature (indicated	−20°C.
Temperature correction	− 6°C.
Outside air temperature (corrected)	−26°C.

The resultant TAS is 252 knots. Some computers have incorporated in their scales the compressibility corrections so that certain of these steps need not be taken. You should be familiar with the details of your particular computer.

22—(2)

Most computers now have Mach Indexes so that the conversion of a TAS to a Mach number is a simple step.

23—(3)

Mach number is defined as the *ratio* of the speed of the aircraft to the speed of sound in the air existing at flight altitude. As air temperature increases, the TAS of a Mach number increases—i.e., directly. The reverse is also true.

24—(3)

The flight planned time from ORD to QG is 1 hour, 02 minutes. Flight plan ETA at QG is therefore 1532 GMT. Actual time at BAM is 1540 GMT which is 8 minutes late.

25—(3)

Time interval between PMM and QG is 35 minutes for the distance of 146 miles. Groundspeed is therefore 250 knots. Application of variation to magnetic course and magnetic heading precedes the solution outlined below:

True heading	100°
TAS	250 kts.
True course	094°
Groundspeed	250 kts.

Resultant wind is 190°/26 knots.

26—(4)

The average magnetic course between QG and ERI (Figure 8—Appendix) is 102°. After converting to true direction, the following items are known:

True course	098°
TAS	250 knots
W/V	190°/26 knots

Solution yields:

True heading	104°
Groundspeed	248 knots

Application of variation and deviation to true heading yields compass heading of 112°.

27—(4)

Distance to ERI is 115 miles. Time interval at the groundspeed of 248 knots is 28 minutes. ETA at ERI is therefore 1608 GMT.

28—(1)

Remaining distance of 374 miles must be covered in 1 hour, 14 minutes. Groundspeed is

therefore 303 knots. The tailwind of 35 knots will require a TAS of 268 knots.

29—(3)

Reference: *Airmen's Information Manual*, "Air Traffic Control Procedures" section.

Choice 1—incorrect; IFR flights shall maintain the centerline of the airway, *unless* otherwise advised by ATC, maneuvering to pass other aircraft, or maneuvering in VFR conditions to visually clear the intended flight path prior to and during climb or descent.

Choice 2—incorrect; standard separation is assured between all aircraft operating on IFR flight plans except when "VFR Conditions-on-Top" or outside of controlled airspace has been requested by a pilot and authorized by ATC. A further exception occurs when clearances are issued specifying that climb or descent or any other portion of the flight shall be conducted in "VFR conditions."

Choice 3—correct.

Choice 4—incorrect; clearances authorizing "VFR Conditions-on-Top" are issued when specifically requested by the pilot or if filed in the IFR flight plan.

30—(2)

A—incorrect; DH is 212 feet.

B—correct as shown in note.

C—correct as shown on chart.

D—incorrect; VASI is available only on certain runways.

E—incorrect; ATIS available on selected frequencies.

F—correct as shown on chart.

31—(4)

Correct as shown on referenced chart.

32—(3)

Correct as shown on referenced chart.

33—(2)

Refer to the explanation associated with Figure 14 for a description of RUNWAY and CLIMB limitations on gross weight. In this situation, the RUNWAY LIMIT establishes the maximum permissible gross weight at brake release under the stated conditions. Note that when the REF (reference) line lies within a range of values, entry is always made first *to the REF line.* For instance, in the plotted example, had the temperature been given as +40°F.—rather than +88°F.—the dashed guideline would have sloped upward to the left from the REF line to intersect the +40°F. line. This would result in a gross weight at brake release of 136,500 pounds, rather than 132,000 pounds.

34—(4)

Follow the plotted guidelines on the referenced chart. Note that the entry for trip time in the upper left corner of the chart involves "ISA DEV." This means the difference between the existing outside air temperature and the standard temperature. The deviation is marked (+) if the OAT is warmer than standard and (−) if colder than standard. "ISA" means "International Standard Atmosphere."

35—(2)

	Time	*Fuel*	*Weight*	*F/F**
Start	1600	----	150,000	----
Climb	1625	5,350	144,650	----
Cruise	1656	4,650	140,000	8,973
Cruise	1730	5,000	135,000	8,802
Cruise	1745	2,160	132,840	8,640

*NOTE: Average fuel flow between successive brackets.

36—(4)

Average GS in climb is 421 kts.
Average GS in cruise is 555 kts.
Resultant distance is 916 miles.

37—(3)

	GS	*Dist*	*Time*	*Total Time*
Climb	395	230	0:35	----
Cruise	500	2,600	5:12	5:47
Descent	340	120	0:21	6:08

38—(2)

F/F	*Time*	*Total Fuel*
26,600	0:35	15,500
17,000	5:12	88,400
3,800	0:21	1,330
	6:08	105,230

39—(1)

Maximum Takeoff gross weight	314,000 lbs.
Fuel to destination	105,230 lbs.
Landing gross weight	208,770 lbs.
Reserve	27,550 lbs.
Zero fuel weight	181,220 lbs.

40—(4)

Zero fuel weight	181,220 lbs.
Basic operating weight	139,200 lbs.
Maximum allowable payload	42,020 lbs.

41—(1)

Choice 2—incorrect; freezing level over LPPT is approximately 8,000 feet for the valid time of 0000Z.

Choice 3—incorrect; *moderate* icing and *light* turbulence are expected.

Choice 4—incorrect; top of CB's are expected to be between 22,000 and 28,000 feet.

42—(3)

The 300-millibar surface commences to slope upward after 20°W. on the great circle route. As the aircraft maintains the constant pressure altitude of 31,000 feet, the true altitude (actual height above sea level) will increase in conformance with the slope of the pressure surface.

43—(1)

Wind direction is parallel to the contour lines and wind speed is interpolated between the 20K and 40K isotachs.

44—(3)

The Tropopause Vertical Wind Shear Chart, when used in conjunction with the 300-millibar chart, provides wind and temperature information—vertically and horizontally—within the layer from 300 millibars to 150 millibars. The following data is shown on this chart:

1. Intersections of the tropopause in 50-millibar intervals from 300 to 150 millibars. Standard heights of the pressure surfaces are given in the inset box at the top of the chart.
2. Mean vertical wind shear for the layer from 300 to 150 millibars at intervals of 2 knots/1,000 feet, shown by dashed lines. The mean vertical wind shear is an arithmetic mean of the forecast values of the shear below and above the layer of maximum wind. It is not drawn for values less than 2 knots.
3. Tropopause and 150-millibar level temperatures are enclosed in rectangles and squares, respectively.

In this problem, the aircraft is flying at FL 270, or pressure altitude 27,000 feet. Over a portion of the route, the tropopause is shown to be slightly below the 300-millibar level (pressure altitude 30,100 feet). The flight will therefore be well below the tropopause over the entire route.

45—(4)

Note the recorded tropopause temperatures in the Newfoundland area (average −52°C. at 300 mb.). The temperature at 150 millibars is shown in the circular inset to be −50°C. For the vertical height between the 300- and 150-millibar levels (14,500 feet in standard atmosphere), the temperature lapse rate is almost isothermal.

FA CHI 111245
13Z TUE Ø1Z WED
WIS ILL IND MICH LK MICH

HGTS ASL UNLESS NOTED.

SYNS. HOT MOIST AIR OVR AREA. N-S CDFNT CNTRL MINN-CNTRL LA MOVG EWD ABT 15-2ØKT TO CNTRL UPR MICH ERN WIS -SWRN ILL BY Ø1Z.

CLDS AND WX.

WIS MICH LK MICH ILL IND.
3Ø-5ØD V@8Ø-12ØD V@25Ø-@ VSBYS IND SE LWR MICH 4-7HK TIL 14Z.
OVR ILL UPR MICH LK MICH N LWR MICH SCTD C3Ø-5ØD V@4-8RW-
OR 2-4TRW-. TOPS AS LYRS 14Ø-18Ø TOPS CBS TO 35Ø.

AS THE CDFNT MOVES EWD BCMG OVR ILL WIS 16Z-2ØZ TSTMS INCRG BCMG NMRS 1Ø-2ØD V@C3Ø@1-4TRW AND FEW C6-1ØX1/2-ITRW+ CHC LCL HAIL AND G4Ø-5Ø. TSTMS BCMG OCNLLY IN N-S LNS. THESE CONDS THEN SPRD EWD AND NEWD OVR IND LWR MICH LK MICH AND PTNS UPR MICH GENLLY AFT 1ØZ. TOPS CBS INCRG TO OCNLLY 4ØØ-45Ø CK FOR LATEST WWS AND SIGMETS.

BCMG BHND THE CDFNT OVR WRN PTNS UPR MICH WIS AND ILL GENLLY 4Ø-6ØD8Ø- 1ØØD.

ICG. OCNL HVY MXD ICG IN CB TOPS AND ALSO TOPS CU BLDUPS ABV FRZG LVL. FRZLVL 13Ø-15Ø THRUT.

TURBC. LCL SVR IN AND VCNTY TSTMS.

OTLK Ø1Z-19Z WED.
CDFNT CONTG EWD AND SEWD MOVG BYD THE AREA BY 13Z. AHD OF CDFNT NMRS SHWRS AND TSTMS FEW LCLLY HVY WITH ASSOCD LOW CIGS POOR VSBYS. BCMG BHND THE FRONT SCTD TO BRKN CU NRN SECS AND CLR TO SCTD CU AC SRN SECS.

FIGURE 1. Airway Forecasts

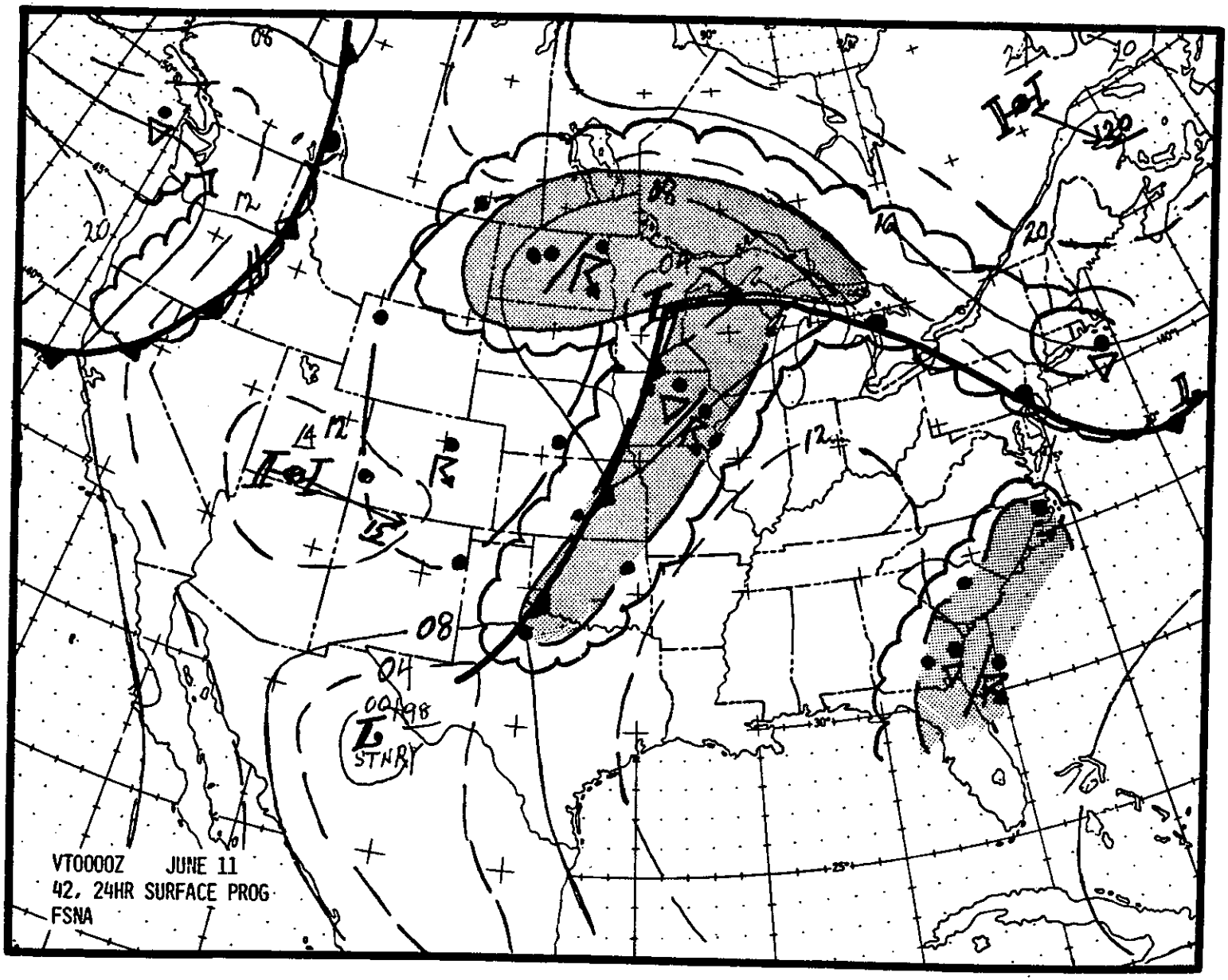

FIGURE 2. 24-Hour Surface Prognostic Chart

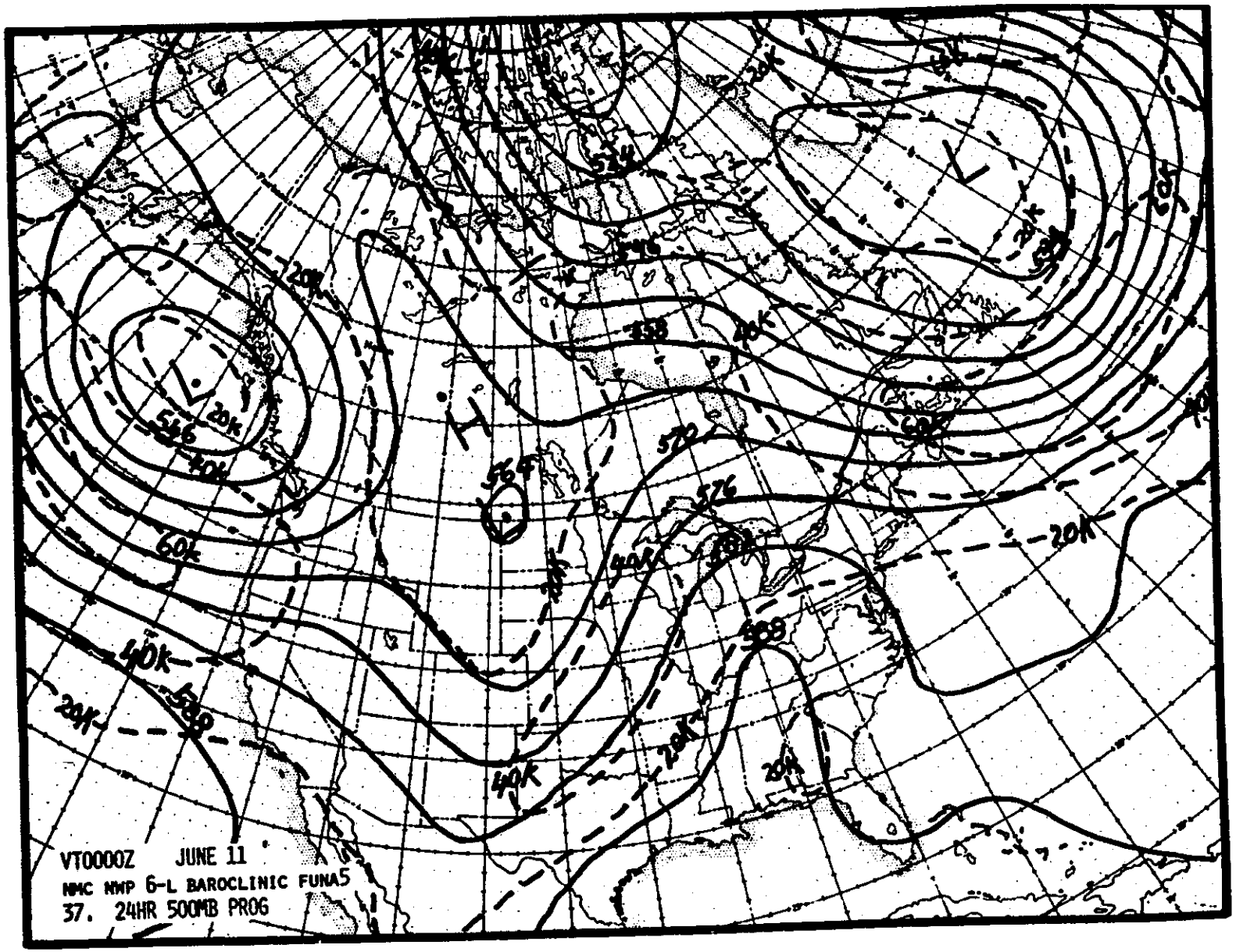

FIGURE 3. 24-Hour 500-Millibar Prognostic Chart

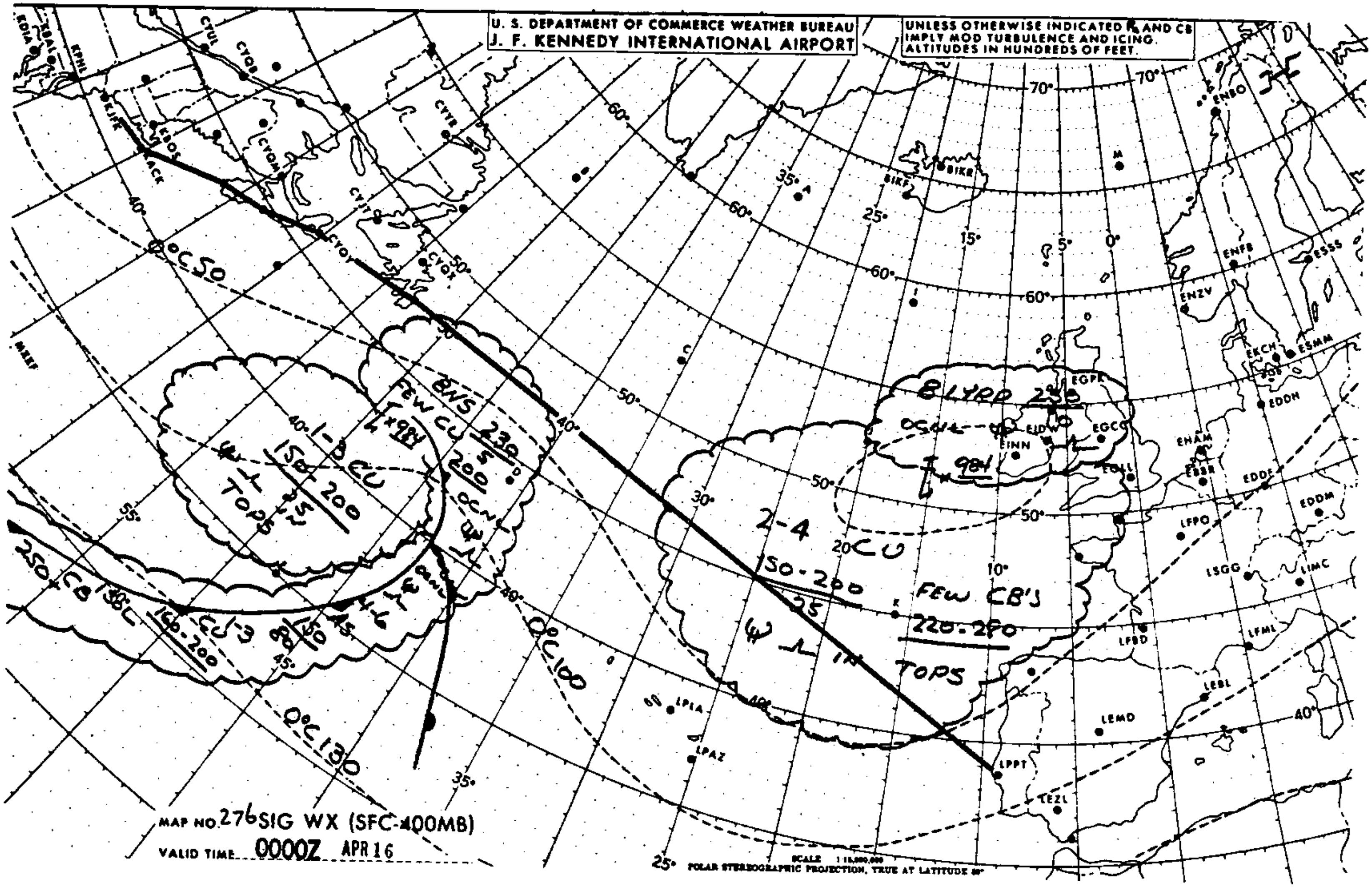

Figure 4. Significant Weather Chart (Surface to 400 MB)

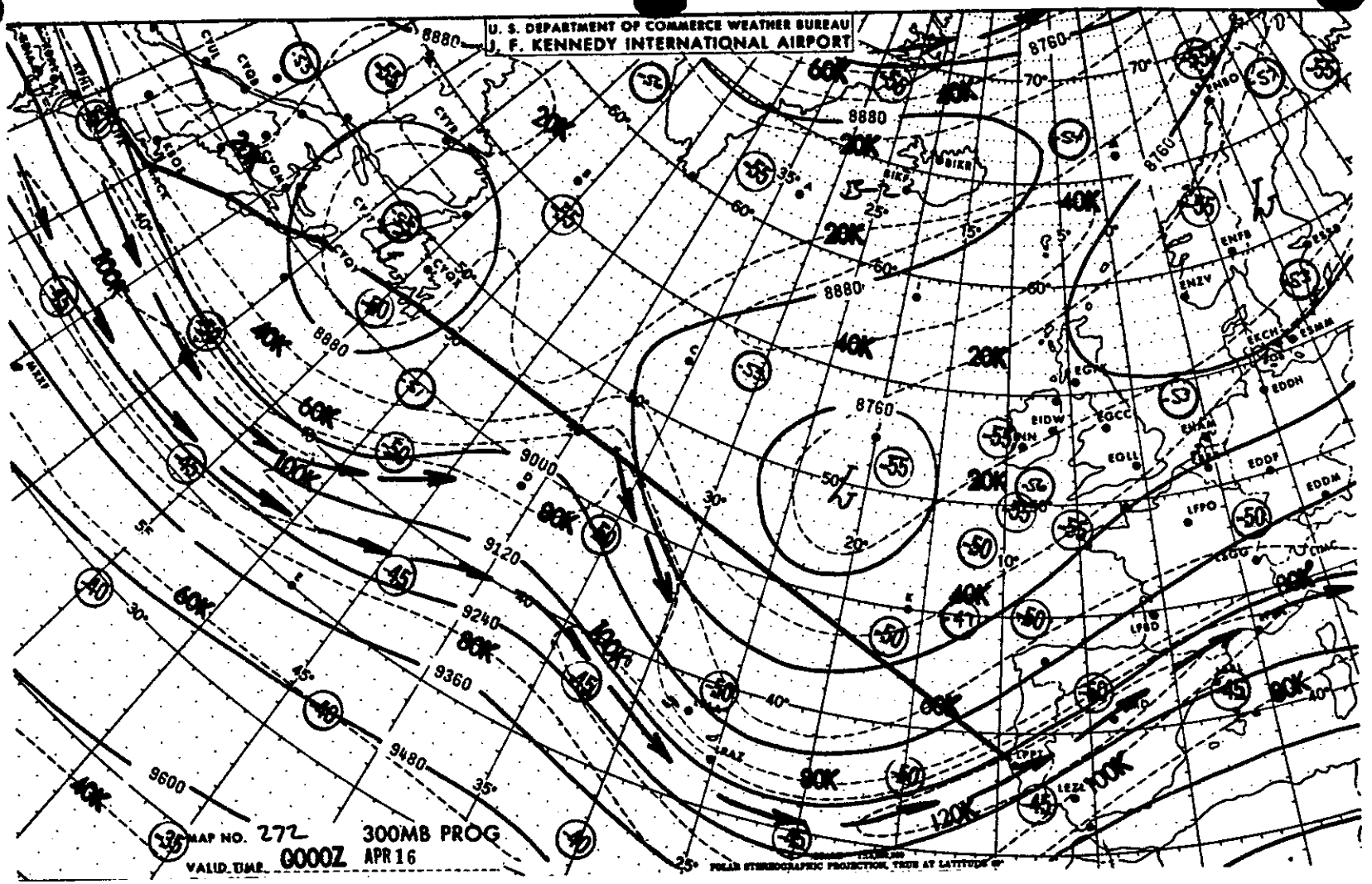

FIGURE 5. 300-Millibar Prognostic Chart

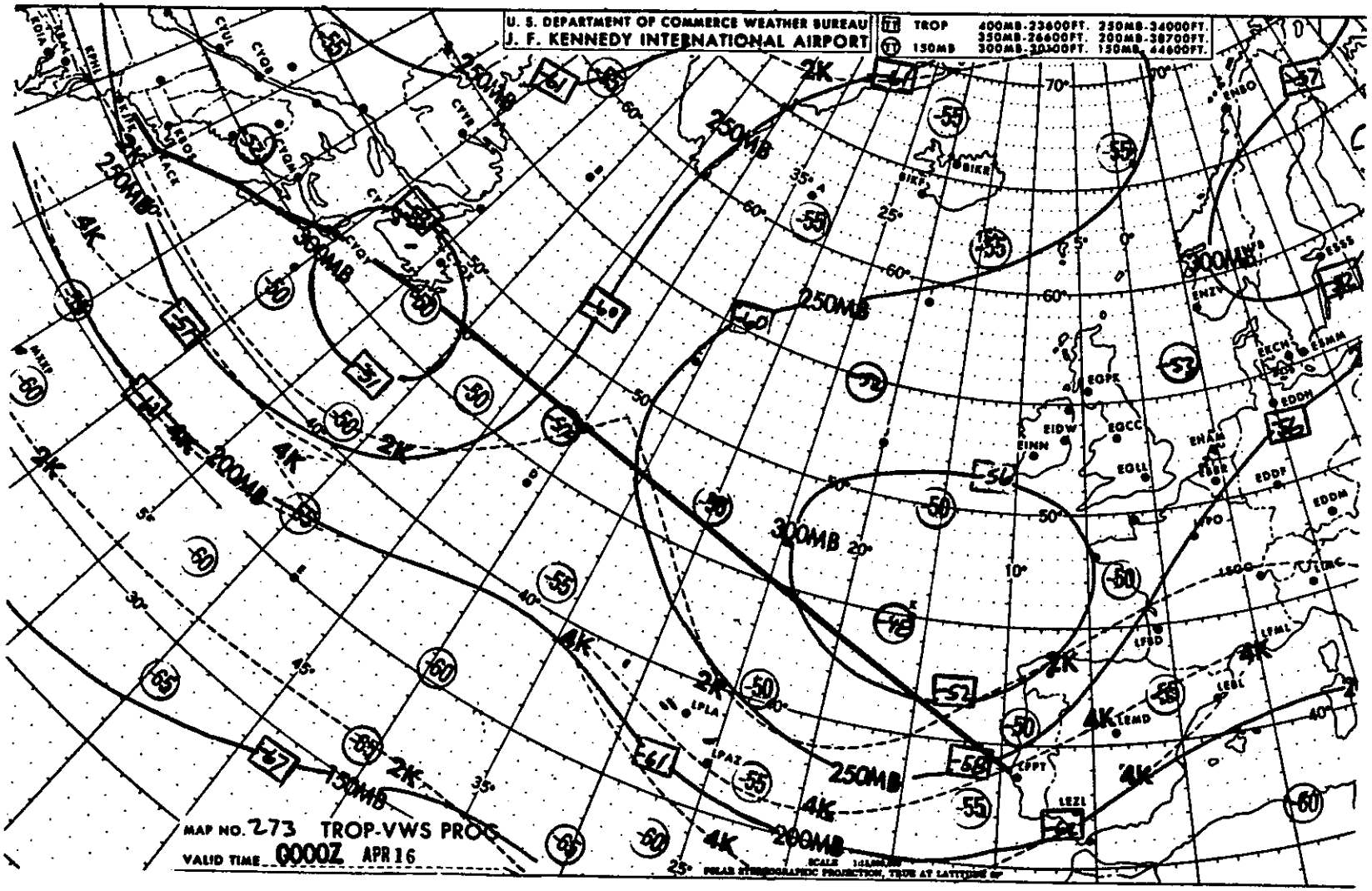

FIGURE 6. Tropopause/Vertical Wind Shear Chart

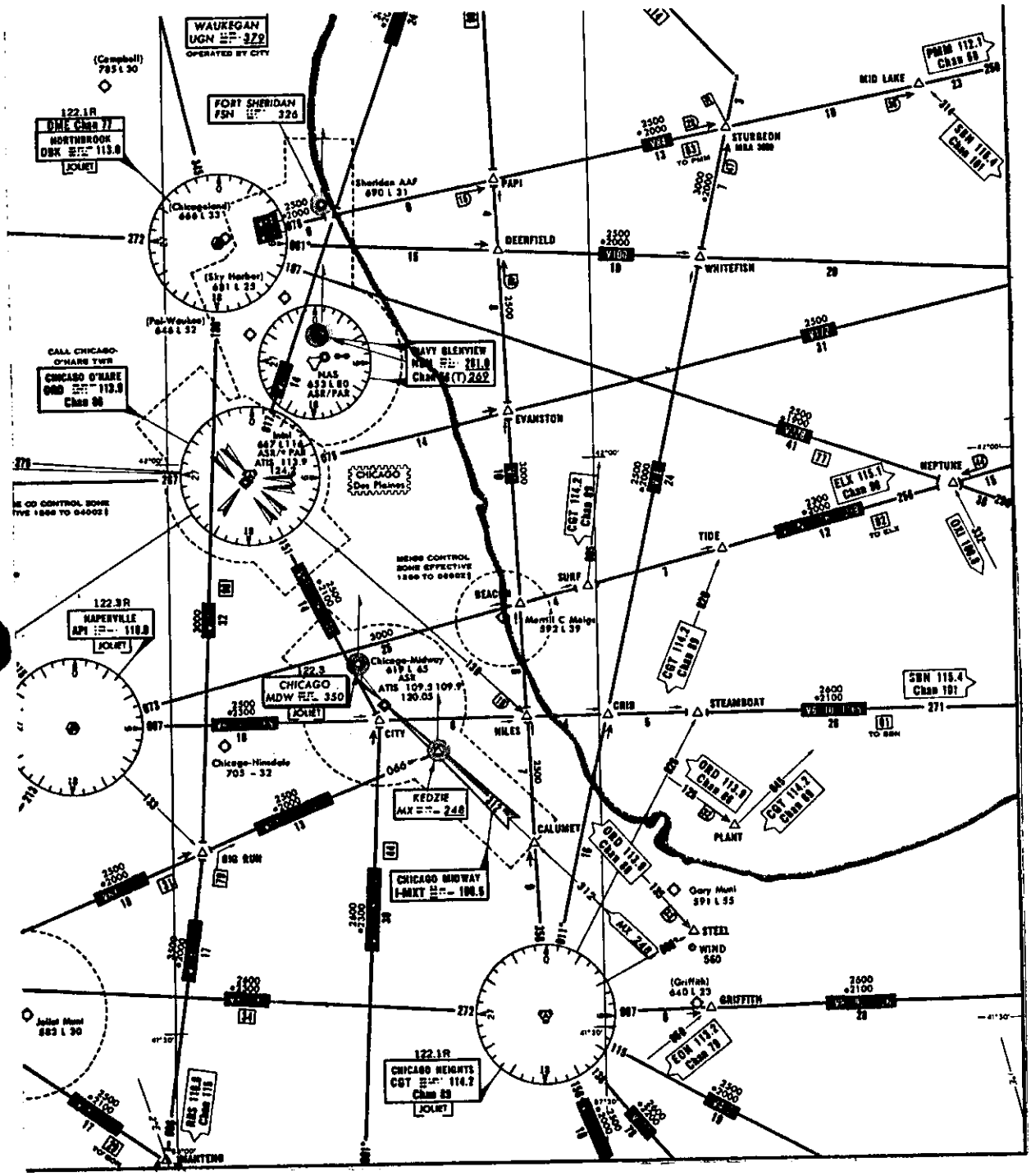

FIGURE 7. Segment of Area Chart—Chicago

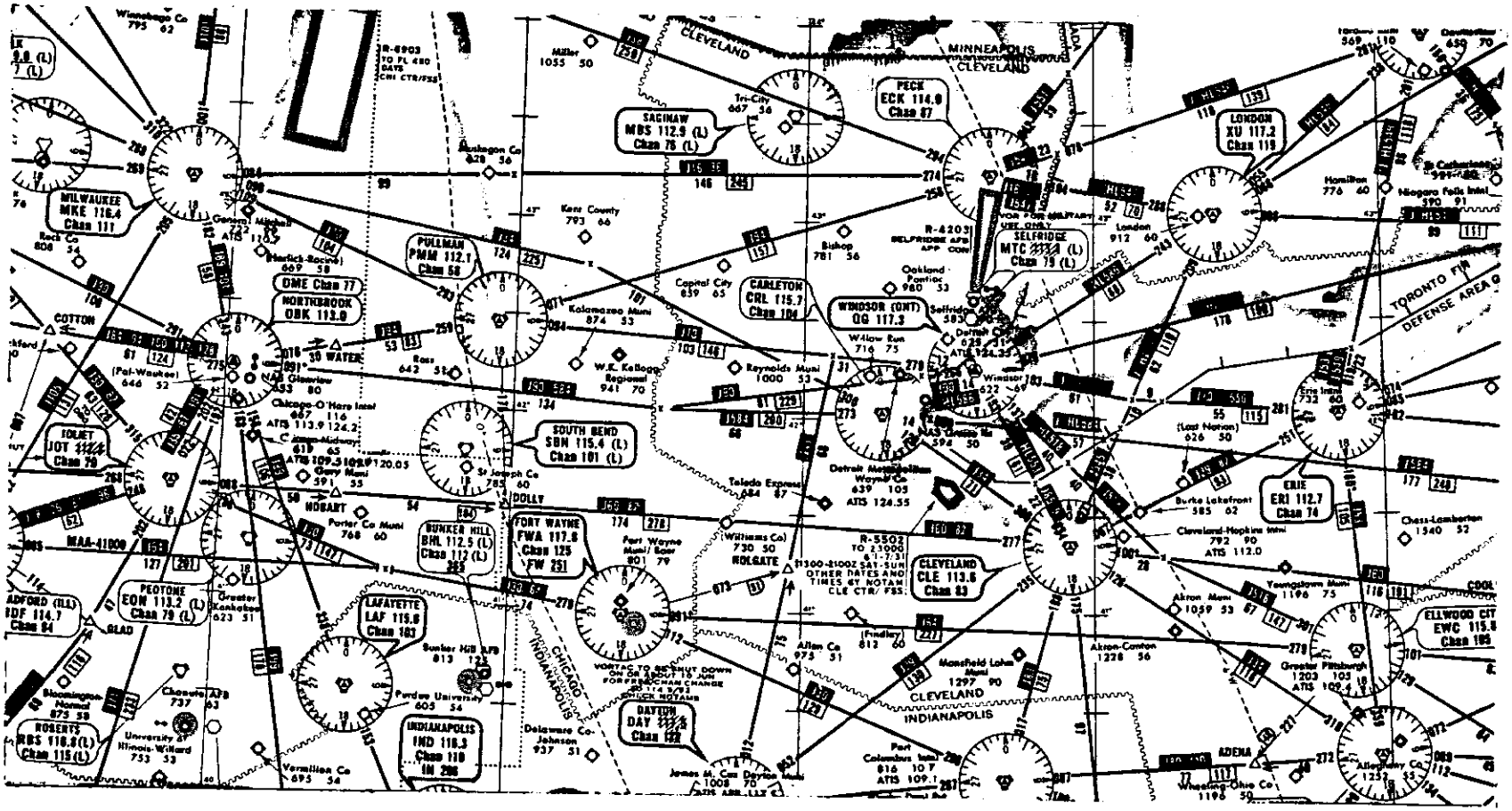

FIGURE 8. Segment of Enroute High-Altitude Chart (ORD—ERI)

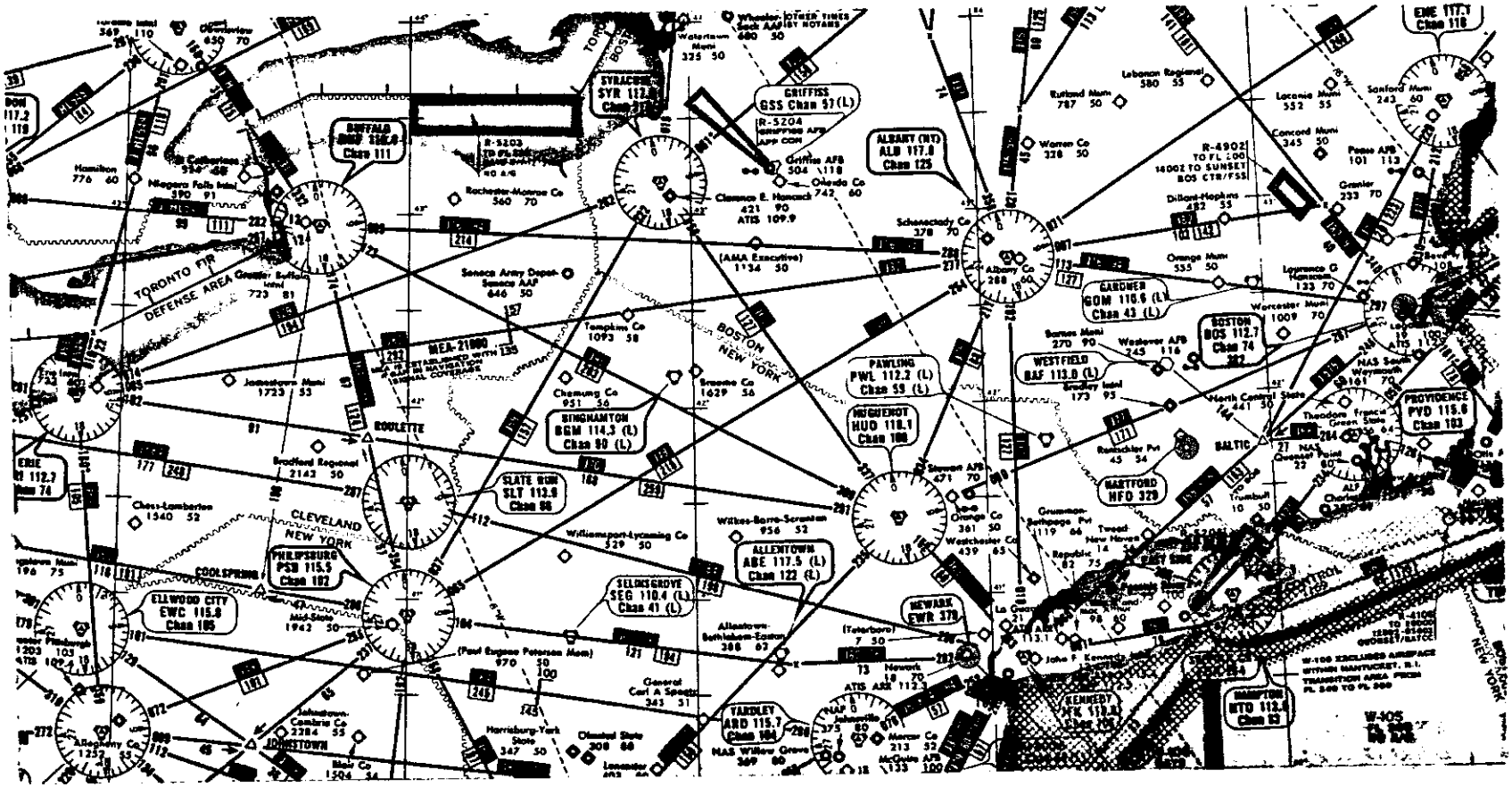

FIGURE 9. Segment of Enroute High-Altitude Chart (ERI—JFK)

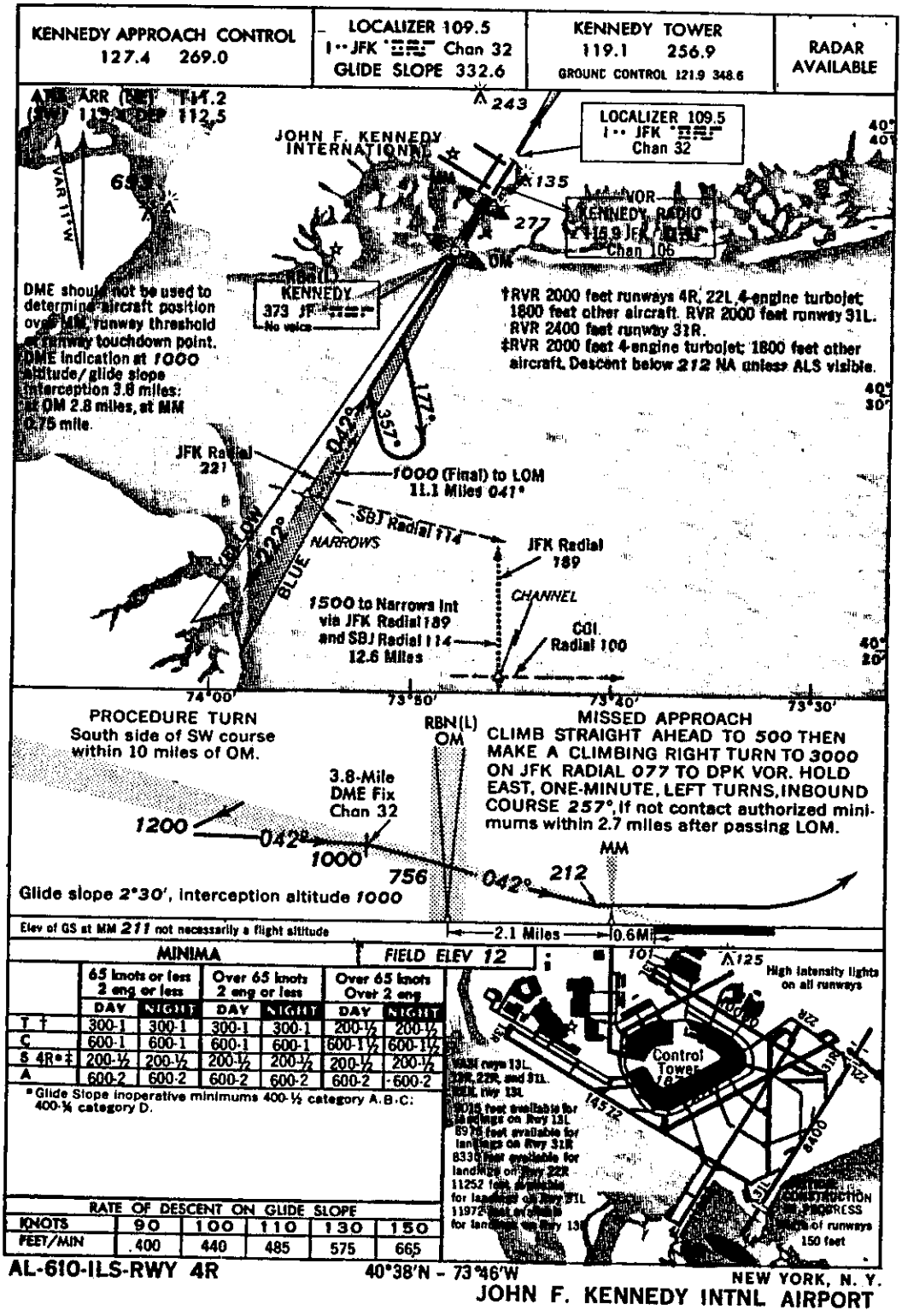

FIGURE 10. Instrument Approach Chart—JFK

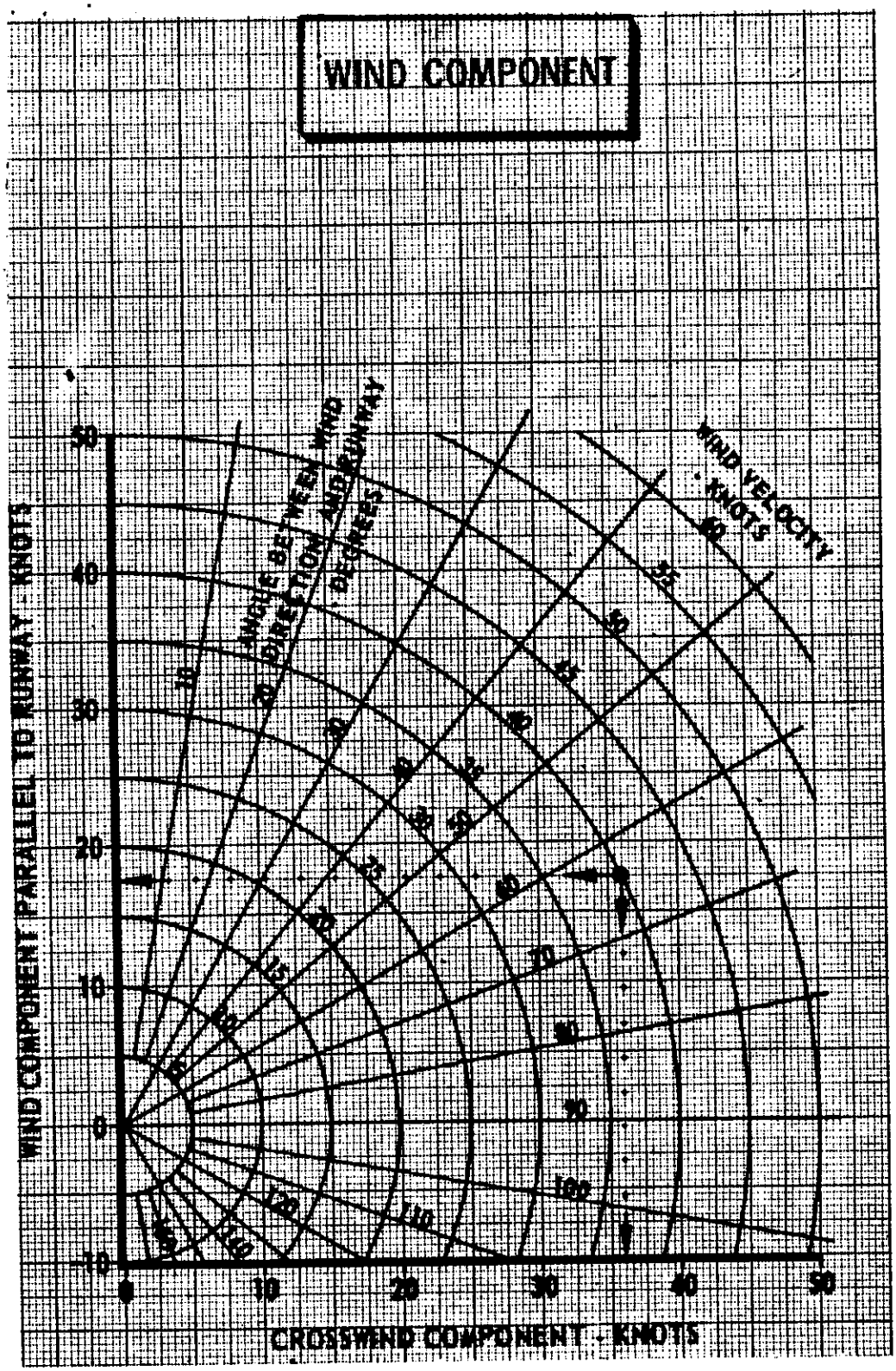

FIGURE 11. Wind Component Chart

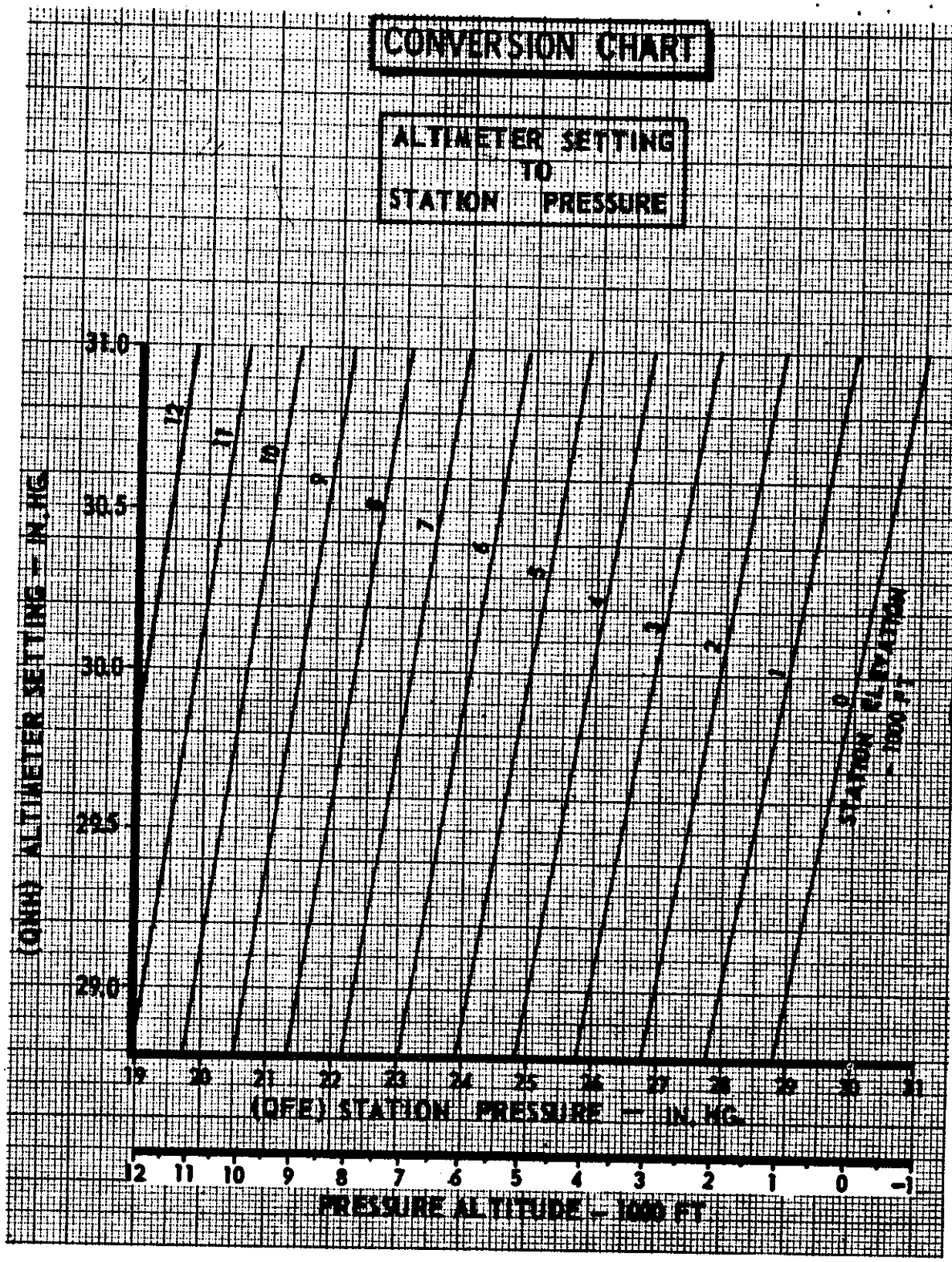

FIGURE 12. Conversion Chart—Altimeter Setting/Station Pressure

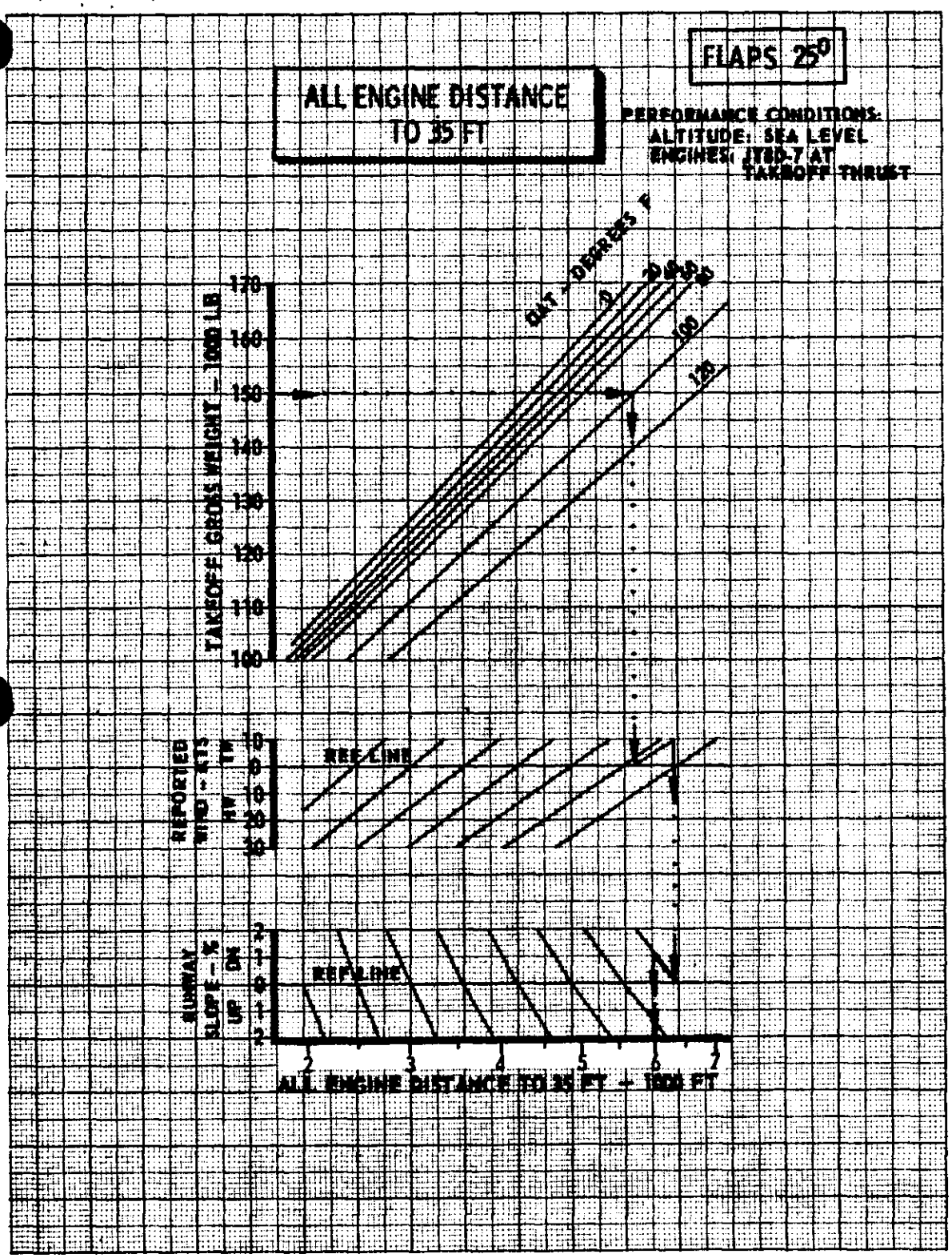

FIGURE 13. Performance—Distance to 35 Ft.

EXPLANATION OF FIGURE 14

Takeoff Performance Flaps 15°—Gross Weight at Brake Release

Given:

Runway length available	8,150 feet
Tailwind component	4 knots
Slope	1% UP
Airport pressure altitude	4,000 feet
Outside air temperature	+88°F.
Average takeoff EPR	1.88

For runway limit: start at runway length available line and follow dotted line and arrows. Answer is 132,000 pounds.

For climb start: start where EPR 1.88 intersects climb limit baseline and follow dotted line and arrows. Answer is 143,500 pounds.

Explanation of Chart

Gross weight at brake release for this aircraft under the conditions specified on the chart is seen to be influenced by either *Runway* or *Climb* limitations. The following explanation of these limits is offered.

Runway Limit. Based on the runway length available, the operating variables (wind, runway slope, pressure altitude, and temperature) together with average takeoff EPR directly influence the gross weight at brake release. In the plotted example, this value is seen to be 132,000 lbs.

Climb Limit. Regulations specify that certain climb gradients or profiles must be met during the takeoff and climb phases. (See FAR Part 25.121.) This chart, therefore, shows the weights for various combinations of power (EPR) and pressure altitude at which the aircraft is able to equal the prescribed climb gradients. In the plotted example, the gross weight at brake release which would meet the climb restrictions imposed by the regulations is 143,500 pounds. This value far exceeds the runway limit of 132,000 pounds. Of these two weights, the *smaller value* is *always* used and in *most* cases, this is the *runway limit.* Structural weight limitations, of course, must not be exceeded.

NOTE.—Under certain conditions, the climb limit gross weight at brake release will be *less than* the runway limit value and thus it becomes the limiting value. Plot the example below which shows this relationship:

Given

Runway length available	9,250 feet
Wind	Calm
Slope	0
Airport pressure altitude	3,000 feet
Outside air temperature	+59°F.
Average takeoff EPR	1.90

Solution

Runway limit gross weight at brake release	156,000 pounds.
Climb limit gross weight at brake release	153,500 pounds.

(The climb limit value is the limiting weight in this case.)

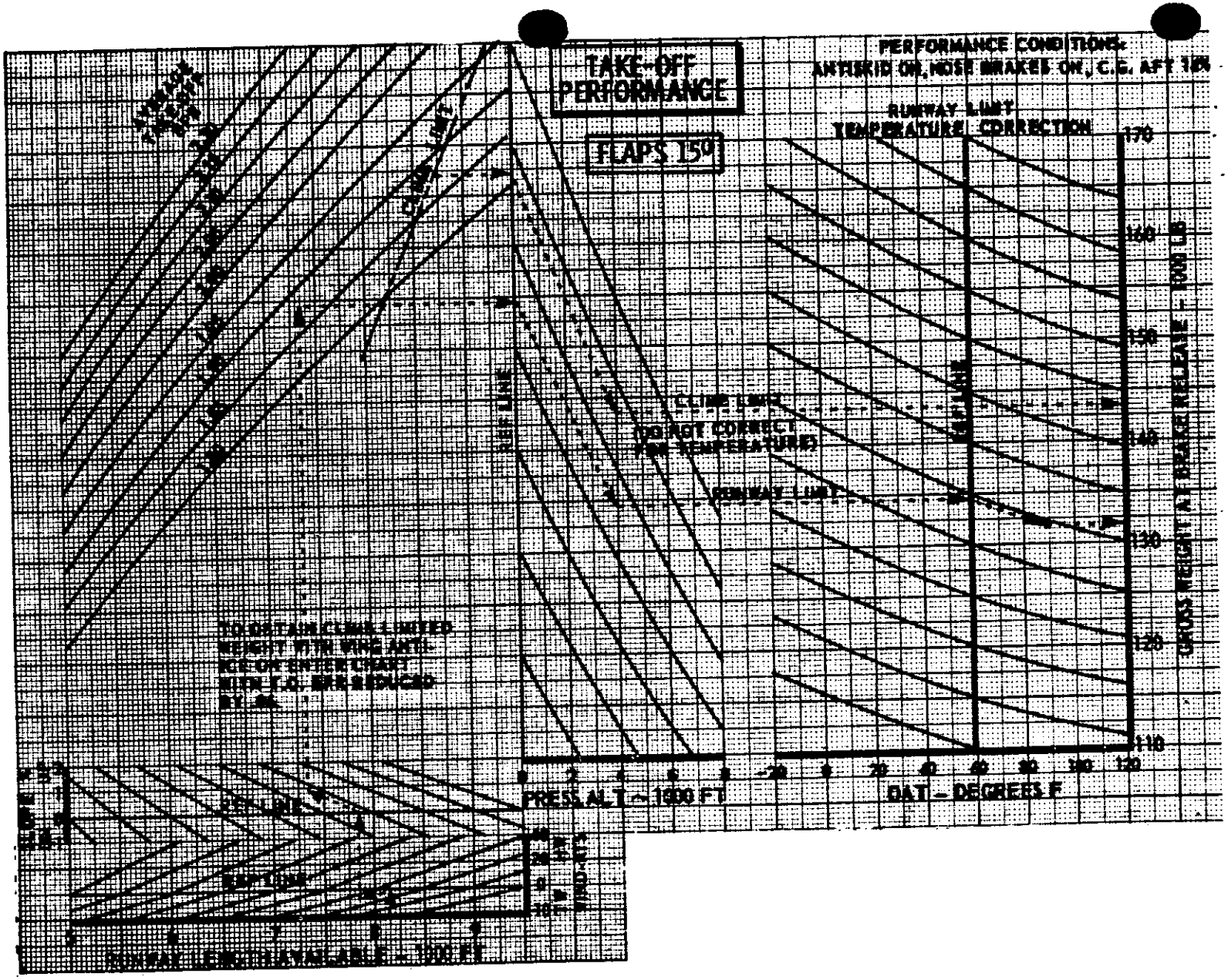

FIGURE 14. Takeoff Performance

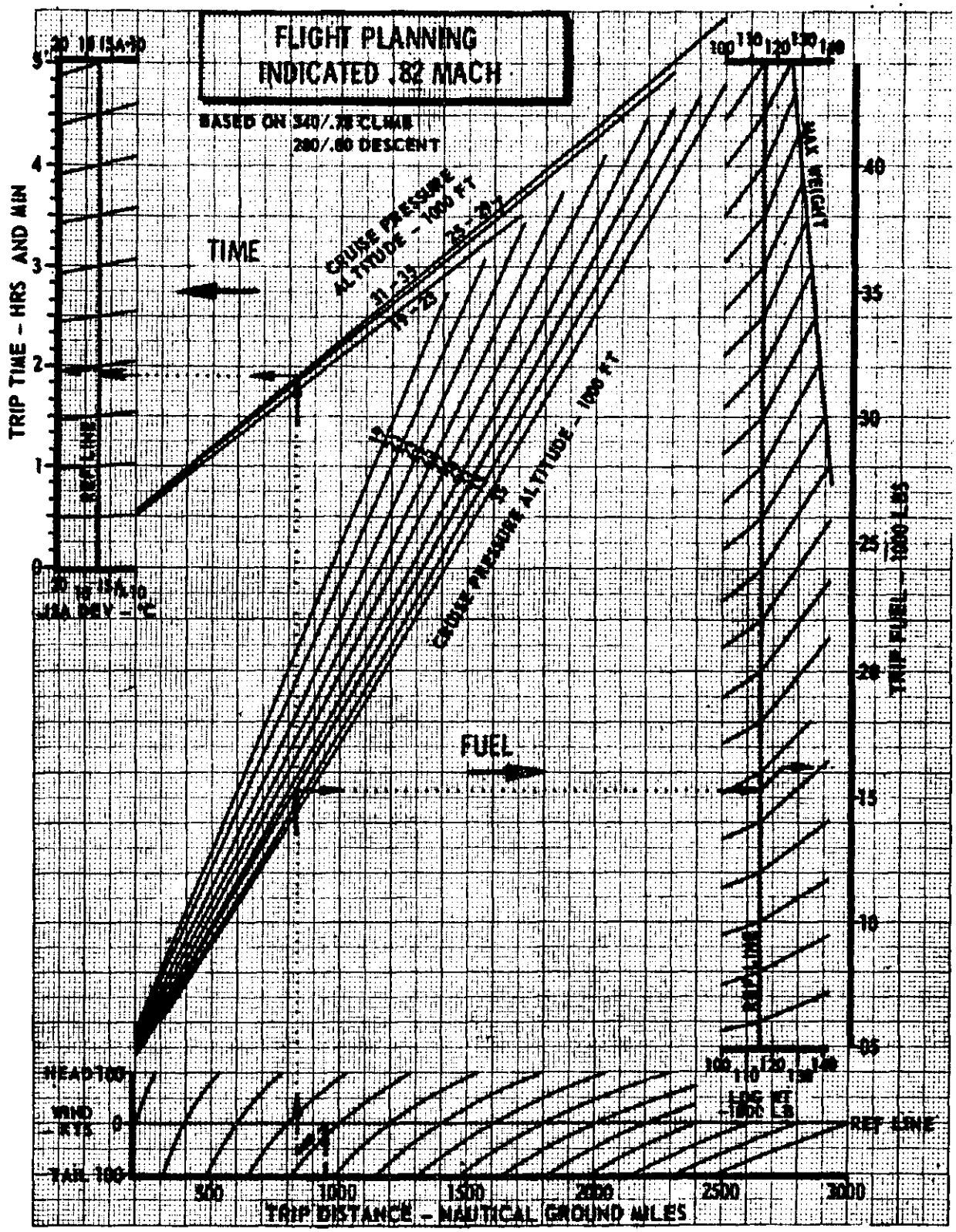

FIGURE 15. Flight Planning Chart

3 ENGINES 2 BLEEDS

280/.75

ENROUTE CLIMB
START CLIMB WEIGHT
150,000 LB

PRESS. ALT-FT	CLIMB DATA	DEVIATION FROM ISA - DEGREE(C)								
		-15	-10	-5	-0	5	10	15	20	25
40000	TIME MIN									
	FUEL LBS									
	DIST NAM									
	AVTAS KTS									
39000	TIME MIN	27	33							
	FUEL LBS	5499	6251							
	DIST NAM	177	217							
	AVTAS KTS	388	395							
38000	TIME MIN	23	26	30	36					
	FUEL LBS	4922	5359	5927	6759					
	DIST NAM	147	169	198	242					
	AVTAS KTS	383	389	396	403					
37000	TIME MIN	20	23	25	29	34	41			
	FUEL LBS	4570	4908	5312	5816	6485	7507			
	DIST NAM	129	146	165	191	226	281			
	AVTAS KTS	379	385	391	397	404	411			
36000	TIME MIN	19	21	23	25	29	33	39	48	
	FUEL LBS	4310	4599	4933	5329	5814	6438	7292	8599	
	DIST NAM	117	130	146	165	189	221	266	337	
	AVTAS KTS	376	381	387	393	398	405	412	420	
35000	TIME MIN	17	19	21	23	26	29	33	39	49
	FUEL LBS	4112	4370	4667	5012	5424	5928	6572	7447	8777
	DIST NAM	108	120	133	149	169	194	226	272	343
	AVTAS KTS	373	378	384	389	395	400	407	414	422
34000	TIME MIN	16	18	19	21	24	27	30	35	42
	FUEL LBS	3944	4181	4451	4762	5127	5564	6106	6813	7802
	DIST NAM	101	111	123	137	154	175	202	237	288
	AVTAS KTS	371	376	381	386	391	397	402	409	416
33000	TIME MIN	15	17	18	20	22	24	28	31	37
	FUEL LBS	3791	4011	4260	4544	4874	5264	5739	6344	7156
	DIST NAM	94	104	114	127	142	160	183	212	253
	AVTAS KTS	368	373	377	382	388	393	398	404	411
32000	TIME MIN	15	16	17	19	21	23	25	29	34
	FUEL LBS	3650	3855	4087	4350	4652	5005	5433	5968	6666
	DIST NAM	88	97	107	118	132	148	167	193	227
	AVTAS KTS	365	369	374	379	384	389	394	400	406
31000	TIME MIN	14	15	16	18	19	21	24	27	31
	FUEL LBS	3518	3711	3928	4173	4452	4776	5165	5647	6259
	DIST NAM	83	91	100	111	123	137	155	177	206
	AVTAS KTS	362	366	371	376	380	385	390	396	402
30000	TIME MIN	13	14	15	17	18	20	22	25	28
	FUEL LBS	3389	3571	3774	4002	4260	4559	4916	5350	5893
	DIST NAM	78	85	94	103	114	127	143	163	188
	AVTAS KTS	358	363	367	372	376	381	386	391	397
29000	TIME MIN	12	13	14	15	17	18	20	23	26
	FUEL LBS	3234	3401	3588	3796	4031	4301	4620	5004	5475
	DIST NAM	72	79	86	95	104	116	130	146	168
	AVTAS KTS	354	358	363	367	371	376	380	385	390
28000	TIME MIN	11	12	13	14	16	17	19	21	24
	FUEL LBS	3085	3240	3412	3603	3818	4064	4354	4697	5112
	DIST NAM	67	73	80	87	96	106	118	133	151
	AVTAS KTS	350	354	358	363	367	371	375	380	384
27000	TIME MIN	11	12	12	13	15	16	17	19	22
	FUEL LBS	2942	3087	3246	3422	3619	3845	4109	4419	4789
	DIST NAM	62	67	74	80	88	97	108	121	136
	AVTAS KTS	346	350	354	358	362	366	370	375	379
20000	TIME MIN	7	7	8	8	9	10	10	11	12
	FUEL LBS	2061	2149	2244	2348	2465	2596	2743	2912	3108
	DIST NAM	36	39	42	46	49	54	59	65	72
	AVTAS KTS	322	325	329	332	335	339	342	345	348
10000	TIME MIN	3	3	3	3	4	4	4	5	5
	FUEL LBS	991	1028	1069	1113	1161	1215	1276	1344	1421
	DIST NAM	14	15	16	17	19	20	22	24	26
	AVTAS KTS	295	298	301	304	306	309	312	314	317

FIGURE 16. Enroute Climb Table

IND. MACH .82 CRUISE
PLANNING
3 ENGINES 2 AIRBLEEDS

30,000 FT

ISA--46.4 DEG C

GROSS WT	OAT-DEG C	-60	-55	-50	-45	-40	-35	-30	-25	-20
165000 LB	MACH/TAS TOTAL FF	.820/464 9219	.820/469 9351	.820/474 9483	.820/480 9615	.815/462 9615				
160000 LB	MACH/TAS TOTAL FF	.820/464 9012	.820/469 9141	.820/474 9270	.820/480 9399	.820/485 9528	.804/481 9288			
155000 LB	MACH/TAS TOTAL FF	.820/464 8820	.820/469 8946	.820/474 9072	.820/480 9198	.820/485 9324	.815/487 9339			
150000 LB	MACH/TAS TOTAL FF	.820/464 8631	.820/469 8757	.820/474 8880	.820/480 9003	.820/485 9126	.820/490 9246	.804/485 9015		
145000 LB	MACH/TAS TOTAL FF	.820/464 8457	.820/469 8580	.820/474 8700	.820/480 8823	.820/485 8943	.820/490 9060	.815/492 9060		
140000 LB	MACH/TAS TOTAL FF	.820/464 8295	.820/469 8415	.820/474 8535	.820/480 8652	.820/485 8769	.820/490 8886	.820/495 9003	.802/489 8733	
135000 LB	MACH/TAS TOTAL FF	.820/464 8139	.820/469 8256	.820/474 8373	.820/480 8487	.820/485 8604	.820/490 8718	.820/495 8832	.812/495 8775	
130000 LB	MACH/TAS TOTAL FF	.820/464 7992	.820/469 8106	.820/474 8220	.820/480 8334	.820/485 8448	.820/490 8562	.820/495 8673	.820/500 8787	
125000 LB	MACH/TAS TOTAL FF	.820/464 7845	.820/469 7959	.820/474 8070	.820/480 8184	.820/485 8295	.820/490 8406	.820/495 8517	.820/500 8625	.808/498 8484
120000 LB	MACH/TAS TOTAL FF	.820/464 7713	.820/469 7824	.820/474 7935	.820/480 8043	.820/485 8154	.820/490 8262	.820/495 8370	.820/500 8478	.817/503 8517
115000 LB	MACH/TAS TOTAL FF	.820/464 7581	.820/469 7689	.820/474 7800	.820/480 7908	.820/485 8016	.820/490 8121	.820/495 8229	.820/500 8334	.820/505 8442
110000 LB	MACH/TAS TOTAL FF	.820/464 7467	.820/469 7575	.820/474 7680	.820/480 7788	.820/485 7893	.820/490 7998	.820/495 8103	.820/500 8208	.820/505 8313
105000 LB	MACH/TAS TOTAL FF	.820/464 7356	.820/469 7461	.820/474 7566	.820/480 7671	.820/485 7776	.820/490 7881	.820/495 7983	.820/500 8088	.820/505 8190
100000 LB	MACH/TAS TOTAL FF	.820/464 7251	.820/469 7356	.820/474 7458	.820/480 7563	.820/485 7665	.820/490 7767	.820/495 7869	.820/500 7971	.820/505 8073

31,000 FT

ISA--46.4 DEG C

GROSS WT	OAT-DEG C	-65	-60	-55	-50	-45	-40	-35	-30	-25
165000 LB	MACH/TAS TOTAL FF	.820/458 9015	.820/464 9147	.820/459 9279	.820/474 9411	.818/478 9486				
160000 LB	MACH/TAS TOTAL FF	.820/458 8802	.820/464 8931	.820/459 9060	.820/474 9189	.820/480 9315	.809/478 9177			
155000 LB	MACH/TAS TOTAL FF	.820/458 8595	.820/464 8721	.820/469 8847	.820/474 8973	.820/480 9096	.820/485 9222			
150000 LB	MACH/TAS TOTAL FF	.820/458 8400	.820/464 8523	.820/459 8646	.820/474 8769	.820/480 8889	.820/485 9012	.810/484 8922		
145000 LB	MACH/TAS TOTAL FF	.820/458 8214	.820/464 8334	.820/459 8454	.820/474 8574	.820/480 8691	.820/485 8811	.820/490 8928		
140000 LB	MACH/TAS TOTAL FF	.820/458 8034	.820/464 8154	.820/459 8271	.820/474 8388	.820/480 8505	.820/485 8619	.820/490 8736	.811/490 8664	
135000 LB	MACH/TAS TOTAL FF	.820/458 7875	.820/464 7992	.820/459 8106	.820/474 8220	.820/480 8334	.820/485 8448	.820/490 8562	.820/495 8673	
130000 LB	MACH/TAS TOTAL FF	.820/458 7719	.820/464 7833	.820/469 7944	.820/474 8058	.820/480 8169	.820/485 8280	.820/490 8391	.820/495 8502	.810/494 8400
125000 LB	MACH/TAS TOTAL FF	.820/458 7575	.820/464 7686	.820/459 7797	.820/474 7908	.820/480 8016	.820/485 8127	.820/490 8235	.820/495 8343	.819/500 8436
120000 LB	MACH/TAS TOTAL FF	.820/458 7434	.820/464 7542	.820/459 7650	.820/474 7758	.820/480 7866	.820/485 7974	.820/490 8079	.820/495 8187	.820/500 8292
115000 LB	MACH/TAS TOTAL FF	.820/458 7302	.820/464 7410	.820/469 7515	.820/474 7623	.820/480 7728	.820/485 7833	.820/490 7936	.820/495 8043	.820/500 8145
110000 LB	MACH/TAS TOTAL FF	.820/458 7173	.820/464 7281	.820/459 7383	.820/474 7488	.820/480 7593	.820/485 7695	.820/490 7800	.820/495 7902	.820/500 8004
105000 LB	MACH/TAS TOTAL FF	.820/458 7062	.820/464 7167	.820/459 7269	.820/474 7371	.820/480 7473	.820/485 7575	.820/490 7677	.820/495 7776	.820/500 7878
100000 LB	MACH/TAS TOTAL FF	.820/458 6954	.820/464 7056	.820/469 7158	.820/474 7257	.820/480 7359	.820/485 7458	.820/490 7557	.820/495 7656	.820/500 7755

FIGURE 17. Cruise Tables

FLIGHT TIME ANALYSIS

CHECK POINTS		ROUTE CRUISE ALT./FLT. LEVEL	TRUE COURSE	AIRSPEED-STS.		WINDS ALOFT DIRECTION VELOCITY TEMPERATURE	DRIFT CORR ANGLE	GROUND SPEED	DISTANCE N.M.	TIME		FUEL CONSUMPTION LBS./GALS.		MISC.
FROM	TO			EAS OR MACH NO.	TAS					LEG	TOTAL	LEG	TOTAL	
ORD	OBK		VAR	--	--	----	--	--	--	0:05	0:05	--		
OBK	PMM		078°	--	180	+20		200	83	0:25	0:30	2150		
PMM	QG	21,000	094°	--	245	250/30			146					
QG	ERI	"	098°	--	250	250/30			115					
ERI	HUO	"	099°	--	250	290/25			259					
HUO	JFK		141°	--	255	290/25			60					

ALTERNATE DATA

JFK	ALB	10,000	358°	--	220	330/20			127		

FUEL SUMMARY

	TIME	LBS./GALS.
ENROUTE		
ALTERNATE		
RESERVE		
EXTRA		
TOTAL		

FUEL CONSUMPTION VALUES:

CLIMB ---------- 4,300 Lbs./Hr.
CRUISE ---------- 2,300 Lbs./Hr.
ALT./RES./EXTRA ---------- 1,800 Lbs./Hr.

FIGURE 18. Flight Time Analysis

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