



2025 FAR/AIM

Federal Aviation Regulations / Aeronautical Information Manual



Rules and Procedures for Aviators
U.S. Department of Transportation
From Titles 14 and 49 of the Code of Federal Regulations



2025 FAR/AIM

Federal Aviation Regulations / Aeronautical Information Manual



Rules and Procedures for Aviators
U.S. Department of Transportation
From Titles 14 and 49 of the Code of Federal Regulations



AVIATION SUPPLIES & ACADEMICS, INC.
NEWCASTLE, WASHINGTON

Aviation Supplies & Academics, Inc.
7005 132nd Place SE
Newcastle, Washington 98059
asa@asa2fly.com | 425-235-1500 | asa2fly.com

Copyright © 2024 Aviation Supplies & Academics, Inc.
First edition published 1945. 2025 edition published 2024.

This publication contains current regulations as of May 10, 2024.
The *Aeronautical Information Manual* is current through March 21, 2024.

Visit the FAA's website to review changes to the regulations:
www.faa.gov/regulations_policies/faa_regulations/

Visit asa2fly.com/farupdate for regulation and *AIM* changes released after this printing date. ASA provides a free Update service with email notification when rules and procedures change.

All rights reserved.

None of the material in this publication supersedes any documents, procedures, or regulations issued by the Federal Aviation Administration or Department of Transportation.

ASA does not claim copyright on any material published herein that was taken from United States government sources. The *Aeronautical Information Manual* is prepared referencing from the public government sources without revision.

Front cover photo: © Ethan O'Rourke

ASA-25-FR-AM-BK
ISBN 978-1-64425-368-7

Additional formats available:
eBook EPUB ISBN 978-1-64425-370-0
eBook PDF ISBN 978-1-64425-371-7

Printed in the United States of America

2025 2024 9 8 7 6 5 4 3 2 1

14

Stay informed with ASA online resources.

Website







asa2fly.com

Updates



asa2fly.com/farupdate

Follow, like, share.

 [instagram.com/asa2fly](https://www.instagram.com/asa2fly)
 [facebook.com/asa2fly](https://www.facebook.com/asa2fly)
 [youtube.com/asa2fly](https://www.youtube.com/asa2fly)
 [linkedin.com/company/asa2fly](https://www.linkedin.com/company/asa2fly)

2025 FAR/AIM

Federal Aviation Regulations / Aeronautical Information Manual

Contents

Introduction: ASA 2025 FAR/AIM Series	v
Identifying Regulation Changes Since Last Year	vi
Summary of Major FAR Changes Since 2024 Book Was Published	vii
Pilot's Bill of Rights.....	ix
FAR Parts Listed in Titles 14 and 49 of the Code of Federal Regulations	xiv
Federal Aviation Regulations (FAR)	1
Aeronautical Information Manual (AIM)	459
NASA Aviation Safety Reporting System—General Form.....	1083
FAR/AIM Index	1085

Additional Online Resources

Stay current on all regulation changes that affect this book with ASA's free Update service: **asa2fly.com/farupdate**

Access ASA's suggested study list of AIM paragraphs and regulations pertinent to specific pilot certificates and ratings: **asa2fly.com/faraim**

Introduction

ASA 2025 FAR/AIM Series

FAR/AIM • FAR for Flight Crew • FAR for AMT

ASA has been supplying the standard reference of the industry, the FAR/AIM series, for nearly 80 years. The 2025 series continues to provide the Federal Aviation Regulations and the *Aeronautical Information Manual* along with these important features:

- All changes since the last edition are clearly identified.
- Access to online suggested study list of *AIM* paragraphs and regulations pertinent to specific pilot certificates and ratings (see asa2fly.com/faraim).
- Index includes both FAR and *AIM* terms to provide an **alphabetized listing** of subject matter for quick look-up.
- *AIM* produced with full-color graphics.

Each regulation Part is preceded by a table of contents. Changes since last year's printing are identified on page vii and in the table of contents for each regulation Part (in bold and marked with an asterisk), as well as within the text for quick reference (changed text is indicated with a bold line in the margin). In the *AIM*, changes are explained in a list at the beginning and with bold lines in the margins. It is recommended that you familiarize yourself with all the changes to identify those that affect your aviation activities.

Changes affecting the regulations can take place daily; the *AIM* changes every 6 months. ASA tracks all changes and offers you two options for free **Updates** at asa2fly.com/farupdate:

- You can download the latest Updates from the ASA website anytime.
- You may sign up for ASA's free service to have Update notices automatically emailed to you.

Visit the Federal Aviation Administration (FAA) website at www.faa.gov to review Advisory Circulars (AC), Notices of Proposed Rulemaking (NPRM), current regulations, FSDO contact details, and FAA Orders and publications. Pilots operating internationally should be familiar with Customs and Border Protection regulations, which can be found at cbp.gov.

Although ASA is not a government agency, and we do not write the regulations or the *AIM*, we do work closely with the FAA. Questions or concerns can be forwarded to our attention, and we will in turn pass the comments on to the responsible office within the agency. The FAA is interested in user feedback and your comments could foster improvements in the regulations that affect the entire industry.

FAR/AIM Comments

Aviation Supplies & Academics, Inc.
7005 132nd Place SE
Newcastle, Washington 98059

Website asa2fly.com
Email asa@asa2fly.com

Identifying Regulation Changes Since Last Year

Changes since last year's printing of the book are noted in the table of contents of each Part with an asterisk and bold title:

Example:

***61.5 Certificates and ratings issued under this part.**

The updated text within the context of the regulation is indicated by a bold line in the margin:

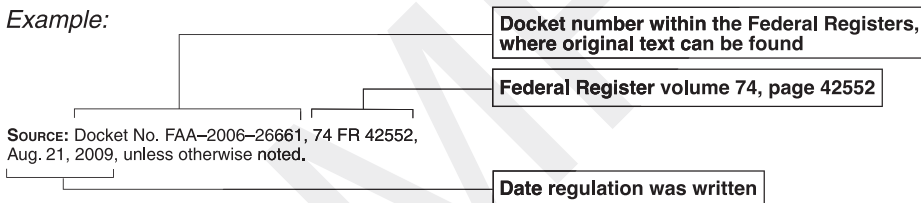
(a) The following certificates are issued under this part to an applicant who satisfactorily accomplishes the training and certification requirements for the certificate sought:

- (1) Pilot certificates—
 - (i) Student pilot.
 - (ii) Sport pilot.
 - (iii) Recreational pilot.
 - (iv) Private pilot.
 - (v) Commercial pilot.
 - (vi) Airline transport pilot.
- (2) Flight instructor certificates.
- (3) Ground instructor certificates.

How to Identify the Currency of the Regulations

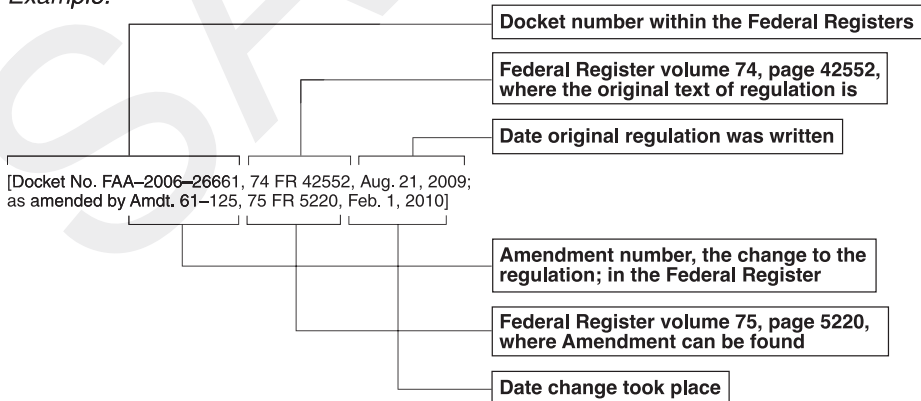
In each Part following the Table of Contents is a Source, with the date of origin for that regulation.

Example:



If a change has taken place since the original Regulation was written, it is noted at the end of the regulation.

Example:



Summary of Major FAR Changes Since 2024 Book Was Published

All changes are identified in the table of contents of each Part with bold Section titles and asterisks and in the regulation text with bold lines in the margins.

These regulation changes from the *Federal Register* affect this book as follows:

14 CFR

Part 5:

- Updates requirements for safety management systems and requires certain certificate holders and commercial air tour operators to develop and implement a safety management system (SMS).

Part 43

- Amends the Automatic Dependent Surveillance–Broadcast (ADS-B) Out requirements to allow aircraft meeting the performance requirements in Technical Standard Order (TSO)-C166c or TSO-C154d to meet the regulations.

Part 61

- Revises certain regulations governing airman certification by incorporating by reference the FAA Airman Certification Standards and Practical Test Standards into the certification requirements for pilots and flight instructors.

Part 71

- Amends regulations relating to airspace designations to reflect the incorporation by reference of FAA Order JO 7400.11H, Airspace Designations and Reporting Points.

Part 91

- Amends the regulatory definitions of certain air carrier and commercial operations to add powered-lift to these definitions to ensure the appropriate sets of rules apply to air carriers' and certain commercial operators' operations of aircraft that FAA regulations define as powered-lift.
- Amends the Automatic Dependent Surveillance–Broadcast (ADS-B) Out requirements to allow aircraft meeting the performance requirements in Technical Standard Order (TSO)-C166c or TSO-C154d to meet the regulations.
- Updates certain basic requirements that apply to management specifications that persons who participate in a fractional ownership program under Part 91, Subpart K, must maintain.
- Updates requirements for safety management systems and requires certain certificate holders and commercial air tour operators to develop and implement a safety management system (SMS).
- Extends SFAR No. 79—Prohibition Against Certain Flights in the Pyongyang Flight Information Region (FIR) (ZKKP).
- Removes SFAR No. 113—Prohibition Against Certain Flights in Specified Areas of the Dnipro Flight Information Region (FIR) (UKDV).
- Extends SFAR No. 114—Prohibition Against Certain Flights in the Damascus Flight Information Region (FIR) (OSTT).

(continued)

- Amends SFAR No. 115—Prohibition Against Certain Flights in Specified Areas of the Sanaa Flight Information Region (FIR) (OYSC) to update the current waypoint names and locations.
- Adds SFAR No. 119—Prohibition Against Certain Flights in the Kabul Flight Information Region (FIR) (OAKX).

Part 110

- Amends the regulatory definitions of certain air carrier and commercial operations to add powered-lift to these definitions to ensure the appropriate sets of rules apply to air carriers' and certain commercial operators' operations of aircraft that FAA regulations define as powered-lift.

Part 119

- Amends the regulatory definitions of certain air carrier and commercial operations to add powered-lift to these definitions to ensure the appropriate sets of rules apply to air carriers' and certain commercial operators' operations of aircraft that FAA regulations define as powered-lift.
- Updates requirements for safety management systems and requires certain certificate holders and commercial air tour operators to develop and implement a safety management system (SMS).

Part 136

- Amends the regulatory definitions of certain air carrier and commercial operations to add powered-lift to these definitions to ensure the appropriate sets of rules apply to air carriers' and certain commercial operators' operations of aircraft that FAA regulations define as powered-lift.

49 CFR

Part 1552

- Amends the Flight Training Security Program (FTSP) rule (formerly known as the Alien Flight Student Program) to prevent flight schools from providing flight training to any individuals who are not U.S. citizens or nationals, and who have not been vetted by the Federal Government to determine whether the flight training candidate is a security threat.

The ***Aeronautical Information Manual*** printed in this book is current through March 21, 2024. The major changes are summarized in the *AIM* introductory text.

Note: Changes affecting the regulations can take place daily. ASA tracks all changes and posts them on the ASA website so you always have the most current information. To view the rules currently in effect and to have Update notices automatically emailed to you, visit asa2fly.com/farupdate.

FAR Contents

Federal Aviation Regulations (from Titles 14 and 49 Code of Federal Regulations)

Part 1	Definitions and Abbreviations	3	1
Part 5	Safety Management Systems	17	5
Part 43	Maintenance, Preventive Maintenance, Rebuilding, and Alteration	25	43
Part 48	Registration and Marking Requirements for Small Unmanned Aircraft	41	48
Part 61	Certification: Pilots, Flight Instructors, and Ground Instructors.....	45	61
Part 67	Medical Standards and Certification.....	155	67
Part 68	Operating Certain Small Aircraft Without a Medical Certificate	167	68
Part 71	Airspace, Air Traffic Service Routes, and Reporting Points.....	171	71
Part 73	Special Use Airspace.....	175	73
Part 89	Remote Identification of Unmanned Aircraft.....	177	89
Part 91	General Operating and Flight Rules	189	91
Part 97	Standard Instrument Procedures.....	327	97
Part 103	Ultralight Vehicles	331	103
Part 105	Parachute Operations	333	105
Part 107	Small Unmanned Aircraft Systems.....	339	107
Part 110	General Requirements.....	353	110
Part 119	Certification: Air Carriers and Commercial Operators.....	357	119
Part 136	Commercial Air Tours and National Parks Air Tour Management.....	373	136
Part 137	Agricultural Aircraft Operations.....	381	137
Part 141	Pilot Schools	389	141
Part 142	Training Centers.....	437	142
49 CFR	NTSB 830 Accident Reporting • TSA 1552 Flight Training Security Program	449	49 CFR

PART 61**CERTIFICATION: PILOTS, FLIGHT INSTRUCTORS,
AND GROUND INSTRUCTORS**

SPECIAL FEDERAL AVIATION REGULATIONS

SFAR No. 73

SFAR No. 100–2

Subpart A—General

Sec.

- 61.1 Applicability and definitions.
- 61.2 Exercise of Privilege.
- 61.3 Requirement for certificates, ratings, and authorizations.
- 61.4 Qualification and approval of flight simulators and flight training devices.
- 61.5 Certificates and ratings issued under this part.
- 61.7 Obsolete certificates and ratings.
- 61.8 Inapplicability of unmanned aircraft operations.
- 61.9 [Reserved]
- 61.11 Expired pilot certificates and reissuance.
- 61.13 Issuance of airman certificates, ratings, and authorizations.
- *61.14 Incorporation by Reference.**
- 61.15 Offenses involving alcohol or drugs.
- 61.16 Refusal to submit to an alcohol test or to furnish test results.
- 61.17 Temporary certificate.
- 61.18 [Reserved]
- 61.19 Duration of pilot and instructor certificates and privileges.
- 61.21 Duration of a Category II and a Category III pilot authorization (for other than Part 121 and Part 135 use).
- 61.23 Medical certificates: Requirement and duration.
- 61.25 Change of name.
- 61.27 Voluntary surrender or exchange of certificate.
- 61.29 Replacement of a lost or destroyed airman or medical certificate or knowledge test report.
- 61.31 Type rating requirements, additional training, and authorization requirements.
- 61.33 Tests: General procedure.
- 61.35 Knowledge test: Prerequisites and passing grades.
- 61.37 Knowledge tests: Cheating or other unauthorized conduct.
- 61.39 Prerequisites for practical tests.
- 61.41 Flight training received from flight instructors not certificated by the FAA.
- *61.43 Practical tests: General procedures.**

- 61.45 Practical tests: Required aircraft and equipment.
- 61.47 Status of an examiner who is authorized by the Administrator to conduct practical tests.
- 61.49 Retesting after failure.
- 61.51 Pilot logbooks.
- 61.52 Use of aeronautical experience obtained in ultralight vehicles.
- 61.53 Prohibition on operations during medical deficiency.
- 61.55 Second in command qualifications.
- 61.56 Flight review.
- *61.57 Recent flight experience: Pilot in command.**
- *61.58 Pilot-in-command proficiency check: Operation of an aircraft that requires more than one pilot flight crewmember or is turbojet-powered.**
- 61.59 Falsification, reproduction, or alteration of applications, certificates, logbooks, reports, or records.
- 61.60 Change of address.

**Subpart B—
Aircraft Ratings and Pilot Authorizations**

- 61.61 Applicability.
- 61.63 Additional aircraft ratings (other than for ratings at the airline transport pilot certification level).
- 61.64 Use of a flight simulator and flight training device.
- 61.65 Instrument rating requirements.
- 61.66 Enhanced flight vision system pilot requirements.
- 61.67 Category II pilot authorization requirements.
- 61.68 Category III pilot authorization requirements.
- 61.69 Glider and unpowered ultralight vehicle towing: Experience and training requirements.
- 61.71 Graduates of an approved training program other than under this part: Special rules.
- 61.73 Military pilots or former military pilots: Special rules.
- 61.75 Private pilot certificate issued on the basis of a foreign pilot license.
- 61.77 Special purpose pilot authorization: Operation of a civil aircraft of the United States and leased by a non-U.S. citizen.

Subpart C—Student Pilots

- 61.81 Applicability.
- 61.83 Eligibility requirements for student pilots.
- 61.85 Application.
- 61.87 Solo requirements for student pilots.
- 61.89 General limitations.
- 61.91 [Reserved]
- 61.93 Solo cross-country flight requirements.
- 61.94 Student pilot seeking a sport pilot certificate or a recreational pilot certificate: Operations at airports within, and in airspace located within, Class B, C, and D airspace, or at airports with an operational control tower in other airspace.
- 61.95 Operations in Class B airspace and at airports located within Class B airspace.

Subpart D—Recreational Pilots

- 61.96 Applicability and eligibility requirements: General.
- 61.97 Aeronautical knowledge.
- 61.98 Flight proficiency.
- 61.99 Aeronautical experience.
- 61.100 Pilots based on small islands.
- 61.101 Recreational pilot privileges and limitations.

Subpart E—Private Pilots

- 61.102 Applicability.
- 61.103 Eligibility requirements: General.
- 61.105 Aeronautical knowledge.
- 61.107 Flight proficiency.
- 61.109 Aeronautical experience.
- 61.110 Night flying exceptions.
- 61.111 Cross-country flights: Pilots based on small islands.
- 61.113 Private pilot privileges and limitations: Pilot in command.
- 61.115 Balloon rating: Limitations.
- 61.117 Private pilot privileges and limitations: Second in command of aircraft requiring more than one pilot.
- 61.118 – 61.120 [Reserved]

Subpart F—Commercial Pilots

- 61.121 Applicability.
- 61.123 Eligibility requirements: General.
- 61.125 Aeronautical knowledge.
- 61.127 Flight proficiency.
- 61.129 Aeronautical experience.
- 61.131 Exceptions to the night flying requirements.
- 61.133 Commercial pilot privileges and limitations.
- 61.135 – 61.141 [Reserved]

Subpart G—Airline Transport Pilots

- 61.151 Applicability.
- 61.153 Eligibility requirements: General.
- 61.155 Aeronautical knowledge.
- 61.156 Training requirements: Airplane category—multiengine class or multiengine airplane type rating concurrently with an airline transport pilot certificate.
- *61.157 **Flight proficiency.**
- 61.158 [Reserved]
- 61.159 Aeronautical experience: Airplane category rating.
- 61.160 Aeronautical experience—airplane category restricted privileges.
- 61.161 Aeronautical experience: Rotorcraft category and helicopter class rating.
- 61.163 Aeronautical experience: Powered-lift category rating.
- 61.165 Additional aircraft category and class ratings.
- 61.167 Airline transport pilot privileges and limitations.
- 61.169 Letters of authorization for institutions of higher education.
- 61.170 – 61.171 [Reserved]

Subpart H—Flight Instructors Other than Flight Instructors With a Sport Pilot Rating

- 61.181 Applicability.
- 61.183 Eligibility requirements.
- 61.185 Aeronautical knowledge.
- 61.187 Flight proficiency.
- 61.189 Flight instructor records.
- 61.191 Additional flight instructor ratings.
- 61.193 Flight instructor privileges.
- 61.195 Flight instructor limitations and qualifications.
- 61.197 Renewal requirements for flight instructor certification.
- 61.199 Reinstatement requirements of an expired flight instructor certificate.
- 61.201 [Reserved]

Subpart I—Ground Instructors

- 61.211 Applicability.
- 61.213 Eligibility requirements.
- 61.215 Ground instructor privileges.
- 61.217 Recent experience requirements.

Subpart J—Sport Pilots

- 61.301 What is the purpose of this subpart and to whom does it apply?
- 61.303 If I want to operate a light-sport aircraft, what operating limits and endorsement requirements in this subpart must I comply with?

- 61.305 What are the age and language requirements for a sport pilot certificate?
- 61.307 What tests do I have to take to obtain a sport pilot certificate?
- 61.309 What aeronautical knowledge must I have to apply for a sport pilot certificate?
- 61.311 What flight proficiency requirements must I meet to apply for a sport pilot certificate?
- 61.313 What aeronautical experience must I have to apply for a sport pilot certificate?
- 61.315 What are the privileges and limits of my sport pilot certificate?
- 61.317 Is my sport pilot certificate issued with aircraft category and class ratings?
- 61.319 [Reserved]
- *61.321 How do I obtain privileges to operate an additional category or class of light-sport aircraft?**
- 61.323 [Reserved]
- 61.325 How do I obtain privileges to operate a light-sport aircraft at an airport within, or in airspace within, Class B, C, and D airspace, or in other airspace with an airport having an operational control tower?
- 61.327 Are there specific endorsement requirements to operate a light-sport aircraft based on V_H ?
- 61.413 What are the privileges of my flight instructor certificate with a sport pilot rating?
- 61.415 What are the limits of a flight instructor certificate with a sport pilot rating?
- 61.417 Will my flight instructor certificate with a sport pilot rating list aircraft category and class ratings?
- *61.419 How do I obtain privileges to provide training in an additional category or class of light-sport aircraft?**
- 61.421 May I give myself an endorsement?
- 61.423 What are the recordkeeping requirements for a flight instructor with a sport pilot rating?
- 61.425 How do I renew my flight instructor certificate?
- 61.427 What must I do if my flight instructor certificate with a sport pilot rating expires?
- 61.429 May I exercise the privileges of a flight instructor certificate with a sport pilot rating if I hold a flight instructor certificate with another rating?

APPENDICES TO PART 61

***Appendix A—Airman Certification Standards and Practical Test Standards**

Authority: 49 U.S.C. 106(f), 106(g), 40113, 44701–44703, 44707, 44709–44711, 44729, 44903, 45102–45103, 45301–45302; Sec. 2307 Pub. L. 114–190, 130 Stat. 615 (49 U.S.C. 44703 note); and sec. 318, Pub. L. 115–254, 132 Stat. 3186 (49 U.S.C. 44703 note).

Source: Docket No. 25910, 62 FR 16298, April 4, 1997, unless otherwise noted.

SPECIAL FEDERAL AVIATION REGULATIONS

SFAR No. 73

ROBINSON R-22 / R-44 SPECIAL TRAINING AND EXPERIENCE REQUIREMENTS

Sections

1. *Applicability.*
2. *Required training, aeronautical experience, endorsements, and flight review.*
3. *Expiration date.*

1. Applicability. Under the procedures prescribed herein, this SFAR applies to all persons who seek to manipulate the controls or act as pilot in command of a Robinson model R-22 or R-44 helicopter. The requirements stated in this SFAR are in addition to the current requirements of part 61.

Subpart K—**Flight Instructors With a Sport Pilot Rating**

- 61.401 What is the purpose of this subpart?
- 61.403 What are the age, language, and pilot certificate requirements for a flight instructor certificate with a sport pilot rating?
- 61.405 What tests do I have to take to obtain a flight instructor certificate with a sport pilot rating?
- 61.407 What aeronautical knowledge must I have to apply for a flight instructor certificate with a sport pilot rating?
- 61.409 What flight proficiency requirements must I meet to apply for a flight instructor certificate with a sport pilot rating?
- 61.411 What aeronautical experience must I have to apply for a flight instructor certificate with a sport pilot rating?
- 61.412 Do I need additional training to provide instruction on control and maneuvering an airplane solely by reference to the instruments in a light-sport aircraft based on V_H ?

2. Required training, aeronautical experience, endorsements, and flight review.

(a) Awareness Training:

(1) Except as provided in paragraph (a)(2) of this section, no person may manipulate the controls of a Robinson model R-22 or R-44 helicopter after March 27, 1995, for the purpose of flight unless the awareness training specified in paragraph (a)(3) of this section is completed and the person's logbook has been endorsed by a certified flight instructor authorized under paragraph (b)(5) of this section.

(2) A person who holds a rotorcraft category and helicopter class rating on that person's pilot certificate and meets the experience requirements of paragraph (b)(1) or paragraph (b)(2) of this section may not manipulate the controls of a Robinson model R-22 or R-44 helicopter for the purpose of flight after April 26, 1995, unless the awareness training specified in paragraph (a)(3) of this section is completed and the person's logbook has been endorsed by a certified flight instructor authorized under paragraph (b)(5) of this section.

(3) Awareness training must be conducted by a certified flight instructor who has been endorsed under paragraph (b)(5) of this section and consists of instruction in the following general subject areas:

- (i) Energy management;
- (ii) Mast bumping;
- (iii) Low rotor RPM (blade stall);
- (iv) Low G hazards; and
- (v) Rotor RPM decay.

(4) A person who can show satisfactory completion of the manufacturer's safety course after January 1, 1994, may obtain an endorsement from an FAA aviation safety inspector in lieu of completing the awareness training required in paragraphs (a)(1) and (a)(2) of this section.

(b) Aeronautical Experience:

(1) No person may act as pilot in command of a Robinson model R-22 unless that person:

(i) Has had at least 200 flight hours in helicopters, at least 50 flight hours of which were in the Robinson R-22; or

(ii) Has had at least 10 hours dual instruction in the Robinson R-22 and has received an endorsement from a certified flight instructor authorized under paragraph (b)(5) of this section that the individual has been given the training required by this paragraph and is proficient to act as pilot in command of an R-22. Beginning 12 calendar months after the date of the endorsement, the individual may not act as pilot in command unless the individual has completed a flight review in an R-22 within the preceding 12 calendar months and obtained an endorsement for that flight review. The dual instruction must include at least

the following abnormal and emergency procedures flight training:

(A) Enhanced training in autorotation procedures,

(B) Engine rotor RPM control without the use of the governor,

(C) Low rotor RPM recognition and recovery, and

(D) Effects of low G maneuvers and proper recovery procedures.

(2) No person may act as pilot in command of a Robinson R-44 unless that person—

(i) Has had at least 200 flight hours in helicopters, at least 50 flight hours of which were in the Robinson R-44. The pilot in command may credit up to 25 flight hours in the Robinson R-22 toward the 50 hour requirement in the Robinson R-44; or

(ii) Has had at least 10 hours dual instruction in a Robinson helicopter, at least 5 hours of which must have been accomplished in the Robinson R-44 helicopter and has received an endorsement from a certified flight instructor authorized under paragraph (b)(5) of this section that the individual has been given the training required by this paragraph and is proficient to act as pilot in command of an R-44. Beginning 12 calendar months after the date of the endorsement, the individual may not act as pilot in command unless the individual has completed a flight review in a Robinson R-44 within the preceding 12 calendar months and obtained an endorsement for that flight review. The dual instruction must include at least the following abnormal and emergency procedures flight training—

(A) Enhanced training in autorotation procedures;

(B) Engine rotor RPM control without the use of the governor;

(C) Low rotor RPM recognition and recovery; and

(D) Effects of low G maneuvers and proper recovery procedures.

(3) A person who does not hold a rotorcraft category and helicopter class rating must have had at least 20 hours of dual instruction in a Robinson R-22 helicopter prior to operating it in solo flight. In addition, the person must obtain an endorsement from a certified flight instructor authorized under paragraph (b)(5) of this section that instruction has been given in those maneuvers and procedures, and the instructor has found the applicant proficient to solo a Robinson R-22. This endorsement is valid for a period of 90 days. The dual instruction must include at least the following abnormal and emergency procedures flight training:

(i) Enhanced training in autorotation procedures,

(ii) Engine rotor RPM control without the use of the governor,

(iii) Low rotor RPM recognition and recovery, and

(iv) Effects of low G maneuvers and proper recovery procedures.

(4) A person who does not hold a rotorcraft category and helicopter class rating must have had at least 20 hours of dual instruction in a Robinson R-44 helicopter prior to operating it in solo flight. In addition, the person must obtain an endorsement from a certified flight instructor authorized under paragraph (b)(5) of this section that instruction has been given in those maneuvers and procedures, and the instructor has found the applicant proficient to solo a Robinson R-44. This endorsement is valid for a period of 90 days. The dual instruction must include at least the following abnormal and emergency procedures flight training:

(i) Enhanced training in autorotation procedures,

(ii) Engine rotor RPM control without the use of the governor,

(iii) Low rotor RPM recognition and recovery, and

(iv) Effects of low G maneuvers and proper recovery procedures.

(5) No certificated flight instructor may provide instruction or conduct a flight review in a Robinson R-22 or R-44 unless that instructor—

(i) Completes the awareness training in paragraph 2(a) of this SFAR.

(ii) For the Robinson R-22, has had at least 200 flight hours in helicopters, at least 50 flight hours of which were in the Robinson R-22, or for the Robinson R-44, has had at least 200 flight hours in helicopters, 50 flight hours of which were in Robinson helicopters. Up to 25 flight hours of Robinson R-22 flight time may be credited toward the 50 hour requirement.

(iii) Has completed flight training in a Robinson R-22, R-44, or both, on the following abnormal and emergency procedures—

(A) Enhanced training in autorotation procedures;

(B) Engine rotor RPM control without the use of the governor;

(C) Low rotor RPM recognition and recovery; and

(D) Effects of low G maneuvers and proper recovery procedures.

(iv) Has been authorized by endorsement from an FAA aviation safety inspector or authorized designated examiner that the instructor has completed the appropriate training, meets the experience requirements and has satisfactorily demonstrated an ability to provide instruction on the general subject areas of paragraph 2(a)(3) of this SFAR, and the flight training identified in paragraph 2(b)(5)(iii) of this SFAR.

(c) Flight Review:

(1) No flight review completed to satisfy §61.56 by an individual after becoming eligible to function as pilot in command in a Robinson R-22 helicopter shall be valid for the operation of R-22 helicopter unless that flight review was taken in an R-22.

(2) No flight review completed to satisfy §61.56 by an individual after becoming eligible to function as pilot in command in a Robinson R-44 helicopter shall be valid for the operation of R-44 helicopter unless that flight review was taken in the R-44.

(3) The flight review will include a review of the awareness training subject areas of paragraph 2(a)(3) of this SFAR and the flight training identified in paragraph 2(b) of this SFAR.

(d) Currency Requirements: No person may act as pilot in command of a Robinson model R-22 or R-44 helicopter carrying passengers unless the pilot in command has met the recency of flight experience requirements of §61.57 in an R-22 or R-44, as appropriate.

3. Expiration date. This SFAR No. 73 shall remain in effect until it is revised or rescinded.

[Docket No. 25910, 62 FR 16298, April 4, 1997, as amended by SFAR 73-1, 63 FR 666, Jan. 7, 1998; 68 FR 43, Jan. 2, 2003; Amdt. 61-120, 73 FR 17246, April 1, 2008; Amdt. SFAR 73-2, 74 FR 25650, May 29, 2009]

SFAR No. 100-2

RELIEF FOR U.S. MILITARY AND CIVILIAN PERSONNEL WHO ARE ASSIGNED OUTSIDE THE UNITED STATES IN SUPPORT OF U.S. ARMED FORCES OPERATIONS

1. Applicability. Flight Standards offices are authorized to accept from an eligible person, as described in paragraph 2 of this SFAR, the following:

(a) An expired flight instructor certificate to show eligibility for renewal of a flight instructor certificate under §61.197, or an expired written test report to show eligibility under part 61 to take a practical test;

(b) An expired written test report to show eligibility under §§63.33 and 63.57 to take a practical test; and

(c) An expired written test report to show eligibility to take a practical test required under part 65 or an expired inspection authorization to show eligibility for renewal under §65.93.

2. Eligibility. A person is eligible for the relief described in paragraph 1 of this SFAR if:

(a) The person served in a U.S. military or civilian capacity outside the United States in support of the U.S. Armed Forces' operation during some period of time from September 11, 2001, to termination of SFAR 100-2;

(b) The person's flight instructor certificate, airman written test report, or inspection authorization expired some time between September 11,

2001, and 6 calendar months after returning to the United States or termination of SFAR 100–2, whichever is earlier; and

(c) The person complies with §61.197 or §65.93 of this chapter, as appropriate, or completes the appropriate practical test within 6 calendar months after returning to the United States, or upon termination of SFAR 100–2, whichever is earlier.

3. Required documents. The person must send the Airman Certificate and/or Rating Application (FAA Form 8710–1) to the appropriate Flight Standards office. The person must include with the application one of the following documents, which must show the date of assignment outside the United States and the date of return to the United States:

(a) An official U.S. Government notification of personnel action, or equivalent document, showing the person was a civilian on official duty for the U.S. Government outside the United States and was assigned to a U.S. Armed Forces' operation some time between September 11, 2001, to termination of SFAR 100–2;

(b) Military orders showing the person was assigned to duty outside the United States and was assigned to a U.S. Armed Forces' operation some time between September 11, 2001, to termination of SFAR 100–2; or

(c) A letter from the person's military commander or civilian supervisor providing the dates during which the person served outside the United States and was assigned to a U.S. Armed Forces' operation some time between September 11, 2001, to termination of SFAR 100–2.

4. Expiration date. This Special Federal Aviation Regulation No. 100–2 is effective until further notice.

[Docket No. FAA–2009–0923, 75 FR 9766, March 4, 2010, as amended by Docket FAA–2018–0119, Amdt. 61–141, 83 FR 9170, March 5, 2018]

Subpart A—General

§61.1 Applicability and definitions.

(a) Except as provided in part 107 of this chapter, this part prescribes:

(1) The requirements for issuing pilot, flight instructor, and ground instructor certificates and ratings; the conditions under which those certificates and ratings are necessary; and the privileges and limitations of those certificates and ratings.

(2) The requirements for issuing pilot, flight instructor, and ground instructor authorizations; the conditions under which those authorizations are necessary; and the privileges and limitations of those authorizations.

(3) The requirements for issuing pilot, flight instructor, and ground instructor certificates and

ratings for persons who have taken courses approved by the Administrator under other parts of this chapter.

(b) For the purpose of this part:

Accredited has the same meaning as defined by the Department of Education in 34 CFR 600.2.

Aeronautical experience means pilot time obtained in an aircraft, flight simulator, or flight training device for meeting the appropriate training and flight time requirements for an airman certificate, rating, flight review, or recency of flight experience requirements of this part.

Authorized instructor means—

(i) A person who holds a ground instructor certificate issued under part 61 of this chapter and is in compliance with §61.217, when conducting ground training in accordance with the privileges and limitations of his or her ground instructor certificate;

(ii) A person who holds a flight instructor certificate issued under part 61 of this chapter and is in compliance with §61.197, when conducting ground training or flight training in accordance with the privileges and limitations of his or her flight instructor certificate; or

(iii) A person authorized by the Administrator to provide ground training or flight training under part 61, 121, 135, or 142 of this chapter when conducting ground training or flight training in accordance with that authority.

Aviation training device means a training device, other than a full flight simulator or flight training device, that has been evaluated, qualified, and approved by the Administrator.

Complex airplane means an airplane that has a retractable landing gear, flaps, and a controllable pitch propeller, including airplanes equipped with an engine control system consisting of a digital computer and associated accessories for controlling the engine and propeller, such as a full authority digital engine control; or, in the case of a seaplane, flaps and a controllable pitch propeller, including seaplanes equipped with an engine control system consisting of a digital computer and associated accessories for controlling the engine and propeller, such as a full authority digital engine control.

Cross-country time means—

(i) Except as provided in paragraphs (ii) through (vi) of this definition, time acquired during flight—

(A) Conducted by a person who holds a pilot certificate;

(B) Conducted in an aircraft;

(C) That includes a landing at a point other than the point of departure; and

(D) That involves the use of dead reckoning, pilotage, electronic navigation aids, radio aids, or other navigation systems to navigate to the landing point.

(ii) For the purpose of meeting the aeronautical experience requirements (except for a rotorcraft category rating), for a private pilot certificate (except for a powered parachute category rating), a commercial pilot certificate, or an instrument rating, or for the purpose of exercising recreational pilot privileges (except in a rotorcraft) under §61.101(c), time acquired during a flight—

(A) Conducted in an appropriate aircraft;

(B) That includes a point of landing that was at least a straight-line distance of more than 50 nautical miles from the original point of departure; and

(C) That involves the use of dead reckoning, pilotage, electronic navigation aids, radio aids, or other navigation systems to navigate to the landing point.

(iii) For the purpose of meeting the aeronautical experience requirements for a sport pilot certificate (except for powered parachute privileges), time acquired during a flight conducted in an appropriate aircraft that—

(A) Includes a point of landing at least a straight line distance of more than 25 nautical miles from the original point of departure; and

(B) Involves, as applicable, the use of dead reckoning; pilotage; electronic navigation aids; radio aids; or other navigation systems to navigate to the landing point.

(iv) For the purpose of meeting the aeronautical experience requirements for a sport pilot certificate with powered parachute privileges or a private pilot certificate with a powered parachute category rating, time acquired during a flight conducted in an appropriate aircraft that—

(A) Includes a point of landing at least a straight line distance of more than 15 nautical miles from the original point of departure; and

(B) Involves, as applicable, the use of dead reckoning; pilotage; electronic navigation aids; radio aids; or other navigation systems to navigate to the landing point.

(v) For the purpose of meeting the aeronautical experience requirements for any pilot certificate with a rotorcraft category rating or an instrument-helicopter rating, or for the purpose of exercising recreational pilot privileges, in a rotorcraft, under §61.101(c), time acquired during a flight—

(A) Conducted in an appropriate aircraft;

(B) That includes a point of landing that was at least a straight-line distance of more than 25 nautical miles from the original point of departure; and

(C) That involves the use of dead reckoning, pilotage, electronic navigation aids, radio aids, or other navigation systems to navigate to the landing point.

(vi) For the purpose of meeting the aeronautical experience requirements for an airline transport pilot certificate (except with a rotorcraft category rating), time acquired during a flight—

(A) Conducted in an appropriate aircraft;

(B) That is at least a straight-line distance of more than 50 nautical miles from the original point of departure; and

(C) That involves the use of dead reckoning, pilotage, electronic navigation aids, radio aids, or other navigation systems.

(vii) For a military pilot who qualifies for a commercial pilot certificate (except with a rotorcraft category rating) under §61.73 of this part, time acquired during a flight—

(A) Conducted in an appropriate aircraft;

(B) That is at least a straight-line distance of more than 50 nautical miles from the original point of departure; and

(C) That involves the use of dead reckoning, pilotage, electronic navigation aids, radio aids, or other navigation systems.

Examiner means any person who is authorized by the Administrator to conduct a pilot proficiency test or a practical test for an airman certificate or rating issued under this part, or a person who is authorized to conduct a knowledge test under this part.

Flight training means that training, other than ground training, received from an authorized instructor in flight in an aircraft.

Ground training means that training, other than flight training, received from an authorized instructor.

Institution of higher education has the same meaning as defined by the Department of Education in 34 CFR 600.4.

Instrument approach means an approach procedure defined in part 97 of this chapter.

Instrument training means that time in which instrument training is received from an authorized instructor under actual or simulated instrument conditions.

Knowledge test means a test on the aeronautical knowledge areas required for an airman certificate or rating that can be administered in written form or by a computer.

Nationally recognized accrediting agency has the same meaning as defined by the Department of Education in 34 CFR 600.2.

Night vision goggles means an appliance worn by a pilot that enhances the pilot's ability to maintain visual surface reference at night.

Night vision goggle operation means the portion of a flight that occurs during the time period from 1 hour after sunset to 1 hour before sunrise where the pilot maintains visual surface reference using night vision goggles in an aircraft that is approved for such an operation.

Pilot time means that time in which a person—

(i) Serves as a required pilot flight crewmember;

(ii) Receives training from an authorized instructor in an aircraft, full flight simulator, flight training device, or aviation training device;

(iii) Gives training as an authorized instructor in an aircraft, full flight simulator, flight training device, or aviation training device; or

(iv) Serves as second in command in operations conducted in accordance with §135.99(c) of this chapter when a second pilot is not required under the type certification of the aircraft or the regulations under which the flight is being conducted, provided the requirements in §61.159(c) are satisfied.

Practical test means a test on the areas of operations for an airman certificate, rating, or authorization that is conducted by having the applicant respond to questions and demonstrate maneuvers in flight, in a flight simulator, or in a flight training device.

Set of aircraft means aircraft that share similar performance characteristics, such as similar airspeed and altitude operating envelopes, similar handling characteristics, and the same number and type of propulsion systems.

Student pilot seeking a sport pilot certificate means a person who has received an endorsement—

(i) To exercise student pilot privileges from a certificated flight instructor with a sport pilot rating; or

(ii) That includes a limitation for the operation of a light-sport aircraft specified in §61.89(c) issued by a certificated flight instructor with other than a sport pilot rating.

Technically advanced airplane (TAA) means an airplane equipped with an electronically advanced avionics system.

Training time means training received—

(i) In flight from an authorized instructor;

(ii) On the ground from an authorized instructor;

or

(iii) In a flight simulator or flight training device from an authorized instructor.

[Docket No. 25910, 62 FR 16298, April 4, 1997; Amdt. 61-103, 62 FR 40893, July 30, 1997 as amended by Amdt. 61-110, 69 FR 44864, July 27, 2004; Amdt. 61-124, 74 FR 42546, Aug. 21, 2009; Amdt. 61-128, 76 FR 54105, Aug. 31, 2011; Amdt. 61-130, 78 FR 42372, July 15, 2013; Amdt. 61-137, 81 FR 42208, June 28, 2016; Amdt. 61-142, 83 FR 30276, June 27, 2018]

§61.2 Exercise of Privilege.

(a) **Validity.** No person may:

(1) Exercise privileges of a certificate, rating, endorsement, or authorization issued under this part if the certificate, rating or authorization is surrendered, suspended, revoked or expired.

(2) Exercise privileges of a flight instructor certificate if that flight instructor certificate is surrendered, suspended, revoked or expired.

(3) Exercise privileges of a foreign pilot certificate to operate an aircraft of foreign registry

under §61.3(b) if the certificate is surrendered, suspended, revoked or expired.

(4) Exercise privileges of a pilot certificate issued under §61.75, or an authorization issued under §61.77, if the foreign pilot certificate relied upon for the issuance of the U.S. pilot certificate or authorization is surrendered, suspended, revoked or expired.

(5) Exercise privileges of a medical certificate issued under part 67 to meet any requirements of part 61 if the medical certificate is surrendered, suspended, revoked or expired according to the duration standards set forth in §61.23(d).

(6) Use an official government issued driver's license to meet any requirements of part 61 related to holding that driver's license, if the driver's license is surrendered, suspended, revoked or expired.

(b) **Currency.** No person may:

(1) Exercise privileges of an airman certificate, rating, endorsement, or authorization issued under this part unless that person meets the appropriate airman and medical recency requirements of this part, specific to the operation or activity.

(2) Exercise privileges of a foreign pilot license within the United States to conduct an operation described in §61.3(b), unless that person meets the appropriate airman and medical recency requirements of the country that issued the license, specific to the operation.

[Docket No. FAA-2006-26661, 74 FR 42546, Aug. 21, 2009]

§61.3 Requirement for certificates, ratings, and authorizations.

(a) **Required pilot certificate for operating a civil aircraft of the United States.** No person may serve as a required pilot flight crewmember of a civil aircraft of the United States, unless that person:

(1) Has in the person's physical possession or readily accessible in the aircraft when exercising the privileges of that pilot certificate or authorization—

(i) A pilot certificate issued under this part and in accordance with §61.19;

(ii) A special purpose pilot authorization issued under §61.77;

(iii) A temporary certificate issued under §61.17;

(iv) A document conveying temporary authority to exercise certificate privileges issued by the Airmen Certification Branch under §61.29(e);

(v) When engaged in a flight operation within the United States for a part 119 certificate holder authorized to conduct operations under part 121 or 135 of this chapter, a temporary document provided by that certificate holder under an approved certificate verification plan;

AIM Contents

Aeronautical Information Manual

Official Guide to Basic Flight Information and ATC Procedures

U.S. Department of Transportation • Federal Aviation Administration

General Information	460	
Explanation of Major Changes.....	463	
Detailed AIM Table of Contents	465	
Chapter 1 Air Navigation.....	475	Ch 1
Chapter 2 Aeronautical Lighting and Other Airport Visual Aids.....	517	Ch 2
Chapter 3 Airspace	553	Ch 3
Chapter 4 Air Traffic Control	575	Ch 4
Chapter 5 Air Traffic Procedures	667	Ch 5
Chapter 6 Emergency Procedures	797	Ch 6
Chapter 7 Safety of Flight	819	Ch 7
Chapter 8 Medical Facts for Pilots.....	913	Ch 8
Chapter 9 Aeronautical Charts and Related Publications.....	921	Ch 9
Chapter 10 Helicopter Operations.....	933	Ch 10
Chapter 11 Unmanned Aircraft Systems (UAS)	955	Ch 11
Appendices	979	
Appendix 1: Bird/Other Wildlife Strike Report	979	APP
Appendix 2: Volcanic Activity Reporting Form (VAR)	980	
Appendix 3: Abbreviations/Acronyms	981	
Appendix 4: FAA Form 7233-4—International Flight Plan.....	987	
Appendix 5: FAA Form 7233-1—Flight Plan.....	1005	
Pilot/Controller Glossary	1007	P/C

Federal Aviation Administration (FAA)

The Federal Aviation Administration is responsible for ensuring the safe, efficient, and secure use of the Nation's airspace, by military as well as civil aviation, for promoting safety in air commerce, for encouraging and developing civil aeronautics, including new aviation technology, and for supporting the requirements of national defense.

The activities required to carry out these responsibilities include: safety regulations; airspace management and the establishment, operation, and maintenance of a civil–military common system of air traffic control (ATC) and navigation facilities; research and development in support of the fostering of a national system of airports, promulgation of standards and specifications for civil airports, and administration of Federal grants-in-aid for developing public airports; various joint and cooperative activities with the Department of Defense; and technical assistance (under State Department auspices) to other countries.

Aeronautical Information Manual (AIM)

Basic Flight Information and ATC Procedures

This manual is designed to provide the aviation community with basic flight information and ATC procedures for use in the National Airspace System (NAS) of the United States. An international version called the Aeronautical Information Publication contains parallel information, as well as specific information on the international airports for use by the international community.

This manual contains the fundamentals required in order to fly in the United States NAS. It also contains items of interest to pilots concerning health and medical facts, factors affecting flight safety, a pilot/controller glossary of terms used in the ATC System, and information on safety, accident, and hazard reporting.

This manual is complemented by other operational publications which are available via separate subscriptions. These publications are:

The Chart Supplement U.S., the Chart Supplement Alaska, and the Chart Supplement Pacific—These publications contain information on airports, communications, navigation aids, instrument landing systems, VOR receiver check points, preferred routes, Flight Service Station/Weather Service telephone numbers, Air Route Traffic Control Center (ARTCC) frequencies, part-time surface areas, and various other pertinent special notices essential to air navigation. These publications are available through a network of FAA approved print providers. A listing of products, dates of latest editions, and print providers

is available on the Aeronautical Information Services (AIS) website at: http://www.faa.gov/air_traffic/flight_info/aeronav/print_providers/.

Publication Schedule		
Basic or Change	Cutoff Date for Completion	Effective Date of Publication
Basic Manual	11/3/22	4/20/23
Change 1	4/20/23	10/5/23
Change 2	10/5/23	3/21/24
Change 3	3/21/24	9/5/24
Basic Manual	9/5/24	2/20/25
Change 1	2/20/25	8/7/25
Change 2	8/7/25	1/22/26
Change 3	1/22/26	7/9/26

Flight Information Publication Policy

The following is in essence, the statement issued by the FAA Administrator and published in the December 10, 1964, issue of the Federal Register, concerning the FAA policy as pertaining to the type of information that will be published as NOTAMs and in the *Aeronautical Information Manual*.

a. It is a pilot's inherent responsibility to be alert at all times for and in anticipation of all circumstances, situations, and conditions affecting the safe operation of the aircraft. For example, a pilot should expect to find air traffic at any time or place. At or near both civil and military airports and in the vicinity of known training areas, a pilot should expect concentrated air traffic and realize concentrations of air traffic are not limited to these places.

b. It is the general practice of the agency to advertise by NOTAM or other flight information publications such information it may deem appropriate; information which the agency may from time to time make available to pilots is solely for the purpose of assisting them in executing their regulatory responsibilities. Such information serves the aviation community as a whole and not pilots individually.

c. The fact that the agency under one particular situation or another may or may not furnish information does not serve as a precedent of the agency's responsibility to the aviation community; neither does it give assurance that other information of the same or similar nature will be advertised, nor, does it guarantee that any and all information known to the agency will be advertised.

d. This publication, while not regulatory, provides information which reflects examples of operating techniques and procedures which may be requirements in other federal publications or regulations. It is made available solely to assist pilots in executing their responsibilities required by other publications.

Consistent with the foregoing, it is the policy of the Federal Aviation Administration to furnish information only when, in the opinion of the agency, a unique situation should be advertised and not to furnish routine information such as concentrations of air traffic, either civil or military. The *Aeronautical Information Manual* will not contain informative items concerning everyday circumstances that pilots should, either by good practices or regulation, expect to encounter or avoid.

Aeronautical Information Manual (AIM)

Code of Federal Regulations and Advisory Circulars

Code of Federal Regulations—The FAA publishes the Code of Federal Regulations (CFRs) to make readily available to the aviation community the regulatory requirements placed upon them. These regulations are sold as individual parts by the Superintendent of Documents.

The more frequently amended parts are sold on subscription service with subscribers receiving changes automatically as issued. Less active parts are sold on a single-sale basis. Changes to

single-sale parts will be sold separately as issued. Information concerning these changes will be furnished by the FAA through its Status of Federal Aviation Regulations, AC 00-44.

Advisory Circulars—The FAA issues Advisory Circulars (ACs) to inform the aviation public in a systematic way of nonregulatory material. Unless incorporated into a regulation by reference, the contents of an advisory circular are not binding on the public. Advisory Circulars are issued in a numbered subject system corresponding to the subject areas of the Code of Federal Regulations (CFRs) (Title 14, Chapter 1, FAA).

Note: *Current AC information can be found at: https://www.faa.gov/regulations_policies/advisory_circulars/.*

External References—All references to Advisory Circulars and other FAA publications in the *Aeronautical Information Manual* include the FAA Advisory Circular or Order identification numbers (when available). However, due to varied publication dates, the basic publication letter is not included.

Example
FAA Order JO 7110.65X, Air Traffic Control, is referenced as FAA Order JO 7110.65.

Comments/Corrections

The office of primary responsibility (OPR) for this manual is:

FAA Headquarters, Mission Support Services
Policy Directorate (AJV-P)
600 Independence Avenue SW
Washington, DC 20597

Proposed changes must be submitted electronically, using the following format, to the Policy Directorate Correspondence Mailbox at 9-AJV-P-HQ-Correspondence@faa.gov.

Notice to Editor

The following comments/corrections are submitted concerning the information contained in:

Paragraph number _____

Title _____

Page _____

Dated _____

Name _____

Street _____

City _____

State _____

Zip _____

Subscription Information

This manual is available by its effective date on the FAA's Air Traffic Plans and Publications website at https://www.faa.gov/air_traffic/publications/.

This manual is distributed electronically to all who subscribe to receive email notifications through the FAA's website. All organizations are responsible for viewing, downloading, and subscribing to receive email notifications when changes occur to this manual. Subscriptions to air traffic directives can be made through the Air Traffic Plans and Publications website at https://www.faa.gov/air_traffic/publications/ or directly via the following link: https://public.govdelivery.com/accounts/USAFAA/subscriber/new?topic_id=USAFAA_39.

Explanation of Major Changes

Change 1 effective October 5, 2023, and Change 2 effective March 21, 2024 (to Basic Manual effective April 20, 2023).

1–1–9. Instrument Landing System (ILS)

This change reflects the FAA Order JO 7110.65 guidance that allows a preceding arrival or departure in or over the ILS critical area when the weather is above 200' ceiling and 2000 RVR. The new guidance warns pilots of signal disturbances that may be encountered in any weather at or above standard CAT I minima.

1–1–17. Global Positioning System

This change aligns the AIM with Flight Standards B036 issuance policy that two GPS receivers are considered independent systems for extended overwater operations.

1–1–20. Precision Approach Systems Other Than ILS and GPS

Appendix 3. Abbreviations/Acronyms

This change will result in the removal of references to SCAT-I DGPS from the AIM.

2–3–8. Mandatory Instruction Signs

This change addresses a change to the mandatory instruction sign to include the departure runway information in the sign legend. The sign for holding positions protecting both the approach area of a runway end and the departure area for the opposite runway end will now display "DEP" in addition to "APCH" (e.g., 15 APCH–33 DEP). Holding positions signs on taxiways that traverse the approach area but not the departure area (e.g., displaced threshold) will continue to display just the APCH legend. This change does not address changes to the hold line marking or implement conditional holding for protection of approach/departure areas.

3–5–2. Military Training Routes

This change adds language to paragraph 3-5-2 that defines what the Department of Defense Flight Information Publications (DoD FLIP) represent and describes instrument/visual routes (IR/VR) that can be found in charts and narratives. It also describes FAA's responsibility for providing information about them on IFR and VFR routes. Additionally, a note was added for users who require copies of the FLIP.

3–5–8. Washington DC Special Flight Rules Area (SFRA) Including the Flight Restricted Zone (FRZ)

This change adds a new paragraph 3-5-8, Washington DC Special Flight Rules Area (SFRA) including the Flight Restricted Zone (FRZ), to the AIM to better inform pilots and reduce violations reference the requirements of 14 CFR Part 93.339 and Part 91.161, and 14 CFR 99.7 Special Security Instruction NOTAMs. The current paragraphs

3-5-8 and 3-5-9 are being renumbered 3-5-9 and 3-5-10, respectively.

4–1–21. Airport Reservation Operations and Special Traffic Management Programs

Dual-tone multi-frequency (telephone touch-tone signaling) interfaces are no longer available for use to receive an Electronic Special Traffic Management Program or Enhanced Computer Voice Reservation System reservation. Procedures for coordination processing are updated and some content has been revised for clarification.

4–3–20. Standard Taxi Routes

This change adds a paragraph to Chapter 4, Air Traffic Control, Section 3, Airport Operations, of the AIM, to provide guidance to pilots about Standard Taxi Routes (STRs). This new paragraph will support the implementation of a new directive, FAA Order JO 7110.664, Standard Taxi Routes. All subsequent paragraphs will be renumbered.

7–1–3. Use of Aviation Products

7–1–4. Graphical Forecasts for Aviation Weather (GFA)

7–1–11. Weather Radar Services

7–1–18. Pilot Weather Reports (PIREPS)

This change updates the references to AC 00-45 to the *Aviation Weather Handbook*, FAA-H-8083-28.

7–1–5. Preflight Briefing

This change updates the subparagraph to use true north rather than magnetic north.

7–3–5. Cold Temperature Airport Procedures

This change adds an additional segment to Figure 7-3-1, Example Cold Temperature Restricted Airport List—Required Segments, along with guidance on how to apply a temperature correction to this segment. The change also rearranges the section for better flow, swapping the positions of updated subparagraphs e and f.

7–6–4. Obstructions to Flight

This change provides pilots guidance on the distinctive hazards when flying near wind turbines and their unique marking and lighting. Additionally, other updates were made to improve the readability of the paragraphs addressing other obstruction types.

9–1–4. General Description of Each Chart Series

As a result of the Chart Supplement Modernization Initiative, the Chart Supplement U.S. descriptions were revised and expanded creating Chart Supplement, Chart Supplement Alaska, and Chart Supplement Pacific. Figure 9-1-14 was

(continued)

repositioned and renumbered to immediately follow subparagraph d2 for better readability.

Appendix 4. FAA Form 7233-4—International Flight Plan

This change modifies codes used in field 18 of the ICAO flight plan for indication of ADS-B equipage in compliance with international agreements.

Appendix 4. FAA Form 7233-4—International Flight Plan

This change modifies an existing note to identify three Item 18 NAV and PBN codes that require all civil operators to obtain specific operational approval prior to including on their flight plan. Additionally, an identical comment was added to Appendix 2 of the U.S. AIP.

Editorial Changes

Editorial changes include updated and corrected references and typos; rewording subparagraph 8-1-2d to eliminate confusion between high altitude of aircraft vs. low cabin altitude pressure; clarifying language in subparagraph 11-2-2c2 to say that UAS that are flown exclusively for recreational purposes must be registered if they weigh

more than 0.55 pounds (250 grams); updating the subscription information for this publication; a hyperlink fix and hyperlink update for Helicopter Association International in subparagraph 10-2-1a; updates to the term Chart Supplement and Chart Supplement U.S.; the addition of RX Receive/Receiver and edit of REDL to Runway Edge Light in 5-1-3, Table 5-1-2; a change reconciling the discrepancy between FAA Order JO 7210.3 and the *Aeronautical Information Manual* by changing the time for requesting Remote Airport Information Service (RAIS) support from 60 days to 30 days; correcting the spelling of “Juliet” to “Juliett” in paragraph 4-1-16; a couple of simple editorial changes in paragraphs 3-2-3 and 5-4-1; correcting non-radar to nonradar in 5-3-2c4; and a simple editorial correcting “four” to “these” in 7-1-10d1(a).

Entire Publication

Additional editorial/format changes were made where necessary. Revision bars were not used because of the insignificant nature of these changes.

Chapter 1 Air Navigation

Section 1 Navigation Aids	475
■ 1-1-1 General	
1-1-2 Nondirectional Radio Beacon (NDB)	
1-1-3 VHF Omni-Directional Range (VOR)	
■ 1-1-4 VOR Receiver Check	
1-1-5 Tactical Air Navigation (TACAN)	
1-1-6 VHF Omni-Directional Range/Tactical Air Navigation (VORTAC)	
1-1-7 Distance Measuring Equipment (DME)	
■ 1-1-8 NAVAID Service Volumes	
1-1-9 Instrument Landing System (ILS)	
1-1-10 Simplified Directional Facility (SDF)	
1-1-11 NAVAID Identifier Removal During Maintenance	
■ 1-1-12 NAVAIDs with Voice	
1-1-13 User Reports Requested on NAVAID Outages	
1-1-14 LORAN	
1-1-15 Inertial Reference Unit (IRU), Inertial Navigation System (INS), and Attitude Heading Reference System (AHRS)	
1-1-16 Doppler Radar	
■ 1-1-17 Global Positioning System (GPS)	
1-1-18 Wide Area Augmentation System (WAAS)	
1-1-19 Ground Based Augmentation System (GBAS) Landing System (GLS)	
■ 1-1-20 Precision Approach Systems other than ILS and GLS	
Section 2 Performance-Based Navigation (PBN) and Area Navigation (RNAV)	508
1-2-1 General	
1-2-2 Required Navigation Performance (RNP)	
1-2-3 Use of Suitable Area Navigation (RNAV) Systems on Conventional Procedures and Routes	
1-2-4 Recognizing, Mitigating and Adapting to GPS Interference (Jamming or Spoofing)	

Chapter 2 Aeronautical Lighting and Other Airport Visual Aids

Section 1 Airport Lighting Aids	517
2-1-1 Approach Light Systems (ALS)	
■ 2-1-2 Visual Glideslope Indicators	
2-1-3 Runway End Identifier Lights (REIL)	
2-1-4 Runway Edge Light Systems	
2-1-5 In-Runway Lighting	
2-1-6 Runway Status Light (RWSL) System	
2-1-7 Control of Lighting Systems	
■ 2-1-8 Pilot Control of Airport Lighting	
2-1-9 Airport/Heliport Beacons	
2-1-10 Taxiway Lights	
Section 2 Air Navigation and Obstruction Lighting	529
2-2-1 Aeronautical Light Beacons	
2-2-2 Code Beacons and Course Lights	
2-2-3 Obstruction Lights	
2-2-4 LED Lighting Systems	
Section 3 Airport Marking Aids and Signs	531
2-3-1 General	
2-3-2 Airport Pavement Markings	
2-3-3 Runway Markings	
2-3-4 Taxiway Markings	

- 2-3-5 Holding Position Markings
- 2-3-6 Other Markings
- 2-3-7 Airport Signs
- 2-3-8 Mandatory Instruction Signs
- 2-3-9 Location Signs
- 2-3-10 Direction Signs
- 2-3-11 Destination Signs
- 2-3-12 Information Signs
- 2-3-13 Runway Distance Remaining Signs
- 2-3-14 Aircraft Arresting Systems
- 2-3-15 Security Identification Display Area (SIDA)

Chapter 3 Airspace

Section 1 General	553
3-1-1 General	
3-1-2 General Dimensions of Airspace Segments	
3-1-3 Hierarchy of Overlapping Airspace Designations	
3-1-4 Basic VFR Weather Minimums	
3-1-5 VFR Cruising Altitudes and Flight Levels	
Section 2 Controlled Airspace	555
3-2-1 General	
3-2-2 Class A Airspace	
3-2-3 Class B Airspace	
3-2-4 Class C Airspace	
3-2-5 Class D Airspace	
3-2-6 Class E Airspace	
Section 3 Class G Airspace	564
3-3-1 General	
3-3-2 VFR Requirements	
3-3-3 IFR Requirements	
Section 4 Special Use Airspace	565
3-4-1 General	
3-4-2 Prohibited Areas	
3-4-3 Restricted Areas	
3-4-4 Warning Areas	
3-4-5 Military Operations Areas	
3-4-6 Alert Areas	
3-4-7 Controlled Firing Areas	
3-4-8 National Security Areas	
3-4-9 Obtaining Special Use Airspace Status	
Section 5 Other Airspace Areas	567
3-5-1 Airport Advisory/Information Services	
3-5-2 Military Training Routes	
3-5-3 Temporary Flight Restrictions	
■ 3-5-4 Parachute Jump Aircraft Operations	
3-5-5 Published VFR Routes	
3-5-6 Terminal Radar Service Area (TRSA)	
3-5-7 Special Air Traffic Rules (SATR) and Special Flight Rules Area (SFRA)	
3-5-8 Washington, DC, Special Flight Rules Area (SFRA) including the Flight Restricted Zone (FRZ)	
3-5-9 Weather Reconnaissance Area (WRA)	
3-5-10 Other Non-Charted Airspace Areas	

Chapter 4 Air Traffic Control

Section 1 Services Available to Pilots575

- 4-1-1 Air Route Traffic Control Centers
- 4-1-2 Control Towers
- 4-1-3 Flight Service Stations
- 4-1-4 Recording and Monitoring
- 4-1-5 Communications Release of IFR Aircraft Landing at an Airport Without an Operating Control Tower
- 4-1-6 Pilot Visits to Air Traffic Facilities
- 4-1-7 Operation Rain Check
- 4-1-8 Approach Control Service for VFR Arriving Aircraft
- 4-1-9 Traffic Advisory Practices at Airports Without Operating Control Towers
- 4-1-10 IFR Approaches/Ground Vehicle Operations
- 4-1-11 Designated UNICOM/MULTICOM Frequencies
- 4-1-12 Use of UNICOM for ATC Purposes
- 4-1-13 Automatic Terminal Information Service (ATIS)
- 4-1-14 Automatic Flight Information Service (AFIS)—Alaska FSSs Only
- 4-1-15 Radar Traffic Information Service
- 4-1-16 Safety Alert
- 4-1-17 Radar Assistance to VFR Aircraft
- 4-1-18 Terminal Radar Services for VFR Aircraft
- 4-1-19 Tower En Route Control (TEC)
- 4-1-20 Transponder and ADS-B Out Operation
- 4-1-21 Airport Reservation Operations and Special Traffic Management Programs
- 4-1-22 Requests for Waivers and Authorizations from Title 14, Code of Federal Regulations (14 CFR)
- 4-1-23 Weather Systems Processor

Section 2 Radio Communications Phraseology and Techniques592

- 4-2-1 General
- 4-2-2 Radio Technique
- 4-2-3 Contact Procedures
- 4-2-4 Aircraft Call Signs
- 4-2-5 Description of Interchange or Leased Aircraft
- 4-2-6 Ground Station Call Signs
- 4-2-7 Phonetic Alphabet
- 4-2-8 Figures
- 4-2-9 Altitudes and Flight Levels
- 4-2-10 Directions
- 4-2-11 Speeds
- 4-2-12 Time
- 4-2-13 Communications with Tower when Aircraft Transmitter or Receiver or Both are Inoperative
- 4-2-14 Communications for VFR Flights

Section 3 Airport Operations599

- 4-3-1 General
- 4-3-2 Airports with an Operating Control Tower
- 4-3-3 Traffic Patterns
- 4-3-4 Visual Indicators at Airports Without an Operating Control Tower
- 4-3-5 Unexpected Maneuvers in the Airport Traffic Pattern
- 4-3-6 Use of Runways/Declared Distances
- 4-3-7 Low Level Wind Shear/Microburst Detection Systems
- 4-3-8 Braking Action Reports and Advisories
- 4-3-9 Runway Condition Reports
- 4-3-10 Intersection Takeoffs
- 4-3-11 Pilot Responsibilities When Conducting Land and Hold Short Operations (LAHSO)
- 4-3-12 Low Approach

- 4-3-13 Traffic Control Light Signals
- 4-3-14 Communications
- 4-3-15 Gate Holding Due to Departure Delays
- 4-3-16 VFR Flights in Terminal Areas
- 4-3-17 VFR Helicopter Operations at Controlled Airports
- 4-3-18 Taxiing
- 4-3-19 Taxi During Low Visibility
- 4-3-20 Standard Taxi Routes
- 4-3-21 Exiting the Runway After Landing
- 4-3-22 Practice Instrument Approaches
- 4-3-23 Option Approach
- 4-3-24 Use of Aircraft Lights
- 4-3-25 Flight Inspection/"Flight Check" Aircraft in Terminal Areas
- 4-3-26 Hand Signals
- 4-3-27 Operations at Uncontrolled Airports With Automated Surface Observing System (ASOS)/Automated Weather Observing System (AWOS)

Section 4 ATC Clearances and Aircraft Separation626

- 4-4-1 Clearance
- 4-4-2 Clearance Prefix
- 4-4-3 Clearance Items
- 4-4-4 Amended Clearances
- 4-4-5 Coded Departure Route (CDR)
- 4-4-6 Special VFR Clearances
- 4-4-7 Pilot Responsibility upon Clearance Issuance
- 4-4-8 IFR Clearance VFR-On-Top
- 4-4-9 VFR/IFR Flights
- 4-4-10 Adherence to Clearance
- 4-4-11 IFR Separation Standards
- 4-4-12 Speed Adjustments
- 4-4-13 Runway Separation
- 4-4-14 Visual Separation
- 4-4-15 Use of Visual Clearing Procedures and Scanning Techniques
- 4-4-16 Traffic Alert and Collision Avoidance System (TCAS I & II)
- 4-4-17 Traffic Information Service (TIS)

Section 5 Surveillance Systems637

- 4-5-1 Radar
- 4-5-2 Air Traffic Control Radar Beacon System (ATCRBS)
- 4-5-3 Surveillance Radar
- 4-5-4 Precision Approach Radar (PAR)
- 4-5-5 Airport Surface Detection Equipment (ASDE-X)/Airport Surface Surveillance Capability (ASSC)
- 4-5-6 Traffic Information Service (TIS)
- 4-5-7 Automatic Dependent Surveillance–Broadcast (ADS-B) Services
- 4-5-8 Traffic Information Service–Broadcast (TIS-B)
- 4-5-9 Flight Information Service–Broadcast (FIS-B)
- 4-5-10 Automatic Dependent Surveillance–Rebroadcast (ADS-R)

Section 6 Operational Policy/Procedures for Reduced Vertical Separation Minimum (RVSM) in the Domestic U.S., Alaska, Offshore Airspace and the San Juan FIR.....657

- 4-6-1 Applicability and RVSM Mandate (Date/Time and Area)
- 4-6-2 Flight Level Orientation Scheme
- 4-6-3 Aircraft and Operator Approval Policy/Procedures, RVSM Monitoring and Databases for Aircraft and Operator Approval
- 4-6-4 Flight Planning into RVSM Airspace
- 4-6-5 Pilot RVSM Operating Practices and Procedures
- 4-6-6 Guidance on Severe Turbulence and Mountain Wave Activity (MWA)

- 4-6-7 Guidance on Wake Turbulence
- 4-6-8 Pilot/Controller Phraseology
- 4-6-9 Contingency Actions: Weather Encounters and Aircraft System Failures that Occur After Entry into RVSM Airspace
- 4-6-10 Procedures for Accommodation of Non-RVSM Aircraft
- 4-6-11 Non-RVSM Aircraft Requesting Climb to and Descent from Flight Levels Above RVSM Airspace Without Intermediate Level Off

**Section 7 Operational Policy/Procedures for the Gulf of Mexico
50 NM Lateral Separation Initiative.....665**

- 4-7-1 Introduction and General Policies
- 4-7-2 Accommodating Non-RNP 10 Aircraft
- 4-7-3 Obtaining RNP 10 or RNP 4 Operational Authorization
- 4-7-4 Authority for Operations with a Single Long-Range Navigation System
- 4-7-5 Flight Plan Requirements
- 4-7-6 Contingency Procedures

Chapter 5 Air Traffic Procedures

Section 1 Preflight.....667

- 5-1-1 Preflight Preparation
- 5-1-2 Follow IFR Procedures Even When Operating VFR
- 5-1-3 Notice to Air Missions (NOTAM) System
- 5-1-4 Operational Information System (OIS)
- 5-1-5 Flight Plan—VFR Flights
- 5-1-6 Flight Plan—IFR Flights
- 5-1-7 Flight Plans For Military/DOD Use Only
- 5-1-8 Flight Plan—Defense VFR (DVFR) Flights
- 5-1-9 Single Flights Conducted With Both VFR and IFR Flight Plans
- 5-1-10 IFR Operations to High Altitude Destinations
- 5-1-11 Flights Outside U.S. Territorial Airspace
- 5-1-12 Change in Flight Plan
- 5-1-13 Change in Proposed Departure Time
- 5-1-14 Closing VFR/DVFR Flight Plans
- 5-1-15 Canceling IFR Flight Plan
- 5-1-16 RNAV and RNP Operations
- 5-1-17 Cold Temperature Operations

Section 2 Departure Procedures683

- 5-2-1 Pre-Taxi Clearance Procedures
- 5-2-2 Automated Pre-Departure Clearance Procedures
- 5-2-3 IFR Clearances Off Uncontrolled Airports
- 5-2-4 Taxi Clearance
- 5-2-5 Line Up and Wait (LUAW)
- 5-2-6 Abbreviated IFR Departure Clearance (Cleared...as Filed) Procedures
- 5-2-7 Departure Restrictions, Clearance Void Times, Hold for Release, and Release Times
- 5-2-8 Departure Control
- 5-2-9 Instrument Departure Procedures (DP)—Obstacle Departure Procedures (ODP), Standard Instrument Departures (SID), and Diverse Vector Areas (DVA)

Section 3 En Route Procedures695

- 5-3-1 ARTCC Communications
- 5-3-2 Position Reporting
- 5-3-3 Additional Reports
- 5-3-4 Airways and Route Systems
- 5-3-5 Airway or Route Course Changes
- 5-3-6 Changeover Points (COPs)
- 5-3-7 Minimum Turning Altitude (MTA)
- 5-3-8 Holding

Section 4 Arrival Procedures	719
5-4-1 Standard Terminal Arrival (STAR) Procedures	
5-4-2 Local Flow Traffic Management Program	
5-4-3 Approach Control	
5-4-4 Advance Information on Instrument Approach	
5-4-5 Instrument Approach Procedure (IAP) Charts	
5-4-6 Approach Clearance	
5-4-7 Instrument Approach Procedures	
5-4-8 Special Instrument Approach Procedures	
5-4-9 Procedure Turn and Hold-in-lieu of Procedure Turn	
5-4-10 Timed Approaches from a Holding Fix	
5-4-11 Radar Approaches	
5-4-12 Radar Monitoring of Instrument Approaches	
5-4-13 Simultaneous Approaches to Parallel Runways	
5-4-14 Simultaneous Dependent Approaches	
5-4-15 Simultaneous Independent ILS/RNAV/GLS Approaches	
5-4-16 Simultaneous Close Parallel PRM Approaches and Simultaneous Offset Instrument Approaches (SOIA)	
5-4-17 Simultaneous Converging Instrument Approaches	
5-4-18 RNP AR (Authorization Required) Instrument Procedures	
5-4-19 Side-Step Maneuver	
5-4-20 Approach and Landing Minimums	
5-4-21 Missed Approach	
5-4-22 Use of Enhanced Flight Vision Systems (EFVS) on Instrument Approaches	
5-4-23 Visual Approach	
5-4-24 Charted Visual Flight Procedure (CVFP)	
5-4-25 Contact Approach	
5-4-26 Landing Priority	
5-4-27 Overhead Approach Maneuver	
Section 5 Pilot/Controller Roles and Responsibilities	777
5-5-1 General	
5-5-2 Air Traffic Clearance	
5-5-3 Contact Approach	
5-5-4 Instrument Approach	
5-5-5 Missed Approach	
5-5-6 Vectors	
5-5-7 Safety Alert	
5-5-8 See and Avoid	
5-5-9 Speed Adjustments	
5-5-10 Traffic Advisories (Traffic Information)	
5-5-11 Visual Approach	
5-5-12 Visual Separation	
5-5-13 VFR-on-Top	
5-5-14 Instrument Departures	
5-5-15 Minimum Fuel Advisory	
5-5-16 RNAV and RNP Operations	
Section 6 National Security and Interception Procedures	784
5-6-1 National Security	
5-6-2 National Security Requirements	
5-6-3 Definitions	
5-6-4 ADIZ Requirements	
5-6-5 Civil Aircraft Operations To or From U.S. Territorial Airspace	
5-6-6 Civil Aircraft Operations Within U.S. Territorial Airspace	
5-6-7 Civil Aircraft Operations Transiting U.S. Territorial Airspace	
5-6-8 Foreign State Aircraft Operations	
5-6-9 FAA/TSA Airspace Waivers	
5-6-10 TSA Aviation Security Programs	

- 5-6-11 FAA Flight Routing Authorizations
- 5-6-12 Emergency Security Control of Air Traffic (ESCAT)
- 5-6-13 Interception Procedures
- 5-6-14 Interception Signals
- 5-6-15 ADIZ Boundaries and Designated Mountainous Areas
- 5-6-16 Visual Warning System (VWS)

Chapter 6 Emergency Procedures

Section 1 General	797
6-1-1 Pilot Responsibility and Authority	
6-1-2 Emergency Condition—Request Assistance Immediately	
Section 2 Emergency Services Available to Pilots	798
6-2-1 Radar Service for VFR Aircraft in Difficulty	
6-2-2 Transponder Emergency Operation	
6-2-3 Intercept and Escort	
6-2-4 Emergency Locator Transmitter (ELT)	
6-2-5 FAA K-9 Explosives Detection Team Program	
6-2-6 Search and Rescue	
Section 3 Distress and Urgency Procedures	808
6-3-1 Distress and Urgency Communications	
6-3-2 Obtaining Emergency Assistance	
6-3-3 Ditching Procedures	
6-3-4 Special Emergency (Air Piracy)	
6-3-5 Fuel Dumping	
Section 4 Two-Way Radio Communications Failure	814
6-4-1 Two-Way Radio Communications Failure	
6-4-2 Transponder Operation During Two-Way Communications Failure	
6-4-3 Reestablishing Radio Contact	
Section 5 Aircraft Rescue and Fire Fighting Communications	816
6-5-1 Discrete Emergency Frequency	
6-5-2 Radio Call Signs	
6-5-3 ARFF Emergency Hand Signals	

Chapter 7 Safety of Flight

Section 1 Meteorology	819
7-1-1 National Weather Service Aviation Weather Service Program	
7-1-2 FAA Weather Services	
7-1-3 Use of Aviation Weather Products	
7-1-4 Graphical Forecasts for Aviation (GFA)	
7-1-5 Preflight Briefing	
7-1-6 Inflight Aviation Weather Advisories	
7-1-7 Categorical Outlooks	
7-1-8 Inflight Weather Advisory Broadcasts	
7-1-9 Flight Information Services (FIS)	
7-1-10 Weather Observing Programs	
7-1-11 Weather Radar Services	
7-1-12 ATC Inflight Weather Avoidance Assistance	
7-1-13 Runway Visual Range (RVR)	
7-1-14 Reporting of Cloud Heights	
7-1-15 Reporting Prevailing Visibility	
7-1-16 Estimating Intensity of Rain and Ice Pellets	
7-1-17 Estimating Intensity of Snow or Drizzle (Based on Visibility)	
7-1-18 Pilot Weather Reports (PIREPs)	
7-1-19 PIREPs Relating to Airframe Icing	

7-1-20	Definitions of Inflight Icing Terms	
7-1-21	PIREPs Relating to Turbulence	
7-1-22	Wind Shear PIREPs	
7-1-23	Clear Air Turbulence (CAT) PIREPs	
7-1-24	Microbursts	
7-1-25	PIREPs Relating to Volcanic Ash Activity	
7-1-26	Thunderstorms	
7-1-27	Thunderstorm Flying	
7-1-28	Key to Aerodrome Forecast (TAF) and Aviation Routine Weather Report (METAR)	
7-1-29	International Civil Aviation Organization (ICAO) Weather Formats	
	Section 2 Barometric Altimeter Errors and Setting Procedures	878
7-2-1	General	
7-2-2	Barometric Pressure Altimeter Errors	
7-2-3	Altimeter Errors	
	Section 3 Cold Temperature Barometric Altimeter Errors, Setting Procedures and Cold Temperature Airports (CTA)	880
7-3-1	Effect of Cold Temperature on Barometric Altimeters	
7-3-2	Pre-Flight Planning for Cold Temperature Altimeter Errors	
7-3-3	Effects of Cold Temperature on Baro-Vertical Navigation (VNAV) Vertical Guidance	
7-3-4	Cold Temperature Airports (CTA)	
7-3-5	Cold Temperature Airport Procedures	
7-3-6	Examples for Calculating Altitude Corrections on CTAs	
	Section 4 Wake Turbulence	886
7-4-1	General	
7-4-2	Vortex Generation	
7-4-3	Vortex Strength	
7-4-4	Vortex Behavior	
7-4-5	Operations Problem Areas	
7-4-6	Vortex Avoidance Procedures	
7-4-7	Helicopters	
7-4-8	Pilot Responsibility	
7-4-9	Air Traffic Wake Turbulence Separations	
7-4-10	Development and New Capabilities	
	Section 5 Bird Hazards and Flight Over National Refuges, Parks, and Forests	893
7-5-1	Migratory Bird Activity	
7-5-2	Reducing Bird Strike Risks	
7-5-3	Reporting Bird Strikes	
7-5-4	Reporting Bird and Other Wildlife Activities	
7-5-5	Pilot Advisories on Bird and Other Wildlife Hazards	
7-5-6	Flights Over Charted U.S. Wildlife Refuges, Parks, and Forest Service Areas	
	Section 6 Potential Flight Hazards	895
7-6-1	Accident Cause Factors	
7-6-2	Reporting Radio/Radar Altimeter Anomalies	
7-6-3	VFR in Congested Areas	
7-6-4	Obstructions To Flight	
7-6-5	Avoid Flight Beneath Unmanned Balloons	
7-6-6	Unmanned Aircraft Systems	
7-6-7	Mountain Flying	
7-6-8	Use of Runway Half-Way Signs at Unimproved Airports	
7-6-9	Seaplane Safety	
7-6-10	Flight Operations in Volcanic Ash	
7-6-11	Emergency Airborne Inspection of Other Aircraft	
7-6-12	Precipitation Static	

- 7-6-13 Light Amplification by Stimulated Emission of Radiation (Laser) Operations and Reporting Illumination of Aircraft
- 7-6-14 Flying in Flat Light, Brown Out Conditions, and White Out Conditions
- 7-6-15 Operations in Ground Icing Conditions
- 7-6-16 Avoid Flight in the Vicinity of Exhaust Plumes (Smoke Stacks and Cooling Towers)
- 7-6-17 Space Launch and Reentry Area

Section 7 Safety, Accident, and Hazard Reports909

- 7-7-1 Aviation Safety Reporting Program
- 7-7-2 Aircraft Accident and Incident Reporting
- 7-7-3 Near Midair Collision Reporting
- 7-7-4 Unidentified Flying Object (UFO) Reports
- 7-7-5 Safety Alerts For Operators (SAFO) and Information For Operators (InFO)

Chapter 8 Medical Facts for Pilots

Section 1 Fitness for Flight 913

- 8-1-1 Fitness For Flight
- 8-1-2 Effects of Altitude
- 8-1-3 Hyperventilation in Flight
- 8-1-4 Carbon Monoxide Poisoning in Flight
- 8-1-5 Illusions in Flight
- 8-1-6 Vision in Flight
- 8-1-7 Aerobatic Flight
- 8-1-8 Judgment Aspects of Collision Avoidance

Chapter 9 Aeronautical Charts and Related Publications

Section 1 Types of Charts Available 921

- 9-1-1 General
- 9-1-2 Obtaining Aeronautical Charts
- 9-1-3 Selected Charts and Products Available
- 9-1-4 General Description of Each Chart Series
- 9-1-5 Where and How to Get Charts of Foreign Areas

Chapter 10 Helicopter Operations

Section 1 Helicopter IFR Operations933

- 10-1-1 Helicopter Flight Control Systems
- 10-1-2 Helicopter Instrument Approaches
- 10-1-3 Helicopter Approach Procedures to VFR Heliports
- 10-1-4 The Gulf of Mexico Grid System
- 10-1-5 Departure Procedures

Section 2 Special Operations 939

- 10-2-1 Offshore Helicopter Operations
- 10-2-2 Helicopter Night VFR Operations
- 10-2-3 Landing Zone Safety
- 10-2-4 Emergency Medical Service (EMS) Multiple Helicopter Operations

Chapter 11 Unmanned Aircraft Systems (UAS)

Section 1 General.....955

- 11-1-1 General
- 11-1-2 Access to the National Airspace System (NAS) for UAS Operators

Section 2 Small Unmanned Aircraft System (sUAS)957

- 11-2-1 Part 107 sUAS and Recreational Flyers
- 11-2-2 Registration Requirements

Section 3 Large UAS (MGOW 55 Pounds or More)	959
11-3-1 Large Public UAS Operations	
11-3-2 Exemptions Under 49 USC 44807, Special Authority for Certain Unmanned Systems	
11-3-3 Emerging Large UAS Civil Operations	
Section 4 Airspace Access for UAS	963
11-4-1 Recreational Flyers	
11-4-2 14 CFR Part 107 and Waivers to 14 CFR Part 107	
11-4-3 Airspace Access for Public Aircraft Operations (PAOs)	
11-4-4 14 CFR Part 89 Remote Identification and FAA-Recognized Identification Areas (FRIAs)	
11-4-5 Airspace Access for 14 CFR Part 135 and 14 CFR Part 137	
11-4-6 Airspace Restrictions To Flight	
11-4-7 UAS Traffic Management (UTM)	
Section 5 UAS Pilot Testing, Certification and Responsibilities	971
■ 11-5-1 UAS Pilot Certification and Requirements for Part 107 and Recreational Flyers	
11-5-2 Pilot Certification and Requirements for Public Aircraft Operations (PAOs)	
11-5-3 Pilot Certification for 14 CFR Part 135, Part 137, and Large Civil UAS	
11-5-4 Foreign Pilot Certification	
Section 6 Advanced Air Mobility	973
11-6-1 General	
Section 7 UAS Operations on Airports	974
11-7-1 UAS Operations on Airports	
Section 8 Other Information and Best Practices	975
11-8-1 Best Practices for UAS Operations	
11-8-2 UAS Operations and Air Traffic Control (ATC)	
11-8-3 Precautions: Flight Over or Near People, Vehicles, Manned Aircraft, and Night Operations	
11-8-4 Accidents and Incidents: UAS Operator Responsibilities	
11-8-5 Emergency UAS Authorizations Through Special Government Interest (SGI) Airspace Waivers	
■ 11-8-6 Environmental Best Practices	
11-8-7 Resources for UAS Operators	
Appendix 1 Bird/Other Wildlife Strike Report	979
Appendix 2 Volcanic Activity Reporting Form (VAR)	980
Appendix 3 Abbreviations/Acronyms	981
Appendix 4 FAA Form 7233-4—International Flight Plan	987
Appendix 5 FAA Form 7233-1—Flight Plan	1005
■ Pilot/Controller Glossary	1007

Chapter 2 Aeronautical Lighting and Other Airport Visual Aids

Section 1 Airport Lighting Aids

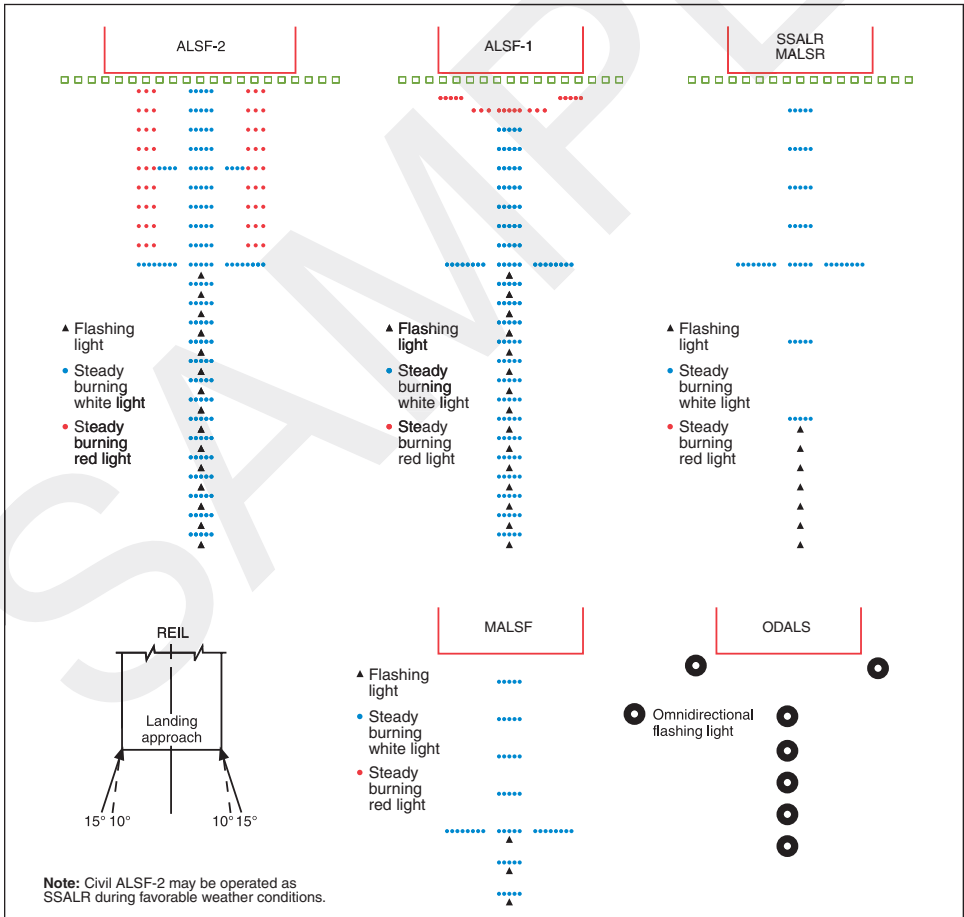
2-1-1 Approach Light Systems (ALS)

a. ALS provide the basic means to transition from instrument flight to visual flight for landing. Operational requirements dictate the sophistication and configuration of the approach light system for a particular runway.

b. ALS are a configuration of signal lights starting at the landing threshold and extending into the approach area a distance of 2,400–3,000 feet for precision instrument runways and 1,400–1,500 feet for nonprecision instrument runways. Some systems include sequenced flashing lights which appear to the pilot as a ball of light traveling towards the runway at high speed (twice a second). (See Figure 2-1-1.)

Ch 2

FIGURE 2-1-1
Precision and Nonprecision Configurations



2-1-2 Visual Glideslope Indicators

a. Visual Approach Slope Indicator (VASI)

1. VASI installations may consist of either 2, 4, 6, 12, or 16 light units arranged in bars referred to as near, middle, and far bars. Most VASI installations consist of 2 bars, near and far, and may consist of 2, 4, or 12 light units. Some VASIs consist of three bars, near, middle, and far, which provide an additional visual glide path to accommodate high cockpit aircraft. This installation may consist of either 6 or 16 light units. VASI installations consisting of 2, 4, or 6 light units are located on one side of the runway, usually the left. Where the installation consists of 12 or 16 light units, the units are located on both sides of the runway.

2. Two-bar VASI installations provide one visual glide path which is normally set at 3 degrees. Three-bar VASI installations provide two visual glide paths. The lower glide path is provided by the near and middle bars and is normally set at 3 degrees while the upper glide path, provided by the middle and far bars, is normally 1/4 degree higher. This higher glide path is intended for use only by high cockpit aircraft to provide a sufficient threshold crossing height. Although normal glide path angles are three degrees, angles at some locations may be as high as 4.5 degrees to give proper obstacle clearance. Pilots of high performance aircraft are cautioned that use of VASI angles in excess of 3.5 degrees may cause an increase in runway length required for landing and rollout.

3. The basic principle of the VASI is that of color differentiation between red and white. Each light unit projects a beam of light having a white segment in the upper part of the beam and red segment in the lower part of the beam. The light units are arranged so that the pilot using the VASIs during an approach will see the combination of lights shown below.

4. The VASI is a system of lights so arranged to provide visual descent guidance information during the approach to a runway. These lights are visible from 3–5 miles during the day and up to 20 miles or more at night. The visual glide path of the VASI provides safe obstruction clearance within plus or minus 10 degrees of the extended runway centerline and to 4 NM from the runway threshold. Descent, using the VASI, should not be initiated until the aircraft is visually aligned with the runway. Lateral course guidance is provided by the runway or runway lights. In certain circumstances, the safe obstruction clearance area may be reduced by narrowing the beam width or shortening the usable distance due to local limitations, or the VASI may be offset from the extended runway centerline. This will be noted in the Chart Supplement and/or applicable Notices to Air Missions (NOTAMs).

5. For 2-bar VASI (4 light units) see Figure 2-1-2.

6. For 3-bar VASI (6 light units) see Figure 2-1-3.

7. For other VASI configurations see Figure 2-1-4.

b. Precision Approach Path Indicator (PAPI).

The precision approach path indicator (PAPI) uses light units similar to the VASI but are installed in a single row of either two or four light units. These lights are visible from about 5 miles during the day and up to 20 miles at night. The visual glide path of the PAPI typically provides safe obstruction clearance within plus or minus 10 degrees of the extended runway centerline and to 3.4 NM from the runway threshold. Descent, using the PAPI, should not be initiated until the aircraft is visually aligned with the runway. The row of light units is normally installed on the left side of the runway and the glide path indications are as depicted. Lateral course guidance is provided by the runway or runway lights. In certain circumstances, the safe obstruction clearance area may be reduced by narrowing the beam width or shortening the usable distance due to local limitations, or the PAPI may be offset from the extended runway centerline. This will be noted in the Chart Supplement and/or applicable NOTAMs. (See Figure 2-1-5.)

c. **Tri-color Systems.** Tri-color visual approach slope indicators normally consist of a single light unit projecting a three-color visual approach path into the final approach area of the runway upon which the indicator is installed. The below glide path indication is red, the above glide path indication is amber, and the on glide path indication is green. These types of indicators have a useful range of approximately one-half to one mile during the day and up to five miles at night depending upon the visibility conditions. (See Figure 2-1-6.)

d. **Pulsating Systems.** Pulsating visual approach slope indicators normally consist of a single light unit projecting a two-color visual approach path into the final approach area of the runway upon which the indicator is installed. The on glide path indication may be a steady white light or alternating RED and WHITE light. The slightly below glide path indication is a steady red light. If the aircraft descends further below the glide path, the red light starts to pulsate. The above glide path indication is a pulsating white light. The pulsating rate increases as the aircraft gets further above or below the desired glide slope. The useful range of the system is about four miles during the day and up to ten miles at night. (See Figure 2-1-7.)

e. **Alignment of Elements Systems.** Alignment of elements systems are installed on some small general aviation airports and are a low-cost system consisting of painted plywood panels, normally black and white or fluorescent orange. Some

of these systems are lighted for night use. The useful range of these systems is approximately three-quarter miles. To use the system the pilot positions the aircraft so the elements are in alignment. The glide path indications are shown in Figure 2-1-8.

FIGURE 2-1-2
2-Bar VASI

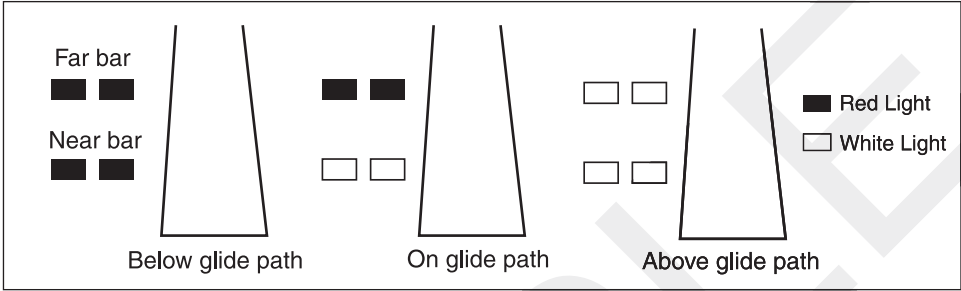


FIGURE 2-1-3
3-Bar VASI

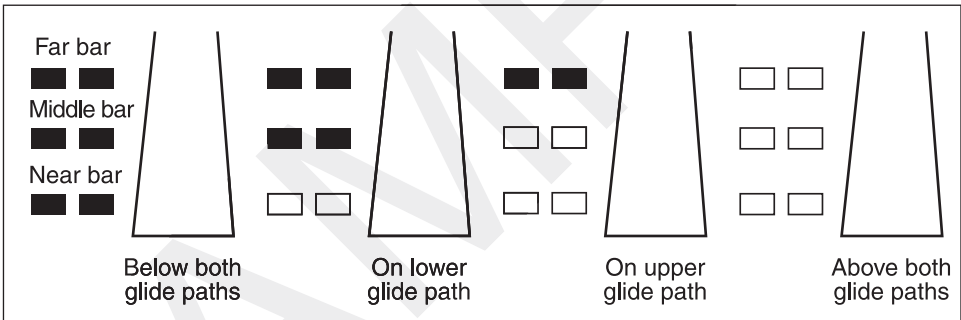


FIGURE 2-1-4
VASI Variations

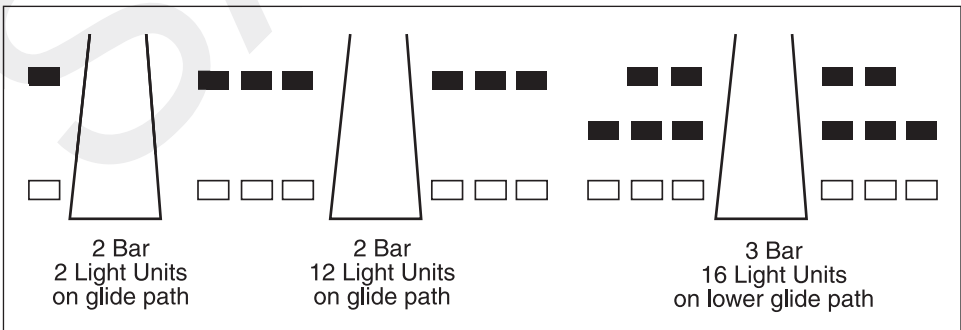


FIGURE 2-1-5
Precision Approach Path Indicator (PAPI)

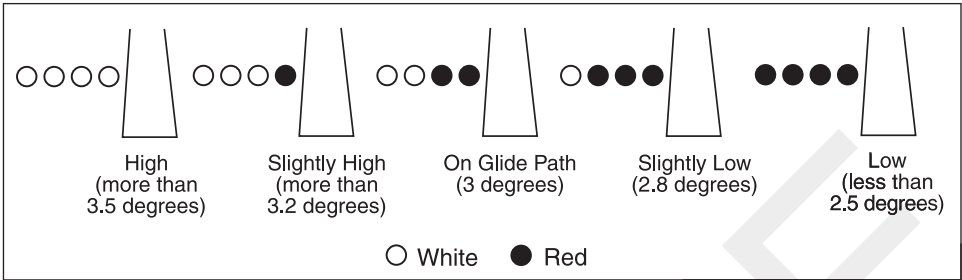
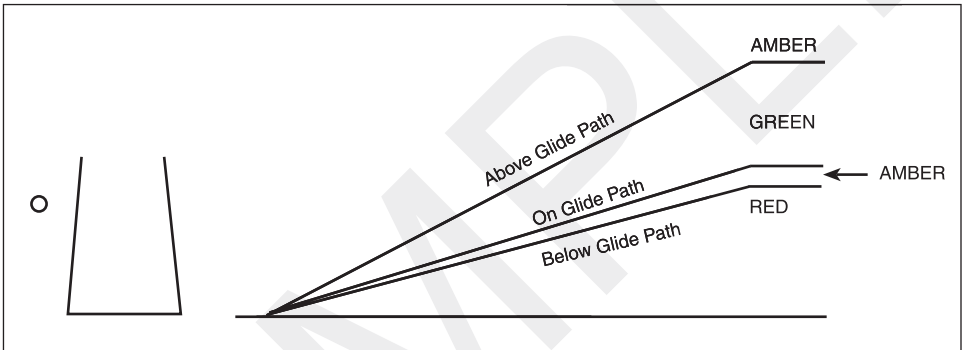


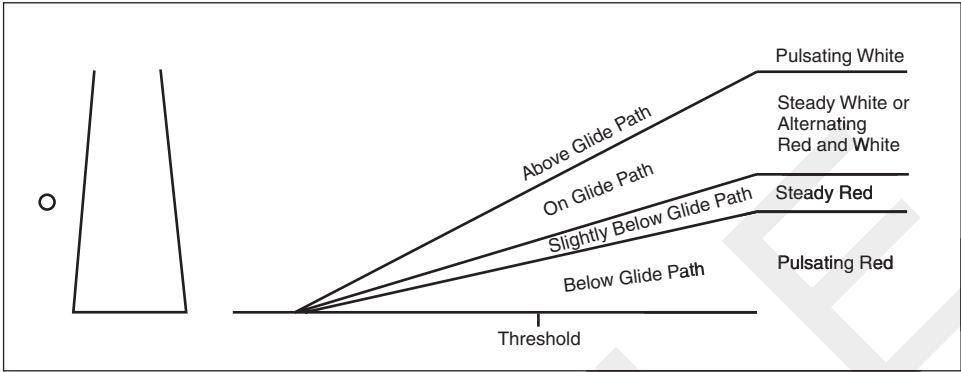
FIGURE 2-1-6
Tri-Color Visual Approach Slope Indicator



Notes:

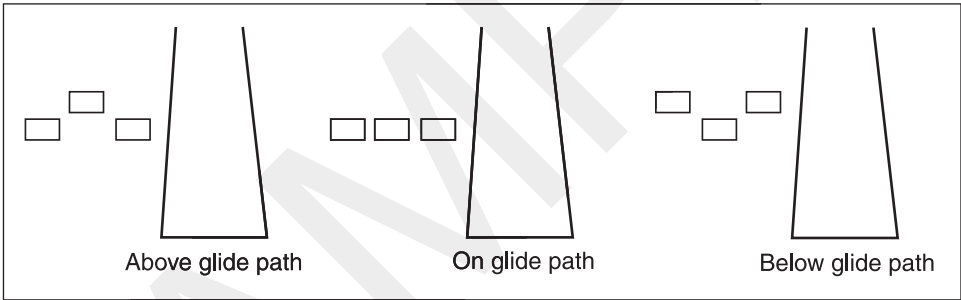
1. Since the tri-color VASI consists of a single light source which could possibly be confused with other light sources, pilots should exercise care to properly locate and identify the light signal.
2. When the aircraft descends from green to red, the pilot may see a dark amber color during the transition from green to red.

FIGURE 2-1-7
Pulsating Visual Approach Slope Indicator



Note: Since the PVASI consists of a single light source which could possibly be confused with other light sources, pilots should exercise care to properly locate and identify the light signal.

FIGURE 2-1-8
Alignment of Elements



2-1-3 Runway End Identifier Lights (REIL)

REILs are installed at many airfields to provide rapid and positive identification of the approach end of a particular runway. The system consists of a pair of synchronized flashing lights located laterally on each side of the runway threshold. REILs may be either omnidirectional or unidirectional facing the approach area. They are effective for:

- a. Identification of a runway surrounded by a preponderance of other lighting.
- b. Identification of a runway which lacks contrast with surrounding terrain.
- c. Identification of a runway during reduced visibility.

2-1-4 Runway Edge Light Systems

a. Runway edge lights are used to outline the edges of runways during periods of darkness or restricted visibility conditions. These light systems are classified according to the intensity or brightness they are capable of producing: they are the High Intensity Runway Lights (HIRL), Medium Intensity Runway Lights (MIRL), and the Low Intensity Runway Lights (LIRL). The HIRL and MIRL systems have variable intensity controls, whereas the LIRLs normally have one intensity setting.

b. The runway edge lights are white, except on instrument runways yellow replaces white on the last 2,000 feet or half the runway length, whichever is less, to form a caution zone for landings.

c. The lights marking the ends of the runway emit red light toward the runway to indicate the end of runway to a departing aircraft and emit green outward from the runway end to indicate the threshold to landing aircraft.

2-1-5 In-Runway Lighting

a. Runway Centerline Lighting System (RCLS). Runway centerline lights are installed on some precision approach runways to facilitate landing under adverse visibility conditions. They are located along the runway centerline and are spaced at 50-foot intervals. When viewed from the landing threshold, the runway centerline lights are white until the last 3,000 feet of the runway. The white lights begin to alternate with red for the next 2,000 feet, and for the last 1,000 feet of the runway, all centerline lights are red.

b. Touchdown Zone Lights (TDZL). Touchdown zone lights are installed on some precision approach runways to indicate the touchdown zone when landing under adverse visibility conditions. They consist of two rows of transverse light bars disposed symmetrically about the runway centerline. The system consists of steady-burning white lights which start 100 feet beyond the landing threshold and extend to 3,000 feet beyond the landing threshold or to the midpoint of the runway, whichever is less.

c. Taxiway Centerline Lead-Off Lights. Taxiway centerline lead-off lights provide visual guidance to persons exiting the runway. They are color-coded to warn pilots and vehicle drivers that they are within the runway environment or instrument landing system (ILS) critical area, whichever is more restrictive. Alternate green and yellow lights are installed, beginning with green, from the runway centerline to one centerline light position beyond the runway holding position or ILS critical area holding position.

d. Taxiway Centerline Lead-On Lights. Taxiway centerline lead-on lights provide visual guidance to persons entering the runway. These "lead-on" lights are also color-coded with the same color pattern as lead-off lights to warn pilots and vehicle drivers that they are within the runway environment or instrument landing system (ILS) critical area, whichever is more conservative. The fixtures used for lead-on lights are bidirectional, i.e., one side emits light for the lead-on function while the other side emits light for the lead-off function. Any fixture that emits yellow light for the lead-off function must also emit yellow light for the lead-on function. (See Figure 2-1-12.)

e. Land and Hold Short Lights. Land and hold short lights are used to indicate the hold short point on certain runways which are approved for Land and Hold Short Operations (LAHSO). Land and hold short lights consist of a row of pulsing white lights installed across the runway at the hold short point. Where installed, the lights will be on anytime LAHSO is in effect. These lights will be off when LAHSO is not in effect.

Reference: AIM, ¶4-3-11, *Pilot Responsibilities When Conducting Land and Hold Short Operations (LAHSO)*.

2-1-6 Runway Status Light (RWSL) System

a. Introduction.

RWSL is a fully automated system that provides runway status information to pilots and surface vehicle operators to clearly indicate when it is unsafe to enter, cross, takeoff from, or land on a runway. The RWSL system processes information from surveillance systems and activates Runway Entrance Lights (REL) and Takeoff Hold Lights (THL), in accordance with the position and velocity of the detected surface traffic and approach traffic. REL and THL are in-pavement light fixtures that are directly visible to pilots and surface vehicle operators. RWSL is an independent safety enhancement that does not substitute for or convey an ATC clearance. Clearance to enter, cross, takeoff from, land on, or operate on a runway must still be received from ATC. Although ATC has limited control over the system, personnel do not directly use and may not be able to view light fixture activations and deactivations during the conduct of daily ATC operations.

b. Runway Entrance Lights (REL): The REL system is composed of flush mounted, in-pavement, unidirectional light fixtures that are parallel to and focused along the taxiway centerline and directed toward the pilot at the hold line. An array of REL lights include the first light at the hold line followed by a series of evenly spaced lights to the runway edge; one additional light at the runway centerline is in line with the last two lights before the runway edge (see Figure 2-1-9 and Figure 2-1-10). When activated, the red lights indicate that there is high speed traffic on the runway or there is an aircraft on final approach within the activation area.

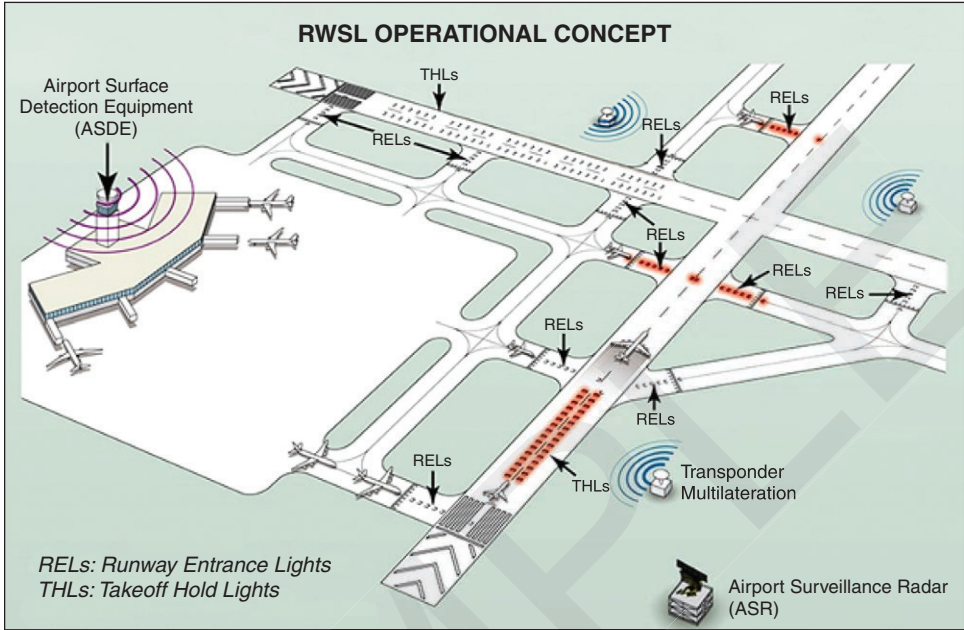
1. REL Operating Characteristics—Departing Aircraft:

When a departing aircraft reaches a site adaptable speed of approximately 30 knots, all taxiway intersections with REL arrays along the runway ahead of the aircraft will illuminate (see Figure 2-1-9). As the aircraft approaches an REL equipped taxiway intersection, the lights at that intersection extinguish approximately 3 to 4 seconds before the aircraft reaches it. This allows controllers to apply "anticipated separation" to permit ATC to move traffic more expeditiously without compromising safety. After the aircraft is declared "airborne" by the system, all REL lights associated with this runway will extinguish.

2. REL Operating Characteristics—Arriving Aircraft:

When an aircraft on final approach is approximately 1 mile from the runway threshold, all sets of taxiway REL light arrays that intersect the runway illuminate. The distance is adjustable and can be configured for specific operations at particular

FIGURE 2-1-9
Runway Status Light System



airports. Lights extinguish at each equipped taxiway intersection approximately 3 to 4 seconds before the aircraft reaches it to apply anticipated separation until the aircraft has slowed to approximately 80 knots (site adjustable parameter). Below 80 knots, all arrays that are not within 30 seconds of the aircraft's forward path are extinguished. Once the arriving aircraft slows to approximately 34 knots (site adjustable parameter), it is declared to be in a taxi state, and all lights extinguish.

3. What a pilot would observe: A pilot at or approaching the hold line to a runway will observe RELs illuminate and extinguish in reaction to an aircraft or vehicle operating on the runway, or an arriving aircraft operating less than 1 mile from the runway threshold.

4. When a pilot observes the red lights of the REL, that pilot will stop at the hold line or remain stopped. The pilot will then contact ATC for resolution if the clearance is in conflict with the lights. Should pilots note illuminated lights under circumstances when remaining clear of the runway is impractical for safety reasons (for example, aircraft is already on the runway), the crew should proceed according to their best judgment while understanding the illuminated lights indicate the runway is unsafe to enter or cross. Contact ATC at the earliest possible opportunity.

c. Takeoff Hold Lights (THL): The THL system is composed of flush mounted, in-pavement, unidirectional light fixtures in a double longitudinal row aligned either side of the runway centerline lighting. Fixtures are focused toward the arrival end of the runway at the "line up and wait" point. THLs extend for 1,500 feet in front of the holding aircraft starting at a point 375 feet from the departure threshold (see Figure 2-1-11). Illuminated red lights provide a signal, to an aircraft in position for takeoff or rolling, that it is unsafe to takeoff because the runway is occupied or about to be occupied by another aircraft or ground vehicle. Two aircraft, or a surface vehicle and an aircraft, are required for the lights to illuminate. The departing aircraft must be in position for takeoff or beginning takeoff roll. Another aircraft or a surface vehicle must be on or about to cross the runway.

1. THL Operating Characteristics—Departing Aircraft:

THLs will illuminate for an aircraft in position for departure or departing when there is another aircraft or vehicle on the runway or about to enter the runway (see Figure 2-1-9). Once that aircraft or vehicle exits the runway, the THLs extinguish. A pilot may notice lights extinguish prior to the downfield aircraft or vehicle being completely clear of the runway but still moving. Like RELs, THLs have an "anticipated separation" feature.

2025 FAR/AIM

Federal Aviation Regulations
Aeronautical Information Manual

Rules and Procedures for Aviators

- Regulations pertinent to pilots, drone operators, and instructors, including Title 14 Parts 1, 5, 43, 48, 61, 67, 68, 71, 73, 89, 91, 97, 103, 105, 107, 110, 119, 136, 137, 141, and 142; Title 49 NTSB 830 and TSA 1552; and *Aeronautical Information Manual*, Pilot/Controller Glossary, and NASA Aviation Safety Reporting System Form.
- Free updates available online and via email subscription for instant access to regulation and procedural changes.
- Changes and updates since last edition clearly identified.
- Pilot's Bill of Rights.
- Unabridged *AIM*, including full-color graphics.
- Comprehensive *FAR/AIM* index.
- Online access to suggested regulation study list for each certificate and rating.
- Tabs printed in page margins for quick reference.



FAR/AIM Series
ON DEMAND
APPS, EBOOKS, UPDATES
asa2fly.com/faraim

OTHER BOOKS AVAILABLE IN ASA'S FAR/AIM SERIES:



FAR FOR AVIATION MAINTENANCE TECHNICIANS (ASA-25-FAR-AMT)

Title 14 Parts 1, 3, 5, 13, 21, 23, 26, 27, 33, 34, 35, 38, 39, 43, 45, 47, 48, 65, 91, 110, 119, 121 (J, L, Z, AA, DD), 125, 135, 145, 147, and 183; Advisory Circulars 20-62E, 20-109B, 21-12C, 39-7D, 43-9C, 43.9-1G



FAR FOR FLIGHT CREW (ASA-25-FAR-FC)

Title 14 Parts 1, 5, 63, 65, 91 Subpart K, 110, 111, 117, 119, 120, 121, and 135;
Title 49 Hazmat 175 and TSA 1544



Aviation Supplies & Academics, Inc.
7005 132nd Place SE
Newcastle, Washington 98059 USA
425-235-1500 | asa2fly.com

ASA-25-FR-AM-BK

TRANSPORTATION USD \$29.95

ISBN 978-1-64425-368-7

