



FAR AIM

2020

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



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Aviation Supplies & Academics, Inc.
7005 132nd Place SE
Newcastle, Washington 98059-3153

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ASA has been supplying the standard reference of the industry, the FAR/AIM series, for more than 75 years. The 2020 series continues to provide information directly from the Federal Aviation Regulations and the *Aeronautical Information Manual*, along with these important features:

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FAR/AIM Comments

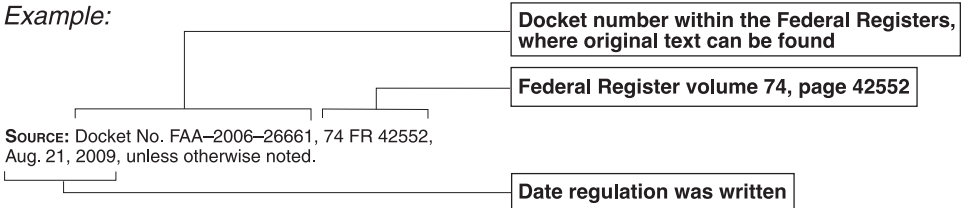
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How to Identify the Currency of the Regulations

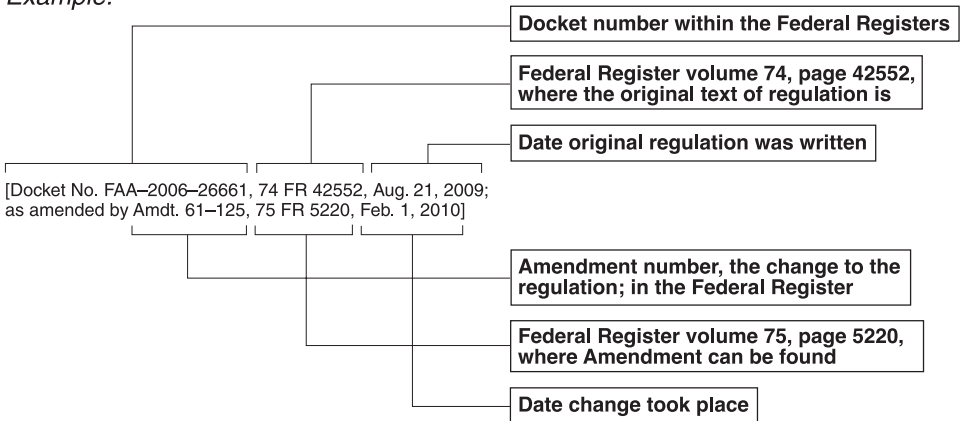
In each Part following the Table of Contents is a Source, with the date of origin for that regulation.

Example:



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

Example:



FAR/AIM Contents

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

Part 1	Definitions and Abbreviations	1	1
Part 43	Maintenance, Rebuilding, and Alteration	15	43
Part 48	Registration and Marking Requirements for Small Unmanned Aircraft	31	48
Part 61	Certification: Pilots and Instructors	35	61
Part 67	Medical Standards and Certification	143	67
Part 68	Operating Small Aircraft Without a Medical Certificate	155	68
Part 71	Airspace	159	71
Part 73	Special Use Airspace	163	73
Part 91	General Operating and Flight Rules	165	91
Part 97	Standard Instrument Procedures	301	97
Part 103	Ultralight Vehicles	305	103
Part 105	Parachute Operations	307	105
Part 107	Small Unmanned Aircraft Systems	313	107
Part 110	General Requirements	321	110
Part 117	Flight and Duty Limitations and Rest Requirements: Flightcrew Members	325	117
Part 119	Certification: Air Carriers and Commercial Operators	333	119
Part 135	Operating Requirements: Commuter and On Demand Operations	349	135
Part 136	Commercial Air Tours and National Parks Air Tour Management	469	136
Part 137	Agricultural Aircraft Operations	477	137
Part 141	Pilot Schools	485	141
Part 142	Training Centers	533	142
49 CFR	NTSB 830 Accident Reporting • TSA 1552 Flight Training Security	545	49 CFR
Aeronautical Information Manual (AIM)	555	AIM
FAR/AIM Index	1149	INDEX

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 [Reserved]
- 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 Security disqualification.
- 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 rating or airplane type rating concurrently with 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.
- 61.195 Flight instructor limitations and qualifications.
- 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 ?

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 ?
- 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?

Authority: 49 U.S.C. 106(f), 106(g), 40113, 44701–44703, 44707, 44709–44711, 44729, 44903, 45102–45103, 45301–45302.

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

SPECIAL FEDERAL AVIATION REGULATIONS

SFAR No. 73 TO PART 61ROBINSON 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.

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 number 73 shall remain in effect until it is revised or rescinded.

[Docket No. 28095, 63 FR 666, Jan. 7, 1998; as amended by Docket No. FAA-2002-13744; SFAR No. 73-1, 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 TO PART 61

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, SFAR No. 100–2, 75 FR 9766, March 4, 2010; as amended by Docket No. 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; as amended by Amdt. 61–103, 62 FR 40893, July 30, 1997; 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;

(vi) When engaged in a flight operation within the United States for a fractional ownership program manager authorized to conduct operations under part 91, subpart K, of this chapter, a temporary document provided by that program manager under an approved certificate verification plan; or

(vii) When operating an aircraft within a foreign country, a pilot license issued by that country may be used.

(2) Has a photo identification that is in that person's physical possession or readily accessible in the aircraft when exercising the privileges of that pilot certificate or authorization. The photo identification must be a:

(i) Driver's license issued by a State, the District of Columbia, or territory or possession of the United States;

(ii) Government identification card issued by the Federal government, a State, the District of Columbia, or a territory or possession of the United States;

(iii) U.S. Armed Forces' identification card;

(iv) Official passport;

(v) Credential that authorizes unescorted access to a security identification display area at an airport regulated under 49 CFR part 1542; or

(vi) Other form of identification that the Administrator finds acceptable.

(b) Required pilot certificate for operating a foreign-registered aircraft within the United States. No person may serve as a required pilot flight crewmember of a civil aircraft of foreign registry within the United States, unless—

(1) That person's pilot certificate or document issued under §61.29(e) is in that person's physical possession or readily accessible in the aircraft when exercising the privileges of that pilot certificate; and

(2) Has been issued in accordance with this part, or has been issued or validated by the country in which the aircraft is registered.

(c) Medical certificate.

(1) A person may serve as a required pilot flight crewmember of an aircraft only if that person holds the appropriate medical certificate issued under part 67 of this chapter, or other documentation acceptable to the FAA, that is in that person's physical possession or readily accessible in the aircraft. Paragraph (c)(2) of this section provides

certain exceptions to the requirement to hold a medical certificate.

(2) A person is not required to meet the requirements of paragraph (c)(1) of this section if that person—

(i) Is exercising the privileges of a student pilot certificate while seeking a pilot certificate with a glider category rating, a balloon class rating, or glider or balloon privileges;

(ii) Is exercising the privileges of a student pilot certificate while seeking a sport pilot certificate with other than glider or balloon privileges and holds a U.S. driver's license;

(iii) Is exercising the privileges of a student pilot certificate while seeking a pilot certificate with a weight-shift-control aircraft category rating or a powered parachute category rating and holds a U.S. driver's license;

(iv) Is exercising the privileges of a sport pilot certificate with glider or balloon privileges;

(v) Is exercising the privileges of a sport pilot certificate with other than glider or balloon privileges and holds a U.S. driver's license. A person who has applied for or held a medical certificate may exercise the privileges of a sport pilot certificate using a U.S. driver's license only if that person—

(A) Has been found eligible for the issuance of at least a third-class airman medical certificate at the time of his or her most recent application; and

(B) Has not had his or her most recently issued medical certificate suspended or revoked or most recent Authorization for a Special Issuance of a Medical Certificate withdrawn.

(vi) Is holding a pilot certificate with a balloon class rating and is piloting or providing training in a balloon as appropriate;

(vii) Is holding a pilot certificate or a flight instructor certificate with a glider category rating, and is piloting or providing training in a glider, as appropriate;

(viii) Is exercising the privileges of a flight instructor certificate, provided the person is not acting as pilot in command or as a required pilot flight crewmember;

(ix) Is exercising the privileges of a ground instructor certificate;

(x) Is operating an aircraft within a foreign country using a pilot license issued by that country and possesses evidence of current medical qualification for that license;

(xi) Is operating an aircraft with a U.S. pilot certificate, issued on the basis of a foreign pilot license, issued under §61.75, and holds a medical certificate issued by the foreign country that issued the foreign pilot license, which is in that person's physical possession or readily accessible in the aircraft when exercising the privileges of that airman certificate;

(xii) Is a pilot of the U.S. Armed Forces, has an up-to-date U.S. military medical examination, and holds military pilot flight status;

(xiii) Is exercising the privileges of a student, recreational or private pilot certificate for operations conducted under the conditions and limitations set forth in §61.113(i) and holds a U.S. driver's license; or

(xiv) Is exercising the privileges of a flight instructor certificate and acting as pilot in command for operations conducted under the conditions and limitations set forth in §61.113(i) and holds a U.S. driver's license.

(d) Flight instructor certificate.

(1) A person who holds a flight instructor certificate issued under this part must have that certificate, or other documentation acceptable to the Administrator, in that person's physical possession or readily accessible in the aircraft when exercising the privileges of that flight instructor certificate.

(2) Except as provided in paragraph (d)(3) of this section, no person other than the holder of a flight instructor certificate issued under this part with the appropriate rating on that certificate may—

(i) Give training required to qualify a person for solo flight and solo cross-country flight;

(ii) Endorse an applicant for a—

(A) Pilot certificate or rating issued under this part;

(B) Flight instructor certificate or rating issued under this part; or

(C) Ground instructor certificate or rating issued under this part;

(iii) Endorse a pilot logbook to show training given; or

(iv) Endorse a logbook for solo operating privileges.

(3) A flight instructor certificate issued under this part is not necessary—

(i) Under paragraph (d)(2) of this section, if the training is given by the holder of a commercial pilot certificate with a lighter-than-air rating, provided the training is given in accordance with the privileges of the certificate in a lighter-than-air aircraft;

(ii) Under paragraph (d)(2) of this section, if the training is given by the holder of an airline transport pilot certificate with a rating appropriate to the aircraft in which the training is given, provided the training is given in accordance with the privileges of the certificate and conducted in accordance with an approved air carrier training program approved under part 121 or part 135 of this chapter;

(iii) Under paragraph (d)(2) of this section, if the training is given by a person who is qualified in accordance with subpart C of part 142 of this chapter, provided the training is conducted

in accordance with an approved part 142 training program;

(iv) Under paragraphs (d)(2)(i), (d)(2)(ii)(C), and (d)(2)(iii) of this section, if the training is given by the holder of a ground instructor certificate in accordance with the privileges of the certificate; or

(v) Under paragraph (d)(2)(iii) of this section, if the training is given by an authorized flight instructor under §61.41 of this part.

(e) Instrument rating. No person may act as pilot in command of a civil aircraft under IFR or in weather conditions less than the minimums prescribed for VFR flight unless that person holds:

(1) The appropriate aircraft category, class, type (if required), and instrument rating on that person's pilot certificate for any airplane, helicopter, or powered-lift being flown;

(2) An airline transport pilot certificate with the appropriate aircraft category, class, and type rating (if required) for the aircraft being flown;

(3) For a glider, a pilot certificate with a glider category rating and an airplane instrument rating; or

(4) For an airship, a commercial pilot certificate with a lighter-than-air category rating and airship class rating.

(f) Category II pilot authorization. Except for a pilot conducting Category II operations under part 121 or part 135, a person may not:

(1) Act as pilot in command of a civil aircraft during Category II operations unless that person—

(i) Holds a Category II pilot authorization for that category or class of aircraft, and the type of aircraft, if applicable; or

(ii) In the case of a civil aircraft of foreign registry, is authorized by the country of registry to act as pilot in command of that aircraft in Category II operations.

(2) Act as second in command of a civil aircraft during Category II operations unless that person—

(i) Holds a pilot certificate with category and class ratings for that aircraft and an instrument rating for that category aircraft;

(ii) Holds an airline transport pilot certificate with category and class ratings for that aircraft; or

(iii) In the case of a civil aircraft of foreign registry, is authorized by the country of registry to act as second in command of that aircraft during Category II operations.

(g) Category III pilot authorization. Except for a pilot conducting Category III operations under part 121 or part 135, a person may not:

(1) Act as pilot in command of a civil aircraft during Category III operations unless that person—

(i) Holds a Category III pilot authorization for that category or class of aircraft, and the type of aircraft, if applicable; or

(ii) In the case of a civil aircraft of foreign registry, is authorized by the country of registry to act as pilot in command of that aircraft in Category III operations.

(2) Act as second in command of a civil aircraft during Category III operations unless that person—

(i) Holds a pilot certificate with category and class ratings for that aircraft and an instrument rating for that category aircraft;

(ii) Holds an airline transport pilot certificate with category and class ratings for that aircraft; or

(iii) In the case of a civil aircraft of foreign registry, is authorized by the country of registry to act as second in command of that aircraft during Category III operations.

(h) Category A aircraft pilot authorization.

The Administrator may issue a certificate of authorization for a Category II or Category III operation to the pilot of a small aircraft that is a Category A aircraft, as identified in §97.3(b)(1) of this chapter if:

(1) The Administrator determines that the Category II or Category III operation can be performed safely by that pilot under the terms of the certificate of authorization; and

(2) The Category II or Category III operation does not involve the carriage of persons or property for compensation or hire.

(i) Ground instructor certificate.

(1) Each person who holds a ground instructor certificate issued under this part must have that certificate or a temporary document issued under §61.29(e) in that person's physical possession or immediately accessible when exercising the privileges of that certificate.

(2) Except as provided in paragraph (i)(3) of this section, no person other than the holder of a ground instructor certificate, issued under this part or part 143, with the appropriate rating on that certificate may—

(i) Give ground training required to qualify a person for solo flight and solo cross-country flight;

(ii) Endorse an applicant for a knowledge test required for a pilot, flight instructor, or ground instructor certificate or rating issued under this part; or

(iii) Endorse a pilot logbook to show ground training given.

(3) A ground instructor certificate issued under this part is not necessary—

(i) Under paragraph (i)(2) of this section, if the training is given by the holder of a flight instructor certificate issued under this part in accordance with the privileges of that certificate;

(ii) Under paragraph (i)(2) of this section, if the training is given by the holder of a commercial pilot certificate with a lighter-than-air rating, provided the training is given in accordance with the

privileges of the certificate in a lighter-than-air aircraft;

(iii) Under paragraph (i)(2) of this section, if the training is given by the holder of an airline transport pilot certificate with a rating appropriate to the aircraft in which the training is given, provided the training is given in accordance with the privileges of the certificate and conducted in accordance with an approved air carrier training program approved under part 121 or part 135 of this chapter;

(iv) Under paragraph (i)(2) of this section, if the training is given by a person who is qualified in accordance with subpart C of part 142 of this chapter, provided the training is conducted in accordance with an approved part 142 training program; or

(v) Under paragraph (i)(2)(iii) of this section, if the training is given by an authorized flight instructor under §61.41 of this part.

(j) Age limitation for certain operations.

(1) *Age limitation.* No person who holds a pilot certificate issued under this part may serve as a pilot on a civil airplane of U.S. registry in the following operations if the person has reached his or her 60th birthday or, in the case of operations with more than one pilot, his or her 65th birthday:

(i) Scheduled international air services carrying passengers in turbojet-powered airplanes;

(ii) Scheduled international air services carrying passengers in airplanes having a passenger-seat configuration of more than nine passenger seats, excluding each crewmember seat;

(iii) Nonscheduled international air transportation for compensation or hire in airplanes having a passenger-seat configuration of more than 30 passenger seats, excluding each crewmember seat; or

(iv) Scheduled international air services, or nonscheduled international air transportation for compensation or hire, in airplanes having a payload capacity of more than 7,500 pounds.

(2) Definitions.

(i) "International air service," as used in this paragraph (j), means scheduled air service performed in airplanes for the public transport of passengers, mail, or cargo, in which the service passes through the airspace over the territory of more than one country.

(ii) "International air transportation," as used in this paragraph (j), means air transportation performed in airplanes for the public transport of passengers, mail, or cargo, in which the service passes through the airspace over the territory of more than one country.

(k) Special purpose pilot authorization. Any person that is required to hold a special purpose pilot authorization, issued in accordance with §61.77 of this part, must have that authorization

and the person's foreign pilot license in that person's physical possession or have it readily accessible in the aircraft when exercising the privileges of that authorization.

(l) **Inspection of certificate.** Each person who holds an airman certificate, temporary document in accordance with paragraph (a)(1)(v) or (vi) of this section, medical certificate, documents establishing alternative medical qualification under part 68 of this chapter, authorization, or license required by this part must present it and their photo identification as described in paragraph (a) (2) of this section for inspection upon a request from:

- (1) The Administrator;
- (2) An authorized representative of the National Transportation Safety Board; or
- (3) Any Federal, State, or local law enforcement officer; or
- (4) An authorized representative of the Transportation Security Administration.

[Docket No. 25910, 62 FR 16298, April 4, 1997; as amended by Amdt. 61–103, 62 FR 40894, July 30, 1997; Amdt. 61–110, 67 FR 65861, Oct. 28, 2002; Amdt. 61–110, 69 FR 44864, July 27, 2004; Amdt. 61–123, 74 FR 34234, July 15, 2009; Amdt. 61–124, 74 FR 42546, Aug. 21, 2009; Amdt. 61–124A, 74 FR 53644, Oct. 20, 2009; Amdt. 61–131, 78 FR 56828, Sept. 16, 2013; Amdt. 61–134, 80 FR 33401, June 12, 2015; Amdt. 61–135, 81 FR 1306, Jan. 12, 2016; Amdt. 61–140, 82 FR 3164, Jan. 11, 2017; Amdt. 61–142, 83 FR 30276, June 27, 2018]

§61.4 Qualification and approval of flight simulators and flight training devices.

(a) Except as specified in paragraph (b) or (c) of this section, each flight simulator and flight training device used for training, and for which an airman is to receive credit to satisfy any training, testing, or checking requirement under this chapter, must be qualified and approved by the Administrator for—

- (1) The training, testing, and checking for which it is used;
- (2) Each particular maneuver, procedure, or crewmember function performed; and
- (3) The representation of the specific category and class of aircraft, type of aircraft, particular variation within the type of aircraft, or set of aircraft for certain flight training devices.

(b) Any device used for flight training, testing, or checking that has been determined to be acceptable to or approved by the Administrator prior to August 1, 1996, which can be shown to function as originally designed, is considered to be a flight training device, provided it is used for the same purposes for which it was originally accepted or approved and only to the extent of such acceptance or approval.

(c) The Administrator may approve a device other than a flight simulator or flight training device for specific purposes.

[Docket No. 25910, 62 FR 16298, April 4, 1997; as amended by Amdt. 61–103, 62 FR 40894, July 30, 1997]

§61.5 Certificates and ratings issued under this part.

(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.

(b) The following ratings are placed on a pilot certificate (other than student pilot) when an applicant satisfactorily accomplishes the training and certification requirements for the rating sought:

- (1) Aircraft category ratings—
 - (i) Airplane.
 - (ii) Rotorcraft.
 - (iii) Glider.
 - (iv) Lighter-than-air.
 - (v) Powered-lift.
 - (vi) Powered parachute.
 - (vii) Weight-shift-control aircraft.
- (2) Airplane class ratings—
 - (i) Single-engine land.
 - (ii) Multiengine land.
 - (iii) Single-engine sea.
 - (iv) Multiengine sea.
- (3) Rotorcraft class ratings—
 - (i) Helicopter.
 - (ii) Gyroplane.
- (4) Lighter-than-air class ratings—
 - (i) Airship.
 - (ii) Balloon.
- (5) Weight-shift-control aircraft class ratings—
 - (i) Weight-shift-control aircraft land.
 - (ii) Weight-shift-control aircraft sea.
- (6) Powered parachute class ratings—
 - (i) Powered parachute land.
 - (ii) Powered parachute sea.
- (7) Aircraft type ratings—
 - (i) Large aircraft other than lighter-than-air.
 - (ii) Turbojet-powered airplanes.
 - (iii) Other aircraft type ratings specified by the Administrator through the aircraft type certification procedures.

(iv) Second-in-command pilot type rating for aircraft that is certificated for operations with a minimum crew of at least two pilots.

(8) Instrument ratings (on private and commercial pilot certificates only) —

- (i) Instrument—Airplane.
- (ii) Instrument—Helicopter.
- (iii) Instrument—Powered-lift.

(c) The following ratings are placed on a flight instructor certificate when an applicant satisfactorily accomplishes the training and certification requirements for the rating sought:

- (1) Aircraft category ratings—
 - (i) Airplane.
 - (ii) Rotorcraft.
 - (iii) Glider.
 - (iv) Powered-lift.
- (2) Airplane class ratings—
 - (i) Single-engine.
 - (ii) Multiengine.
- (3) Rotorcraft class ratings—
 - (i) Helicopter.
 - (ii) Gyroplane.
- (4) Instrument ratings—
 - (i) Instrument—Airplane.
 - (ii) Instrument—Helicopter.
 - (iii) Instrument—Powered-lift.
- (5) Sport pilot rating.

(d) The following ratings are placed on a ground instructor certificate when an applicant satisfactorily accomplishes the training and certification requirements for the rating sought:

- (1) Basic.
- (2) Advanced.
- (3) Instrument.

[Docket No. 25910, 62 FR 16298, April 4, 1997; as amended by Amdt. 61–110, 69 FR 44864, July 27, 2004; Amdt. 61–113, 70 FR 45271, Aug. 4, 2005]

§61.7 Obsolete certificates and ratings.

(a) The holder of a free-balloon pilot certificate issued before November 1, 1973, may not exercise the privileges of that certificate.

(b) The holder of a pilot certificate that bears any of the following category ratings without an associated class rating may not exercise the privileges of that category rating:

- (1) Rotorcraft.
- (2) Lighter-than-air.
- (3) Helicopter.
- (4) Autogyro.

§61.8 Inapplicability of unmanned aircraft operations.

Any action conducted pursuant to part 107 of this chapter or Subpart E of part 101 of this chapter cannot be used to meet the requirements of this part.

[Docket No. FAA–2015–0150, 81 FR 42208, June 28, 2016]

§61.9 [Reserved]

§61.11 Expired pilot certificates and reissuance.

(a) No person who holds an expired pilot certificate or rating may act as pilot in command or as a required pilot flight crewmember of an aircraft of the same category or class that is listed on that expired pilot certificate or rating.

(b) The following pilot certificates and ratings have expired and will not be reissued:

(1) An airline transport pilot certificate issued before May 1, 1949, or an airline transport pilot certificate that contains a horsepower limitation.

(2) A private or commercial pilot certificate issued before July 1, 1945.

(3) A pilot certificate with a lighter-than-air or free-balloon rating issued before July 1, 1945.

(c) An airline transport pilot certificate that was issued after April 30, 1949, and that bears an expiration date but does not contain a horsepower limitation, may have that airline transport pilot certificate re-issued without an expiration date.

(d) A private or commercial pilot certificate that was issued after June 30, 1945, and that bears an expiration date, may have that pilot certificate reissued without an expiration date.

(e) A pilot certificate with a lighter-than-air or free-balloon rating that was issued after June 30, 1945, and that bears an expiration date, may have that pilot certificate reissued without an expiration date.

[Docket No. FAA–2006–26661, 74 FR 42547, Aug. 21, 2009]

§61.13 Issuance of airman certificates, ratings, and authorizations.

(a) Application.

(1) An applicant for an airman certificate, rating, or authorization under this part must make that application on a form and in a manner acceptable to the Administrator.

(2) An applicant must show evidence that the appropriate fee prescribed in appendix A to part 187 of this chapter has been paid when that person applies for airmen certification services administered outside the United States.

(3) An applicant who is neither a citizen of the United States nor a resident alien of the United

States may be refused issuance of any U.S. airman certificate, rating or authorization by the Administrator.

(4) Except as provided in paragraph (a)(3) of this section, an applicant who satisfactorily accomplishes the training and certification requirements for the certificate, rating, or authorization sought is entitled to receive that airman certificate, rating, or authorization.

(b) Limitations.

(1) An applicant who cannot comply with certain areas of operation required on the practical test because of physical limitations may be issued an airman certificate, rating, or authorization with the appropriate limitation placed on the applicant's airman certificate provided the—

(i) Applicant is able to meet all other certification requirements for the airman certificate, rating, or authorization sought;

(ii) Physical limitation has been recorded with the FAA on the applicant's medical records; and

(iii) Administrator determines that the applicant's inability to perform the particular area of operation will not adversely affect safety.

(2) A limitation placed on a person's airman certificate may be removed, provided that person demonstrates for an examiner satisfactory proficiency in the area of operation appropriate to the airman certificate, rating, or authorization sought.

(c) Additional requirements for Category II and Category III pilot authorizations.

(1) A Category II or Category III pilot authorization is issued by a letter of authorization as part of an applicant's instrument rating or airline transport pilot certificate.

(2) Upon original issue, the authorization contains the following limitations:

(i) For Category II operations, the limitation is 1,600 feet RVR and a 150-foot decision height; and

(ii) For Category III operations, each initial limitation is specified in the authorization document.

(3) The limitations on a Category II or Category III pilot authorization may be removed as follows:

(i) In the case of Category II limitations, a limitation is removed when the holder shows that, since the beginning of the sixth preceding month, the holder has made three Category II ILS approaches with a 150-foot decision height to a landing under actual or simulated instrument conditions.

(ii) In the case of Category III limitations, a limitation is removed as specified in the authorization.

(4) To meet the experience requirements of paragraph (c)(3) of this section, and for the practical test required by this part for a Category II or a Category III pilot authorization, a flight simulator or flight training device may be used if it is approved by the Administrator for such use.

(d) Application during suspension or revocation.

(1) Unless otherwise authorized by the Administrator, a person whose pilot, flight instructor, or ground instructor certificate has been suspended may not apply for any certificate, rating, or authorization during the period of suspension.

(2) Unless otherwise authorized by the Administrator, a person whose pilot, flight instructor, or ground instructor certificate has been revoked may not apply for any certificate, rating, or authorization for 1 year after the date of revocation.

[Docket No. 25910, 62 FR 40895, July 30, 1997; as amended by Amdt. 61-116, 72 FR 18558, April 12, 2007; Amdt. 61-132, 78 FR 77572, Dec. 24, 2013]

§61.14 [Reserved]

§61.15 Offenses involving alcohol or drugs.

(a) A conviction for the violation of any Federal or State statute relating to the growing, processing, manufacture, sale, disposition, possession, transportation, or importation of narcotic drugs, marijuana, or depressant or stimulant drugs or substances is grounds for:

(1) Denial of an application for any certificate, rating, or authorization issued under this part for a period of up to 1 year after the date of final conviction; or

(2) Suspension or revocation of any certificate, rating, or authorization issued under this part.

(b) Committing an act prohibited by §91.17(a) or §91.19(a) of this chapter is grounds for:

(1) Denial of an application for a certificate, rating, or authorization issued under this part for a period of up to 1 year after the date of that act; or

(2) Suspension or revocation of any certificate, rating, or authorization issued under this part.

(c) For the purposes of paragraphs (d), (e), and (f) of this section, a motor vehicle action means:

(1) A conviction after November 29, 1990, for the violation of any Federal or State statute relating to the operation of a motor vehicle while intoxicated by alcohol or a drug, while impaired by alcohol or a drug, or while under the influence of alcohol or a drug;

(2) The cancellation, suspension, or revocation of a license to operate a motor vehicle after November 29, 1990, for a cause related to the operation of a motor vehicle while intoxicated by alcohol or a drug, while impaired by alcohol or a drug, or while under the influence of alcohol or a drug; or

(3) The denial after November 29, 1990, of an application for a license to operate a motor vehicle for a cause related to the operation of a motor vehicle while intoxicated by alcohol or a drug, while impaired by alcohol or a drug, or while under the influence of alcohol or a drug.

AIM

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Aeronautical Information Manual



OFFICIAL GUIDE TO BASIC FLIGHT INFORMATION
U.S. Department of Transportation

Aeronautical Information Manual	AIM
Pilot/Controller Glossary	P/C
NASA Safety Form	NASA FORM
FAR/AIM Index	INDEX

Chapter 1 Air Navigation

Section 1 Navigation Aids	573
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 Navigational Aid (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 or Global Navigation Satellite System (GNSS) Performance or Interference	
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)	604
--	------------

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 Pilots and Air Traffic Controllers Recognizing Interference or Spoofing	

Chapter 2 Aeronautical Lighting and Other Airport Visual Aids

Section 1 Airport Lighting Aids	613
--	------------

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 Stand-Alone Final Approach Runway Occupancy Signal (FAROS)	
2-1-8 Control of Lighting Systems	
2-1-9 Pilot Control of Airport Lighting	
2-1-10 Airport/Heliport Beacons	
2-1-11 Taxiway Lights	

Section 2 Air Navigation and Obstruction Lighting	628
--	------------

2-2-1 Aeronautical Light Beacons	
2-2-2 Code Beacons and Course Lights	
2-2-3 Obstruction Lights	

Section 3 Airport Marking Aids and Signs	629
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 Identifications Display Area (Airport Ramp Area)	

Chapter 3 Airspace

Section 1 General	651
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	653
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	662
3-3-1 General	
3-3-2 VFR Requirements	
3-3-3 IFR Requirements	
Section 4 Special Use Airspace	663
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	665
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 Weather Reconnaissance Area (WRA)	

Chapter 4 Air Traffic Control

Section 1 Services Available to Pilots675

- 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 FSS's 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 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 System Processor

Section 2 Radio Communications Phraseology and Techniques692

- 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 Operations699

- 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	Exiting the Runway After Landing	
4-3-21	Practice Instrument Approaches	
4-3-22	Option Approach	
4-3-23	Use of Aircraft Lights	
4-3-24	Flight Inspection/"Flight Check" Aircraft in Terminal Areas	
4-3-25	Hand Signals	
4-3-26	Operations at Uncontrolled Airports With Automated Surface Observing System (ASOS)/Automated Weather Sensor System (AWSS)/Automated Weather Observing System (AWOS)	

Section 4 ATC Clearances and Aircraft Separation726

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	
4-4-16	Traffic Alert and Collision Avoidance System (TCAS I & II)	
4-4-17	Traffic Information Service (TIS)	

Section 5 Surveillance Systems736

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.....754

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.....762**

- 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.....765

- 5-1-1 Preflight Preparation
- 5-1-2 Follow IFR Procedures Even When Operating VFR
- 5-1-3 Notice to Airmen (NOTAM) System
- 5-1-4 Flight Plan—VFR Flights
- 5-1-5 Operational Information System (OIS)
- 5-1-6 Flight Plan—Defense VFR (DVFR) Flights
- 5-1-7 Composite Flight Plan (VFR/IFR Flights)
- 5-1-8 Flight Plan (FAA Form 7233-1)—Domestic IFR Flights
- 5-1-9 International Flight Plan (FAA Form 7233-4)—IFR Flights (For Domestic or International Flights)
- 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 Procedures793

- 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 Procedures805

- 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	830
5-4-1	Standard Terminal Arrival (STAR) Procedures	
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 Instrument Approach 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	889
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	Radar 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	896
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 Law Enforcement Operations by Civil and Military Organizations
- 5-6-15 Interception Signals
- 5-6-16 ADIZ Boundaries and Designated Mountainous Areas
- 5-6-17 Visual Warning System (VWS)

Chapter 6 Emergency Procedures

Section 1 General	909
6-1-1 Pilot Responsibility and Authority	
6-1-2 Emergency Condition—Request Assistance Immediately	
Section 2 Emergency Services Available to Pilots	910
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	920
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	926
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	928
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	931
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 Telephone Information Briefing Service (TIBS) (Alaska Only)	
7-1-9 Transcribed Weather Broadcast (TWEB) (Alaska Only)	
7-1-10 Inflight Weather Broadcasts	
7-1-11 Flight Information Services (FIS)	
7-1-12 Weather Observing Programs	
7-1-13 Weather Radar Services	
7-1-14 ATC Inflight Weather Avoidance Assistance	

7-1-15	Runway Visual Range (RVR)	
7-1-16	Reporting of Cloud Heights	
7-1-17	Reporting Prevailing Visibility	
7-1-18	Estimating Intensity of Rain and Ice Pellets	
7-1-19	Estimating Intensity of Snow or Drizzle (Based on Visibility)	
7-1-20	Pilot Weather Reports (PIREPs)	
7-1-21	PIREPs Relating to Airframe Icing	
7-1-22	Definitions of Inflight Icing Terms	
7-1-23	PIREPs Relating to Turbulence	
7-1-24	Wind Shear PIREPs	
7-1-25	Clear Air Turbulence (CAT) PIREPs	
7-1-26	Microbursts	
7-1-27	PIREPs Relating to Volcanic Ash Activity	
7-1-28	Thunderstorms	
7-1-29	Thunderstorm Flying	
7-1-30	Key to Aerodrome Forecast (TAF) and Aviation Routine Weather Report (METAR)	
7-1-31	International Civil Aviation Organization (ICAO) Weather Formats	
Section 2 Altimeter Setting Procedures		992
7-2-1	General	
7-2-2	Procedures	
7-2-3	Altimeter Errors	
7-2-4	High Barometric Pressure	
7-2-5	Low Barometric Pressure	
Section 3 Wake Turbulence.....		995
7-3-1	General	
7-3-2	Vortex Generation	
7-3-3	Vortex Strength	
7-3-4	Vortex Behavior	
7-3-5	Operations Problem Areas	
7-3-6	Vortex Avoidance Procedures	
7-3-7	Helicopters	
7-3-8	Pilot Responsibility	
7-3-9	Air Traffic Wake Turbulence Separations	
Section 4 Bird Hazards and Flight Over National Refuges, Parks, and Forests.....		1002
7-4-1	Migratory Bird Activity	
7-4-2	Reducing Bird Strike Risks	
7-4-3	Reporting Bird Strikes	
7-4-4	Reporting Bird and Other Wildlife Activities	
7-4-5	Pilot Advisories on Bird and Other Wildlife Hazards	
7-4-6	Flights Over Charted U.S. Wildlife Refuges, Parks, and Forest Service Areas	
Section 5 Potential Flight Hazards		1004
7-5-1	Accident Cause Factors	
7-5-2	VFR in Congested Areas	
7-5-3	Obstructions To Flight	
7-5-4	Avoid Flight Beneath Unmanned Balloons	
7-5-5	Unmanned Aircraft Systems	
7-5-6	Mountain Flying	
7-5-7	Use of Runway Half-Way Signs at Unimproved Airports	
7-5-8	Seaplane Safety	
7-5-9	Flight Operations in Volcanic Ash	
7-5-10	Emergency Airborne Inspection of Other Aircraft	
7-5-11	Precipitation Static	
7-5-12	Light Amplification by Stimulated Emission of Radiation (Laser) Operations and Reporting Illumination of Aircraft	

7-5-13	Flying in Flat Light, Brown Out Conditions, and White Out Conditions	
7-5-14	Operations in Ground Icing Conditions	
7-5-15	Avoid Flight in the Vicinity of Exhaust Plumes (Smoke Stacks and Cooling Towers)	
Section 6	Safety, Accident, and Hazard Reports	1016
7-6-1	Aviation Safety Reporting Program	
7-6-2	Aircraft Accident and Incident Reporting	
7-6-3	Near Midair Collision Reporting	
7-6-4	Unidentified Flying Object (UFO) Reports	
7-6-5	Safety Alerts For Operators (SAFO) and Information For Operators (InFO)	

Chapter 8 Medical Facts for Pilots

Section 1	Fitness for Flight	1019
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	1027
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 Operations	1041
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	
Section 2	Special Operations	1046
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	

Appendix 1	Bird/Other Wildlife Strike Report	1063
Appendix 2	Volcanic Activity Reporting Form (VAR)	1064
Appendix 3	Abbreviations/Acronyms	1065
Pilot/Controller Glossary		1071
NASA Aviation Safety Reporting System Form		1147
FAR/AIM Index		1149

AIM

Chapter 2 Aeronautical Lighting and Other Airport Visual Aids

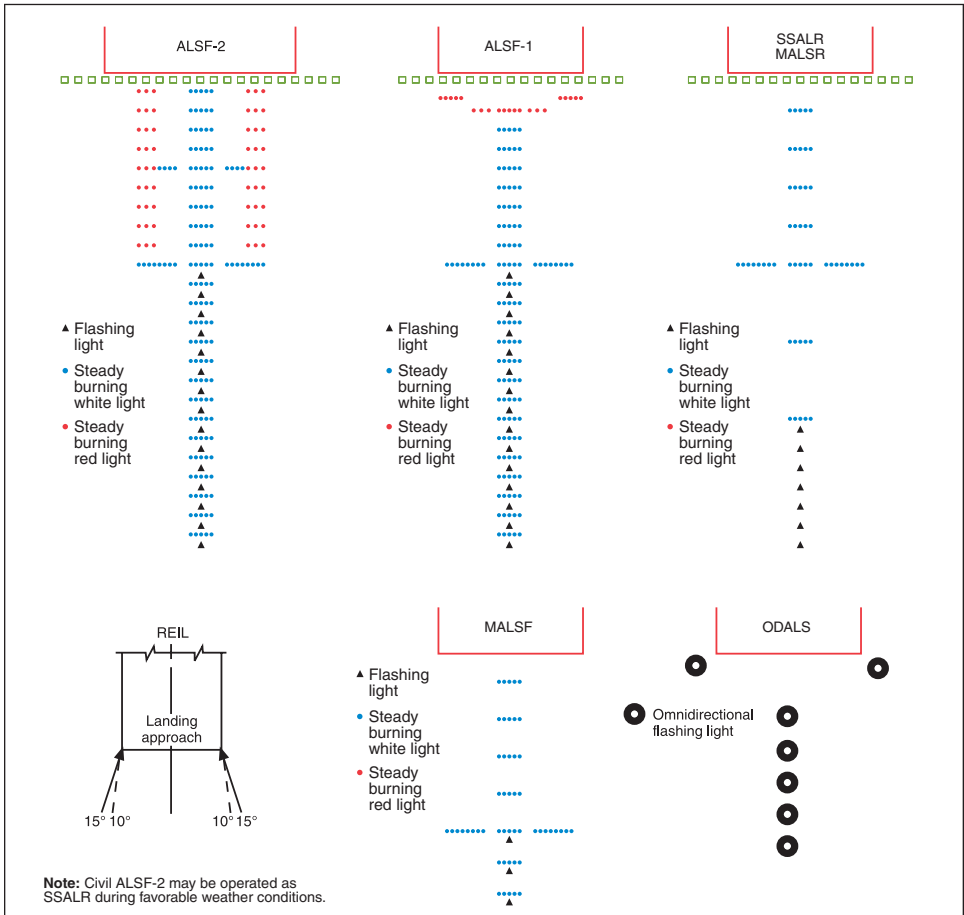
Section 1 Airport Lighting Aids

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.)

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 U.S. and/or applicable notices to airmen (NOTAM).

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 U.S. 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

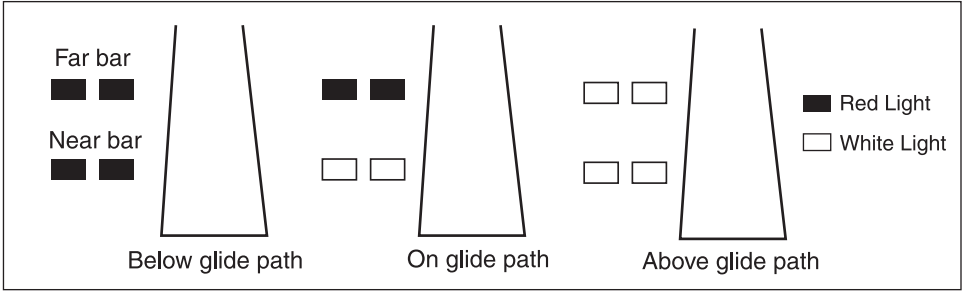


FIGURE 2-1-3
3-Bar VASI

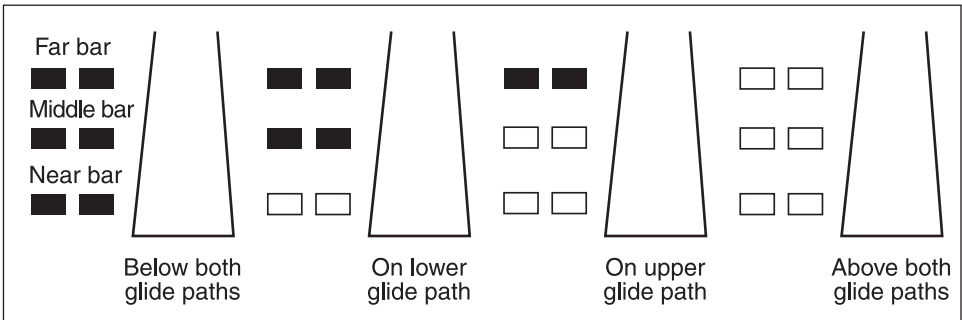


FIGURE 2-1-4
VASI Variations

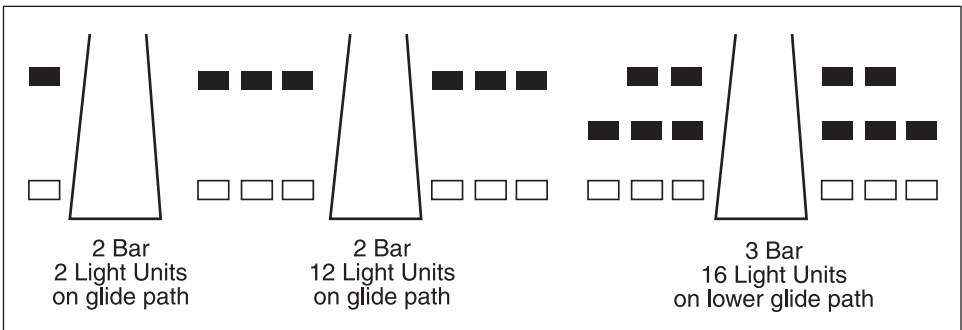


FIGURE 2-1-5
Precision Approach Path Indicator (PAPI)

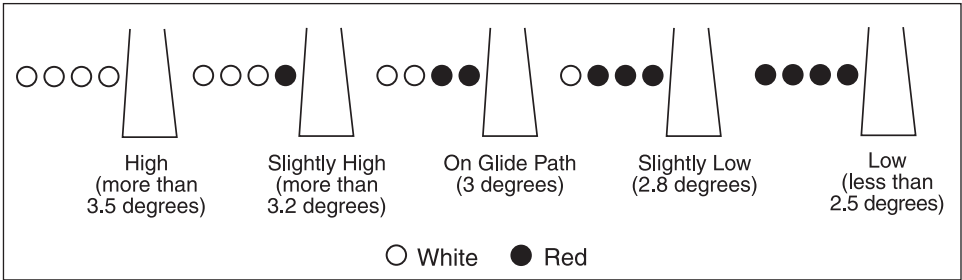
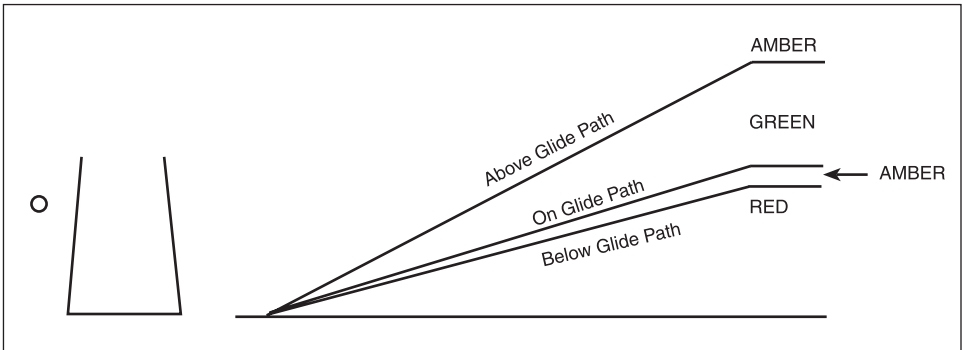


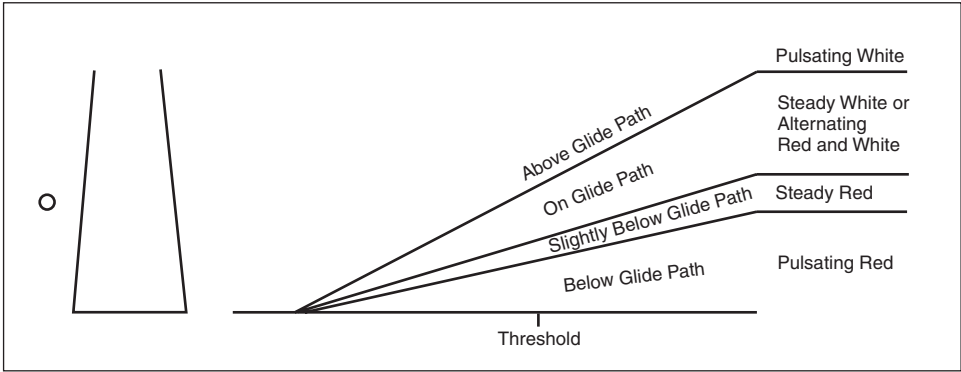
FIGURE 2-1-6
Tri-Color Visual Approach Slope Indicator



Notes:

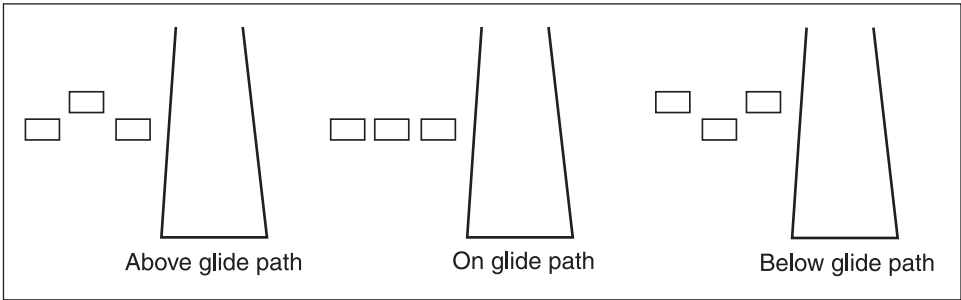
1. Since the tri-color VASI consists of a single light source which could possibly be confused with other light sources, pilots should exercise care to properly locate and identify the light signal.
2. When the aircraft descends from green to red, the pilot may see a dark amber color during the transition 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 2-1-14.)

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, Pilot Responsibilities When Conducting Land and Hold Short Operations (LAHSO), Paragraph 4-3-11.

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), Takeoff Hold Lights (THL), Runway Intersection Lights (RIL), and Final Approach Runway Occupancy Signal (FAROS) in accordance with the position and velocity of the detected surface traffic and approach traffic. REL, THL, and RIL are in-pavement light fixtures that are directly visible to pilots and surface vehicle operators. FAROS alerts arriving pilots that the approaching runway is occupied by flashing the Precision Approach Path Indicator (PAPI). FAROS may be implemented as an add-on to the RWSL system or implemented as a stand-alone system at airports without a RWSL system. 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 2-1-12). 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 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 2-1-13). 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.

Note: *When the THLs extinguish, this is not clearance to begin a takeoff roll. All takeoff clearances will be issued by ATC.*

2. What a pilot would observe: A pilot in position to depart from a runway, or has begun takeoff roll, will observe THLs illuminate in reaction to an aircraft or vehicle on the runway or entering or crossing it. Lights will extinguish when the runway is clear. A pilot may observe several cycles of illumination and extinguishing depending on the amount of crossing traffic.

3. When a pilot observes the red light of the THLs, the pilot should safely stop if it’s feasible or remain stopped. The pilot must contact ATC for resolution if any clearance is in conflict with the lights. Should pilots note illuminated lights while in takeoff roll and under circumstances when stopping is impractical for safety reasons, the crew should proceed according to their best judgment while understanding the illuminated lights indicate that continuing the takeoff is unsafe. Contact ATC at the earliest possible opportunity.

d. Runway Intersection Lights (RIL): The RIL system is composed of flush mounted, in-pavement, unidirectional light fixtures in a double longitudinal row aligned either side of the runway centerline lighting in the same manner as THLs. Their appearance to a pilot is similar to that of THLs. Fixtures are focused toward the arrival end of the runway, and they extend for 3,000 feet in front of an aircraft that is approaching an intersecting runway. They end at the Land and Hold Short Operation (LASHO) light bar or the hold short line for the intersecting runway.

1. RIL Operating Characteristics—Departing Aircraft:

RILs will illuminate for an aircraft departing or in position to depart when there is high speed traffic operating on the intersecting runway (see Figure 2-1-9). Note that there must be an aircraft or vehicle in a position to observe the RILs for them to illuminate. Once the conflicting traffic passes through the intersection, the RILs extinguish.

2. RIL Operating Characteristics—Arriving Aircraft:

RILs will illuminate for an aircraft that has landed and is rolling out when there is high speed traffic on the intersecting runway that is ± 5 seconds of

meeting at the intersection. Once the conflicting traffic passes through the intersection, the RILs extinguish.

3. What a pilot would observe: A pilot departing or arriving will observe RILs illuminate in reaction to the high speed traffic operation on the intersecting runway. The lights will extinguish when that traffic has passed through the runway intersection.

4. Whenever a pilot observes the red light of the RIL array, the pilot will stop before the LA-HSO stop bar or the hold line for the intersecting runway. If a departing aircraft is already at high speed in the takeoff roll when the RILs illuminate, it may be impractical to stop for safety reasons. The crew should safely operate according to their best judgment while understanding the illuminated lights indicate that continuing the takeoff is unsafe. Contact ATC at the earliest possible opportunity.

e. The Final Approach Runway Occupancy Signal (FAROS) is communicated by flashing of the Precision Approach Path Indicator (PAPI) (see Figure 2-1-9). When activated, the light fixtures of the PAPI flash or pulse to indicate to the pilot on an approach that the runway is occupied and that it may be unsafe to land.

Note: FAROS is an independent automatic alerting system that does not rely on ATC control or input.

1. FAROS Operating Characteristics:

If an aircraft or surface vehicle occupies a FAROS equipped runway, the PAPI(s) on that runway will flash. The glide path indication will not be affected, and the allotment of red and white PAPI lights observed by the pilot on approach will not change. The FAROS system will flash the PAPI when traffic enters the runway and there is an aircraft on approach and within 1.5 nautical miles of the landing threshold.

2. What a pilot would observe: A pilot on approach to the runway will observe the PAPI flash if there is traffic on the runway and will notice the PAPI ceases to flash when the traffic moves outside the hold short lines for the runway.

3. When a pilot observes a flashing PAPI at 500 feet above ground level (AGL), the contact height, the pilot must look for and acquire the traffic on the runway. At 300 feet AGL, the pilot must contact ATC for resolution if the FAROS indication is in conflict with the clearance. If the PAPI continues to flash, the pilot must execute an immediate "go around" and contact ATC at the earliest possible opportunity.

f. Pilot Actions:

1. When operating at airports with RWSL, pilots will operate with the transponder "On" when departing the gate or parking area until it is shut-down upon arrival at the gate or parking area. This ensures interaction with the FAA surveillance systems such as ASDE-X/Airport Surface Surveillance Capability (ASSC) which provide information to the RWSL system.

2. Pilots must always inform the ATCT when they have either stopped, are verifying a landing clearance, or are executing a go-around due to RWSL or FAROS indication that are in conflict with ATC instructions. Pilots must request clarification of the taxi, takeoff, or landing clearance.

3. Never cross over illuminated red lights. Under normal circumstances, RWSL will confirm the pilot's taxi or takeoff clearance previously issued by ATC. If RWSL indicates that it is unsafe to takeoff from, land on, cross, or enter a runway, immediately notify ATC of the conflict and re-confirm the clearance.

4. Do not proceed when lights have extinguished without an ATC clearance. RWSL verifies an ATC clearance, it does not substitute for an ATC clearance.

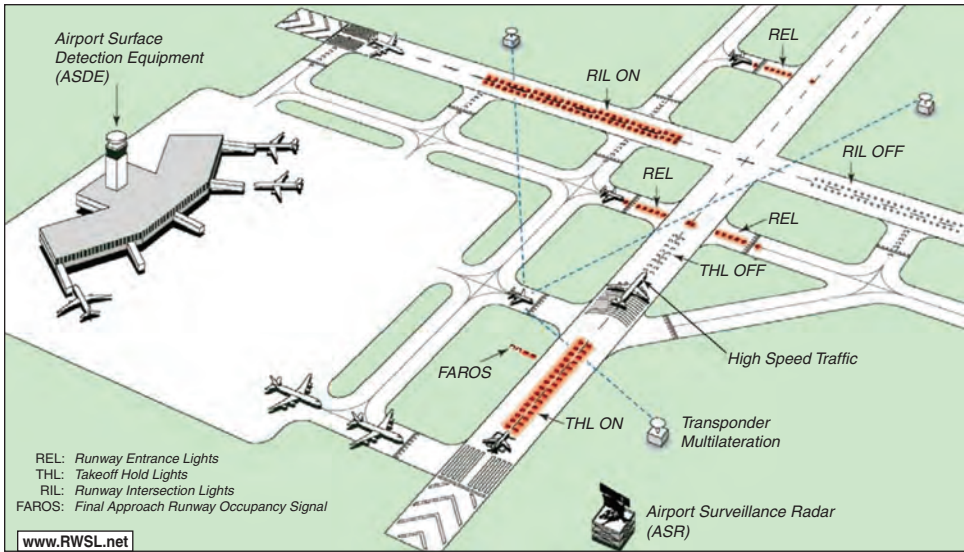
5. Never land if PAPI continues to flash. Execute a go-around and notify ATC.

g. ATC Control of RWSL System:

1. Controllers can set in-pavement lights to one of five (5) brightness levels to assure maximum conspicuity under all visibility and lighting conditions. REL, THL, and RIL subsystems may be independently set.

2. System lights can be disabled should RWSL operations impact the efficient movement of air traffic or contribute, in the opinion of the assigned ATC Manager, to unsafe operations. REL, THL, RIL, and FAROS light fixtures may be disabled separately. Disabling of the FAROS subsystem does not extinguish PAPI lights or impact its glide path function. Whenever the system or a component is disabled, a NOTAM must be issued, and the Automatic Terminal Information System (ATIS) must be updated.

FIGURE 2-1-9
Runway Status Light System



2-1-7 Stand-Alone Final Approach Runway Occupancy Signal (FAROS)

a. Introduction:

The stand-alone FAROS system is a fully automated system that provides runway occupancy status to pilots on final approach to indicate whether it may be unsafe to land. When an aircraft or vehicle is detected on the runway, the Precision Approach Path Indicator (PAPI) light fixtures flash as a signal to indicate that the runway is occupied and that it may be unsafe to land. The stand-alone FAROS system is activated by localized or comprehensive sensors detecting aircraft or ground vehicles occupying activation zones.

The stand-alone FAROS system monitors specific areas of the runway, called activation zones, to determine the presence of aircraft or ground vehicles in the zone (see Figure 2-1-10). These activation zones are defined as areas on the runway that are frequently occupied by ground traffic during normal airport operations and could present a hazard to landing aircraft. Activation zones may include the full-length departure position, the midfield departure position, a frequently crossed intersection, or the entire runway.

Pilots can refer to the airport specific FAROS pilot information sheet for activation zone configuration.

Clearance to land on a runway must be issued by Air Traffic Control (ATC). ATC personnel have limited control over the system and may not be able to view the FAROS signal.

b. Operating Characteristics:

If an aircraft or ground vehicle occupies an activation zone on the runway, the PAPI light fixtures on that runway will flash. The glide path indication is not affected, i.e. the configuration of red and white PAPI lights observed by the pilot on approach does not change. The stand-alone FAROS system flashes the PAPI lights when traffic occupies an activation zone whether or not there is an aircraft on approach.

c. Pilot Observations:

A pilot on approach to the runway observes the PAPI lights flashing if there is traffic on the runway activation zones and notices the PAPI lights cease to flash when the traffic moves outside the activation zones.

A pilot on departure from the runway should disregard any observations of flashing PAPI lights.

d. Pilot Actions:

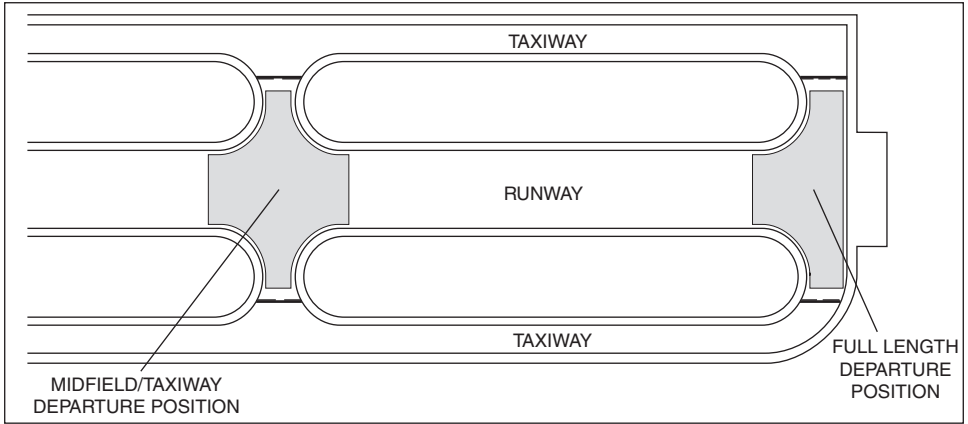
When a pilot observes a flashing PAPI at 500 feet above ground level (AGL), the pilot must look for and attempt to acquire the traffic on the runway. At 300 feet AGL, the pilot must contact ATC for resolution if the FAROS indication is in conflict

with the clearance (see Figure 2-1-11). If the PAPI lights continue to flash and the pilot cannot visually determine that it is safe to land, the pilot must execute an immediate “go around”. As with operations at non-FAROS airports, it is always the pilot’s responsibility to determine whether or not it is safe to continue with the approach and to land on

the runway. Pilots should inform the ATCT when they have executed a go around due to a FAROS indication that is in conflict with ATC instructions.

Note: At this time, the stand-alone FAROS system is not widely implemented and is used for evaluation purposes.

**FIGURE 2-1-10
FAROS Activation Zones**



**FIGURE 2-1-11
FAROS Glide Slope Action Points**

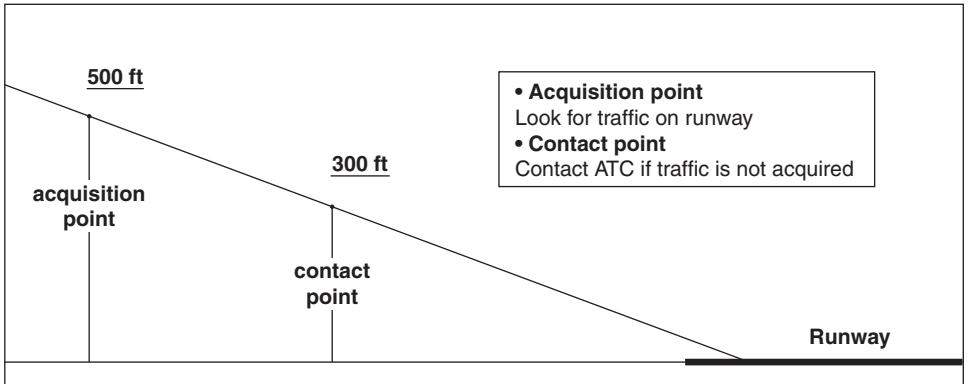


FIGURE 2-1-12
Runway Entrance Lights



FIGURE 2-1-13
Takeoff Hold Lights



FIGURE 2-1-14
Taxiway Lead-On Light Configuration



2-1-8 Control of Lighting Systems

a. Operation of approach light systems and runway lighting is controlled by the control tower (ATCT). At some locations the FSS may control the lights where there is no control tower in operation.

b. Pilots may request that lights be turned on or off. Runway edge lights, in-pavement lights and approach lights also have intensity controls which may be varied to meet the pilots request. Sequenced flashing lights (SFL) may be turned on and off. Some sequenced flashing light systems also have intensity control.

2-1-9 Pilot Control of Airport Lighting

Radio control of lighting is available at selected airports to provide airborne control of lights by keying the aircraft's microphone. Control of lighting systems is often available at locations without specified hours for lighting and where there is no control tower or FSS or when the tower or FSS is closed (locations with a part-time tower or FSS) or specified hours. All lighting systems which are radio controlled at an airport, whether on a single runway or multiple runways, operate on the same radio frequency. (See Tables 2-1-1 and 2-1-2.)

**TABLE 2-1-1
RUNWAYS WITH APPROACH LIGHTS**

Lighting System	No. of Int. Steps	Status During Nonuse Period	Intensity Step Selected Per No. of Mike Clicks		
			3 Clicks	5 Clicks	7 Clicks
Approach Lights (Med. Int.)	2	Off	Low	Low	High
Approach Lights (Med. Int.)	3	Off	Low	Med	High
MIRL	3	Off or Low	◆	◆	◆
HIRL	5	Off or Low	◆	◆	◆
VASI	2	Off	★	★	★

Notes: ◆ Predetermined intensity step.
★ Low intensity for night use. High intensity for day use as determined by photocell control.

**TABLE 2-1-2
RUNWAYS WITHOUT APPROACH LIGHTS**

Lighting System	No. of Int. Steps	Status During Nonuse Period	Intensity Step Selected Per No. of Mike Clicks		
			3 Clicks	5 Clicks	7 Clicks
MIRL	3	Off or Low	Low	Med	High
HIRL	5	Off or Low	Step 1 or 2	Step 3	Step 5
LIRL	1	Off	On	On	On
VASI ★	2	Off	◆	◆	◆
REIL ★	1	Off	Off	On/Off	On
REIL ★	3	Off	Low	Med	High

Notes: ◆ Low intensity for night use. High intensity for day use as determined by photocell control.
★ The control of VASI and/or REIL may be independent of other lighting systems.

a. With FAA approved systems, various combinations of medium intensity approach lights, runway lights, taxiway lights, VASI and/or REIL may be activated by radio control. On runways with both approach lighting and runway lighting (runway edge lights, taxiway lights, etc.) systems, the approach lighting system takes precedence for air-to-ground radio control over the runway lighting system which is set at a predetermined intensity step, based on expected visibility conditions. Runways without approach lighting may provide radio controlled intensity adjustments of runway edge lights. Other lighting systems, including VASI, REIL, and taxiway lights may be either controlled with the runway edge lights or controlled independently of the runway edge lights.

b. The control system consists of a 3-step control responsive to 7, 5, and/or 3 microphone clicks. This 3-step control will turn on lighting facilities capable of either 3-step, 2-step or 1-step operation. The 3-step and 2-step lighting facilities can be altered in intensity, while the 1-step cannot. All lighting is illuminated for a period of 15 minutes from the most recent time of activation and may not be extinguished prior to end of the 15 minute period (except for 1-step and 2-step REILs which may be turned off when desired by keying the mike 5 or 3 times respectively).

c. Suggested use is to always initially key the mike 7 times; this assures that all controlled lights are turned on to the maximum available intensity. If desired, adjustment can then be made, where the capability is provided, to a lower intensity (or the REIL turned off) by keying 5 and/or 3 times. Due to the close proximity of airports using the same frequency, radio controlled lighting receivers may be set at a low sensitivity requiring the aircraft to be relatively close to activate the system. Consequently, even when lights are on, always key mike as directed when overflying an airport of intended landing or just prior to entering the final segment of an approach. This will assure the aircraft is close enough to activate the system and a full 15 minutes lighting duration is available. Approved lighting systems may be activated by keying the mike (within 5 seconds) as indicated in Table 2-1-3.

TABLE 2-1-3
RADIO CONTROL SYSTEM

Key Mike	Function
7 times within 5 seconds	Highest intensity available
5 times within 5 seconds	Medium or lower intensity (Lower REIL or REIL-off)
3 times within 5 seconds	Lowest intensity available (Lower REIL or REIL-off)

d. For all public use airports with FAA standard systems the Chart Supplement U.S. contains the types of lighting, runway and the frequency that is used to activate the system. Airports with IAPs include data on the approach chart identifying the light system, the runway on which they are installed, and the frequency that is used to activate the system.

Note: Although the CTAF is used to activate the lights at many airports, other frequencies may also be used. The appropriate frequency for activating the lights on the airport is provided in the Chart Supplement U.S. and the standard instrument approach procedures publications. It is not identified on the sectional charts.

e. Where the airport is not served by an IAP, it may have either the standard FAA approved control system or an independent type system of different specification installed by the airport sponsor. The Chart Supplement U.S. contains descriptions of pilot controlled lighting systems for each airport having other than FAA approved systems, and explains the type lights, method of control, and operating frequency in clear text.

2-1-10 Airport/Heliport Beacons

a. Airport and heliport beacons have a vertical light distribution to make them most effective from one to ten degrees above the horizon; however, they can be seen well above and below this peak spread. The beacon may be an omnidirectional capacitor-discharge device, or it may rotate at a constant speed which produces the visual effect of flashes at regular intervals. Flashes may be one or two colors alternately. The total number of flashes are:

1. 24 to 30 per minute for beacons marking airports, landmarks, and points on Federal airways.

2. 30 to 45 per minute for beacons marking heliports.

b. The colors and color combinations of beacons are:

1. White and Green—Lighted land airport.

2. *Green alone—Lighted land airport.

3. White and Yellow—Lighted water airport.

4. *Yellow alone—Lighted water airport.

5. Green, Yellow, and White—Lighted heliport.

Note: *Green alone or yellow alone is used only in connection with a white-and-green or white-and-yellow beacon display, respectively.

c. Military airport beacons flash alternately white and green, but are differentiated from civil beacons by dualpeaked (two quick) white flashes between the green flashes.

d. In Class B, Class C, Class D and Class E surface areas, operation of the airport beacon

during the hours of daylight often indicates that the ground visibility is less than 3 miles and/or the ceiling is less than 1,000 feet. ATC clearance in accordance with 14 CFR Part 91 is required for landing, takeoff and flight in the traffic pattern. Pilots should not rely solely on the operation of the airport beacon to indicate if weather conditions are IFR or VFR. At some locations with operating control towers, ATC personnel turn the beacon on or off when controls are in the tower. At many airports the airport beacon is turned on by a photoelectric cell or time clocks and ATC personnel can not control them. There is no regulatory requirement for daylight operation and it is the pilot's responsibility to comply with proper preflight planning as required by 14 CFR Section 91.103.

2-1-11 Taxiway Lights

a. Taxiway Edge Lights. Taxiway edge lights are used to outline the edges of taxiways during periods of darkness or restricted visibility conditions. These fixtures emit blue light.

Note: *At most major airports these lights have variable intensity settings and may be adjusted at pilot request or when deemed necessary by the controller.*

b. Taxiway Centerline Lights. Taxiway centerline lights are used to facilitate ground traffic under low visibility conditions. They are located along the taxiway centerline in a straight line on straight portions, on the centerline of curved portions, and along designated taxiing paths in portions of runways, ramp, and apron areas. Taxiway centerline lights are steady burning and emit green light.

c. Clearance Bar Lights. Clearance bar lights are installed at holding positions on taxiways in order to increase the conspicuity of the holding position in low visibility conditions. They may also be installed to indicate the location of an intersecting taxiway during periods of darkness. Clearance bars consist of three in-pavement steady-burning yellow lights.

d. Runway Guard Lights. Runway guard lights are installed at taxiway/runway intersections. They are primarily used to enhance the conspicuity of taxiway/runway intersections during low visibility conditions, but may be used in all weather conditions. Runway guard lights consist of either a pair of elevated flashing yellow lights installed on either side of the taxiway, or a row of in-pavement yellow lights installed across the entire taxiway, at the runway holding position marking.

Note: *Some airports may have a row of three or five in-pavement yellow lights installed at taxiway/runway intersections. They should not be confused with clearance bar lights described in paragraph 2-1-11c, Clearance Bar Lights.*

e. Stop Bar Lights. Stop bar lights, when installed, are used to confirm the ATC clearance to enter or cross the active runway in low visibility conditions (below 1,200 ft Runway Visual Range). A stop bar consists of a row of red, unidirectional, steady-burning in-pavement lights installed across the entire taxiway at the runway holding position, and elevated steady-burning red lights on each side. A controlled stop bar is operated in conjunction with the taxiway centerline lead-on lights which extend from the stop bar toward the runway. Following the ATC clearance to proceed, the stop bar is turned off and the lead-on lights are turned on. The stop bar and lead-on lights are automatically reset by a sensor or backup timer.

Caution: *Pilots should never cross a red illuminated stop bar, even if an ATC clearance has been given to proceed onto or across the runway.*

Note: *If after crossing a stop bar, the taxiway centerline lead-on lights inadvertently extinguish, pilots should hold their position and contact ATC for further instructions.*