

ORDER

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**AIRCRAFT CERTIFICATION SERVICE
FAA FLIGHT TEST RESPONSIBILITIES,
PROCEDURES, AND TRAINING**



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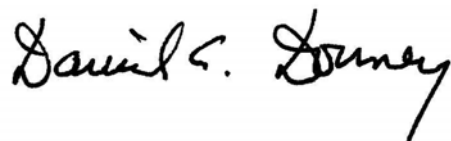
**DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION**

DIRECTIVE NO.

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FOREWORD

This order prescribes the Federal Aviation Administration's (FAA's) Aircraft Certification Service (AIR) policy and procedures for flight test pilot/engineer responsibilities, procedures, and training.

A handwritten signature in black ink, reading "David A. Downey". The signature is written in a cursive style with a large, stylized 'D' and 'A'.

David A. Downey
Rotorcraft Directorate, ASW-100

TABLE OF CONTENTS

CHAPTER 1. FLIGHT TEST PILOT/ENGINEER RESPONSIBILITIES, PROCEDURES, AND TRAINING OVERVIEW

<i>Paragraph</i>	<i>Page</i>
100. Purpose.....	1
101. Distribution.....	1
102. Who This Order Applies To	1
103. Background	1
104. General Responsibilities	1
105. Records Management	2

CHAPTER 2. GENERAL FLIGHT TEST PERSONNEL QUALIFICATION POLICY AND REQUIREMENTS

200. Initial Training and Qualification of Flight Test Personnel	3
201. Initial Flight Training.....	4
202. Recurrent Training of Flight Test Personnel	4
203. Recurrent Flight Training	5
204. Currency	5
205. Cockpit Pass	5
206. Five-Year Flight Training Plan	5
207. Failure to Meet Training Requirements	6
208. Drug Screening (Testing Designated Positions)	6

CHAPTER 3. SPECIFIC PILOT QUALIFICATION POLICY

300. Aircraft Certification Office (ACO) Flight Test Pilots.....	7
301. Flight Test Managers.....	7
302. Imported Transport Category Aircraft	7
303. Production Surveillance	8
304. Qualification on Test Aircraft.....	8
305. Familiarization Flight Time on New Models.....	8
306. Airman Rating Qualification During Type Certificate (TC)/ Supplemental Type Certificate (STC).....	8
307. Initial Type Rating.....	8

CHAPTER 4. RESPONSIBILITY FOR QUALIFICATIONS

<i>Paragraph</i>	<i>Page</i>
400. Skills and Knowledge.....	9
401. Determination of Qualifications for Flight Testing	9

CHAPTER 5. FLIGHT TEST RESPONSIBILITIES AND PROCEDURES

500. Flight Test Planning.....	11
501. Type Inspection Authorization (TIA)	11
502. Letters of Authorization	11
503. Concurrent Testing.....	11
504. Flight Equipment	11
505. Ballast Requirements.....	12
506. Spin Tests.....	12
507. Official Flight Tests.....	13
508. Non-certification / Developmental Flight Testing.....	13
509. Pilot Relationships	13

CHAPTER 6. INTER-ACO COOPERATION

600. Short Duration Projects.	15
---	-----------

CHAPTER 7. TRAINING REQUESTS

700. Flight Test Training.....	17
---------------------------------------	-----------

APPENDIX 1. FLIGHT PROGRAM OVERSIGHT COMMITTEE (FPOC) CHARTER (3 pages)

APPENDIX 2. SAMPLE LETTER OF AUTHORIZATION (LOA) (1 page)

APPENDIX 3. SPIN TEST/ RECOVERY DEVICE REQUIREMENT DECISION TREE (2 pages)

APPENDIX 4. SAMPLE LETTER, FAA FLIGHT TEST PILOT SEAT POSITION (2 pages)

APPENDIX 5. MEDICAL STANDARDS FOR FAA FLIGHT TEST ENGINEERS (4 pages)

DIRECTIVE FEEDBACK INFORMATION (1 page)

CHAPTER 1. FLIGHT TEST PILOT/ENGINEER RESPONSIBILITIES, PROCEDURES, AND TRAINING OVERVIEW

100. Purpose. This order establishes responsibilities, procedures and guidance pertaining to FAA flight-testing. It also outlines certain training and type rating requirements. This information supersedes pilot training data contained in Order 8110.4B, Type Certification, and supplements the guidance in Order 8000.32, National Training Plan for Aerospace Engineers, Flight Test Pilots, and Program Support Specialists.

101. Distribution. This order is distributed to Washington Headquarters branch levels of the Aircraft Certification Service (AIR), to the branch level in the regional Aircraft Certification Directorates, all Aircraft Certification Offices (ACOs), the Brussels Aircraft Certification Division, the office of Training and Higher Education, and the FAA Academy.

102. Who This Order Applies To. All flight test pilots (FTP) (2181 series), flight test engineers (FTEs) (0861 series), and their managers (managers can be 2181, 0861, or 0340 series) will adhere to the policies contained in this order. Per the requirements of paragraph 301 of this Order, flight test managers who are also classified as flight test pilots, and who actively participate in flight tests, are required to meet the same standards as FTPs (except for recency of flight experience flight time). The requirements of this order should be followed during budget preparation to identify pilot training needs. The Flight Program Oversight Committee (FPOC) has responsibility for the oversight of the AIR Flight Program. Appendix 1 contains the charter of the FPOC.

103. Background. The Aircraft Certification Service workforce includes a cadre of FTPs and FTEs (otherwise referred to as crewmembers in this order), who are assigned among the Service's directorate staffs and ACOs. Those flight test personnel comprise one of the most highly credentialed, experienced, and skilled flight-test organizations in the aviation industry today. This group of flight test professionals is instrumental in achieving the successful accomplishment of AIR's strategic goals and in maintaining a position of preeminence in Safety Management. A flight test staff that represents the FAA well, contributes significantly to the overall effectiveness and credibility of the Service in the national and international aviation arenas. FAA flight test personnel provide the final validation in the certification process, and provide credible flight operations and aircraft level perspective in the Continued Operational Safety (COS) process. In order to establish operating limitations, FAA FTPs and FTEs routinely fly technically advanced and unconventional aircraft well beyond the most adverse conditions the aircraft will encounter in operation. FTPs fly aircraft during marginal conditions and may encounter unexpected and potentially hazardous situations, which require exceptional piloting skill. The safety of FAA flight test personnel, and the applicant flight crews who fly with them, is paramount to the accomplishment of FAA safety management responsibilities. The keys to ensuring flight test safety are: hiring and retaining the most qualified people, training them continuously, keeping them current and proficient in the practice of flight testing, and maintaining an effective safety program.

104. General Responsibilities. FAA flight test personnel perform essential roles in AIR's certification programs, COS efforts, and delegation oversight functions. FTPs and FTEs review

and approve applicant's type certification plans and flight test plans, perform flight tests on new or modified aircraft, evaluate the resultant engineering data to determine compliance with applicable certification regulations, and appropriately document the approved data and associated findings. Those tests typically include assessments of aircraft performance, flight characteristics, systems integration, and human factors design considerations. In the COS arena, in addition to Aircraft Certification Systems Evaluation Program (ACSEPs), FAA flight test personnel evaluate service difficulty reports and manufacturer's service bulletins, provide the engineering flight test and flight operations perspective in the development of Airworthiness Directives, and develop responses to FAA and National Transportation Safety Board safety recommendations. FAA flight test personnel are also responsible for the oversight and guidance of Designated Engineering Representatives (DERs), delegated organizations, production flight test, and a myriad of other flight test-related tasks.

105. Records Management. Refer to Orders 0000.1, FAA Standard Subject Classification System; 1350.14, Records Management; and 1350.15, Records Organization, Transfer, and Destruction Standards; or your office records Management Officer (RMO)/Directives Management Officer (DMO) for guidance regarding retention or disposition of records. Any deficiencies found, clarifications needed, or improvements suggested regarding the content of this order should be forwarded to the Aircraft Certification Service, Planning and Financial Resources Management Branch, AIR-530, Attention: Directives Management Officer, for consideration. Your assistance is welcomed. Federal Aviation Administration Form 1320-19, Directives Feedback Information, is located on the last page of this document for your convenience. If an interpretation is urgently needed, you may contact the AIR Senior Flight Program Manager, ASW-100, or an FPOC member, but you should also use FAA Form 1320-19 as a follow-up to verbal conversation.

CHAPTER 2. GENERAL FLIGHT TEST PERSONNEL QUALIFICATION, POLICY AND REQUIREMENTS

200. Initial Training and Qualification of Flight Test Personnel. Each newly hired FTP or FTE [an FAA employee for less than two (2) years] is initially qualified by successfully completing a formal flight test training program coupled with on-the-job training. This order should be cited as the authority for requesting this required initial training. The courses listed in this chapter of the order are considered Priority 1 training for all FTPs and FTEs. Other training requirements are contained in Order 8000.32.

a. Each FTP and FTE should complete the Engineering Indoctrination Training Course (#21936 and 27936) within the first 6 months of service with the Aircraft Certification Service.

b. FTPs and FTEs must successfully complete the formal Initial Flight Test Pilot/Flight Test Engineer Course #28083, within the first year following assignment to flight test duty. Failure to successfully complete the course could result in reassignment, demotion, or dismissal from assignment as a FTP or FTE in the FAA.

c. The Crew Resource Management (CRM) Course, #12062, should be completed within the first year of employment.

d. Within the first 2 years of employment, each FTP or FTE should complete the following courses:

(1) Core Job Functions Course (#21017)

(2) Part 21 Course (#21016)

(3) Delegation Management Course (#21050)

e. Prior to participating in flight-testing, FAA employees must meet the following requirements:

(1) Medical Certificates. FAA Management has an over-riding obligation to ensure that our employees are physically capable of performing flight duties. Employee well-being and safety are our major concerns. The only method of ensuring the medical fitness of employees to perform flight duties is by a flight physical. Flight physicals should be coordinated through the local Office of Aerospace Medicine.

(a) All FTPs are required to maintain at least an FAA Class II medical certificate in order to perform their duties.

(b) All active FTEs are required to maintain at least an FAA Class III medical certificate or meet the medical standards outlined in Appendix 5 in order to perform their duties.

(c) Other individuals whose proper performance of duty is necessary for safety during flight tests must have a current FAA Class III medical certificate to perform those duties.

(2) Physiological Training.

(a) FAA personnel participating in flight tests above 10,000 feet, where oxygen equipment is normally used, or on pressurized aircraft that operate at altitudes above 25,000 feet, must have completed an initial physiological training course (including altitude chamber) prior to being assigned to flight tests, where the environmental control and oxygen systems have not been deemed mature by the FAA. Flight test participation of FAA personnel other than an FTE must be considered in the risk assessment required by FAA Order 4040.26.

(b) The physiological training course is routinely given at the Civil Aeromedical Institute (CAMI), although completion of a training course conducted by one of the military services or an approved civil facility is acceptable. Previous altitude chamber training as a flight crewmember of the U.S. Armed Forces, is an acceptable means of meeting the initial training requirements of this order.

(3) Smoke Evacuation Training. It is recommended that all flight test personnel participate in a smoke evacuation drill conducted by the Accident Investigation School at Oklahoma City, OK, or equivalent, at least once early in their careers. This training provides a very real appreciation of the difficulty of performing emergency evacuation procedures.

(4) Survival Training. All flight test crews must complete survival training as specified in FAA Order 4040.9D. Survival training received while a flight crew member of the U.S. Armed Forces, satisfies this requirement. Commercially available courses are appropriate.

201. Initial Flight Training.

a. It is desirable to have career FTPs attend an initial qualification course (type rating/formally trained) in a new or different type of aircraft, as soon as possible after initial assignment. Additional initial qualification courses should be offered subsequently, based on the operational needs of the office and available training resources. However, this order will NOT be used as authority to obtain an Initial Type Rating in an aircraft in which the FTP will probably not perform certification testing.

b. In order to participate in the AIR Flight Currency Program, each FTP must qualify in accordance with FAA Order 4040.9.

202. Recurrent Training of Flight Test Personnel.

a. FTPs and FTEs must complete the Recurrent Flight Test Pilot/Flight Test Engineer Course #28273, every 4 years.

b. Recurrent physiological training is required when official duties require high altitude flight, currently every 4 years for ground school and every 8 years in the altitude chamber.

c. Recurrent survival training must be completed in accordance with FAA Order 4040.9D.

d. For FTPs, a CRM Recurrent Course must be completed every 3 years. This requirement may be completed during formal recurrent flight training in type-rated aircraft or at the FAA Academy. CRM Recurrent Course for FTPs and FTEs will also be required to be taken concurrently at the Recurrent Flight Test Pilot/Flight Test Engineer Course.

e. For FTEs, the CRM Recurrent Course for FTPs and FTEs must be completed every 4 years at the Recurrent Flight Test Pilot/Flight Test Engineer Course.

203. Recurrent Flight Training. All FTPs will be scheduled to complete at least one recurrent training course annually in the class of aircraft appropriate to their expected workload, unless scheduled for initial qualification training in another type of aircraft the same year. That recurrent training must be obtained in a formal course. If an FTP is involved with both fixed and rotary wing testing, recurrent training may be completed annually in each category. Recurrent training for normal category airplanes and normal category helicopters may be obtained at the local level following the guidelines of FAA Order 4040.9D, FAA Aircraft Management Program.

204. Currency. The Aircraft Management Program (FAA Order 4040.9D) must be used to ensure that all FTPs are proficient and have flown at least 100 hours per year (48 hours per year for active flight test manager pilots). To ensure that FTPs meet the minimum flight hour requirements of Order 4040.9D, the certification directorates should request aircraft rental resources. Directorate managers should consider the ratings and currency requirements of their FTPs who are both fixed-wing and rotary-wing rated. If such requests are not accepted at the regional level, the directorate manager must notify the Aircraft Certification Service Senior Flight Program Manager in writing. Additionally, FAA FTPs must maintain the instrument and night recent flight experience requirements of FAR 61.57.

205. Cockpit Pass. It is virtually impossible for anyone to remain abreast of the technology currently being installed in aircraft. Therefore, each FTP (and FTE) is encouraged to apply for a cockpit pass following the instructions contained in Order 8000.38, "Aviation Safety Inspector Credential Program," (FAA Form 110A), as an Aviation Certification Specialist. All requests should be routed through the directorate manager and the Director, Aircraft Certification Service, for approval. FTPs and FTEs are encouraged to use a cockpit pass on commercial flights to enhance their knowledge of new technology and to familiarize themselves with the operation of modern equipment used by flight crews in the National Airspace System. This program also provides an additional set of eyes and ears in the cockpit, which many captains appreciate. This type of pass can only be used in conjunction with a purchased ticket and while on official FAA business.

206. Five-Year Flight Training Plan. Each Flight Test Manager/ACO Manager will develop and maintain a Five-Year Flight Training Plan for each assigned FTP. The five-year training plan must ensure that assigned FTPs will obtain the necessary type ratings appropriate to their regional responsibilities (Priority (1) training requirement). FTPs may be type rated or formally trained in:

- a. Single engine reciprocating airplane, both tricycle gear and tail wheel,
- b. light reciprocating twin-engine airplane,
- c. multi-engine turbo-propeller airplane,
- d. business jets and/or regional jets,
- e. narrow body transports,
- f. wide body transports,
- g. normal and transport helicopters (where applicable), and
- h. any other special aircraft types that may be appropriate for the type certificate (TC)/supplemental type certificate (STC) projects typically flown within the office's geographic area of responsibility (e.g., seaplanes, gyroplanes, gliders, lighter-than-air (LTA)-balloons, LTA-airships).

NOTE: Items a through h are not mission critical; however, it is the goal of AIR to have as many career FTPs as possible who are trained and experienced in the above categories of aircraft. Previous training and ratings (military, airline, etc.) may be used to meet the above requirements.

207. Failure to Meet Training Requirements. If the training requirements of this order cannot be met for any reason (e.g., budgetary), then a letter of waiver from the requirements must be issued to the individual FTP or FTE (including Flight Test Managers) by his or her supervisor with an explanation of why the requirements were not met. CRM training waivers are approved by the FPFSSO and forwarded to the FAA Senior Flight Safety Officer for processing. A directorate manager must approve waivers for other than budgetary reasons. A copy of each waiver should be forwarded to the AIR Senior Flight Program Manager. The letter of waiver will be maintained locally with the individual's flight qualification records. The waiver letter will allow the individual to continue to perform flight-testing under the conditions specified in the letter.

208. Drug Screening. Flight Testing Personnel (FTP and FTE) are Testing Designated Positions and are required by Executive Order 12564 and the Office of National Drug Control Policy to participate in substance abuse screening. Guidance on procedures are contained in:

- a. U.S. Department of Transportation Order 3910.1C, Drug and Alcohol-Free Departmental Workplace; and/or
- b. a collective bargaining agreement, if applicable.

CHAPTER 3. SPECIFIC PILOT QUALIFICATION POLICY

300. Aircraft Certification Office (ACO) Flight Test Pilots.

a. Each ACO should have at least two FTPs who are type-rated or formally trained in the aircraft types currently in production for which the ACO is geographically responsible. The term “formally trained” means a type rating course or a formal course of training on those aircraft that do not require a type rating or for which a type rating is not yet available. If it is impractical for a particular ACO to have two FTPs trained in a currently produced aircraft type for which they are responsible, then an FAA FTP from another office may be called upon to assist with required test flying when it is deemed necessary that a type-rated pilot be provided.

b. For each aircraft intended primarily for operation under 14 CFR Parts 121 or 135 that are still in production in an ACO’s geographic area, a project FTP should be assigned, as a focal for certification and COS activities related to that aircraft. The project FTP must possess a type rating in that specific aircraft type or in one of equivalent size and complexity. Although specific type ratings are always desirable, and in some cases may be required by the applicant, amassing the full range of transport type ratings for current fleets would be both unnecessary and uneconomical. An FTP does not need a type rating in a Boeing 777 to do a Traffic Collision and Avoidance System (TCAS) installation flight test in that aircraft. However, the FTP should have experience in TCAS programs and a type rating in a heavy jet to ensure understanding of crew duties and procedures, piloting techniques, performance characteristics, and operational implications for a large jet transport. In any case, an FTP possessing the above qualifications is to conduct all tests that have an important role in the cockpit interface. Project pilots operating large aircraft intended primarily for operation under FAR Part 91 should be type rated in those aircraft or one of comparable size and complexity.

301. Flight Test Managers. Flight test managers who are rated FTPs and who actively participate in certification flight tests are expected to conform to the requirements of this order. They will also fly an adequate amount annually to stay abreast of the advancing technology and maintain their ability to help their FTPs and FTEs evaluate specific problems with the certification of an aircraft. They must also stay sufficiently current (reference paragraph 204 of this Order) to not only evaluate the performance of their cadre of FTPs, but also to evaluate prospective FTP candidates. When selecting new FTPs, non-test pilot managers should rely on evaluations of senior FAA FTPs.

302. Imported Transport Category Aircraft. Nationally, at least two FTPs (depending upon the workload) should be type rated/formally trained in every foreign manufactured transport category aircraft type that are or will be used primarily in 14 CFR Part 121 or 135 operations, and in current production. Familiarity with the imported aircraft is essential for proper evaluation of the aircraft to ensure compliance with the regulations. Experience in the aircraft is essential to AIR in the accomplishment of its safety management responsibilities. FTPs should remain current in the aircraft after their initial qualification, as long as there are active projects on the aircraft. It is incumbent upon each Directorate to ensure that an adequate number of FTPs are trained in the import aircraft for which the Directorate has type validation responsibility. Directorate staffs may coordinate with supporting ACOs to arrange for the necessary training.

303. Production Surveillance. Production surveillance flight-testing by FAA FTPs, may be conducted at the discretion of the ACO. Production flight-testing by FAA FTPs is encouraged as a means of auditing the production flight-testing performance of manufacturers and keeping FAA FTPs familiar with the manufacturer's product line.

304. Qualification on Test Aircraft. As a part of the flight test program for TC projects, the applicant is expected to provide the necessary first pilot checkout qualification flight time for the FTP(s) responsible for the project. The assigned project FTP(s) will contact a responsible official of the applicant's organization to arrange for an adequate and agreed upon checkout in the applicant's aircraft. The checkout must be completed before the FAA FTP(s) conduct any flight tests requiring action in an official flight test pilot capacity.

305. Familiarization Flight Time on New Models. Familiarization flying may be arranged for additional flight test pilots as a part of functional and reliability testing, production testing, or during extensive type testing, if it does not impose an additional burden on the applicant or interfere with the responsible directorate's conduct of the required certification tests. If additional FTPs, not assigned directly to the project, need qualification flight training (as a convenience to the government) in a manufacturer's prototype or in first production models, arrangements should be made to contract for this training. Such arrangements should be made through internal service channels of the pilot's training organization, and not directly with the manufacturer. Since it is unlikely that the FAA Academy can provide such training, the funds will come from the training budget.

306. Airman Rating Qualification During Type Certificate (TC)/Supplemental Type Certificate (STC) Tests. Each TC project involving a new design or any major STC project that significantly modifies the flight characteristics or procedures (such as change from reciprocating engine to turboprop) will include those airman competency tests and maneuvers specified in FAR Part 61. An FTP is required to perform these tests and maneuvers to determine how the aircraft will perform in the operation(s) and atmospheric conditions for which it will be approved. The airman competency maneuvers and minimum crew evaluation will be developed in coordination with the assigned Aircraft Evaluation Group (AEG) specialist during the type certification program. This is to ensure satisfactory determinations of speeds, handling characteristics, procedures and systems operations for the airman competency maneuvers, and the adequacy of the proposed minimum flight crew.

307. Initial Type Rating. If a test aircraft requires a new type rating, the project FTP should make every effort to obtain a type rating on that aircraft as soon as possible. The preferred method of obtaining a type rating on a new aircraft is by participating as an advisor to the AEG Flight Standardization Board (FSB). An FTPs participation in the FSB benefits both the AEG and AIR. The benefit to the AEG is that the FSB is able to use the FTP's knowledge of the aircraft from the certification aspect to make more accurate FSB findings. AIR benefits when one of its FTPs receives a type rating in a new aircraft type. This benefit to AIR is especially true for foreign aircraft validated by the FAA under a bilateral agreement where training opportunities for the FTP are more difficult to obtain. An alternative to FTP participation in the FSB is for the FTP to make arrangements to attend and complete a ground school acceptable by the AEG and undergo an oral and practical flight check ride in the new aircraft. A second

alternative is for the FTP to schedule formal type rating training for that aircraft through the FAA Academy.

CHAPTER 4. RESPONSIBILITY FOR QUALIFICATIONS

400. Skills and Knowledge. Every FAA FTP is expected to be skilled and knowledgeable in experimental aircraft testing techniques, as well as in aircraft operations under environmental conditions appropriate to the kind(s) of operation(s) for which the applicant is seeking approval. Special training (e.g., type rating, seaplane rating, or tailwheel qualification) should be requested, to qualify individuals in advance of actual need for a specific project. This training may be through normal training request channels, or may be obtained locally. The special training may be a formal course of instruction or a check-out in the applicant's aircraft. An FTP will not be assigned to conduct flight tests until the manager is assured that the FTP's experience, ability, skills, and proficiency are adequate to safely conduct the tests. When certification projects arise that require special training, the manager should cite this order when preparing the request for Priority 1 training. Funds normally used to maintain currency under Order 4040.9D (rental funds) may be used by FTPs to acquire training and proficiency in unique aircraft in preparation for assigned test programs.

401. Determination of Qualification for Flight Testing. Before an FTP is assigned to conduct a flight test, it should be determined by the first line supervisor/manager that:

a. The FTP's experience, training, skill, and proficiency are appropriate for the scope, level of difficulty, and criticality of the test.

b. The FTP has:

(1) Successfully completed the Initial Flight Test Pilot/Flight Test Engineers Course (#28083), or,

(2) while waiting to complete the required formal course, has received the equivalent in on-the-job training in certification testing techniques and knowledge under the supervision of an experienced FAA FTP, or,

(3) has otherwise demonstrated his or her aircraft testing competence and knowledge to an experienced FAA FTP and the results have been reviewed and approved by another FTP or flight test manager.

c. The FTP otherwise meets the requirements of this order.

CHAPTER 5. FLIGHT TEST RESPONSIBILITIES AND PROCEDURES

500. Flight Test Planning. All flight testing and evaluations conducted by FAA personnel will be done under the authority of either a Type Inspection Authorization (TIA) or a Letter of Authorization (LOA) signed at the appropriate management level. Prior to issuing the above authorization, the approving authority must ensure that a risk assessment of the flight tests has been done following FAA Order 4040.26, Aircraft Certification Service Flight Safety Program. Each flight test must be performed under an approved test plan. In addition, the FAA Flight Test Briefing Guide described in Appendix 1 of Order 4040.26 must be used prior to each flight or sequence of flights as appropriate unless an applicant's company briefing guide is deemed to be more appropriate.

501. Type Inspection Authorization (TIA). The TIA is prepared by the ACO on FAA Form 8110-1 and is used to authorize official conformity, airworthiness inspections, and flight tests necessary to fulfill certain requirements for TC, STC, and approval of other design changes. In addition, the TIA may contain a section (Operational and Maintenance Requirements) that provides for certain other operational evaluations identified by the AEG. FAA Form 8110.1, TIA, may be supplemented as necessary by individual ACOs to fit their unique regional requirements (e.g., Risk Assessment).

502. Letter of Authorization (LOA). An LOA must be used in lieu of a TIA in cases where other-than-dedicated-certification-flights are conducted by FAA crews (see paragraph 508 of this order). Examples of such flights are flight tests in support of field approvals, foreign type validations, proof of concept flights, avionics systems demonstrations, or early FAA participation in developmental flight tests. When an LOA is required, it must be signed by the appropriate level of authority commensurate with the level of risk and following Order 4040.26. A sample LOA is presented in Appendix 2. An LOA must also be used for training flights not covered by FAA Academy courses or FAA Order 4040.9D, Form 4040-6.

503. Concurrent Testing. The FAA defines concurrent testing as those certification tests that are performed simultaneously with the applicant. Concurrent testing may be performed in certain unique cases when the cognizant FAA manager considers them appropriate and practical to ease the burden on the applicant. Examples of typical low risk concurrent tests are avionics installation and engine cooling. Vmu, Vmcg, Vmca, maximum brake energy tests, and wet runway tests are higher risk tests, but by their nature are impractical to repeat. For such tests, concurrent testing by the FAA may be performed provided that an appropriate level of risk management evaluation is completed per Order 4040.26.

504. Flight Equipment. Managers, FTPs, and FTEs should ensure that all necessary safety/survival equipment is provided and that all crewmembers are familiar with the usage of this equipment. The required safety equipment for each test will be determined by the hazard analysis/risk assessment required by Order 4040.26. Each crewmember should be provided with all necessary protective clothing and equipment as detailed in Order 3900.19, Occupational Safety and Health, Chapter 8, 9, Section 107f.

The basic flight equipment includes:

Number	Item(s)
2	Nomex flight suits
1	Nomex flight jacket
1	Pair high top, steel toe flight boots
2	Pair Nomex gloves
2	Two piece Nomex (2) underwear and (2) socks
1	Flight Helmet and bag (based on operational requirements)
1	Military type MBU Oxygen mask with amplifier (based on operational requirements)
1	Kneeboard
1	Headset with boom mike
1	Flight Bag
--	Equipment required for unique environmental conditions
--	Sunglasses (prescription, if required, are fully reimbursable)

505. Ballast Requirements. FAA Order 8110.4B, Paragraph 5-11.b(3)(c) states, “*Flight Loadings—The manufacturing inspector should determine the various loading conditions specified by the flight test specialist are carried out by the applicant. This includes a determination that the ballast used is accurately weighed, located, and safely secured.*”

- a. All weight and center of gravity (c.g.) requirements must be specified in the approved flight test plan for each test condition.
- b. Approved engineering documentation must be provided to the manufacturing inspector to define the ballast, the location for the ballast to be installed, and the method used to secure it safely to the airframe structure.
- c. All critical loadings should be weighed; in addition, they should be checked (conformed) after the aircraft has been loaded. Critical loadings will be defined as those that are added to achieve either the forward or aft c.g. limit, or to obtain the maximum weight condition. The crew should be onboard for the weighing, whenever possible. Stand-ins of comparable weight may be used if the crew is not available. Calibration data for the scales should be included in the instrument calibrations submitted in the Type Inspection Report.
- d. The FAA FTP makes the final acceptance of the test aircraft for flight, as it relates to the operation of the aircraft and the integrity of the test.

506. Spin Tests. Spin tests conducted by FAA FTPs should be flown initially with a spin chute (or equivalent equipment) installed on the aircraft and approved by an FAA structural and/or systems engineer. (See Appendix 3 for additional guidance on requirements for spin recovery devices). After all spin modes have been evaluated and found satisfactory, the spin characteristics should be checked with the external spin chute removed, unless it is determined that the spin chute installation has no significant effect on spin characteristics.

507. Official Flight Tests. Official flight tests will not be started until a TIA or LOA has been issued. All official tests, including those conducted by a DER, will be conducted in concurrence with any restrictions and limitations issued to ensure safety and to determine compliance with the FAR. The TIA may be phased or issued in increments to ensure basic airworthiness and that flight test safety has been established before proceeding to the next phase. An LOA will be used in lieu of a TIA, in cases where a TIA would be inappropriate such as; foreign type validation flight-testing, or tests in support of field approvals. In these cases, a letter will be prepared by the appropriate office authorizing participation by FAA flight test and manufacturing inspection personnel, specifying in detail, what is to be accomplished. When applicant flight tests are performed early in a program (prior to TIA), before an FAA conformity inspection is conducted, the resulting data may still be valid if it can be established that the testing took place on an aircraft that was essentially identical to the article that is later conformed to the type design and that no significant changes were made between the time of the test and the subsequent conformity inspection.

508. Non-certification / Developmental Flight Testing. Occasionally, there is a need for early flight testing by FAA flight test personnel, either to familiarize themselves with a proposal or to evaluate its merits and potential certification issues. In such cases, FAA flight test personnel may be authorized to fly, provided the following requirements are met:

- a. Approval has been granted via an LOA signed by the appropriate management level described in Order 4040.26.
- b. A flight test safety risk assessment has been performed following requirements detailed in FAA Order 4040.26 and so stated in the LOA.

509. Pilot Relationships. During FAA flight tests, the pilot-in-command is the applicant's pilot except in single-piloted aircraft. The FAA FTP must ensure that the applicant's pilot understands that either pilot may terminate any test at his or her discretion. All tests that evaluate the performance, flight characteristics, systems, or pilot/cockpit interface must be conducted by an FAA (or designee) FTP occupying the pilot seat that is most appropriate for the evaluation being conducted. At the discretion of the FAA (or designee) FTP, other tests may be observed from any other cockpit position. The letter in Appendix 4 of this order may be used to justify the requirement for an FAA FTP to occupy a pilot position.

CHAPTER 6. INTER-ACO COOPERATION

600. Short Duration Projects. For short duration projects, when a particular ACO does not have a qualified FTP in a particular type aircraft, the ACO's are encouraged to request help from an ACO that has a qualified FTP. A list of pilot qualifications is available in Flight Activity and Crew Tracking System (FACTS).

CHAPTER 7. TRAINING REQUESTS

700. Flight Test Training. The AIR flight test community has global safety management responsibility. Therefore, training must receive service-wide prioritization, and the overall qualifications of the Service's flight test community must be considered when allocating training funds and assets. Available training must be flexible to meet the changing aircraft qualification requirements, based on anticipated certification projects and COS requirements. The AIR flight test community workload, certification schedules, and manufacturer's delivery schedules must be considered when prioritizing available training funds and assets. Prioritization of AIR's flight test training is the responsibility of the Flight Program Oversight Committee (FPOC), and will be completed prior to the Agency's annual call for training.

APPENDIX 1. FLIGHT PROGRAM OVERSIGHT COMMITTEE (FPOC) CHARTER

U.S. Department
of Transportation**Federal Aviation
Administration**

Memorandum

Subject: **INFORMATION: Flight Program Oversight
Committee Charter**

Date: **FEB 13, 2004**

From: **Manager, Rotorcraft Directorate, Aircraft
Certification Service, ASW-100**

Reply to
Attn. of:

To: **All Aircraft Certification Directorate Managers
All Aircraft Certification Division Managers**

TEAM SPONSORS: ACMT

BACKGROUND: FAA organizations with pilot participants are required by FAA Order 4040,9 to administer their own pilot proficiency and flight safety programs, or to be included under the cognizance of another recognized program. The decision by the Aircraft Certification Service (AIR) to form a flight program that is independent from the Flight Standards Service brings an attendant requirement. to oversee that program.

OBJECTIVE: The Flight Program Oversight Committee (FPOC) is established as an advisory group to provide expert advice on the Service flight program to the AIR Director and Deputy Director, the AIR Senior Flight Program Manager, the DMTs, and the various cross-organizational Management Teams {"MTs"} within AIR.

MEMBERSHIP:

FPOC membership includes the following representatives: the flight test branch managers of the Atlanta ACO, Los Angeles AGO, Seattle AGO, and Wichita AGO; a manager or senior flight test pilot from the Rotorcraft Directorate, Small Airplane Directorate, Engine and Propeller Directorate, and the AIR Lead Flight Safety Officer. The AIR Senior Flight Program Manager will appoint the FPOC chairman from the membership to a three-year term.

TEAM TASKS:

1. The FPOC will review the AIR plans, policies, procedures, conditions, instructions for recent flight experience, and the responsiveness to corrective recommendations. The FPOC will charter the Flight Safety Committee (FSC) required by Order 4040.9D, paragraph 503.b.(4) and will be led by

APPENDIX 1. FLIGHT PROGRAM OVERSIGHT COMMITTEE (FPOC) CHARTER (CONTINUED)

the Lead Flight Safety Officer. The primary purpose of the FSC is to set safety goals and review safety-related recommendations.

2. Recommend appropriate changes to the AIR Operations Manual to FAA Order 4040.9, which delineates those aspects of the AIR flight program that are unique to AIR.
3. Provide prioritized FPOC recommendations to AIR-500 during annual call for flight training needs. Provide advice to local management regarding pilot proficiency training. Coordinate pilot proficiency training requirements from a national perspective.
4. Advise Technical Training Steering Committee (TTSC) regarding adequacy of flight training courses.
5. Oversee national test pilot hiring register and qualification requirements for FAA test pilots.
6. Provide coordinated FPOC input to the annual flight rental budget.
7. Provide national policy on pilot qualifications, pilot development, and shared pilot resources.
8. Coordinate with the Right Test Technical Committee regarding expert oversight of the initial and recurrent FAA flight test pilot/flight test engineer courses.
9. FPOC members will be the focal points for Flight Program matters within their respective regions/Directorates.

PRODUCTS:

1. Flight Safety.
2. Oversight of AIR flight program.
3. Recommend revisions to various documents as necessary. **TIMING:**
The FPOC is a standing committee within AIR. Products will be developed to meet flight safety and overall program needs.

CONSTRAINTS:

The present organizational structure of the Aircraft Certification Service requires that flight program issues be administered via the various Directorate/Division Management Teams and the cross-organizational Management Teams such as the ACOMT, DMT, and ACMT. As a result, the FPOC is an advisory group, albeit one with most of the AIR flight test resources in a direct reporting status. Unless otherwise directed, the FPOC will provide recommendations and products to all DMTs and other applicable MTs.

PROCESS:

APPENDIX 1. FLIGHT PROGRAM OVERSIGHT COMMITTEE (FPOC) CHARTER (CONTINUED)

The FPOC will hold one annual meeting, normally during the first or second quarter of the fiscal year. Telecons will be scheduled as needed.

FUNDING:

Travel and per diem expenses for FPOC members will be shown in the AIR Business Plan as Management Team Meeting for budgeting.

CHARTER APPROVED BY: _____



David A. Downey, ASW-100,
AIR Senior Flight Program Manager

DATE: 2/13/04

7/11/2005

8110.41A
Appendix 2

APPENDIX 2. SAMPLE LETTER OF AUTHORIZATION (LOA)

Subject: **ACTION:** Letter of Authorization (LOA)

Date:

From: Manager, XXX Aircraft Certification Office

Reply to
Attn. of:

To:

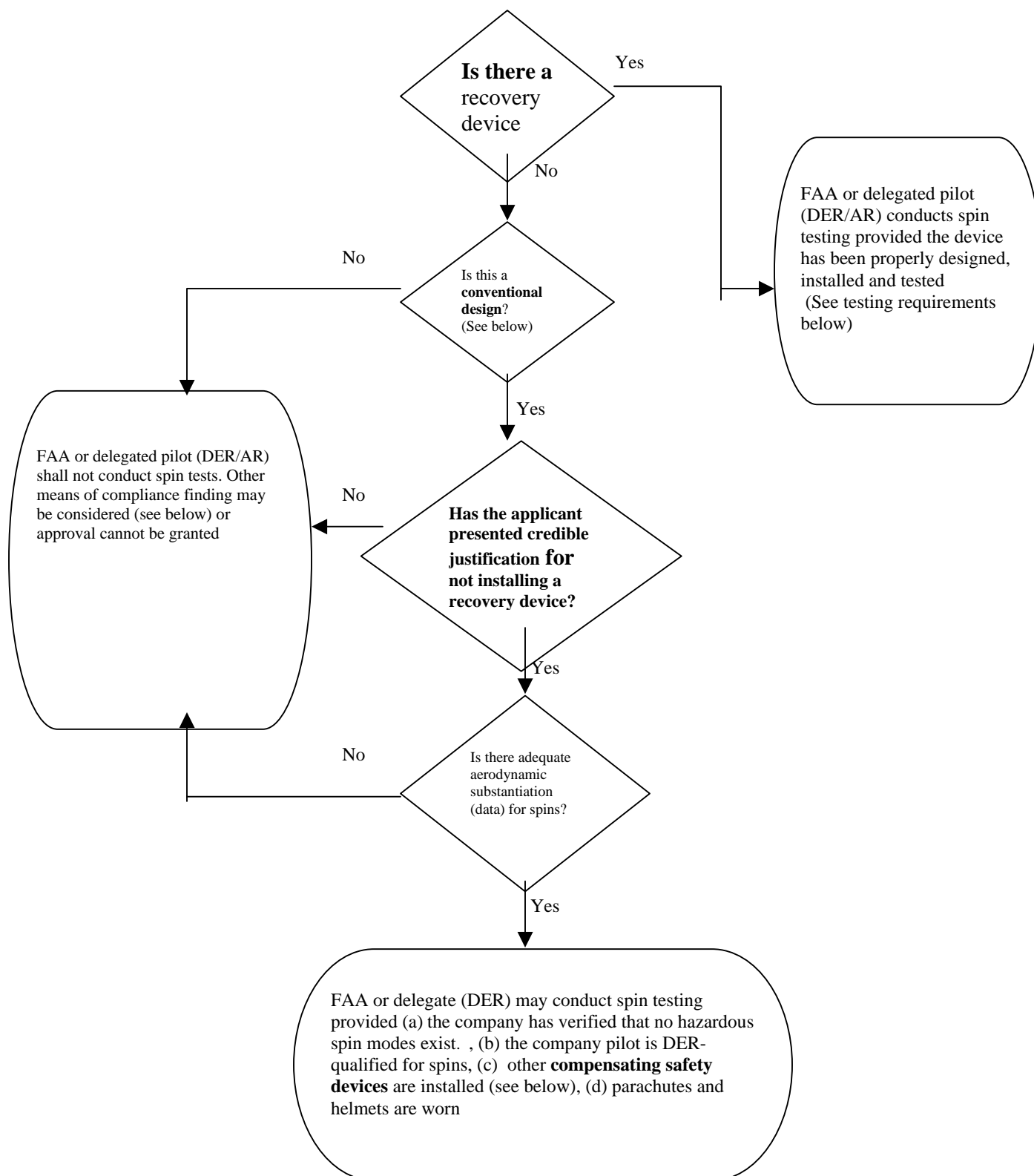
You are authorized to conduct a demonstration flight on XXX aircraft on or about -----. The purpose for this flight is to evaluate the capability of the XXX flat panel display, mounted in the right cockpit pane, to interface in-flight with existing XXX avionics systems and to identify potential TSO certification issues.

The evaluation will be conducted in accordance with XXX Flight Test Plan document number ----, Revision X, dated ----. The evaluation will include both a day and a night flight. The aircraft, -----, is owned and operated by XXX Aviation, Inc.,------. The aircraft is under an Experimental R&D Certificate of Airworthiness, Market Survey, issued by ANE MIDO-XX on April -----. The XXX flat panel display is installed under a limited field approval and is the only component installed that does not meet the type design. This will not be the first flight on this aircraft with this system installed. For the purpose of the evaluation, the company pilot, Pilot In Command (PIC), will be seated in the left seat and the FAA pilot in the right seat.

This flight is considered to be Low Risk. The provisions of Table 1, Index A of Order 4040.26A, attached, will be observed on this flight. This LOA meets the Risk Management requirements of FAA Order 4040.26A.

XXXXXXX

Attachment
4040.26A Table 1

**APPENDIX 3. SPIN TEST / RECOVERY DEVICE REQUIREMENT
DECISION TREE**

APPENDIX 3. SPIN TEST / RECOVERY DEVICE REQUIREMENT DECISION TREE (CONTINUED)

Spin Recovery Device testing requirements. The following requirements for spin recovery parachutes (Spin chutes) are necessary to in order to be acceptable for use during FAA flight testing:

1. The applicant must demonstrate that the spin chute can be deployed and released safely during flight.
2. During extensive program delays or for follow-on spin testing, the applicant may be required to repeat the in-flight deployment and release demonstration.
3. The design must follow the guidance provided in AC 23-8A, Chapter 2, Section 23.221, b(5), Spin Recovery Parachutes.

Company Flight Test Program. The following should be considered when planning a company spin program and FAA demonstration without a spin recovery device when it is determined that a spin chute or appropriate spin recovery device is not to be used as shown in the flowchart above.

1. The FAA pilot may chase the prototype airplane during company spin demonstrations, and
2. Video cameras (time coded) are installed in the test airplane cockpit to show control inputs and aircraft motions during applicant spin demonstrations, or
3. The test airplane is instrumented to show control inputs and aircraft motions during applicant spin demonstrations.

Other compensating devices. The following devices are recommended individually and/or in combination as mitigating factors when FAA is conducting spin testing without a spin recovery device installed:

1. Jettisonable cockpit door that has been properly designed and tested.
2. Alternative escape options such as a second cockpit door or other doors installed
3. Ropes or handles installed to assist in reaching alternative escape means.
4. Proposed non-cockpit doors must be easily opened or jettisonable
5. Quick-disconnect seat restraints.
6. Chase airplane.

Conventional design. For the purposes of this decision tree, a conventional design is defined as follows:

1. A conventional tail (no canards, forward wing design or T-tail). *
2. Wing - Positive or neutral camber with no leading edge devices, significant sweep and/or winglets.
3. Engine - A tractor type propeller design with the thrust axis in line with the fuselage.
4. Positive static margin.
5. No new or novel aerodynamics, propulsion or control design.
6. Floats are acceptable.

* See NASA Technical Paper 2644, February 1987, "Flight Investigation of the Effect of Tail Configuration on Stall, Spin, and recovery Characteristics of a Low-Wing General Aviation Airplane" for information on cruciform tails.

APPENDIX 4. FAA FLIGHT TEST PILOT SEAT POSITION SAMPLE LETTER

Applicants Requiring Federal Aviation Administration (FAA)
Flight Tests

Dear Applicant:

Subject: FAA Flight Test Pilot (FTP) Seat Position

During certification flight-testing by FAA flight test pilots, it may be necessary for them to occupy either the left seat or the right seat of the aircraft being flight-tested. The actual seat position will be determined by the system being evaluated. Systems involving either aircraft performance, handling qualities, avionics systems integration or pilot workload require evaluations where the FAA FTP needs to manipulate the controls from the position in which FAA approval is being requested. Performance and handling qualities flight tests are normally flown from the left seat (right seat for most helicopters); avionics systems integration tests are normally flown from the left seat, if approval for high gain tasks such as approaches are sought. In cases where the left and right seat implementation is identical, evaluations may be conducted from the right seat. The assigned FAA FTP makes the ultimate decision as to which seat is to be used on a case-by-case basis.

The authority for FAA FTPs to manipulate the controls of aircraft being flight-tested for the purpose of certification comes from §21.33 of the Federal Aviation Regulations, 14 CFR §21.33. That section provides that “each applicant must allow the Administrator to make any inspection and any flight and ground test necessary to determine compliance with the applicable requirements of the Federal Aviation Regulations.”

During FAA certification flight tests, the FAA FTP will not act as Pilot-in-Command (PIC). Takeoffs and landings by the FAA FTP are only necessary if required by the test plan. Even if the aircraft to be evaluated is type certificated for more than one pilot flight crewmember, the FAA FTP need not be fully current as second-in-command (SIC) in order to occupy a pilot flight crewmember position. Section 61.55 provides that for the purposes of “aircraft flight test or airborne equipment evaluation” a person may act as SIC of an aircraft requiring more than one pilot flight crewmember without having logged the necessary takeoffs and landings or performed the necessary engine out procedures to maintain currency as SIC.

FAA FTPs are highly qualified with extensive flight test experience in multiple types of aircraft. In addition, they maintain flight proficiency through certification flight-testing and a rental aircraft program, which includes simulators; they also often obtain type ratings in aircraft they are expected to fly. There should be no question that before a test flight, an FAA FTP has become familiar with all information concerning that aircraft’s powerplant, major components and systems, major appliances, performance and limitations, standard and emergency operating procedures, and the contents of the approved aircraft flight manual or approved flight manual material, placards, and markings.

**APPENDIX 4. FAA FLIGHT TEST PILOT SEAT POSITION SAMPLE LETTER
(CONTINUED)**

Please contact this office should you or your insurance carrier need additional information about the FAA FTP before the test flight.

Sincerely,

APPENDIX 5. MEDICAL STANDARDS FOR FAA FLIGHT TEST ENGINEERS**1. Eye.** Eye standards for a third-class airman medical certificate qualification are:

- a. Distant visual acuity of 20/40 or better in each eye separately, with or without corrective lenses. If corrective lenses (spectacles or contact lenses) are necessary for 20/40 vision, the person may be eligible only on the condition that corrective lenses are worn while exercising the privileges of an airman certificate.
- b. Near vision of 20/40 or better, Snellen equivalent, at 16 inches in each eye separately, with or without corrective lenses.
- c. Ability to perceive those colors necessary for the safe performance of airman duties.
- d. No acute or chronic pathological condition of either eye or adnexa that interferes with the proper function of an eye, that may reasonably be expected to progress to that degree, or that may reasonably be expected to be aggravated by flying.

2. Ear, nose, throat, and equilibrium. Ear, nose, throat, and equilibrium standards for a third-class airman medical certificate qualification are:

- a. The person shall demonstrate acceptable hearing by at least one of the following tests:
 - (1) Demonstrate an ability to hear an average conversational voice in a quiet room, using both ears, at a distance of 6 feet from the examiner, with the back turned to the examiner.
 - (2) Demonstrate an acceptable understanding of speech as determined by audiometric speech discrimination testing to a score of at least 70 percent obtained in one ear or in a sound field environment.
 - (3) Provide acceptable results of pure tone audiometric testing of unaided hearing acuity according to the following table of worst acceptable thresholds, using the calibration standards of the American National Standards Institute, 1969:

Frequency (Hz)	500 Hz	1000 Hz	2000 Hz	3000 Hz
Better ear (Db)	35	30	30	40
Poorer ear (Db)	35	50	50	60

- b. No disease or condition of the middle or internal ear, nose, oral cavity, pharynx, or larynx that --
 - (1) Interferes with, or is aggravated by, flying or may reasonably be expected to do so;
or
 - (2) Interferes with clear and effective speech communication.

APPENDIX 5. MEDICAL STANDARDS FOR FAA FLIGHT TEST ENGINEERS (CONTINUED)

c. No disease or condition manifested by, or that may reasonably be expected to be manifested by, vertigo or a disturbance of equilibrium.

3. Mental. Mental standards for a third-class airman medical certificate qualification are:

a. No established medical history or clinical diagnosis of any of the following:

(1) A personality disorder that is severe enough to have repeatedly manifested itself by overt acts.

(2) A psychosis. As used in this section, "psychosis" refers to a mental disorder in which --

(a) The individual has manifested delusions, hallucinations, grossly bizarre or disorganized behavior, or other commonly accepted symptoms of this condition; or

(b) The individual may reasonably be expected to manifest delusions, hallucinations, grossly bizarre or disorganized behavior, or other commonly accepted symptoms of this condition.

(3) A bipolar disorder.

(4) Substance dependence, except where there is established clinical evidence, satisfactory to the Federal Air Surgeon, of recovery, including sustained total abstinence from the substance(s) for not less than the preceding 2 years. As used in this section --

(a) "Substance" includes: alcohol; other sedatives and hypnotics; anxiolytics; opioids; central nervous system stimulants such as cocaine, amphetamines, and similarly acting sympathomimetics; hallucinogens; phencyclidine or similarly acting arylcyclohexylamines; cannabis; inhalants; and other psychoactive drugs and chemicals; and

(b) "Substance dependence" means a condition in which a person is dependent on a substance, other than tobacco or ordinary xanthine-containing (e.g., caffeine) beverages, as evidenced by --

1 Increased tolerance;

2 Manifestation of withdrawal symptoms;

3 Impaired control of use; or

4 Continued use despite damage to physical health or impairment of social, personal, or occupational functioning.

b. No substance abuse within the preceding 2 years defined as:

(1) Use of a substance in a situation in which that use was physically hazardous, if there has been at any other time an instance of the use of a substance also in a situation in which that use was physically hazardous;

**APPENDIX 5. MEDICAL STANDARDS FOR FAA FLIGHT TEST ENGINEERS
(CONTINUED)**

(2) A verified positive drug test result conducted under an anti-drug rule or internal program of the U.S. Department of Transportation or any other Administration within the U.S. Department of Transportation; or

(3) Misuse of a substance that the Federal Air Surgeon, based on case history and appropriate, qualified medical judgment relating to the substance involved, finds --

(a) Makes the person unable to safely perform their flight duties or exercise the privileges of the airman certificate applied for or held; or

(b) May reasonably be expected, for a duration of the maximum one year of the airman medical certificate applied for or held, to make the person unable to perform those flight duties. or exercise those privileges.

c. No other personality disorder, neurosis, or other mental condition that the Federal Air Surgeon, based on the case history and appropriate, qualified medical judgment relating to the condition involved, finds --

(1) Makes the person unable to safely perform their flight duties or exercise the privileges of the airman certificate applied for or held; or

(2) May reasonably be expected, for a duration of the maximum one year of the airman medical certificate applied for or held, to make the person unable to perform those flight duties. or exercise those privileges.

4. Neurological. Neurological standards for a third-class airman medical certificate qualification are:

a. No established medical history or clinical diagnosis of any of the following:

(1) Epilepsy;

(2) A disturbance of consciousness without satisfactory medical explanation of the cause; or

(3) A transient loss of control of nervous system function(s) without satisfactory medical explanation of the cause.

b. No other seizure disorder, disturbance of consciousness, or neurological condition that the Federal Air Surgeon, based on the case history and appropriate, qualified medical judgment relating to the condition involved, finds --

(1) Makes the person unable to safely perform their flight duties or exercise the privileges of the airman certificate applied for or held; or

(2) May reasonably be expected, for a duration of the maximum one year of the airman medical certificate applied for or held, to make the person unable to perform those flight duties. or exercise those privileges.

APPENDIX 5. MEDICAL STANDARDS FOR FAA FLIGHT TEST ENGINEERS (CONTINUED)

5. Cardiovascular. Cardiovascular standards for a third-class airman medical certificate are no established medical history or clinical diagnosis of any of the following:

- a. Myocardial infarction;
- b. Angina pectoris;
- c. Coronary heart disease that has required treatment or, if untreated, that has been symptomatic or clinically significant;
- d. Cardiac valve replacement;
- e. Permanent cardiac pacemaker implantation; or
- f. Heart replacement.

6. General medical condition. The general medical standards for a third-class airman medical certificate qualification are:

a. No established medical history or clinical diagnosis of diabetes mellitus that requires insulin or any other hypoglycemic drug for control.

b. No other organic, functional, or structural disease, defect, or limitation that the Federal Air Surgeon, based on the case history and appropriate, qualified medical judgment relating to the condition involved, finds --

(1) Makes the person unable to safely perform their duties or exercise the privileges of the airman certificate applied for or held; or

(2) May reasonably be expected, for a duration of the maximum one year of the airman medical certificate applied for or held, to make the person unable to perform those flight duties or exercise those privileges.

c. No medication or other treatment that the Federal Air Surgeon, based on the case history and appropriate, qualified medical judgment relating to the medication or other treatment involved, finds --

(1) Makes the person unable to safely perform their duties or exercise the privileges of the airman certificate applied for or held; or

(2) May reasonably be expected, for a duration of the maximum one year of the airman medical certificate applied for or held, to make the person unable to perform those flight duties or exercise those privileges.



U.S. Department
of Transportation

**Federal Aviation
Administration**

Directive Feedback Information

Please submit any written comments or recommendations for improving this directive, or suggest new items or subjects to be added to it. Also, if you find an error, please tell us about it.

Subject: Order 8110.41A, FAA Flight Test Training, Responsibilities, and Procedures

To: Directive Management Officer, AIR-530

(Please check all appropriate line items)

- ☐ An error (procedural or typographical) has been noted in paragraph _____ on page _____ .
- ☐ Recommend paragraph _____ on page _____ be changed as follows:
(attach separate sheet if necessary)

- ☐ In a future change to this directive, please include coverage on the following subject
(briefly describe what you want added):

☐ Other comments:

☐ I would like to discuss the above. Please contact me.

Submitted by: _____ Date: _____

FTS Telephone Number: _____ Routing Symbol: _____

FAA Form 1320-19 (8-89)(Representation)