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NASA Procedural Requirements

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COMPLIANCE IS MANDATORY

Aircraft Operations Management

Responsible Office: Office of Strategic Infrastructure

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Preface

P.1 Purpose

- a. This directive establishes requirements, responsibilities, and procedures that will assist NASA Centers and other locations operating NASA aircraft to create local policies and procedures for the management of NASA aircraft resources, flight operations, and related matters.
- b. This directive provides a standard approach for the management and use of the NASA Aircraft Operations program. The purpose of the NASA Aircraft Operations program is to directly support the Agency's mission in aeronautical research and development, space science and applications, space flight, astronaut readiness training, and related activities by providing operational flights in both manned aircraft and unmanned aircraft systems (UAS).
- c. This directive should be used in conjunction with other governing instructions, handbooks, and manuals.

P.2 Applicability

- a. This directive is applicable to NASA Headquarters (HQ) and NASA Centers, including Component Facilities and Technical and Service Support Centers, and contractors operating NASA aircraft/UAS. This language applies to JPL (a Federally-Funded Research and Development Center), other contractors, recipients of grants, cooperative agreements, or other agreements only to the extent specified or referenced in the applicable contracts, grants, or agreements.

Note: This NPR alone is not sufficient to stipulate requirements for the contractor or grant recipient. The contract, grant, or agreement must state the requirements(s) from NPD 7900.4 and this NPR.

- b. In this directive, all mandatory actions (i.e., requirements) are denoted by statements containing the term "shall." The terms: "may" or "can" denote discretionary privilege or permission, "should" denotes a good practice and is recommended, but not required, "will" denotes expected outcome, and "are/is" denotes descriptive material. All requirements are numbered consecutively in brackets at the end of the applicable sentence. Requirements are compiled as a Compliance Matrix in Appendix C.
- c. In this directive, all document citations are assumed to be the latest version unless otherwise noted.

P.3 Authority

- a. The National Aeronautics and Space Act, 51 U.S.C. § 20113(a).
- b. Functions (National Aeronautics and Space Administration), 14 CFR. § 1201.102.
- c. Transportation, Federal Acquisition Regulation (FAR) 48 CFR, Chapter 1, Part 47.
- d. Transportation, NASA FAR Supplement (NFS), 48 CFR, Chapter 18, Part 1847.
- e. NPD 1000.3, The NASA Organization.
- f. NPR 4300.1, NASA Personal Property Disposal Procedural Requirements.
- g. 8715.1, NASA Occupational Safety and Health Programs.

P.4 Applicable Documents and Forms

- a. Pay Rates and Systems, 5 U.S.C. Chapter 53.
- b. Persons and Supplies: Sea, Land, and Air Transportation, 10 U.S.C. § 2648.
- c. Definitions, 49 U.S.C. § 40102.
- d. Wendell H. Ford Aviation Investment and Reform Act for the 21st Century, Public Law

106-181.

- e. Animal and Plant Health Inspection Service, Department of Agriculture, 7 CFR Subtitle B, Chapter III.
- f. Animal and Plant Health Inspection Service, Department of Agriculture, 9 CFR Chapter I.
- g. Certification Procedures for Products and Parts, 14 CFR Part 21.
- h. Airworthiness Directives, 14 CFR Part 39.
- i. Maintenance, Preventative Maintenance, Rebuilding, and Alteration, 14 CFR Part 43.
- j. Certification: Pilots, Flight Instructors, and Ground Instructors, 14 CFR Part 61.
- k. Certification: Airmen Other Than Flight Crewmembers, 14 CFR, Part 65.
- l. General Operating and Flight Rules, 14 CFR Part 91.
- m. Civil Aircraft: Certifications Required, Subparts (a) and (b), 14 CFR § 91.203.
- n. Certification of Airports, 14 CFR Part 139.
- o. Training Centers, 14 CFR Part 142.
- p. Hazardous Waste Management System: General, 40 CFR Part 260.
- q. Identification and Listing of Hazardous Waste, 40 CFR Part 261.
- r. Standards Applicable to Generators of Hazardous Waste, 40 CFR Part 262.
- s. Standards Applicable to Transporters of Hazardous Waste, 40 CFR Part 263.
- t. Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal, Facilities, 40 CFR Part 264.
- u. Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities, 40 CFR Part 265.
- v. Government Aviation Administration and Coordination, 41 CFR Part 101-37.
- w. Management of Government Aircraft, 41 CFR Part 102-33.
- x. Replacement of Personal Property Pursuant to the Exchange/Sale Authority, 41 CFR Part 102-39.
- y. Federal Travel Regulation System General, 41 CFR Chapter 300.
- z. Temporary Duty (TDY) Travel Allowances, 41 CFR Chapter 301.
- aa. Carriage by Aircraft, 49 CFR Part 175.
- bb. OMB Circular A-11, Preparation, Submission, and Execution of the Budget.
- cc. OMB Circular A-76, Performance of Commercial Activities.
- dd. OMB Circular A-126, Improving the Management and Use of Government Aircraft.
- ee. Management of Government Aircraft, Federal Management Regulation (FMR), Pt. 102-33.
- ff. NPD 4300.1, NASA Personal Property Disposal Policy.
- gg. NPR 1441.1, NASA Records Management Program Requirements.
- hh. NPR 3792.1, NASA's Plan for A Drug Free Workplace.
- ii. NPR 4100.1, NASA Materials Inventory Management Manual.
- jj. NPR 4200.1, NASA Equipment Management Procedural Requirements.

- kk. NPR 4310.1, Artifact Identification and Disposition.
- ll. NPR 8000.4, Agency Risk Management Procedural Requirements.
- mm. NPR 8621.1, NASA Procedural Requirements for Mishap and Close Call Reporting, Investigating, and Recordkeeping.
- nn. NPR 8715.3, NASA General Safety Program Requirements.
- oo. NPR 8715.5, Range Flight Safety Program.
- pp. NPR 8735.2, Management of Government Quality Assurance Functions for NASA Contracts.
- qq. NASA-STD-8719.11, Safety Standard for Fire Protection.
- rr. NASA-STD-8719.12, Safety Standard for Explosives, Propellants, and Pyrotechnics.
- ss. FAA Advisory Circular 20-142, Eligibility and Evaluation of U.S. Military Surplus Flight Safety Aircraft Parts, Engines, and Propellers.
http://www.faa.gov/regulations_policies/advisory_circulars/index.cfm/go/document.information/documentID/22201
- tt. U.S. Department of State (DOS) letter, NASA Request for State Aircraft Status, June 29, 1994.
- uu. DOS e-mail; NASA, NOAA, and NSF Aircraft; March 31, 2003.

P.5 Measurement/Verification

- a. Does the HQ Aircraft Division fulfill its responsibilities as specified within this NPR? To determine the compliance of the HQ Aircraft Management Division (AMD) with the requirements contained in this NPR, internal and external auditors responsible for verifying HQ requirements and processes evaluate the HQ AMD's performance against the requirements contained within this NPR.
- b. Are Centers following the content and process requirements of this NPR that are applicable to Centers for Center aircraft operations and commercial aircraft services in accordance with this NPR? To determine Center compliance with this NPR, Center Directors or designees determine and document compliance by applying a verification process that is tailored to meet the needs of the Center. The HQ AMD, with the support of the Inter-Center Aircraft Operations Panel (IAOP), conducts biennial reviews of the Centers and spot checks to review Center documentation and implementation of Center-specific aircraft operations and commercial aircraft services activity.

P.6 Cancellation

- a. NPR 7900.3C, Aircraft Operations Management, July 15, 2011.
- b. NASA Memorandum (NM) 7900-65, NASA Interim Directive (NID) for NPR 7900.3B, NASA Aircraft Operations Management, September 24, 2009.
- c. NM 7900.83, NASA Interim Directive (NID), Unmanned Aircraft System (UAS) Policy Update, November 10, 2009.

Chapter 1. Flight Operations, General Overview

1.1 Concept of Operations

1.1.1 Where practical, NASA seeks to use aircraft/UAS that can support multiple mission requirements.

1.1.2 NASA shall use its aircraft/UAS resources in an effective and efficient manner to conduct and support missions, approved/planned programs, and projects. [1]

1.1.3 NASA shall maintain the level of airworthiness and aircraft/UAS operating standards that will ensure the safe operation of aircraft/UAS. [2]

a. Except for flights operated to carry individual(s) other than crewmember(s) or qualified non-crewmember(s) (QNC) or operated for commercial purposes, NASA and NASA-contracted aircraft shall be operated as public use aircraft in accordance with public law and U.S.C., regardless of whether the NASA or NASA-contracted aircraft possesses a Federal Aviation Administration's (FAA) Airworthiness Certificate (49 U.S. Code Part 40125). [3]

b. When operated as public use aircraft, NASA and NASA-contracted aircraft are flown under NASA's operational and airworthiness authority with mandatory safety oversight responsibilities.

1.1.4 NASA-controlled aircraft are subject to Federal Aviation Regulations with respect to the use of airspace, the control of air traffic, and aircraft registration. Aircraft on loan from the U.S. Armed Forces are not subject to civil registration. NASA aircraft shall be operated in accordance with applicable provisions of the FAR-14 CFR-except:

a. Where this directive prescribes more stringent requirements.

b. Where Center local directives are more stringent than this directive.

c. Where deviations from the FAA regulations have been approved by the FAA, a Center airworthiness/flight readiness review board, or NASA policy. [4]

1.1.5 For each Center operating aircraft/UAS or procuring and/or acquiring aircraft/UAS services, the Center Director shall maintain a program-independent Flight Operations Office, the specific purpose of which will be to plan, organize, direct, and control the operations, maintenance, modification, safety, and support of all Center-assigned or -contracted aircraft. [5]

1.1.5.1 The head of this office, the Chief of Flight Operations, is responsible for all Center-assigned, newly acquired or contracted aircraft. The head of this office shall be the senior line manager who is responsible for aviation activities at the Center. [6]

1.1.5.2 The Center Director shall assign the Chief of the Flight Operations Office the authority and responsibility and provide the resources necessary to manage and conduct safe, effective, and efficient operations in accordance with NASA directives, guidance, and other applicable Federal regulations. [7]

1.1.5.3 Prior to issuance of an RFI (Request for Information) or RFP (Request for Proposal) solicitation, or award of a sole source contract, grant, or other aviation service procurement, the Chief of the Flight Operations Office shall review and concur upon any Center contract or agreement

that includes aviation operations or aircraft modification. [8]

1.1.5.4 If a Center does not have a Flight Operations Department, the Center Director shall coordinate with NASA HQ Aircraft Management Division (AMD) to have another Center's Flight Operations Department review and concur on such contracts or agreements for them each time they procure aviation services. [9]

1.1.6 Centers should use alternative aviation fuels in fleet aircraft to the maximum extent possible consistent with the availability of approved alternative fuels and aircraft operating procedures or manuals for those aircraft.

1.2 Assignment of Authority and Responsibility

1.2.1 The Director, AMD shall assign aircraft to the appropriate Center after consultation with the affected Mission Directorates and Center Directors. [10]

1.2.1.1 Records created throughout flight operations management shall be maintained, managed, and disposed of by each Center's Flight Operations Office or designated office in accordance with NPR 1441.1. [11]

1.2.2 Mission Directorate Associate Administrators shall:

1.2.2.1 Coordinate early with the Office of Strategic Infrastructure (OSI) to establish program or project plans involving the requirement for acquisition or use of aircraft, including UAS meeting Agency capitalization threshold defined by NPR 9250.1. [12]

1.2.2.2 Comply with applicable OMB Circulars as they apply to the acquisition of aircraft/UAS and coordinate related documentation requirements with the Assistant Administrator for the OSI. [13]

1.2.2.3 Annually review aircraft mission and program requirements, use, and associated costs, and project those requirements and costs over 5 years in an annual report to the HQ AMD not later than March 31 of each year. [14]

1.2.2.4 Coordinate with the OSI and the Office of the Chief Financial Officer for the submission of all Aviation Business Cases per OMB Circular A-11 for aircraft and aircraft programs funded by their Directorate. [15]

1.2.3 Center Directors shall be responsible for:

a. The airworthiness and flight safety of all Center assigned aircraft and UAS, including commercial aircraft services (CAS). [16]

b. Coordination with the OSI in establishing program or project plans involving the requirement, assignment, and operation of aircraft/UAS. [17]

c. Annually reviewing aircraft mission and program requirements (for those programs controlled/funded by their respective Center), use, and associated costs and for projecting those requirements and costs over 5 years in an annual report to the AMD not later than March 31 of each year. [18]

d. Ensuring compliance with the OCFO NPRs in the appropriate use and application of order codes that are used to account for, track, and report aircraft costs. [19]

e. Quarterly reporting of aircraft operations and costs to AMD, as stipulated in Chapter 11, and specific monthly passenger transportation reporting requirements detailed in Chapter 4. [20]

- f. Ensuring compliance with 41 CFR Part 102-33, 41 CFR Chapter 301, and OMB Circular A-126, Improving the Management and Use of Government Aircraft. [21]
- g. The budget for personnel and travel in support of the Inter-Center Aircraft Operations Panel (IAOP) semiannual meetings and the IAOP Review Program. [22]
- h. Approving aircraft charters or leases for periods aggregating 30 days or less per year with 7 days' prior notice to the AMD. [23]
- i. Technical assessment, cost evaluation, acquisition, use, and disposition of all aircraft/UAS under their control. This includes disposal of aircraft/UAS used solely in wind tunnels or other nonflyable test models. [24]
- j. Coordinating and submitting all aircraft acquisition and disposition proposals to the Director, AMD for approval. [25]
- k. Reporting all acquisition and disposal actions to the AMD to comply with Federal aircraft data reporting requirements. [26]
- l. Ensuring that Center managers who acquire aircraft/UAS or commercial aviation services coordinate those acquisitions with the Center's Chief of Flight Operation Office to ensure compliance with the NASA Aviation Safety Program and aircraft management policies. If the Center does not have a Flight Operations Office, prior coordination will be conducted with the AMD. [27]

1.2.4 Program/Project Managers shall:

- a. Coordinate early with the Center Chief of Flight Operations expected to conduct the effort to establish program or project plans involving the requirement for acquisition or use of aircraft, including UAS. [28] This coordination will be initiated prior to any RFI/RFP release or procurement action for aircraft or aviation services. This includes a CAS effort contracted by a contractor under NASA contracted effort. For Centers without a Flight Operations Office, coordination with another Center's Flight Operations as designated by AMD is required.
- b. Support the Mission Directorate or Center Director in the preparation of a Business Case Analysis (BCA) in accordance with OMB Circular A-11, as required. [29]
- c. Support the Mission Directorate and Center Directors in the annual review of aircraft mission and program requirements, use, and associated costs, and project those requirements and costs over 5 years to support their annual report to the AMD, not later than March 31 of each year. [30]

1.2.5 Center's Chief of Flight Operations

1.2.5.1 The Center's Chief of Flight Operations is the senior line manager with authority over all flight activities operated or controlled by the Center, including CAS operations, and is directly responsible to the Center Director for the safe and effective conduct of those activities. The Center's Chief of Flight Operations shall hold the following qualifications for assignment to this position:

- a. A minimum of 10 years of relevant aviation-related experience, of which a minimum of 3 years will be supervisory or managerial experience in aircraft operations similar to the primary aircraft type operated at the Center, and a high level of familiarity with the organization's aircraft operations.
- b. Current or previously held qualifications as a NASA Pilot in Command (PIC), a military rating as an Aircraft Commander, or a FAA Airline Transport Pilot (ATP) certificate. [31]

1.2.5.2 The Center's Chief of Flight Operations is authorized to fly Center aircraft.

1.2.5.3 The Center's Chief of Flight Operations shall perform the following duties:

- a. Ensure the effective management of flight operations under that Center's cognizance, per NPD 7900.4. [32]
- b. Implement a process to ensure all CAS operations are appropriately approved. [33]
- c. Authorize personnel to operate and maintain aircraft under NASA's control. The Center Flight Operations Office has the final operational flight release authority for any NASA aircraft operating from or under the cognizance of that Center. [34]
- d. Determine the number of aircraft types in which an individual crewmember may maintain qualification at any given time and annually review that determination. [35]
- e. Recommend assignment of the Center Aviation Safety Officer (ASO), with the concurrence of the Center Safety and Mission Assurance Director, to the Center Director for approval. [36]
- f. Fly as a crewmember or observer on all assigned aircraft, where practicable and as necessary, to observe performance of assigned flightcrews. [37]

1.2.6 Center Aviation Safety Officers

1.2.6.1 The ASO shall manage the Center's Aviation Safety Program as described in Chapter 6. [38]

1.2.6.2 The ASO shall be a civil servant assigned to the Flight Operations Office, serve as the Center's focal point for aviation safety, and act on behalf of the Center Director when discharging this responsibility. 39 The ASO will advise the Chief of Flight Operations regarding safety issues and concerns within the organization.

1.2.6.3 Managers may use the advice of the ASO in formulating decisions, but shall not expect or rely on the ASO to make managerial decisions. [40]

1.2.6.4 If a safety concern has not been dealt with sufficiently by the Flight Operations organization, the ASO may take the concern directly to the Center Director. In addition, the ASO may take the concern to the Chief, Office of Safety and Mission Assurance or the Director, AMD.

1.2.6.5 The ASO will meet NASA PIC qualifications and the requirements in paragraph 6.2.8.

1.2.7 Chief Pilot

1.2.7.1 To qualify for assignment, the Chief Pilot shall:

- a. Hold and maintain qualification as a NASA PIC.
- b. Have at least 3 years' experience within the past 6 years as PIC of an aircraft similar in category and class to at least one of the aircraft used in the types of operations being conducted at the Center.
- c. Demonstrate satisfactory supervisory and managerial capabilities. [41]

1.2.7.2 Specific duties will be defined by the Chief of Flight Operations at the respective NASA Center.

1.2.8 The Chief of Maintenance shall be a civil servant assigned to the Flight Operations Office and serve as the Chief of Flight Operations' focal point for all aircraft maintenance activities. [42].

1.2.8.1 To qualify for assignment, the Chief of Maintenance shall:

- a. Have had at least 3 years of experience within the past 6 years in aircraft maintenance in a similar-size operation maintaining aircraft similar to those used by the Center, with management

experience such as supervisor or lead in aircraft maintenance.

b. Have held an FAA Airframe and Power Plant (A&P) Certification, have held an equivalent military designation, or demonstrate an equivalent level of qualifications and expertise. [43]

1.2.8.2 Duties will be defined by the Chief of Flight Operations.

1.2.9 The Chief of Quality Assurance or Quality Inspection shall be a civil servant assigned to the Flight Operations Office and serve as the Chief of Flight Operations' focal point for all aircraft quality assurance activities. [44]

1.2.9.1 To qualify for assignment, the Chief of Quality Assurance or Quality Inspection shall:

a. Hold a current FAA Inspection Authorization Certificate, have held an equivalent military designation, or demonstrate an equivalent level of qualifications and expertise.

b. Maintain a level of inspection expertise and activity needed to meet FAA Inspection Authorization Certificate renewal requirements or the military equivalent.

c. Have had at least 3 years of maintenance experience within the last 6 years, 1 year of which shall have been as a maintenance inspector.

d. Have at least 1 year of experience in a supervisory capacity. [45]

1.2.9.2 Duties will be defined by the Chief of Flight Operations.

1.2.10 The IAOP shall:

a. Advise the Assistant Administrator for the OSI regarding operational, management, and safety policies for NASA aircraft. [46]

b. Conduct periodic meetings with the HQ AMD to review policies and procedures related to aircraft/UAS operational matters affecting all Centers and to make recommendations to the AMD regarding policies, procedures, and guidelines that may be applicable to all Centers. [47].

c. Conduct reviews of a special nature at the request of the Assistant Administrator for the OSI and support the conduct of periodic reviews of all aspects of flight operations at NASA Centers, including compliance with applicable Federal regulations and Headquarters and Center policies and procedures. [48].

1.2.11 Aircraft Advisory Committee (AAC): Director, AMD is designated as the Agency-level capability lead for NASA Aircraft Operations. The AAC is established to advise AMD regarding identification of aircraft requirements, prioritization of capability verses requirements, gap analysis for strategic investment, and plans/roadmaps. The AAC will be chaired by Director, AMD and the IAOP will provide the core membership. Additional members include:

a. Aeronautics Research Mission Directorate.

b. Science Mission Directorate.

c. Human Exploration and Operations Mission Directorate.

d. Space Technology Mission Directorate.

e. Office of Safety and Mission Assurance.

f. Office of the Chief Engineer.

1.2.12 The Director of AMD shall:

- a. Coordinate the formulation of Agency-wide policies, procedures, and guidelines concerning aircraft/UAS operation and ensure their effective and efficient communication to Centers and appropriate Headquarters offices. [49]
- b. Advise and assist the Assistant Administrator for the OSI, the Mission Directorates, and the Center Directors concerning the acquisition and disposition process. [50]
- c. Advise the Assistant Administrator for the OSI regarding the establishment of policy for the use of NASA aircraft and UAS. [51]
- d. Coordinate the findings and recommendations of IAOP reviews dealing with institutional management issues with the appropriate institutional Associate Administrator. [52]
- e. Maintain liaison with other Government agencies and the private sector on matters pertaining to flight operations, maintenance, airworthiness, and aviation management practices common to all Centers. [53]
- f. Provide coordination and other assistance in the assignment of IAOP teams as they review and evaluate the adequacy of Center organizations, facilities, and procedures for flight operations. [54]
- g. Collect, collate, and report Agency aircraft data (e.g., Federal Aviation Interactive Reporting System (FAIRS) data) to GSA or other Federal agencies as required. [55]
- h. Be responsible for the functional leadership, staff support to the Administrator, and central services as they relate to aircraft management and is the Agency's Aircraft Capability Leader and the Senior Aviation Management Official (SAMO) as required by Federal Management Regulation (FMR) 102-33.30. [56]
- i. Be responsible for Aviation Safety Policy implementation and functional oversight.

1.2.13 The Chief, Office of Safety and Mission Assurance shall provide leadership, policy direction, functional oversight, assessment, standards, and coordination for safety and mission assurance affecting NASA's aviation operations. [57]

1.3 Operational Use

1.3.1 NASA's aircraft are generally used for research and development, program support, and passenger transportation, and many NASA aircraft fly multiple missions. NASA maintains only the number of aircraft to enable the Agency to meet its mission requirements that are linked to the Agency's Strategic Plan.

1.3.2 NASA's aircraft perform missions that include, but are not limited to:

- a. Research and Development (R&D). R&D operations are a means for NASA's Mission Directorates to conduct research at various altitudes and atmospheric conditions. R&D operations are flown to advance aeronautics research, earth and space science, space exploration, and science technology demonstration.
- b. Program Support (PS). PS operations enable the accomplishment of NASA's program objectives. Such use includes, but is not limited to, astronaut training, safety chase, photo chase, cargo transport, flightcrew training, range surveillance, launch security, launch and landing weather reconnaissance, contingency support, and command and control.

c. Passenger Transportation. Use of NASA aircraft for passenger transportation allows NASA personnel to meet mission-required travel needs, as defined in OMB Circular A-126 and this NPR. Passenger transportation flights may be classified as "Mission Required" only when failure to use a NASA aircraft would have a clear, negative impact on a NASA operational mission, prevent timely response to an aircraft or spacecraft accident, or threaten the health and safety of NASA personnel, and only when such travel could not be conducted using commercial airlines, charter aircraft service, or ground transportation to fulfill that mission need.

1.4 International Aircraft Operations

1.4.1 State Aircraft. NASA aircraft are operated in international airspace either under ICAO flight rules, foreign diplomatic clearances, and/or due regard, per U. S. Department of State guidance in DOS letter of June 29, 1994, and DOS e-mail dated March 31, 2003.

1.5 Special Operational Requirements

1.5.1 Each NASA aircraft shall be operated in accordance with an aircraft manual providing standard operating procedures. [58]

a. For manned aircraft, these manuals (or checklists) shall be available electronically or carried onboard all NASA aircraft. [59]

b. For unmanned aircraft, manuals shall be immediately accessible to the pilots. [60].

1.5.2 All NASA Flight Operations flight planning libraries shall have available the necessary Flight Information Publications for U.S. and international operations. [61]

1.5.3 Each Center shall have a program for their aircrews to maintain a level of proficiency that will ensure their ability to safely operate an aircraft within governing regulations to include abnormal and emergency situations. [62]

1.5.4 Each Center shall establish and maintain a training program using check flights to assess its adequacy and ensure that personnel are competent to perform their assigned duties. [63]

1.6 Waivers

1.6.1 When deviations from this NPR are necessary, Center Directors or Associate Administrators shall submit requests for waivers to the Assistant Administrator for the OSI via HQ AMD. [64]

1.6.1.1 Prior written approval from the Assistant Administrator for the OSI shall be obtained before implementing procedures that are less restrictive than those contained in this NPR. [65]

1.6.2 Only the Administrator or Assistant Administrator for the OSI, who is responsible for this NPR, or delegated authority may waive requirements contained in this NPR.

1.6.2.1 When deviations from this NPR pertaining to Aviation Safety are necessary, AMD will notify Chief, Safety and Mission assurance of any waivers granted.

1.6.3 A waiver may be approved only if it meets all of the following criteria:

a. It is not prohibited by Federal policy.

b. It would not present an undue risk to public health, safety, the environment, or personnel.

c. It is justified under the particular circumstances.

1.6.4 The waiver approval authority shall approve waivers only for a specific event, period, or duration and specify the boundaries of the requirements being waived. [66]

1.6.5 The waiver approval authority shall review all who have current waivers against this NPR when the NPR is updated and request verification of continued validity. [67]

1.6.6 NASA officials who request waivers shall document the following in the request for waiver:

a. Identification of the directive and specific requirement(s) for which the waiver is requested.

b. Scope (e.g., site, facility, operation, or activity) and duration of the waiver request.

c. Justification for the waiver, including:

(1) Purpose/rationale for requesting the waiver.

(2) Whether application of the requirement in the particular circumstances would conflict with another requirement.

(3) Whether application of the requirement in the particular circumstances would not achieve, or is not necessary to achieve, the underlying purpose of the requirement.

(4) Any other pertinent data or information related to the waiver request (e.g., cost or schedule considerations).

(5) Identification and justification of the acceptance of any additional risk that will be incurred if the waiver is granted.

(6) A description of any special circumstances that warrant granting the waiver, including whether:

(a) Application of the requirement in the particular circumstances would not be justified by any safety and health reason.

(b) The waiver would result in a health and safety improvement that compensates for any detriment that would result from granting the waiver.

(c) There exist any other material circumstances that were not considered when the requirement was adopted, for which it is in the public interest to grant a waiver.

(7) A description of any alternative or mitigating action that will be taken to ensure adequate safety and health and protection of the public, the workers, and the environment for the effective period of the waiver. [68]

Chapter 2. Airworthiness and Maintenance

2.1 Purpose

2.1.1 This chapter establishes requirements to ensure the airworthiness and maintenance of NASA aircraft and UAS that use aerodynamic lift for flight, operate in the Earth's atmosphere where aeronautical flight can occur, and are used to perform NASA missions.

2.2 Airworthiness General Requirements

2.2.1 Airworthiness reviews shall be conducted for all aircraft modifications. [69] These processes are to review flight operations and identify hazards to minimize risks to persons and property and to enhance the likelihood of mission and program success. Formal review requirements will be appropriate for the types of modifications incorporated, the specific mission or project requirements, and the operational risks involved.

2.2.2 The airworthiness review process may include several levels of review. Each Center shall clearly identify the appropriate airworthiness review process for experimental, research, and operational configurations and nonstandard ground or flight operations for all aircraft contracted or operated by the Center. [70]

2.2.3 In addition to being certified as airworthy through a Center airworthiness process, all NASA aircraft shall be cleared through separate flight readiness reviews as described in section 3.12. [71]

2.2.4 Centers and Component Facilities that do not have an aircraft operations department and desire to conduct NASA-conducted or NASA-sponsored operations (aircraft/UAS/CAS) shall coordinate with AMD and the IAOP for support from another NASA Center aircraft operations department with a standard airworthiness review process. [72]

2.3 Airworthiness Certification Requirements

2.3.1 NASA aircraft shall be operated in an airworthy condition as certified by a formal NASA Center airworthiness review process, under the authority of a NASA Center Director, in accordance with Federal public use aircraft laws and regulations. [73]

2.3.1.1 All NASA-owned aircraft performing a public use operation shall possess and maintain a NASA Certificate of Airworthiness (Appendix G) approved by the Center Director. This includes loaned and bailed aircraft to NASA. [74]

2.3.1.2 All NASA commercial aircraft services (CAS) aircraft shall possess and maintain a NASA Certificate of Airworthiness (Appendix G) or Statement of Airworthiness issued by a Center and endorsed/signed by the Center Director in accordance with Chapter 10. [75]

2.3.1.3 For all CAS aircraft, the statement shall define the duration of applicability, as well as any limitations to that statement. [76]

a. A NASA Statement of Airworthiness is valid only when conducting a NASA mission. If a CAS aircraft is altered outside of its FAA type certificate or not maintained under an FAA-accepted maintenance program during its operations for NASA, the NASA contract shall require the responsibility of the CAS owner to conduct a conformity inspection, which is required to ensure the

aircraft meets all civil regulations prior to operating that aircraft as a civil aircraft. [77]

b. The CAS owner of an aircraft that has performed a public aircraft operation for NASA may not return the aircraft to service in civil operations without demonstrating that the aircraft meets all the criteria as prescribed by FAA regulations to hold its airworthiness certificate. For more information, the CAS owner should contact their local Flight Standards District Office.

2.3.1.4 All NASA-owned aircraft used for passenger transportation purposes shall operate in Civil Aircraft status and possess a Standard FAA Certificate of Airworthiness. [78]

a. If CAS aircraft are operated for NASA under a FAA Operating Certificate for passenger or cargo transportation, the aircraft shall be operated within the limitations imposed by the FAA Operating Certificate (with the exception of scheduled airline passenger transportation). [79]

b. Aircraft that have been modified from the FAA-approved configuration shall not be used for passenger transportation purposes. [80]

2.3.1.5 When NASA aircraft are transferred between Centers, a new NASA Certificate of Airworthiness approved by the receiving Center Director shall be obtained prior to commencing flight. [81]

2.3.1.6 If aircraft are used for a multi-Center mission, roles and responsibilities for airworthiness mission operational control and mishap response shall be established in writing. [82]

2.3.1.7 If an aircraft is registered internationally and the operations are being conducted internationally, whether modified or flown in a certified condition, an airworthiness and onsite flight readiness and safety review shall be conducted. Exception: An on-site review is not required for passenger operations if the aircraft is not modified and is being operated in compliance with recognized International Civil Aviation Organization (ICAO) scheduled passenger standards. [83]

2.3.1.8 All NASA UAS, whether NASA-owned, -sponsored or, -contracted, shall receive an airworthiness review per this chapter. [84]

2.3.1.9 For all NASA aircraft bailed or loaned outside of NASA, the aircraft certificate of airworthiness shall be removed and suspended. [85]

2.4 Airworthiness Roles and Responsibilities

2.4.1 The Chief, Office of Safety and Mission Assurance (OSMA) formulates NASA safety policy and provides independent oversight of NASA aviation safety and safety procedures or guidelines.

2.4.2 Aircraft Management Division (AMD) shall establish airworthiness policy and requirements and provide support and oversight of airworthiness process. [86]

2.4.3 Center Directors shall establish airworthiness and configuration control review processes and procedures for overall engineering oversight to identify and review engineering analysis and limitations, to manage hazards and risks associated with flight programs, to ensure safe flight operations, to manage and thoroughly document aircraft configurations, and to ensure that flight objectives satisfy programmatic requirements. [87]

2.4.3.1 Center Directors shall ensure that these review processes and procedures are incorporated into the contracts of those who operate, maintain, and provide support for NASA aircraft as well as contracted aircraft used for NASA missions, with the exception of scheduled airline passenger transportation. [88]

2.4.3.2 Center Directors shall establish configuration control procedures to ensure that the configuration of each NASA aircraft is fully documented and reviewed. [89]

2.4.3.3 Center Directors shall establish a minimum equipment list (MEL) for all non-test-related equipment for all aircraft operations. Waivers to a MEL may be granted by the Chief of Flight Operations but may not be delegated to a lower office/position. [90]

2.4.3.4 Center Engineering Technical Authority governs the approval processes conducted to certify an aircraft operating for NASA as airworthy. He/she is responsible for and ensures that all engineering analysis is performed using appropriate technical standards and that engineering rationale is properly documented and reviewed prior to airworthiness review packages' being submitted to the Center's Airworthiness Board for approval.

2.4.3.5 The Center Engineering Technical Authority shall ensure all engineering documentation, reports, and analysis for aircraft airworthiness complies with this NPR, is readily accessible, is archived for the life of the aircraft while owned or operated by NASA, and is properly reviewed based on sound engineering rationale through design reviews, which are scalable based on scope and magnitude of the engineering effort. [91]

2.4.4 Program/Project Managers shall ensure Airworthiness Review Board and Center Engineering Technical Authority are made aware of missions and operations requiring airworthiness review early in the development phase of the Program/Project and provide all requisite documentation, analysis, resources, and presentations to support the review processes. [92]

2.4.5 The Center Airworthiness Review Board is responsible for reviewing and approving a recommendation to the Center Director for all NASA aircraft and to the Chief of Flight Operations for all CAS aircraft as airworthy in accordance with this NPR and NPR 7120 airworthiness and engineering requirements for all NASA missions.

2.5 Airworthiness Review Board Membership

2.5.1 Each Center Director is responsible for establishing a list of senior managers and/or senior engineers who are responsible for conducting the airworthiness reviews and approving projects or missions for flight, including appointing personnel responsible for managing and executing the Center airworthiness function and maintaining records of airworthiness approvals.

2.5.1.1 The Airworthiness Review Board (ARB) Chair shall be independent of flight operations and Project Management and the assignment documented in writing. [93]

2.5.1.2 All reviews shall include, at a minimum, representatives from safety, flight operations, and engineering, and documentation for what constitutes a quorum for the ARB. [94]

2.5.1.3 The flight operations representative shall be a pilot who is either a qualified ASO or Test Pilot who is a graduate of a formal Test Pilot School. [95]

2.5.2 The Center airworthiness review board may be broken down into several subpanels to facilitate the overall review process. For instance, separate reviews of technical issues and safety hazards may facilitate a detailed review of specific aspects of the project or mission by discipline experts, who then advise the overarching Center review board. Any cockpit or cabin modifications that might interfere with aircrew egress shall be reviewed by a subpanel, including aircrew and life support personnel. [96]

2.6 Airworthiness Review Process

2.6.1 All aircraft conducting NASA or NASA-sponsored operations shall be evaluated and approved by a NASA Center Airworthiness Board. [97]

2.6.1.1 Test-related equipment will be handled through the flight test planning process. If test equipment remains on the aircraft for non-test-related missions, then such equipment shall be addressed in the aircraft documentation. [98]

2.6.1.2 The airworthiness review process is an engineering and safety analyses process to determine that an aviation system or its component parts meets minimum design criteria, standards, and configuration for the conduct of safe flight operations. Airworthiness also reviews the operations of NASA aircraft when those operations are nonstandard for that aircraft type, places the aircraft into a more hazardous environment than normal, or involves experimental internal or external payloads, configurations, or noncertified external stores, including the dropping of uncertified stores, which may affect the airworthiness of the aircraft.

2.6.1.3 An airworthiness review and signed Airworthiness Certificate or Statement are required prior to an aircraft commencing its first or subsequent flights. An Airworthiness Certificate or Statement is valid only for the specific configurations, flight envelopes, duration, locations, and operations specified in the approval. Any change to the specified configuration or flight operation requires issuance of a separate or amended Airworthiness Certificate or Statement.

2.6.1.4 Examples of configuration and envelope changes requiring airworthiness review include, but are not limited to:

- a. Structural and material changes that alter the basic aircraft design configuration.
- b. Modification of the exterior contour or mold line of the aircraft to an experimental configuration (e.g., addition/removal of wing fence, ventral fin, vortex generator, air induction system, auxiliary inlets, and nonstandard antenna configurations or locations).
- c. Modification to the flight control system, including software revisions to nonstandard configurations.
- d. A new or modified propulsion system or its control system, including software revisions, that is nonstandard for the aircraft.
- e. Modification of the displays or annunciation affecting critical information presented to the aircrew (e.g., situational awareness, aircraft control, or air vehicle launch) or avionics/electronics that interface with aircraft and/or are nonstandard.
- f. Modification of any subsystem interfacing with and affecting flight or propulsion systems (e.g., mission computer, navigation, and warning and caution systems) that are nonstandard.
- g. Modification of the aircrew life support systems to nonstandard configurations.
- h. Evaluation of crosswind landing or wet runway landing limits, emergency procedures, structural or flight control limits, wind envelopes, or helicopter external lift, cargo hook system, or tow limits that are outside the normal limits for the aircraft.
- i. Flight test instrumentation that interfaces with normal aircraft systems or that may affect the operation of those systems.
- j. Intentional operation in a degraded mode for test purposes (e.g., simulation of partial loss or malfunction of flight control system, engine, and avionics).

k. Dropping of uncertified stores or objects.

l. Any other modifications, payloads, or operations that are nonstandard according to established flight manuals, procedures, or FAA certification requirements (if operated under an FAA airworthiness certificate).

2.6.1.5 The following aircraft modifications require airworthiness review but may not require a change to the airworthiness certification:

- a. Airworthiness Directives commonly issued by FAA.
- b. Maintenance Advisories, which are issued by multiple sources, such as the U.S. Navy, the U.S. Air Force, and manufacturers.
- c. One Time Inspections (OTI), which may be issued by multiple sources.
- d. Service Bulletins/Service Instructions (SB/SI), which may be issued by manufacturers.
- e. Service Information Letters, which may be issued by multiple sources.
- f. Time Compliance Technical Orders (TCTO), issued by the U.S. Air Force.
- g. Technical Orders (TO).
- h. Technical Directives (TD), issued by the U.S. Navy.
- i. Power Plant Bulletins/Power Plant Changes (PPB/PPC).
- j. Supplemental Type Certificates (STC) issued by the FAA.

2.6.1.6 Modifications to aircraft, such as avionics upgrades, that meet FAA certification requirements, according to applicable FAA regulations, may be handled through a configuration control process.

2.6.2 The Center ARB reviews project or mission hazards, aircraft modifications, project processes, and procedures related to safety and mission assurance. In addition, the process approves appropriate risk mitigation procedures/techniques and provides oversight for all planned operations. The review shall include the engineering rationale, substantiation documentation, and risk mitigations in an airworthiness review board package. [99]

2.6.3 Airworthiness approval for flight may be for an entire test or research program or be restricted to a certain number of flights or missions and require additional review once defined project or mission goals are achieved.

2.6.4 The airworthiness process shall be continual throughout the course of a project. [100] The Center Director should establish periodic reviews to review project progress subsequent to defined project events (including successes or failures) or at other points in the project to review the overall airworthiness of the aircraft for the intended mission, as well as the progress of the project.

2.6.5 All aircraft modifications and/or configuration changes that require airworthiness review board approval shall go through an appropriate level of design reviews. [101] The design review schedule should be based on the scope and magnitude of the modification effort. The objectives of the design review process are to provide NASA the assurances necessary that a satisfactory approach has been taken to minimize and manage risk and to achieve productive flight operations. The reviews need to communicate project management and engineering approaches, demonstrate ability to meet requirements, establish current project status, and above all, indicate the project's overall attitude toward safety.

- a. Design review documentation shall be presented to the Center Engineering Technical Authority for review and approval and can be in conjunction with NPR 7120.5/NPR 7120.8 reviews if coordinated by the Program/Project Manager. [102]
- b. Results of the review shall be documented and action items or Review Item Discrepancies (RIDs) tracked using a closed-loop system. [103]
- c. Design review results and action item status shall be presented to the Airworthiness Review Board during approval request. [104]

2.6.6 Prior to award of any CAS contract or other written agreement, the flight operations office at the NASA Center that manages the contract shall follow the requirements in Chapter 10. [105]

- a. The review shall be conducted in the initial planning stage and results of this review incorporated into the contractor selection process. [106]
- b. If the contract is expected to provide long-term, continuous support (greater than 1 year), the aviation program shall be subject to the IAOP review process. [107]

2.7 Airworthiness Documentation and Records

2.7.1 Airworthiness request and approval requirements shall be documented in Center-level procedures. [108] The following are typical of the information required for an airworthiness review board to review in order to approve an aircraft modification or flight operation for a specific aircraft configuration:

- a. A description of the aircraft modifications, including aircraft configuration, loads, flight envelope, aircraft weight and balance data, reference to applicable mechanical and electrical design documents, reference to applicable software version description documents, and a listing of associated computer software configuration. The airworthiness review board reviews each of these items as applicable for the specific aircraft or subsystems under review.
- b. Applicable engineering analyses describe design criteria, aircraft loads and safety limits, external pod loads, electrical or mechanical system vibrations, aero-elastic vibrations (flutter), aero-servo-elastic effects, thermal loads, electrical system loads, impact of software, and other abnormal environmental conditions and their effects on aircraft performance, stability, and control or aircraft systems operation. The results of tests conducted to verify the engineering analyses also shall be considered. [109]
- c. A description of the required flight operations, including operating procedures, test conditions, maneuvers, required instrumentation, mission control operations, mission rules and flight limitations, nonstandard operation or inspection criteria, and associated checklists. Actions to be taken in the event of in-flight malfunctions or emergency conditions associated with the aircraft modifications or nonstandard operations also shall be described. [110]

2.7.2 Each Center shall establish the content of the airworthiness review based on the aircraft mission, complexity of the modifications, and the inherent hazards associated with the operation. [111]

2.7.3 Requirements for design, documentation, and workmanship shall be established and meet or exceed standard aerospace industry practices for flight hardware if there are no NASA engineering standards in place for the following requirements:

- a. Engineering substantiation documentation and drawings.

b. Material conformity for materials used in primary and secondary structures, whose failure could result in loss of or damage to the aircraft or injury to or loss of personnel based on experience gained through past or current testing.

c. Electrical design requirements to include electromagnetic interference.

d. Avionics requirements, including a review of all system vulnerabilities.

e. Structural load and stability requirements. [112]

2.7.4 Hazard Analysis shall be provided, identifying real or potential conditions that could cause injury, illness, or death to the personnel; damage to or loss of a system, equipment, or property; or damage to the environment. [113]

2.7.4.1 This will include a safety hazard analysis of systems and operations, including risk assessment and risk reduction actions and the methodology used to reduce the risks to acceptable levels (e.g., design, safety devices, warnings, procedure, training, or other methods).

2.7.4.2 The following supporting documentation shall be included in an Airworthiness Review:

a. All design review documentation, results, RIDs/action items, and associated status.

b. Weight and balance.

c. Traceability to closed work packages associated with modification.

d. Status of any review or audit findings affecting the modification or flight. If applicable, include any mitigations put in place to address issues.

e. Minimum equipment list (MEL).

f. Associated waivers and deviations.

g. Product verification results.

h. QA results and issues.

i. Maintenance results and issues. [114]

2.7.5 Airworthiness approval is based on the results of Center-approved engineering and safety analyses. The final approval shall contain a description of the configuration of the aircraft, operating instructions and procedures, operating limitations and restrictions, and specific maneuvers or operations for which the aircraft is cleared. [115]

2.7.5.1 A NASA Certificate of Airworthiness (Appendix G) or Statement of Airworthiness shall be issued prior to flight. [116]

2.8 Maintenance Program

2.8.1 The objective of an effective maintenance program is to ensure that assigned aircraft are serviceable (safe and operable) and properly configured to meet mission requirements in the most cost-effective manner. This is accomplished by performing maintenance, inspection, repair, overhaul, modification, preservation, testing, and condition or performance analyses. Emphasis is placed on processes that reduce the risk of a maintenance failure and the associated impact on operations. The Chief of Flight Operations is responsible for maintaining the airworthiness of aircraft assigned to the Center. The airworthiness of the aircraft includes airframes, engines, propellers,

rotors, appliances, and parts. All maintenance and inspections shall be performed in accordance with this chapter and the applicable manufacturer and military manuals as appropriate. [117]

2.8.2 The Center's Chief of Maintenance is the focal point for all Center aircraft maintenance activities and will ensure that discrepancies between required inspections are corrected to maintain continued airworthiness. Any deviations from the procedures in the maintenance program shall conform to an airworthiness review and be substantiated by a risk analysis. [118]

2.8.3 NASA aircraft shall be maintained in accordance with an established and documented Center maintenance program, using standards of quality in workmanship, materials, and support equipment that will ensure airworthiness of aircraft for safety of flight. [119]

2.8.3.1 All NASA aircraft shall be maintained in a condition for safe operation and meet their respective type designs or properly altered condition. [120] It is essential that the continued airworthiness of NASA aircraft be consistent with the terms of the Airworthiness Certificate.

2.8.3.2 A maintenance program shall meet FAA regulations for any passenger-seating capacity for an aircraft that is used for passenger transportation. [121] Documentation is an essential part of maintenance with the objective of providing timely, accurate, and complete information to the Chief of Flight Operations. Use of the NASA standard maintenance application, NASA Aircraft Management Information System (NAMIS) is mandatory.

2.8.4 Depot-Level Maintenance or Major Aircraft Modifications Conducted External to a NASA Facility

2.8.4.1 Center Flight Operations shall maintain continuous onsite oversight of vendors and facilities performing aircraft depot-level maintenance or major aircraft modifications to ensure quality of workmanship, adherence to NASA standards, schedule, and cost control. [122]

2.8.4.2 This oversight function shall be performed only by NASA employees or contractors that are independent of the vendor facility to reduce any conflict of interest and incorporate the requirement of NPR 8735.2. [123] The oversight requirements address various functions to be performed to ensure compliance to the requirements. This oversight is provided in addition to, not as a substitute for, the maintenance organization's responsibilities.

2.8.4.3 Individuals assigned onsite contractor's facility responsibilities shall have expertise and experience in aircraft maintenance and airworthiness standards and requirements. [124]

2.8.4.4 For maintenance performed external to NASA facilities, the Chief of Maintenance shall ensure that:

a. The person(s) performing the maintenance, preventive maintenance, or alteration is properly certificated and qualified to perform the assigned function. [125]

b. The work performed is done in accordance with the NASA-approved continuous airworthiness maintenance program or Federal Aviation Regulations (FAR). [126]

c. A record is made in NAMIS or the aircraft log book, where applicable, of the description of work performed, the date, certificate number, and type of certificate held by the person performing the work. Maintenance and inspection records will, at a minimum, contain a complete description of the maintenance/repair/inspection accomplished and will include technical manual and paragraph information references. [127]

2.8.5 The NASA process for a continuous airworthiness maintenance program is a compilation of the individual maintenance and inspection functions. These specifications prescribe the scope of the program, including limitations, and the reference manuals and other technical data as supplements to

these specifications. The following are the basic elements of a continuous airworthiness maintenance program:

- a. Aircraft Inspection: This element deals with the routine inspections, servicing, and tests performed on the aircraft at prescribed intervals. It includes detailed instructions and standards (or references thereto) by work forms, job cards, and similar documents, which also serve to control the activity and to record and account for the tasks that comprise this element.
- b. Scheduled Maintenance: This element concerns maintenance tasks performed at prescribed intervals. Some are accomplished concurrently with inspection tasks that are part of the inspection element and may be included on the same form. Other tasks are accomplished independently. The scheduled tasks include replacement of life-limited items, components requiring replacement for periodic overhaul, nondestructive inspections, checks or tests for on-condition items, lubrications, and similar activities.
- c. Unscheduled Maintenance: This element provides procedures, instructions, and standards for accomplishing maintenance tasks generated by the inspection and scheduled maintenance elements, pilot reports, failure analyses, or other indications of a need for maintenance.
- d. Engine, Propeller, and Component Repair and Overhaul: This element concerns shop operations, which, although they encompass scheduled and unscheduled tasks, are remote from maintenance performed to the aircraft as a unit. Appropriate life-limited parts replacement requirements are included in this element.
- e. Structural Inspection Program/Airframe Overhaul: This element concerns the structural inspections identified as the C and D check level by the manufacturer, airframe major overhaul, major corrosion inspections, Programmed Depot Maintenance (PDM), and Scheduled Depot Level Maintenance (SDLM) or similar inspections. In addition to structural inspection, major airframe overhaul programs require extensive maintenance scheduling.
- f. Required Inspection Items: This element concerns maintenance work items, which, if improperly done or for which improper parts are used, could endanger the safe operation of the aircraft. Required inspection items appear in all elements of the operator's continuous airworthiness maintenance program. For maintenance conducted by any contractor, NPR 8735.2 provides the requirements for selection and assignment of Government Mandatory Inspection Points (GMIPs) and lists the sources of information that shall be evaluated during the GMIP definition process. [128]

2.8.6 Each Center shall develop written maintenance procedures and practices in a Center's maintenance manual that supports the aircraft-specific (manufacturer, NASA, or DoD) maintenance programs and ensures that information and technical data appropriate to the work performed are used. [129]

2.8.6.1 While this maintenance program may be completed by contractor maintenance, the contractor is required to follow the Center maintenance manual whose accuracy and currency shall be the responsibility of the Chief of Maintenance. [130]

2.8.6.2 Maintenance procedures shall ensure that no person or organization performs maintenance on NASA aircraft unless the person is an authorized employee of NASA or has been authorized to perform the work under the terms of a written maintenance agreement or other form of authorization specified in the Center's operations manual or maintenance manual. [131]

2.8.6.3 The maintenance manual also shall address how the flightcrew will obtain maintenance services when away from the Center. [132]

2.8.6.4 The Center's maintenance manual serves to define the continuous airworthiness maintenance

program and to provide procedures and instructions for its use. A comprehensive maintenance plan will be detailed in the Center's maintenance manual and include a list of specific maintenance processes. At a minimum, the Center's maintenance manual shall include:

a. A description of how aircraft records and associated documentation for assigned aircraft and components are maintained. [133]

(1) Aircraft records and documentation shall be maintained electronically in NAMIS. [134]

(2) Temporary use of paper records and documentation is authorized when necessary to meet mission requirements such as a remote campaign or during a power failure.

(3) NAMIS electronic records and documentation shall be promptly updated and used as the primary source of aircraft documentation. [135]

b. Maintenance of aircraft records and associated documentation is essential to ensure the airworthiness of aircraft. Aircraft records and documentation provide a history of maintenance, operation, and configuration control of aircraft. Persons signing entries on serviceable parts tags and all documentation in NAMIS for work performed on aircraft, systems, and components shall:

(1) Be authorized in accordance with NASA requirements and applicable FARs and have satisfactorily completed maintenance training or possess the equivalent current experience on the applicable type appliance, aircraft, engine, or propeller. The equivalent experience will be documented on the individual's training record, which is filed in the maintenance organization.

(2) Understand and have knowledge of FARs and the applicable types of maintenance or overhaul manuals and follow the applicable procedures set forth in this manual.

(3) Meet Center-defined certification processes. [136]

c. A documented aircraft release procedure that ensures that all maintenance release authorities are designated in writing and that ensures a maintenance release authorization has been completed following maintenance. [137]

(1) Additionally, there shall be a documented aircraft release process for aircraft that are deployed from the Center. [138] If required, the Chief of Maintenance will designate the maintenance release authority in writing for aircraft deployed from the Center.

d. The process to ensure that persons with maintenance release authority have at least 6 months' experience during the preceding 24 months in the inspection, servicing, or maintenance of an aircraft or system or maintenance control duty in accordance with Center maintenance procedures. [139]

e. Written ground handling procedures that may be accomplished only by qualified ground handling personnel to perform fire guard, application of external electrical power, towing, engine run, and taxi operations that document aircraft-specific training and designate those qualified in writing. [140]

f. A documented Metrology and Calibration (METCAL) program that establishes policy, responsibilities, and requirements to ensure that calibrated and tested tools/special equipment performance is compared to referenced calibration standards (CALSTDs) of known and sufficiently greater accuracy. [141] Calibration ensures that only currently calibrated and tested tools/special equipment operating within established tolerance limits are used to perform maintenance on an aircraft.

g. A documented foreign object damage (FOD) control program that addresses the periodicity and

inspection criteria and effectively reduces the risk of FOD both during maintenance and flight operations. [142] The FOD Prevention Program establishes policy, responsibilities, and requirements to prevent damage to aircraft, engines, ground support equipment (GSE), and other aeronautical equipment and provides uniform FOD reporting procedures.

(1) All flight operations personnel and employees shall be constantly on lookout for material that could be ingested into engines, struck by propeller blades, and/or blown by the exhaust of engines or propellers, causing injury to personnel or damage to aircraft. [143]

(2) Maintenance personnel shall be assigned to perform a general inspection of hangar and ramp areas for FOD on a weekly basis at a minimum. [144]

h. A documented tool control program (TCP) that ensures the accuracy of tool inventories at specific intervals, contains a lost tool process, and prohibits aircraft from flying until all tools used on an aircraft have been accounted for. [145] The TCP establishes policy and responsibilities for implementing, maintaining, controlling, storing, replacing, and inventorying common hand tools. The TCP is applicable to all NASA activities performing or supporting aircraft maintenance. The primary objectives of the TCP are enhancing safety by eliminating accidents and equipment damage attributed to uncontrolled tools and minimizing tool replacement costs. An effective TCP is the responsibility of all maintenance personnel and all levels of the organization. The TCP shall:

(1) Apply to all commercial and Government activities performing contract maintenance, production, or other support functions on NASA aircraft. [146]

(2) Provide instant inventory capability. [147]

i. A documented process to ensure that all GSE used on aircraft are safe and operable. [148]

(1) GSE shall be maintained per written requirements that document how to identify and remove equipment that is unserviceable. [149]

(2) GSE includes all equipment used to make an aeronautical system or end item operational in its intended environment.

(3) GSE shall be maintained and documented under an aviation maintenance system or other NASA-approved system. [150]

j. Maintenance procedures and technical standards for Aviation Survival Equipment (including life support and ejection seats) for the equipment being flown that are an integrated function of aircraft maintenance. [151]

(1) If the Center maintains explosive devices (propellant actuated devices (PADs)/cartridge-actuated devices (CADs)), the Center maintenance manual shall document the program for personnel training and qualifications. [152]

(2) All tools shall be accounted for after the repack and inspection of each item. For example, parachutes and floatation equipment, since these items cannot be functionally checked prior to use. [153]

k. A documented confined space program that defines all aircraft confined spaces and ensures safety in these spaces prior to entry per NPR 8715.3. [154] The objective of the Aircraft Confined Space Program is to ensure that a safe environment is maintained when working on aircraft fuel cells, tanks, and service areas.

l. A documented program that ensures that aircraft maintenance complies with Center Electromagnetic Interference (EMI)/Electrostatic Discharge (ESD) programs. [155] The EMI/ESD

control program establishes policy, responsibilities, and requirements for EMI prevention and reporting and the handling, transportation, storage, and maintenance of ESD-sensitive devices/components. Improper handling, transportation, and storage techniques can cause electrostatic-sensitive devices and components to fail. The insidious nature of ESD-induced failures requires ESD control protection measures to be integral parts of aviation maintenance and supply disciplines. All solid state electronic components and assemblies containing such components are considered ESD-sensitive items, unless otherwise directed by higher authority. These items include printed circuit board assemblies, line replaceable units (LRUs), individual components, and integrated circuits.

m. A Fuel Surveillance Program that ensures that fuel is free of contaminants prior to fuel entering any Center aircraft. [156] The Fuel Surveillance Program establishes policy, responsibilities, and requirements for implementing procedures to maintain aircraft and engine fuel systems' purity. The Fuel Surveillance Program applies to all NASA aircraft, engines, and test cells to include outside vendor-supplied fuel.

n. A documented program that ensures aircraft maintenance is conducted in compliance with the Center Hazardous Material Program and the Protection of the Environment Act, 40 CFR Part 260, Part 261, Part 262, Part 263, Part 264, and Part 265. [157]

(1) The program shall include use, disposal, and both long-term and worksite storage of hazardous materials. [158]

(2) All chemicals, paints, and oils shall be stored in approved chemical lockers at the end of each shift. [159]

o. An oil analysis program, per original equipment manufacturer (OEM) and/or DoD maintenance instructions, to identify mechanical breakdown precursors that exist prior to catastrophic failure. [160]

(1) The program shall be specific to the type of engine installed and provide trend analysis, immediate feedback, and recommended actions to the Center's Chief of Maintenance. [161]

p. A documented Weight and Balance (W&B) Program for each aircraft in compliance with any existing Center program, to include the procedure used to ensure that the weight and balance of an aircraft is maintained, current, and properly documented. [162] The W&B Program provides the means to ensure that aircraft weight and center of gravity remain within established limits. The program will establish and maintain a master file for each aircraft's weight and balance, schedule aircraft for periodic weighing, and provide procedures for the accountability of basic empty weight and balance during the period between weighing.

q. A configuration control process (CCP) established to determine applicability and ensure compliance with Product Improvement Publications (PIP), which are defined as airworthiness directives, technical orders, service and safety bulletins, or other pertinent requirements, including those from FAA, DoD, or OEMs. [163] The CCP:

(1) Will allow for documentation of alternate procedures or inspections if they are substituted.

(2) Shall provide a complete audit trail of decisions and design modifications. [164]

(3) Includes three basic elements: configuration identification, configuration control, and configuration status accounting.

r. An Aviation Material Management process to ensure that aircraft and aircraft parts are qualified for flight and properly documented per Center procedures. [165]

s. General housekeeping procedures to ensure that aviation facilities are maintained by NASA standards for hangars, shops, and ramps. [166] Housekeeping procedures shall ensure:

(1) All electrical equipment connections are at least 18 in. above the hangar floor when aircraft are in a hangar with fuel onboard. [167]

(2) No cell phone usage is allowed within 5 feet of any fuel vent and aircraft engines. [168]

(3) To maintain situational awareness, electronic devices with ear buds or headphones are not allowed while working on/near aircraft on the flight line or in hangars. [169] Effective and timely communications and situational awareness can be critical during aircraft maintenance. Situational awareness is a term used to describe a person's awareness of their surroundings, the meaning of these surroundings, a prediction of what these surroundings will mean in the future, and then using this information to act. Changing conditions within the maintenance areas can cause numerous hazards which are compounded if communication across all staff directly involved in operational aircraft maintenance is found wanting. Wearing ear buds or headphones listening to music or other non-maintenance related content can make operators unaware of potential dangers.

(a) Supervisors shall make a concerted effort to ensure that all maintenance personnel maintain a reasonable situational awareness during maintenance conduct. [170]

t. A documented aircraft component inspection program to determine the serviceability, authenticity, traceability, and airworthiness of parts, components, accessories, and assemblies by subjecting them to inspections, tests, or operational checks. [171] This program will ensure that aviation parts are properly tagged, documented, and segregated from non-aircraft parts.

(1) Organizations providing maintenance support to the Center shall have a procurement program to prevent the purchase of unapproved parts and material in type certificated products. [172]

(2) The Center-approved parts program shall include, at a minimum, methods to establish qualified suppliers who are authorized to manufacture or distribute parts they supply and criteria to identify and screen potential unapproved parts suppliers. [173]

u. Detailed description of the procedure used to ensure that any maintenance tasks required by the maintenance schedule/program, an airworthiness directive, or any task required for the rectification of a defect is completed within the time constraints specified in maintenance procedures. [174]

v. Description of a fatigue management system for maintenance personnel, whose provisions are also required in all maintenance agreements to ensure that maintenance personnel do not carry out maintenance work when they are fatigued. This includes procedures to manage the risks associated with maintenance personnel working alone. [175]

w. A continuing structural integrity program, an aging aircraft program, a condition monitoring program, and reliability program descriptions for aircraft systems, components, and power plants. [176]

2.8.6.5 Explosives-laden aircraft shall be parked in designated aircraft parking areas that meet airfield criteria and afford appropriate quantity distance criteria to eliminate hazards to personnel and resources per NASA STD 8719.12, paragraph 5.15.13. [177]

2.8.6.6 NASA Aircraft Livery will be in accordance with the NASA Graphics Standards Manual (current version of NHB 1430).

2.8.7 Training

2.8.7.1 A documented training program shall be defined in the Center's maintenance manual that

ensures that maintenance personnel, Maintenance Inspectors (MI), and Quality Assurance (QA) personnel are trained and qualified prior to being assigned. [178]

2.8.7.2 In addition to a description of the maintenance training and required competencies of the maintenance staff, the program shall document the Center-defined recurrent and proficiency training requirements to ensure that maintenance personnel, MI, and QA personnel attend refresher training that addresses changes to aircraft systems, test equipment, or critical troubleshooting and repair techniques at least every 24 months. [179]

2.8.7.3 All maintenance personnel that are qualified to perform servicing, inspections, and functional tests shall have completed the required training program, which will be documented in their individual training records. [180]

2.8.7.4 The training program shall include all Center safety program training requirements, including training on fire protection equipment, medical stations, and hazardous materials. [181]

2.8.7.5 Within the training program, all required support functions shall be addressed. These include computer training, logistics training, and operator training for facilities and ground support equipment such as hoists, tow tractors, and lifts. [182]

2.8.7.6 Qualification records shall be kept up to date by the Chief of Maintenance or Center Training Officer to reflect both resident and onsite training. [183]

2.8.8 NASA Aircraft Management Information System (NAMIS)

2.8.8.1 NAMIS consists of separate but integrated modules. NAMIS seven modules include:

- a. Aircraft Maintenance System.
- b. Aircraft Logistics System.
- c. Work Card System.
- d. NAMIS Web Reporting System.
- e. Aircraft/Aircrew Records.
- f. Flight Crew Currency System.
- g. Flight Scheduling Application.

2.8.8.2 NAMIS shall be utilized to track servicing, inspections, and METCAL compliance. [184]

2.8.8.3 The following NAMIS modules are mandatory for active NASA-owned or -bailed aircraft: Flight Records/Currency, Flight Data Capture, Aircraft Maintenance, Flight Scheduling Application (FSA), and Aircraft Logistics' Spares Inventory. NAMIS can be used to track demands (i.e., requisitions) and shall be used to track receipts and issues, regardless of how or by whom the item was requisitioned. [185]

2.8.9 Quality Program

2.8.9.1 It is critical to flight safety that quality program requirements are integrated into the comprehensive aircraft maintenance program.

a. Each NASA Center that is responsible for the maintenance of NASA aircraft shall ensure that the quality program requirements are planned, implemented, maintained, and integrated into every aspect of aircraft maintenance and that only fully qualified personnel are assigned quality program responsibilities. [186]

b. The focus of the quality program is providing a structured system that defines the control features that will demonstrate through objective evidence that the requirements have been met.

c. The Center shall operate a program to provide for analysis and surveillance of its continuous airworthiness maintenance program, including work performed according to Center requirements by a non-NASA entity. [187]

2.8.9.2 The Flight Operations Office has the clear responsibility for and management of all aircraft. This is an operations and maintenance senior line management role with the cradle-to-grave authority and responsibility to manage the resources necessary to conduct safe, effective, and efficient operations in accordance with NASA directives, guidance, and other applicable Federal regulations. Fundamental engineering and quality principles mandate that responsibility for achieving safety and quality lie only with one organization--the line organization (the organization doing the work)--and that nothing should be allowed to impair that responsibility. Line organizations have the responsibility to achieve safety and quality. The Flight Operations Office is responsible for establishing and ensuring the adequacy and effectiveness of the maintenance program and should include Mandatory Inspection Points (MIPs) and the Government Mandatory Inspection Points (GMIPs) where appropriate.

2.8.9.3 An independent organization, such as Safety and Mission Assurance (SMA), may be assigned the responsibility for additional verification points such as the GMIPs required by NPR 8735.2. GMIPs are incorporated as hold points on work documents to require an additional independent person to verify proper accomplishment of work steps where required and/or appropriate.

2.8.9.4 Special skills and experience not normally possessed by maintenance personnel are required for of a staff of trained QA personnel for analysis of data and supervision of QA. Only fully qualified personnel are assigned as QA inspectors. Maintenance personnel assigned to QA are assigned as a collateral duty with limited authority, as determined by the QA Chief.

2.8.9.5 Each Center shall develop a documented quality program (i.e., appropriate policies, procedures, and practices) that covers all aspects of maintenance, material acceptance, documentation review, maintenance instruction applicability, and currency that fits within the scope of the Center's quality management system (QMS). [188]

2.8.9.6 QA shall ensure that aircraft configuration and components have been properly maintained and that all requirements have been properly documented. [189]

a. In addition to the data analysis that falls under QA's responsibilities, effective, risk-based Quality Control should also include and incorporate trend analysis and investigation of recurring discrepancies, high-failure-rate components, and high-usage materials.

b. The data can be used to identify underlying causes for poor quality, prevent issues prior to failure, and improve efficiency and effectiveness of QA resources.

2.8.9.7 The terms inspection, QA, audit, and surveillance have separate and distinct meanings and should be used accordingly

a. Inspection is the examination/testing of supplies (including raw materials, documents, data, components, and assemblies) and services to determine if they conform to technical requirements. Inspection/testing are inline product control activities. Product control are those actions that provide a means to control and measure the characteristics of an item or process to the established requirements. Typically, these are in-process activities that focus primarily on defect identification before product release. Inspection for acceptance shall be performed by qualified persons other than

those who performed or directly supervised the work being inspected. [190]

b. Monitoring, surveillance, and analysis of data provides confidence that maintenance processes can be performed satisfactorily and products conform to the established technical requirements. QA supports top and line management through independent surveillance activities and audits. Typically, these are activities observing or outside the process to focus on process improvement and defect prevention.

c. Audit, as it applies to quality assurance, is a periodic or special review and evaluation of details, plans, policies, procedures, products, directives, and records. Audits verify that performance criteria are met and determine the effectiveness of the process/program.

d. Surveillance or monitoring programs use product or process surveillance based on an effective audit program and an objective statistical history. Sampling and surveillance verifications shall be used independently, or in combination, to accomplish the verification function of the quality program processes. [191]

Note: Independent surveillance and audits should be conducted at the appropriate frequency to ensure processes comply with requirements and to determine the health of the program. The surveillance and audit process continually enforces the requirements, ensuring that complacency has not been introduced, that safety and quality requirements are not becoming secondary to operational commitments, and that schedules and budgets are not driving safety and quality below mandated thresholds. The surveillance and audit activities are critical in fending off complacency and ensuring accountability.

2.8.9.8 QA responsibilities shall be performed to:

a. Establish qualification requirements for QA personnel and collateral duty personnel. [192]

(1) Centers shall maintain a list of all personnel qualified and authorized to conduct inspections. [193]

b. Provide a continuous training program in techniques and procedures pertaining to aircraft maintenance quality program, per paragraph 2.6.4, and the conduct of inspections. [194]

c. Ensure that established standard procedures are observed for conducting scheduled and unscheduled inspections, ground tests, and bench check of components, including engines. [195]

d. Ensure that the configuration of aircraft and components is correct and all essential modifications have been incorporated. [196]

e. Ensure that an inspection is conducted on all equipment parts, and materials received for use, returned for repair, or held awaiting repair to verify satisfactory material condition, identification, packaging, preservation, and configuration and, when applicable, that shelf-life limits are not exceeded. [197]

f. Ensure that check pilots and aircrew are briefed before post-maintenance functional check flights (FCF) so that the purpose and objectives of the flight are clearly understood. After completion of the FCF, debrief the check pilots, aircrew, maintenance control representative, and applicable work center representatives to determine compliance with objectives outlined on the FCF checklist and clarify noted discrepancies. [198]

g. Review all incoming technical publications and directives to determine their applicability to Center-maintained aircraft. [199]

- h. Conduct Parts and Hardware Certification of all items procured. All incoming serviceable aircraft material, parts, or components will be placed in a secured area and inspected by a QA inspector or designee, who will ensure that the part or material is in good condition and conforms to specifications and standards and that certification paperwork or data is correct for applicability and acceptance requirements. [200]
- i. Ensure that personnel are trained in the Government-Industry Data Exchange Program (GIDEP) and FAA Suspected Unapproved Parts (SUP) Program and coordinate all actions with the Center's GIDEP office, HQ AMD, and the Inspector General (IG), as appropriate. [201]
- j. Monitor weight and balance of all Center aircraft, in accordance with Center guidelines. [202]
- k. Validate all work orders (excluding minor aircraft write-ups/gripes) and oversee the installation of all work orders on aircraft. [203]
- l. Assist the ASO in the impounding of Center aircraft involved in a mishap or when directed by ASO. [204]
- m. Monitor maintenance using a program to develop trend analysis of processes. This program analyzes all reports of findings and/or actions taken during aircraft and component maintenance. [205]

2.8.9.9 Maintenance Inspection Requirements

- a. Mechanic and QA signatures are required for the following maintenance actions: down discrepancy and special preflight--FCF, special configuration, Required Inspection Items, GMIPs, and special flight purpose.
- b. Mechanic and QA signatures are required for all back shop repairs.

2.8.10 Technical Publications Library

2.8.10.1 The Technical Publications Library provides a central source of up-to-date information for use by all personnel in performing their work and is the source of reference information to facilitate personnel training and individual improvement.

2.8.10.2 The Technical Publications Library's function includes: determining which technical manuals are required to support maintenance of aircraft, their major components, and ground support equipment in the NASA inventory; receipt and distribution control of these manuals; and responsibility for ensuring manual updating throughout the maintenance organization.

- a. All manuals shall be maintained in accordance with the original manufacturers' updates or revisions (or DoD updates or revisions for DoD aircraft) as modified with NASA- or FAA-approved data. [206]
- b. Centers shall maintain documentation to confirm that periodic revision status audits of the technical library have been conducted. [207]
- c. Exceptions to this policy, including additional changes to documents, shall be approved by the Chief of Flight Operations. [208]

2.8.10.3 For remote sites, the Technical Publications Librarian is responsible for the distribution of manuals and inspections of remote libraries.

Chapter 3. Flight Operations

Note: This chapter applies to all NASA-piloted aircraft.

3.1 Operations

3.1.1 Flight Authorization

3.1.1.1 Centers' Chiefs of Flight Operations shall establish procedures to ensure that all flights of NASA aircraft are properly approved and documented, allowing for all contingencies such as deployed aircraft and aircraft ferry approvals. [209]

3.1.1.2 Emergency lifesaving, humanitarian operations, and Homeland Security missions, as pre-approved by the Center Director, may be carried out in any NASA aircraft. The circumstances shall be documented and reported to the Assistant Administrator for the OSI via the Director of AMD within 30 days of action. [210]

3.2 Flight Planning

3.2.1 Fuel Planning and Monitoring

3.2.1.1 Fuel Planning: Considering weather forecasts and any known en route delays, the minimum amount of useable fuel required at takeoff shall be sufficient to do the following:

- a. Complete the flight to the destination airport.
- b. Fly from that airport to the alternate airport, if required.
- c. Fly after that for 45 minutes at normal cruising speed or, for helicopters, fly after that for 30 minutes at normal cruising speed. [211]

3.2.1.2 Fuel Planning Deviations shall be authorized in writing by the Center Chief of Flight Operations to enable Mission accomplishment. [212]

3.2.1.3 Refueling with Personnel On Board. An aircraft shall not be refueled when personnel are embarking, on board, or disembarking unless it is properly attended by qualified personnel ready to initiate and direct an evacuation of the aircraft by the most practical and expeditious means available. [213]

a. When refueling with personnel embarking, on board, or disembarking, two-way communications shall be maintained by the aircraft's intercommunication system or other suitable means between the ground crew supervising the refueling and the qualified personnel on board the aircraft. [214]

3.2.2 Weather Planning. Prior to takeoff, the PIC shall receive a thorough weather briefing concerning current weather and forecasts for the proposed route, destination, and alternate destination. [215]

3.2.2.1 Departure Weather. Weather minimums for takeoffs shall be not less than landing minimums unless a takeoff alternate is available. [216] A takeoff may be made when the weather is below landing minimums but not less than 1/8-mile visibility or Runway Visual Range (RVR) of 800 feet and provided a suitable departure alternate is available within 30-minutes flight time with an engine inoperative or 1 hour for 4-engine aircraft.

a. When mission necessity and urgency dictates, the Chief of Flight Operations may authorize a takeoff below these minimums. This authority may not be delegated. The weather reported at the departure alternate shall be above landing minimums and forecast to remain so for at least 2 hours after takeoff, per the following:

(1) Precision Approach available: 200-foot ceiling and 1/2-statute mile (SM) visibility added to the published Precision Approach minimums.

(2) Non-Precision Approach (only) available: 300-foot ceiling and 1-SM visibility added to the published Non-Precision Approach minimums. [217]

3.2.2.2 En Route Weather. Airborne weather, weather-capable radar, or weather radar information shall be operative for any flight into areas where current weather reports or forecasts indicate that thunderstorms may reasonably be expected and flight under daylight visual meteorological conditions is not possible. [218]

3.2.2.3 Destination Weather. The PIC of a flight may file for a destination that forecasts prevailing visibility equal to or greater than published landing minimums appropriate to the aircraft equipment, but not less than 1/2-mile or an RVR of 1,800 feet for time of arrival. Also:

a. If the destination weather is reported and forecast to be less than a 2,000-foot ceiling or less than 3-mile visibility from 1 hour before until 1 hour after the estimated time of arrival (ETA), an alternate airport shall be listed on the flight plan. [219]

b. Airport weather minimums shall meet or exceed the requirements of FAR Part 91. 220]

c. Aircraft equipped and certified for CAT II approach as well as the assigned aircrew is CAT II qualified and current may utilize CAT II minimums.

3.2.3 International Operations: Flightcrews operating aircraft in international airspace shall be familiar with the relationship between State Regulations and the ICAO Rules of the Air. [221]

3.2.3.1 Centers shall have a training program to provide familiarization with international procedures. [222]

3.2.3.2 Prior to operating in international airspace, flightcrew members shall complete international procedures training. [223]

3.2.3.3 Diplomatic Clearance: NASA pilots shall secure diplomatic clearance approval prior to entry into the airspace of a foreign country, except for brief use of foreign airspace adjoining the United States, as directed by air traffic control (ATC). [224]

3.2.3.4 Due Regard. Those operations not conducted following ICAO flight procedures are conducted under the "due regard" or "operational prerogative of state aircraft," and aircraft shall satisfy one or more of the following conditions:

a. Be operated in visual meteorological conditions (VMC).

b. Be operated within radar surveillance and radio communications of a surface or airborne (AWACS or HAWKEYE) radar facility.

- c. Be equipped with airborne radar that is sufficient to provide separation between themselves, aircraft they may be controlling, and other aircraft.
- d. Be operated outside controlled airspace. [225]
- e. The conditions listed above shall be followed in order to provide a level of safety equivalent to that normally given by ICAO air traffic control agencies and to fulfill U.S. obligations under Article 3 of the Chicago Convention. [226]

3.2.3.5 All flightcrews conducting international, reduced vertical separation minimum (RVSM), minimum navigation performance specifications (MNPS), random area navigation (RNAV), or required navigation performance (RNP) shall complete (as appropriate to the operation) airspace operations training and be authorized by the Chief of Flight Operations to operate in such airspace in accordance with international requirements. [227]

3.2.3.6 The Chief of Flight Operations shall establish a process to review the rules for flights operating outside U.S. airspace in accordance with the latest, most current ICAO and foreign nation rules. [228] Thereafter, the information will be disseminated to the flightcrews operating in the foreign region.

3.2.3.7 While conducting operations in foreign countries or international airspace, all NASA flights will be conducted as State Aircraft. Diplomatic clearance will be coordinated with Office of Interagency and International Relations (OIIR) as appropriate for overflights or entry into foreign countries. Center Flight Operations shall utilize DOD 4500.54-M (DoD Foreign Clearance Guide) and DoD Flight Information Publications for proper international operations coordination. [229]

3.2.3.8 The PIC of any NASA aircraft entering a foreign country or returning to the United States shall be responsible for the custody and care of disembarking crewmembers and crewmembers from the time they leave the aircraft until they are accepted for examination for entry into the country's immigration or Customs checkpoint. [230]

3.2.3.9 The Center Director shall be responsible for identifying and complying with all national and local environmental laws and requirements for the proper handling and disposal of international garbage on NASA aircraft. [231] Each Center will have a documented procedure for handling international garbage on NASA aircraft. In accordance with 7 CFR Subtitle B, Chapter III, the Animal Health Protection Act (AHPA) and the Plant Protection Act, and 9 CFR Chapter I, the United States Department of Agriculture's (USDA) Animal and Plant Health Inspection Service (APHIS) has the authority to regulate the handling and movement of certain foreign waste products to prevent the spread of foreign plant pests and livestock or poultry diseases. This waste is typically referred to as "regulated garbage." Violations to either of these two laws are potentially punishable by both prison time and fines.

3.2.4 Stabilized Approach

- a. All NASA aircraft operations shall establish applicable stabilized-approach criteria suited to their particular flight operation. [232]
- b. In the absence of flight manual or aircraft directive guidance, for a straight-in approach a stabilized approach shall be established by 1,000 feet above airport elevation in instrument meteorological conditions (IMC) and by 500 feet above airport elevation in visual meteorological conditions (VMC). [233]
- c. In the event that a stabilized approach is not established by the altitudes required in paragraph 3.2.4 b, a missed approach shall be executed. [234]

3.2.5 Fatigue Management. Centers shall have a Fatigue Management Plan and a mitigation process to address risks associated with flightcrew and maintenance crew fatigue. [235]

3.2.5.1 Centers shall establish and implement a fatigue management system containing the following elements to ensure that personnel involved in the operation and maintenance of aircraft do not carry out their duties when fatigued:

- a. Fatigue management procedures.
- b. Appropriate training and education regarding preventive and operational fatigue countermeasures.
- c. Flight and duty time limitations.
- d. Fatigue reporting system.
- e. System for monitoring flightcrew fatigue.
- f. An evaluation process that assesses the effectiveness of the fatigue management system. [236]

3.2.5.2 If deviations from the flight and/or duty time limitations are permitted, the system shall include provisions to:

- a. Assess the associated risks and apply the appropriate mitigation to maintain an acceptable level of risk for that operation.
- b. Identify the management person who is authorized to approve the deviation.
- c. Record the deviations, the risk assessment, and related mitigation. [237]

3.2.5.3 Deviations shall be made only with the express approval of all personnel involved. [238]

3.3 TCAS and TAWS Systems

3.3.1 All manned NASA aircraft shall be configured with FAA-approved Traffic Alert and Collision Avoidance System (TCAS) and Terrain Awareness and Warning System (TAWS) for the specific type model aircraft to mitigate midair collisions and controlled flight into terrain. Alternative FAA-approved systems such as ADS-B in/out or other FAA-approved emerging technologies are also acceptable. [239]

3.3.2 For NASA manned aircraft without an available TCAS/TAWS solution, all NASA flight operations shall develop a TCAS/TAWS Risk Management Plan in accordance with NPR 8000.4 and update it annually. [240]

3.3.3 The order of preference for risk controls is:

- a. Engineering (design, material, or substitution).
- b. Administrative (signage/notices, standard operating procedures (SOP), training, or limiting exposure).

3.3.4 All manned NASA aircraft contracted through commercial vendors shall be configured with FAA-approved TCAS and TAWS systems for the specific type of model aircraft to mitigate midair collisions and controlled flight into terrain. [241]

3.3.5 All flight deck crew members of large or turbojet aircraft shall communicate through a boom or throat microphones below the transition level/altitude. [242]

3.3.6 Cockpit Voice Recorder (CVR), Digital Video Recorder (DVR) and Flight Data Recorder (FDR). If installed and operative, the CVR and FDR shall be turned on during the entire flight. [243]

3.3.7 Should an incident occur, the CVR and FDR power shall be removed and appropriate circuit breakers pulled following completion of the after-shutdown checklist. [244]

3.4 Electronic Publications

3.4.1 Center crews will follow FAA guidance regarding use of Electronic Flight Bags (EFB)/Electronics Chart Displays (ECD).

- a. Center crews are authorized to use EFB/ECD in lieu of paper publications for all phases of flight in accordance with written Center authorized procedures.
- b. A secondary or backup source of aeronautical information necessary for the flight will be available. If the secondary or backup information is an additional EFB/ECD, there shall be one more EFB on board the aircraft than the number of pilots. [245]

3.5 Oxygen Requirements

3.5.1 Unpressurized Aircraft. Oxygen shall be used at all altitudes above 10,000 feet above mean sea level (MSL). [246] Aircrew should be aware of the physiological degradation of high altitude flight. Exception: When no oxygen equipment is available, an unpressurized aircraft may ascend to 12,000 feet MSL provided it does not remain above 10,000 feet MSL for more than 3 hours.

3.5.2 Pressurized Aircraft. For NASA aircraft, if cabin pressure altitude is maintained at 10,000 feet or less, the following will apply:

- a. Oxygen masks shall be ready for immediate use when above flight level (FL) 180. [247]
- b. Above FL 250, one pilot at the controls shall either use oxygen or have an approved quick-donning mask with instant intercommunication system (ICS) capability properly adjusted and positioned for use within 5 seconds. [248]
- c. When above FL 350, when one pilot leaves his flight control position, the other pilot shall use oxygen. [249]
- d. When above FL 410, it is recommended that one pilot at the controls use oxygen.
- e. Aircraft with oxygen equipment available but unable to pressurize will not exceed FL 180 unless a comprehensive briefing by competent aviation medical authority is obtained immediately prior to the flight. This is to reacquaint crewmembers with the hazards associated with high altitude flight, such as decompression sickness, hypoxia, etc., and to ensure adherence to preparatory measures, such as prebreathing.

3.6 Personnel Authorized to Operate NASA Aircraft

3.6.1 Only designated NASA pilots specifically authorized by the Center Chief of Flight Operations shall be allowed to manipulate the flight controls of a NASA aircraft and only in performance of NASA missions. [250] Authorized exceptions: an approved NASA Astronaut Training and proficiency program or a single flight for prospective pilot hires in the aircraft type expected to pilot.

Approved candidates in the NASA astronaut training program and a single flight of a prospective NASA employee pilot in aircraft type also may be authorized.

3.6.1.1 Only pilots designated in type, or in training for designation in type, crewmembers, or maintenance personnel designated in writing by the Center Chief of Flight Operations as being qualified to perform taxiing operations, shall taxi a fixed-wing (F/W) aircraft. [251]

3.6.1.2 Only pilots designated in type, or in training for designation in type, shall taxi a rotary-wing (R/W) aircraft. [252]

3.6.2 Instructor pilots shall be selected by the Center's Chief of Flight Operations from highly qualified PICs who have demonstrated the skill, maturity, and temperament to perform instructor duties. [253] Instructor pilots will conduct all pilot flight checks unless the Center designates flight examiners for that purpose.

3.6.3 Flight Examiner Pilots/Flight Examiner Maintenance Technicians. Centers may designate highly qualified instructor pilots (IPs) and flight maintenance technicians as flight examiners to fulfill Center evaluation requirements.

3.7 Crew Complement

3.7.1 General. All personnel scheduled as primary flightcrew members on NASA aircraft shall be trained and qualified in accordance with this chapter. [254]

3.7.2 Crew assignment, including identification of a PIC, shall be designated in writing for each flight. [255]

3.7.3 Basic Crew. No aircraft shall be operated with less than the minimum basic crew specified by the Center. [256]

3.7.4 No NASA aircraft may use the services of any person as a pilot on an airplane engaged in NASA operations if that person has reached the first day of the month of his or her 65th birthday.

3.7.5 Pilot in Command of NASA Aircraft

3.7.5.1 The PIC of a NASA aircraft shall be a designated NASA pilot. [257] Designated NASA pilots are those who perform piloting duties as a part of their official position description, fulfill NASA contract requirements, or fly in accordance with an interagency agreement, such as a military pilot on loan to NASA. Center's Chief of Flight Operations, with the concurrence of the Center Director, may designate as a PIC, on a temporary basis, individuals possessing required aeronautical qualifications to support NASA's requirements.

3.7.5.2 The PIC of a NASA aircraft is responsible, at all times, for the safe operation of the aircraft and the safety of its occupants and is the final authority as to whether a flight will occur. The PIC is the final authority as to whether a flight will be delayed or diverted for reasons of weather, aircraft conditions, or other safety-related considerations. The PIC shall refuse to carry any person, or accept any aircrew for duty, who appear to be intoxicated or under the influence of alcohol or drugs. [258]

3.7.5.3 The PIC of a NASA aircraft shall ensure that the crew is briefed on the mission plan, safety procedures, and emergency information, including emergency egress. [259]

3.7.5.4 Center Chiefs of Flight Operations shall have a written process to train, designate, and document individuals authorized to pilot Functional Check Flight operations. [260]

3.7.5.5 All NASA PICs shall be trained on the operating rules and procedures of the FAA FARs and

the ICAO Rules of the Air when operating in international airspace. [261]

3.7.5.6 The duties and responsibilities of the PIC shall be specified in the Center's policy, in accordance with this NPR. [262]

3.7.5.7 The PIC will direct the duties of the SIC. In the event of PIC incapacitation, the pilot flying as second-in-command (SIC) on a NASA aircraft shall assume PIC duties. [263]

3.7.5.8 The PIC shall ensure that each occupant of a NASA aircraft in motion occupies an aircraft seat and wears a properly fastened safety belt or Center-approved personnel retention system unless otherwise directed by the PIC. [264]

3.7.5.9 Where installed and appropriate, both a safety belt and shoulder harness shall be worn. [265]

3.8 Flightcrew Qualifications, Proficiency, and Currency

3.8.1 Center directives shall establish separate aircrew qualification and currency requirements for unique aircraft (e.g., project, military, or experimental) in which the aircrew cannot meet the following requirements. [266]

3.8.2 Flightcrew Qualifications. NASA flightcrews shall be qualified in accordance with written standards set forth in Center-developed competency criteria, including flying skills, airmanship, stabilized approach, runway excursions, autopilot/automation procedures, and upset recovery. [267]

3.8.2.1 Prior to assigning personnel to flightcrew duties on NASA flights, the requirements contained in this chapter shall be met. [268]

3.8.2.2 Records of qualification and flight evaluation are required and shall be maintained in aircrew training records in accordance with NPR 1441.1. [269]

3.8.2.3 A review of pilot and crew qualifications shall be made prior to flight assignment to ensure that prerequisites for the intended mission are met. [270]

3.8.2.4 The Center's Chief of Flight Operations shall designate in writing the crewmembers for aircraft that are under the Center's purview. [271]

3.8.2.5 NASA flightcrews will be medically certified using NASA medical qualifications, per Chapter 7 of this NPR.

3.8.2.6 Flight Engineers shall possess an FAA Flight Engineer Certificate appropriate for the aircraft category or equivalent military certification. [272]

a. Centers with one-of-a-kind NASA aircraft may develop a documented local certification equivalent. [273]

b. Centers shall develop alternate training programs to satisfy this requirement should commercial training sources or personnel not be available for the requisite training. [274]

3.8.3 Qualified non-crewmembers (QNC) shall be authorized by the Chief of Flight Operations to participate in flight operations to support mission requirements. [275]

3.8.3.1 Qualified non-crewmembers shall be trained and will maintain qualifications (in accordance with local Center policies and procedures), which will include, at a minimum, cabin emergency egress procedures and medical clearances. [276]

3.8.3.2 Qualified non-crewmembers are not passengers. Their presence on a flight is in direct

support of, or associated with, the flight or mission that the flight is supporting. Examples of qualified non-crewmembers include, but are not limited to, media representatives observing the mission, scientists conducting in-flight experiments, and mission managers supporting the mission or flight on the ground.

3.8.3.3 Media Representatives. The Center shall establish policies for qualifying media representatives for flight. [277]

3.8.4 Pilot Proficiency. A comprehensive pilot proficiency program is critical to flight safety for pilots flying research and program support missions. Such programs are specific to the assigned missions and reflect an in-depth evaluation of pilot proficiency and capability. Elements of pilot proficiency programs include the following:

3.8.4.1 Center Flight Operations shall develop sufficient proficiency requirements or flight time/sortie requirements on flightcrews to meet mission needs. [278]

3.8.4.2 Private pilot time shall not be recorded in NAMIS or utilized to meet any proficiency requirements. [279]

3.8.4.3 Each Center shall develop a written flightcrew training plan incorporating pilot competency, emergency procedures, abnormal procedures, high altitude training, and the upgrade process which, at a minimum, meets the following requirements:

- a. Annual night flying requirements.
- b. Landings in category (fixed-wing/rotorcraft).
- c. Six instrument approaches under actual or simulated conditions within 6 calendar months.
- d. Completing 100 hours of flight time per year (fiscal or calendar year to be determined by Center policy) in any NASA manned aircraft or flight simulator approved by the Center's Chief of Flight Operations or 80 hours of flight time and 100 sorties if all are flown in the same model, design, and series of aircraft or flight simulator. [280]

3.8.4.4 Lapse in Proficiency. Crewmembers overdue the annual flight time requirement shall not be assigned as PIC or SIC. [281]

- a. The Center's Chief of Flight Operations shall document the method to regain qualification in the flightcrew training plan and notify the Assistant Administrator for the OSI, via HQ AMD, of this action in a letter from the Center's Director. [282] At a minimum, it will include a dedicated training flight or training in a simulator and a formal flight evaluation by an IP prior to further mission assignments.
- b. The Center's Chief of Flight Operations shall establish requalification procedures for pilots not meeting any of the remaining requirements above. [283]

3.8.5 Minimum Currency Requirements

3.8.5.1 All flightcrew currency documentation shall be recorded in the NASA standard application, NASA Aircraft Management Information System (NAMIS). [284]

- a. Pilots with current qualifications in a NASA aircraft that is also FAA-certified for Passenger Transportation use, but that is infrequently used for that purpose, may perform the duties of PIC and SIC on that aircraft if they meet the stated currency.
- b. Total pilot/copilot hours may include simulator hours.

- c. Instrument hours, approaches, and landings (including night landings) may be accomplished in an approved visual, motion simulator. Approaches should be evenly balanced between precision and nonprecision.
- d. Private pilot time shall not be recorded in NASA information systems or utilized to meet any of the above currency requirements. [285]

Table 3-1 Minimum Currency Requirements for Pilots

Minimum Currency Requirements for All Pilots in the Preceding 90 Days		
	All Types	In Type
Flight Hours	25	
Takeoffs and Landings (Total)	6	3
Takeoffs and Landings (night)	3	1
Approaches	6	3

e. The following apply to pilots overdue for the recent experience provisions of Table 3-1:

(1) Increased Minimums. A pilot at the controls who does not meet the 90-day total hour requirements but is otherwise current shall increase all instrument approach minimums by 200 feet and one half mile visibility (or the Runway Visual Range equivalent). [286] In no case may the resulting minimums be less than a 400-foot ceiling and 1-mile visibility.

(2) Step-Down Qualifications. PICs who are otherwise current but fail to meet the requirements outlined in Table 3-1 may revert to SIC status (if they are current in their respective positions) until the recent-experience provisions for aircraft commander are satisfied.

(3) When an extended period of aircraft non-availability (e.g., PDM, up/downloads, or no funding) causes all Center pilots of a particular type aircraft to lapse in-type currency or proficiency minimums, Center Chiefs of Flight Operations may develop procedures, in accordance with Section 3.8.4.4, without requiring notification of the Assistant Administrator for the OSI.

3.8.5.2 Multiple Currency. At the discretion of the Chief Pilot, pilots flying multiple types of aircraft who have met the all-types requirements may satisfy the in-type currency requirement by flying a training flight with a flight instructor. This training flight shall include a minimum of two instrument approaches, three takeoffs, and three landings. [287]

3.9 Flightcrew and Maintenance Technician Training

3.9.1 Aircraft Initial Training. Each primary crewmember shall complete an approved formal course of instruction in the type aircraft to be flown, including a study of the systems and procedures applicable to the individual's crew position. [288] The term "formal course" is defined as one that is provided by a manufacturer, a commercial activity specializing in pilot training (14 C.F.R Part 142), or other entity approved by the Center's Chief of Flight Operations.

3.9.2 Simulations. Annual flight simulator training in each aircraft category (fixed-wing/rotorcraft) is required, if available. If there is no specific simulator for the aircraft type, a simulator of the same category aircraft should be used. Realistic, mission-oriented scenarios may be used to complement the annual proficiency and instrument check requirements.

3.9.3 Survival Training. Each primary crewmember shall receive basic survival training on a one-time basis. [289]

3.9.3.1 Additional survival training shall be required by appropriate Center management for those crewmembers engaged in frequent over-water or remote-area flights. [290] Training received prior to NASA employment, such as military survival training courses, may be credited for this requirement.

3.9.3.2 Newly assigned personnel with no previous survival training shall complete this requirement within 12 months of being assigned to flightcrew duties. [291]

3.9.3.3 Pilots shall not be assigned as PICs until this requirement has been met. This requirement does not apply to UAS/Small Unmanned Aircraft System (sUAS) crews. [292]

3.9.4 Physiological Training. Prior to initial designation, primary crewmembers shall receive instruction in the physiological aspects of high-altitude flight, including altitude chamber indoctrination or recognized equivalent training (i.e., Reduced Oxygen Breathing Device training). [293]

3.9.4.1 Altitude chamber training received prior to initial designation meets this requirement. Refresher training academics shall be accomplished every 5 years. [294]

3.9.4.2 Refresher altitude chamber training is optional for primary crewmembers not conducting pressure suit operations.

3.9.5 Emergency Egress Training. Prior to initial designation and annually thereafter, each crewmember shall receive emergency egress training on each type of aircraft assigned. [295]

3.9.5.1 Training shall include instructions on the location and operation of normal and emergency exits and cabin emergency equipment, such as fire extinguishers and life vests. [296]

3.9.6 In-Flight Technicians shall attend refresher training that addresses changes to aircraft systems, test equipment, or critical troubleshooting and repair techniques every 24 months. [297]

3.9.7 Crew Resource Management and Training. All NASA aircrew personnel shall, at least once per calendar year, attend a crew resource management course of at least 4 hours (instruction per year) in duration. [298]

3.9.8 Maintenance Resource Management and Training. All NASA maintenance and quality assurance personnel shall, at least once biennially, attend a maintenance resource management course of at least 4 hours' (instruction per year) duration. [299]

3.9.9 Overdue Training. With the exception of systems and simulator training, which have a 2-month grace period, refresher flight training will be considered overdue if not completed by the end of the month in which it is due.

3.10 Evaluation and Exam

3.10.1 Evaluations. The intent of the NASA flightcrew evaluation program is to objectively evaluate aircrew performance and, thereby, measure the effectiveness of the training program.

3.10.1.1 Designated IPs shall administer all flight checks. [300]

3.10.1.2 An IP shall be designated for all flights in which instruction or evaluation is planned. [301]

3.10.2 Documentation. Flight checks conducted by a NASA IP shall be recorded on NASA Form 1615 or Center equivalent, reviewed by the Center's Chief of Flight Operations, and filed in the individual's training file. [302] All items indicated on the Form 1615 or Center equivalent will be evaluated during the flight checks. Flight instructors are urged to include meaningful remarks and recommendations on the check ride form. This will aid in focusing future training.

3.10.3 Flight proficiency shall be evaluated at least annually by a NASA or NASA-designated pilot, who is an instructor or examiner pilot, in the aircraft used for the evaluation. [303] When available, a suitable simulator, or its equivalent, may be used for this purpose at the discretion of the Center's Chief of Flight Operations. Evaluations conducted by 14 C.F.R Part 142 also may be used to satisfy pilot annual evaluations, at the discretion of the Center's Chief of Flight Operations.

3.10.4 Pilot Instrument Evaluations. Instrument flying proficiency shall be evaluated at least annually using professional aeronautical standards such as FAA Instrument Practical Test Standards. [304] The instrument evaluation may be combined with the annual proficiency evaluation or completed separately. The instrument proficiency check may be accomplished in a simulator approved by the Center's Chief of Flight Operations.

3.10.5 Tests. Written tests shall be administered and reviewed annually by a check pilot to ensure current pilot knowledge of air traffic control procedures, aircraft systems, and normal and emergency operating procedures, Agency and local instructions, and other pertinent regulations and procedures. [305] Centers may use military organizations who conduct "instrument schools" and FAA Part 142 Certificated Flight Schools for the above ATC procedural testing.

3.10.6 Reviews. Pilot annual flight evaluations shall be reviewed by the Center's Chief of Flight Operations as part of a comprehensive review of all flight-related aspects of the assigned pilot under review. These aspects include, but are not limited to, mishap and close call reports, observed behavior reflecting CRM principles, and management counseling necessitated by concerning in-flight and work behaviors. [306]

3.11 Flightcrew Documentation Requirements

3.11.1 Designation Document. Each crewmember shall be designated, in writing, to the respective crew position, and required training be completed and documented in the individual's training file. [307]

3.11.2 Training File. A training file shall be maintained for each flightcrew member and contain all documentation pertaining to crew qualification and training. [308] The documents may be retained by the crewmember upon termination of the crewmember's assignment. At a minimum, the file will contain the following documentation:

- a. Copies of certificates of professional and medical qualifications (e.g., copies of pilot's, flight engineer's, or mechanic's licenses and a copy of the letter designating the individual to the current crew position).
- b. A list of ground training accomplishments (including simulator training) indicating dates, location, and amount of training. A record of refresher training shall be maintained for the past 2 calendar years. [309]
- c. A list of flight training accomplishments and flight evaluations for the past 2 calendar years.

3.11.3 All flightcrew currency documentation shall be recorded in NAMIS. [310]

3.11.4 NASA UAS pilot flight time shall be kept separate from NASA manned flight time, by type,

in NAMIS. [311]

3.11.5 Each Center shall establish a means to document that flight critical information has been passed to all flightcrews. [312]

3.11.5.1 Records pertaining to NASA's flight activities shall include, at a minimum, the following:

- a. Approval of mission.
- b. Name and functions of all on board.
- c. Purpose of the flight.
- d. Routing (route of flight) or flight events and takeoff/landing times. [313]

3.12 Flight Readiness Reviews and Mission Readiness Reviews

3.12.1 There are two categories of readiness reviews that shall be applied to both piloted aircraft and UAS. These readiness reviews may be referred to as flight readiness reviews or operational readiness reviews and mission readiness reviews where the purpose is to ensure that hazards associated with aircraft performance, mission profile, research, payloads, and other operational limitations are identified and that risks are adequately managed to enhance the likelihood of mission and program success for all aircraft missions or operations and to minimize the risks to persons or property. [314]

a. For CAS, the reviews shall also include the terms of the contract and the capabilities of the contractor. [315]

b. NASA Centers shall have written Flight Readiness Review (FRR)/Operations Readiness Review (ORR) and Mission Readiness Review (MRR) processes. [316]

3.12.1.1 FRR/ORR shall focus on the flight operational safety aspects of a specific aircraft flight, mission, or campaign. [317]

3.12.1.2 MRR shall focus on mission operational safety using multiple aircraft and multiple activities to ensure mission success. [318]

3.12.2 Chief of Flight Operations from one of the participating NASA Centers shall ensure a MRR is conducted when multiple aircraft operations are to be conducted. [319]

3.12.3 Prior to conducting an FRR/ORR, each individual aircraft involved in the flight or campaign shall have an approved Certificate of Airworthiness or Statement of Airworthiness. [320]

3.12.4 The Chair of the Center Airworthiness Process Program or a representative shall attend all readiness reviews. [321] Personnel who should attend these reviews include the Safety and Mission Assurance Office, the mission manager and/or Principal Investigator, the Range Safety personnel, the Flight Operations personnel, the ASO, and, in the case of UAS operations, the UAS operator.

3.12.5 A supervisory Flight Operations pilot or other Flight Operations supervisory personnel shall chair and approve the FRR/ORR flight authorization. [322]

3.12.6 An FRR/ORR reviews the operational requirements for a specific aircraft flight or campaign. The review should address a description of the required flight operations, including operating procedures, test conditions, maneuvers, required instrumentation, mission control operations, mission rules and flight limitations, nonstandard operation or inspection criteria, and associated checklists. Actions to be taken in the event of in-flight malfunctions or emergency conditions

associated with the aircraft modifications or nonstandard operations also shall be described. [323]

3.12.6.1 Areas of consideration shall include:

- a. Science mission requirements.
- b. Flight operations procedures.
- c. Operational Go/No-Go criteria.
- d. Pilot qualifications, flight operations training, and flight manuals.
- e. UAS operations requirements.
- f. Aircraft configuration.
- g. Aircraft maintenance.
- h. Science payload and operations.
- i. Payload combination.
- j. Status of reviews.
- k. Special weather conditions.
- l. Science functional flight test plan.
- m. Mishap Preparedness Contingency Plan (MPCP). [324]

3.12.7 An MRR reviews the mission interoperability of multiple aircraft from multiple activities to ensure mission success for a specific flight event or campaign. Activities may be different at different Centers, other Federal agencies, military services, commercial vendors, or non-NASA aircraft. Prior to conducting an MRR, each aircraft involved in the flight or campaign shall have an approved FRR/ORR. [325]

3.12.7.1 The program/project management of the flight/campaign event shall assign an individual who has authorization to proceed with the flight program to chair and make the MRR evaluation. [326]

3.12.7.2 The focus of this review is to ensure that the Principal Investigators and the flightcrews or UAS operators have made the coordination and arrangements required to maximize operational safety and ensure mission success.

3.12.7.3 Information required for a MRR include the following:

- a. Airspace management, including aircraft separation/coordination.
- b. Checklists.
- c. Communication plan, including inter-Center/interagency communication/coordination.
- d. Deployment.
- e. Flight experiment and science flight requirements, including test conditions and science coordination requirements.
- f. Flight operations procedures, including maneuvers and nonstandard operation.
- g. Ground operations procedures dealing with hazardous systems.

- h. Inspection criteria.
- i. Liability coverage.
- j. Logistics.
- k. Mission control operations, including mission rules and flight limitations.
- l. Organizational and functional chart, including roles and responsibilities.
- m. Payload status.
- n. Program/Project Mishap Preparedness and Contingency Plan.
- o. Public affairs/outreach.
- p. Required instrumentation.
- q. Safety and mission assurance, including actions to be taken in the event of in-flight malfunctions or emergency conditions associated with the aircraft modifications or nonstandard operations.
- r. Schedule timeline. [327]

3.12.8 Centers, Component Facilities, and contractors that do not have an aircraft operations department and operate NASA aircraft/UAS shall coordinate with an alternate NASA Center aircraft operations department for FRR/ORR and MRR services and support. [328]

3.13 Tobacco

3.13.1 Tobacco Products. The use of any tobacco products onboard NASA aircraft is prohibited.

3.13.2 Lighters. The use of lighters onboard NASA aircraft is prohibited.

3.13.3 Electronic Cigarettes. The use of electronic, simulated smoking materials (e.g., cigarettes, pipes, or cigars) onboard NASA aircraft is prohibited.

3.14 Drugs and Alcohol

3.14.1 Limitations/Federal Law. In many circumstances, it is a violation of Federal law to act or attempt to act as an aircrew member while under the influence of alcohol or drugs. Flight personnel shall comply with applicable Federal laws governing drug and alcohol use by aircrew members. See 14 CFR 91.17. [329]

3.14.2 As detailed in NPR 3792.1, NASA's Plan for A Drug Free Workplace, the use of any drug by flight personnel is prohibited unless specifically approved by a NASA Flight Surgeon (FS) or FAA Aviation Medical Examiner (AME). No person may attempt to act as an aircrew member of or commence any Crew Duty Day assignment to a NASA aircraft:

- a. Within 8 hours after the consumption of any alcoholic beverage.
- b. While under the influence or residual effects of alcohol, defined as having residual .04 percent by weight or more alcohol in the blood.
- c. While using any drug (e.g., illicit, prescription, or over-the-counter) that affects his/her faculties in any way contrary to safety when not approved in writing by a NASA FS or an FAA AME.

3.14.3 Consuming Alcohol On Duty. Aircrew are prohibited from consuming alcohol from any source (including food and medicines) after reporting for duty. This policy includes periods when aircrew may be assigned to be "on call" for flight duty.

Chapter 4. Passenger Transportation

4.1 Purpose

This chapter establishes policies and procedures for management, use, operation, and control of Government aircraft when used or controlled by NASA to transport passengers or cargo. The definition of passengers does not include crewmembers or qualified non-crewmembers who are directly associated with the conduct or purpose of the flight. For example, researchers conducting or observing their experiments aboard the DC-8 are qualified non-crewmembers. A media representative observing NASA's flight operations for public affairs purposes would also be a qualified non-crewmember. NASA aircraft are defined, herein, as aircraft owned, leased, chartered, or rented by NASA, in accordance with NPD 7900.4 and OMB Circular A-126.

4.2 Policy

4.2.1 In compliance with OMB Circular A-126, NASA will not own aircraft exceeding the number, size, and capacity necessary to meet documented mission requirements. When carrying passengers, NASA aircraft shall be operated as civil aircraft. NASA aircraft are prohibited from carrying passengers when operating as public aircraft. [330]

4.2.1.1 When operated as civil aircraft, maintenance and aircrew standards shall meet the requirements for retention of FAA Airworthiness Certification and operation. [331]

a. Those requirements shall be followed for any NASA flight that carries passengers. [332]

4.2.1.2 The Certificate of Airworthiness shall be displayed, per 14 C.F.R § 91.203, Subparts (a) and (b). [333]

4.2.1.3 Passenger Transportation flights shall be operated and maintained in accordance with 14 CFR Part 21, Part 39, Part 43, Part 61, Part 65, and Part 91. [334]

4.2.1.4 Centers shall develop policies/procedures to operate Passenger Transportation flights in accordance with the procedures specified in OMB Circular A-126 and 41 CFR, Section 101-37, as well as the provisions of this chapter. [335] Procedures of the International Civil Aviation Organization (ICAO) apply, in lieu of 14 CFR Part 91.

4.2.2 Passenger Transportation flights shall be conducted only in support of activities that constitute the discharge of NASA's official responsibilities and only when the aircraft is not otherwise scheduled for Mission Required or Required Use flight operations. [336]

4.2.2.1 NASA employees shall not use Passenger Transportation flights if commercial airlines, charter aircraft services, or ground transportation are reasonably available to meet the mission need, unless the flight is cost justified in accordance with OMB Circular A-126 and this chapter. [337]

4.2.2.2 Passenger Transportation flights may be conducted for the transportation of authorized personnel on official Government business, in accordance with OMB Circular A-126. Such travel may be approved only after following all requirements of this chapter.

4.2.3 Flights that require excessive deadheading or involve long, unproductive layovers shall be avoided, absent special emergency situations. [338]

4.2.4 Whenever practicable, inter-Center airlift requirements shall be combined. [339]

4.2.5 Each passenger traveling aboard NASA Passenger Transportation flights shall be a U.S. Government employee or contractor on official U.S. Government business and have either an approved NASA travel authorization, in accordance with NASA directives, or a travel authorization approved by another Federal agency or Congressional committee. [340]

4.2.5.1 Travel authorized by another Federal agency or Congressional committee also shall be approved by an Official-in-Charge of a Headquarters Office or a NASA Center Director. [341]

4.2.5.2 Flightcrew members on Passenger Transportation flights may be considered as passengers for cost-justification purposes when they have either an approved NASA travel authorization, in accordance with NASA directives, or a travel authorization approved by another Federal agency or Congressional committee for purposes or activities beyond their crew flight duties

4.2.5.3 The names of the passengers and purpose of travel for such passengers shall be documented in the Passenger Transportation flight request form. [342] Per 41 CFR, Chapter 300, Federal Travel Regulation System--General, contractors working under a contract with an executive agency are considered Federal travelers and may travel on a Government aircraft.

4.2.5.4 In special emergency situations that are approved by the Assistant Administrator for the OSI or at the Center Director level, other persons may be permitted to travel aboard NASA Passenger Transportation flights for emergency or humanitarian purposes or on a space available and cost-reimbursable basis. Reimbursement by nonofficial travelers shall comply with paragraph 4.7. [343]

4.2.6 All passengers shall be manifested on NASA Form 1269, Flight Itinerary and Passenger Manifest. [344]

4.2.6.1 Prior to departure of any Passenger Transportation flight, the PIC shall certify the accuracy of the manifest and file a copy with a responsible ground agency such as a military, civil, or NASA operations office. [345]

4.2.6.2 The PIC is relieved of the requirement to provide the manifest if a NASA official has been designated as the ground coordinator for the flight with responsibility for maintaining the manifest.

4.2.7 NASA Passenger Transportation flight operations shall be conducted under the cognizance of the Assistant Administrator for the OSI. [346]

4.3 Classification of Passenger Transportation Flights

4.3.1 Required Use. Passenger Transportation flights may be classified as Required Use only if the use of Government aircraft is required because of bona fide communications or security needs or exceptional scheduling requirements. Required Use designation shall be controlled solely by the NASA Administrator and approved in accordance with paragraph 4.4.2 of this chapter. [347]

4.3.2 Mission Required. Passenger Transportation flights may be classified as Mission Required only when failure to use a NASA aircraft would have a clear, negative impact on a NASA operational mission, prevent timely response to an aircraft or spacecraft accident, or threaten the health and safety of NASA personnel, and only when such travel could not be conducted using commercial airlines, charter aircraft service, or ground transportation to fulfill that mission need. All passenger travel that can reasonably be performed using commercial airlines, charter aircraft service, or ground transportation to meet the mission need may not be designated as Mission Required. Classification of a Passenger Transportation (passenger or cargo) flight as Mission Required requires approval from the Assistant Administrator for the OSI before the flight and shall

be coordinated with the HQ AMD. [348] Refer to paragraph 4.4 of this chapter for approval procedures. Passenger Transportation flights also may be designated as Mission Required for non-travel activities that support NASA's official responsibilities. Such activities include, but are not limited to, training, evacuation (including medical evacuation), search and rescue, aeronautical research, space and science applications, and other such non-travel activities as cited in OMB Circular A-126. Mission Required use may not include official travel to give speeches, attend conferences or meetings, or make routine site visits. Cost justification in accordance with OMB Circular A-126 is not required for Mission Required flights

4.3.2.1 Flights can only be designated as Mission Required if such travel cannot be conducted using commercial airlines, charter aircraft services, or ground transportation to fulfill that mission need. Examples of Mission Required Passenger Transportation flights include, but are not limited, to the following:

Table 4-1 Mission Requirements

Space Operations	
a.	Return International Space Station crews after landing.
b.	Provide transportation for emergency response to in-space operations problems and unexpected events.
Space Program	
c.	Transport critical launch management personnel to and from U.S. and international launch sites.
d.	Transport critical commercial space hardware and equipment before or after landing in U.S. and international locations.
e.	Provide emergency transportation capability for response team for each manned space mission launch or landing.
f.	Provide transportation capability for initial response to space vehicle post-mishap investigations.
g.	Needed for emergency response to in-space operations and unexpected events (unscheduled and time-critical events).
h.	Provide transportation of the dependent families of the astronaut crewmembers to and from launches and landings.
i.	Provide transportation for prime flightcrew members to/from launch site during pre-launch countdown and post-launch activities.
Science Programs	
j.	Transport emergency response teams and equipment to flight research mishaps or aircraft grounded off station due to maintenance problems.
k.	Return hardware and data from the landing site of remotely operated space probes.
l.	Transport equipment to support flight research for unscheduled and time-critical events to accommodate tight launch schedules.

m.	Provide contingency, fast-response capability for launch and search and recovery operations for sounding rockets launched from the Wallops Island range.
Natural Disaster Response	
n.	Hurricane and other natural disaster evacuation and response to protect NASA personnel and property.

4.3.3 NASA Passenger Transportation flights that are not classified as Required Use or Mission Required are classified as Other Official Travel. Agency official travel will normally be accomplished using commercial airlines or available means of ground transportation. Travel on Passenger Transportation flights that are designated as Other Official Travel shall be authorized in advance on a trip-by-trip basis as detailed in Section 4.4. [349]

4.3.3.1 NASA employees shall not use Passenger Transportation flights for Other Official Travel if commercial airline, charter aircraft services, or ground transportation is reasonably available, unless the flight is cost justified in accordance with OMB Circular A-126 and this chapter. [350]

4.3.4 Examples of Other Official Travel include, but are not limited to, the following:

- a. Travel to give speeches.
- b. Travel to accept awards.
- c. Travel to make routine site visits.
- d. Travel to attend NASA-sponsored meetings, including meetings for Flight Readiness Reviews, Launch Minus-2, Launch Minus-1, launch or landing activities, launches of other NASA-related payloads, launch recovery operations, Soyuz launch and recovery operations, NASA advisory committees, council and board meetings, professional conferences, or contractor conferences.

4.3.5 Other Official Travel that is not Required Use or Mission Required, as defined in paragraph 4.3.3, shall be authorized only when one of the following conditions is met:

- a. No commercial airline or aircraft (including charter) service is reasonably available (i.e., able to meet the traveler's departure or arrival requirements within a 24-hour period), unless extraordinary circumstances require a shorter period to effectively fulfill Agency requirements. (When using "no commercial airline or aircraft service is reasonably available" to justify the use of Passenger Transportation flights, actual airline schedule information shall be provided as part of, and attached to, the aircraft request [351].)
- b. The actual cost of using a Government aircraft is not more than the cost of using commercial airline or aircraft (including charter service). [352]

4.3.5.1 Such cost justification shall be computed consistent with paragraph 4.4.5.a. [353]

4.3.6 Mission Required or Required Use flights (certified under the terms of paragraph 4.4) may transport passengers on Other Official Travel when space is available and such travel is approved in strict compliance with this chapter. Under these circumstances, such Passenger Transportation flight use may be presumed to result in cost savings to the U.S. Government and a cost justification is not required and should not be completed on NASA Form 1653 for the flight.

4.3.7 Use of NASA aircraft for passenger transportation purposes, regardless of travel classification category, shall follow the same requirements as used for all other Passenger Transportation flights, including compliance with 41 CFR Part 101-37, Government Aviation Administration and

Coordination, and OMB Circular A-126, flight request and approval using NASA Form 1653, cost justification on NASA Form 1653 as required, and obtaining travel authorization approvals. [354]

4.3.7.1 When operated as civil aircraft, maintenance and aircrew standards shall meet those required for retention of FAA Airworthiness Certification and operation and be followed for any NASA Passenger Transportation flight that carries passengers. [355]

4.3.7.2 Centers shall exercise caution to ensure that aircraft are returned to their FAA-certificated configuration after being modified for program support or research purposes. [356] Refer to Section 4.9 for specific policies and procedures for flying passengers on research or program support aircraft.

4.3.8 Nonofficial travel on NASA Passenger Transportation flights is the use of remaining aircraft seating capacity for nonofficial purposes on a flight that is scheduled for official Government business. Nonofficial travel on NASA Passenger Transportation flights shall be authorized only when all the following conditions are met:

- a. The aircraft is already scheduled for use for an official purpose.
- b. Such nonofficial travel use does not require a larger aircraft than needed or alteration of flight itinerary for the official purpose.
- c. Nonofficial travel use results only in minor additional cost to the Government. [357]

4.3.8.1 All nonofficial travelers shall reimburse the U.S. Treasury, in accordance with Section 4.7. [358]

4.3.9 The Center Director shall certify, in writing, that nonofficial travel on a scheduled flight has met the above conditions. [359]

4.3.9.1 The Center shall retain this certification for a minimum of 2 years. [360]

4.3.9.2 In an emergency situation, prior verbal approval by the Center Director, with an after-the-fact written certification, is permitted.

4.4 Approval of Flights

4.4.1 All flights with passengers aboard NASA aircraft assigned to a Center shall be reviewed by the Center's Chief Counsel for compliance with 41 CFR, Part 101-37, Government Aviation Administration and Coordination, and OMB Circular A-126 and approved in advance by the Center Director. [361]

4.4.1.1 In the case of aircraft assigned to HQ, those flights shall be reviewed by the General Counsel or Deputy General Counsel and approved in advance by the Assistant Administrator for the OSI. [362]

4.4.1.2 All flights classified as Other Official Travel that have senior Federal officials aboard shall be reviewed by the General Counsel and approved in advance by the appropriate NASA HQ or Center approval authority. [363] This review and approval authority may not be delegated.

4.4.2 Passenger Transportation flights also shall be approved in advance, in writing, and generally on a trip-by-trip basis. [364]

4.4.2.1 The Administrator shall in each instance determine the appropriateness of Required Use flights following a finding of compliance with OMB Circular A-126 requirements by the General

Counsel. [365]

4.4.2.2 While the Administrator may make a blanket determination that all use of NASA aircraft by certain employees, or travel in specified categories, qualifies as Required Use travel, such determinations shall likewise be in writing, be determined to be compliant with OMB Circular A-126 requirements by the General Counsel, and set forth the justification for that determination. [366]

4.4.2.3 The Center Director will complete the following when a member of the flightcrew also is considered a passenger:

- a. The justification shall be annotated in the remarks section of NASA Form 1653. [367]
- b. The flightcrew member shall have either a NASA travel authorization approved in accordance with NASA directives or a travel authorization approved by another Federal agency or Congressional committee for purposes or activities beyond their crew flight duties. [368]
- c. The flightcrew member shall be listed as a passenger on Form 1653. [369]
- d. If the flightcrew member is a Senior Federal Official, a family member of such Senior Federal Official, or a non-Federal traveler, the flight request shall be reviewed by the General Counsel. [370]

4.4.3 Flights classified as Mission Required, where NASA personnel are traveling to meet mission requirements, also shall be reviewed by the General Counsel and approved in advance by the Assistant Administrator for the OSI. [371] Refer to Figure 4-1 for the approval process flow chart.

4.4.3.1 The Assistant Administrator for the OSI shall ascertain, prior to authorizing the flight, whether the trip is for Mission Required travel, as described in paragraph 4.3.2. [372]

4.4.3.2 Should special emergency situations preclude preflight review and approval, immediate action to review and approve the flight shall be taken as soon as practicable following the flight. [373]

4.4.3.3 Flights classified as Mission Required conducted on research or program support aircraft, where passengers are aboard but the primary purpose of the flight is not passenger transport, may be approved at the Center Director's level with Center Counsel's review.

- a. General Counsel shall review the flight in advance if a Senior Federal Official, families of such senior Federal officials, or non-Federal travelers are passengers. [374] Refer to Figure 4-2 for the approval process flow chart (Figure 4-4, if a Senior Federal Official is a passenger). Cost justification is not required.
- b. Authorization shall be coordinated with the HQ AMD. [375] An example of such a flight would be a program support flight to provide photographic chase on a research object or aircrew training to meet minimum proficiency standards. In this example, the primary purpose of the flight is not passenger transport. However, in addition to the crewmembers and qualified non-crewmembers directly involved with the flight's primary mission, support personnel, or other official travelers, may be carried as passengers providing that all other applicable provisions of this chapter have been met.
- c. A Passenger Transportation Flight Request (NASA Form 1653) is required, and the passenger manifest (NASA Form 1269) shall clearly distinguish aircrew from passengers. [376]
- d. The remarks section of the NASA Form 1653 shall indicate what training and for whom the flight is being conducted. [377]

NOTE: If minimum aircrew currency requirements have been met prior to the commencement of the flight for all of the aircrew assigned to a flight, aircrew training cannot be the primary purpose of a flight when carrying passengers.



Figure 4-1 Mission Required Travel Where Passenger Transportation Is the Primary Purpose of the Flight

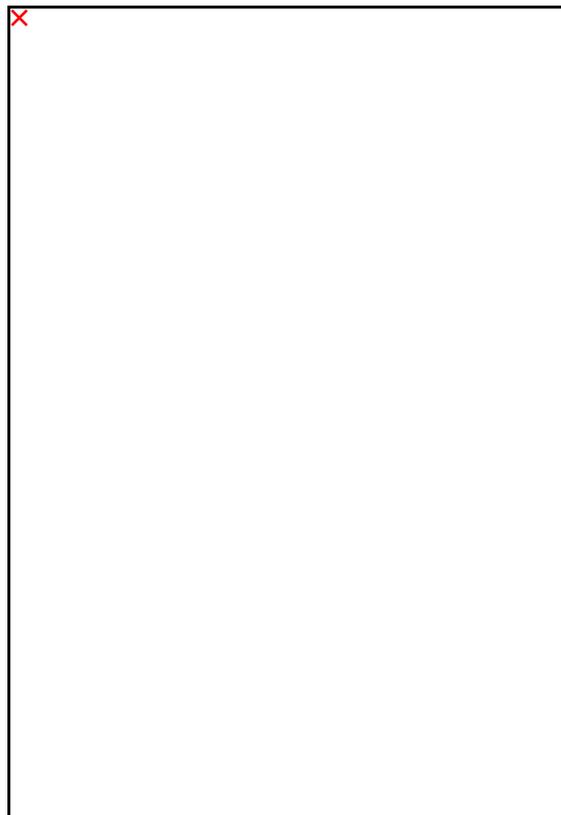


Figure 4-2 Mission Required Travel Where Passenger Transportation

Is Not the Primary Purpose of the Flight

4.4.4 For the approval process for Other Official Travel, refer to Figures 4-3 and 4-4. Travel by the following categories of people shall be authorized in advance and in writing when traveling aboard Passenger Transportation flights on Other Official Travel and their status annotated on the flight request and manifest:

- a. Senior Federal officials.
- b. Members and families of such senior Federal officials.
- c. Non-Federal travelers. [378]

4.4.4.1 Senior Federal officials are persons who meet one of the following definitions:

- a. Employed at a rate of pay specified in or fixed, according to 5 U.S.C., Chapter 53, Pay Rates and Systems.
- b. Employed in a position in an executive agency, including any independent agency, at a rate of pay for Level I of the executive schedule or employed in the Executive Office of the President (EOP) at a rate of pay for Level II of the executive schedule.

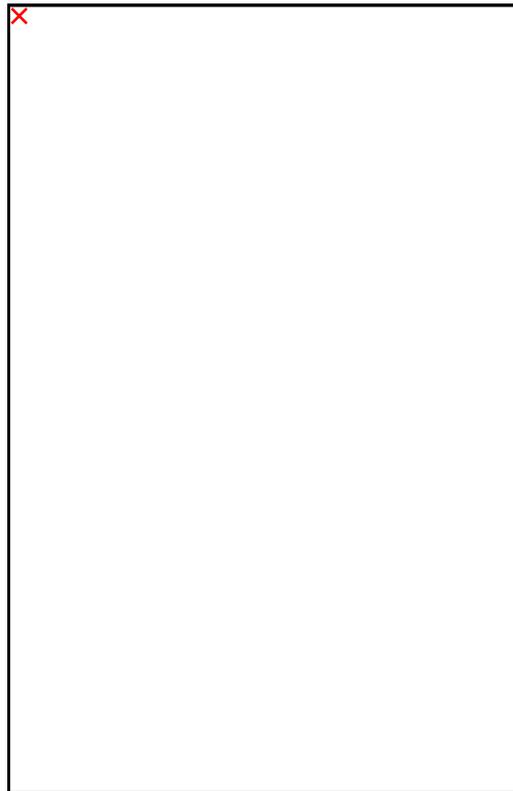


Figure 4-3 Approval Flow for Other Official Travel Without Senior Federal Officials, Families of Such Senior Federal Officials, or Non-Federal Travelers Aboard

- c. Employed in a position in an executive agency that is not referred to in (a) above (other than a position that is subject to pay adjustment under Section 5.e of OMB Circular A-126, Improving the Management and Use of Government Aircraft) and for which the basic rate of pay, exclusive of any locality-based pay adjustment under Section 5304 of Title 5 of the U.S. Code (or any comparable adjustment pursuant to interim authority of the President), is equal to or greater than the rate of basic pay for the senior executive service (SES) under Section 5382 of Title 5 of the U.S. Code.
- d. Appointed by the President to a position under Section 105(a)(2)(A), (B), or (C) of Title 3 of the

U.S. Code or by the Vice President to a position under Section 106(a) (1) (A), (B), or (C) of Title 3 of the U.S. Code.

e. Generally, these officials are persons employed by the White House and executive agencies, including independent agencies, at a rate of pay equal to or greater than the minimum rate of basic pay for the SES. Active duty military officers are exempted from this definition.

4.4.4.2 Authorizations for Other Official Travel flights with senior Federal officials, families of such senior Federal officials, and non-Federal travelers aboard shall be:

- a. Reviewed in advance on a trip-by-trip basis by the Center's Chief Counsel.
- b. Approved by the Center Director.



Figure 4-4 Approval Flow for Other Official Travel With Senior Federal Officials, Families of Such Senior Federal Officials, or Non-Federal Travelers Aboard

c. Reviewed by the NASA General Counsel. [379]

4.4.4.3 At NASA HQ, all flights shall be reviewed by the General Counsel and approved in advance by the Assistant Administrator for the OSI. [380] In special emergency situations, an after-the-fact written certification is permitted.

4.4.4.4 Other Official Travel flights on Center-assigned aircraft with no senior Federal officials aboard shall be reviewed by the Center's Chief Counsel and approved by the Center Director without HQ review. [381]

4.4.5 When a Passenger Transportation flight is for Other Official Travel, the approving official shall determine that one of the following criteria has been satisfied:

- a. No commercial aircraft or airline service is reasonably available in accordance with paragraph 4.3.5a.
- b. The actual cost of Passenger Transportation flights does not exceed the cost of using commercial airlines or aircraft (including charter service). [382]

4.4.5.1 For such cost-justified flights, the cost of using commercial airline or aircraft services for justifying the use of Government aircraft shall:

- a. Be the current Government contract fare or price or the lowest fare or price known to be available for the trip(s) in question.
- b. Include any differences in the costs of any additional ground or air travel, per diem and miscellaneous travel (e.g., taxis, parking), and lost employee work time (computed at gross hourly costs to the Government, including benefits) between commercial air, charter air service, and Government aircraft. [383]

(1) To capture the cost, including fringe benefits, of the employee's lost work time, a multiplier of 1.3285 shall be applied to the locality-adjusted hourly salaries of the individual travelers for the additional travel time. [384] The hourly salaries of the travelers are determined by dividing the applicable current average annual salaries that are provided by the NASA Workforce Web site, by 2,087. Selecting the "Average Salaries by Occupation and Center (table)" view will provide access to the necessary data to determine average salaries by occupation and grade for each Center. While Federal salary data can be found at many other locations, the NASA Workforce Web site is the official NASA source. Travel time is defined as the time required to travel from the office or home until arrival at the business location or hotel, whichever is earliest.

4.5 Responsibilities Associated with Passenger Transportation Flight Operations

4.5.1 The Assistant Administrator for the OSI shall have the following responsibilities:

- a. Approving policies and other matters involving NASA Passenger Transportation flights (except those specifically outlined above) and ensuring that the number of NASA-owned aircraft and their capacity to carry passengers and cargo does not exceed the level necessary to meet NASA's mission requirements. [385]
- b. Coordinating acquisition, assignment, or disposition of aircraft whose primary purpose is the conduct of Passenger Transportation flights with the appropriate Associate Administrators and Center Directors, in accordance with OMB Circular A-76, Performance of Commercial Activities. [386]
- c. Annually reviewing Passenger Transportation flight requirements, use, and associated costs, including variable cost rates for each aircraft used to conduct Passenger Transportation flights. [387]
- d. Periodically reviewing the need for all NASA aircraft whose primary purpose is Passenger Transportation flight operations, and the cost effectiveness of NASA Passenger Transportation flight operations, in accordance with the requirements of OMB Circular A-76. [388]

(1) Each such review of NASA-owned aircraft whose primary purpose is Passenger Transportation flight operations shall be submitted to GSA when completed and to OMB with NASA's next budget

submission. [389]

e. Ensuring that current (by fiscal year) variable cost rate for each aircraft utilized to conduct Passenger Transportation flights is used by all NASA officials who operate and account for NASA Passenger Transportation flights to calculate the flight-by-flight cost justification required by OMB Circular A-126. [390]

4.5.2 Center Directors are responsible for the safe and efficient operation of Passenger Transportation flights conducted by their assigned aircraft. Specifically, Center Directors shall:

a. Ensure that aircraft are used properly and that the functions, including contract functions, performed by their aircraft comply, at a minimum, with NASA, FAA, OMB, and other Federal requirements, policies, and procedures. [391] Center Directors may establish more restrictive local standards, where circumstances warrant, following coordination with the Assistant Administrator for the OSI.

b. Ensure compliance with 41 CFR, Part 101-37, and OMB Circular A-126. [392]

c. Approve the use of their assigned aircraft to conduct Passenger Transportation flights where passenger transport is not the primary mission. [393]

d. Designate aircrew to conduct Passenger Transportation flights and ensure continuing compliance with all governing regulations. [394]

e. Establish variable cost rates for aircraft under their control that are, or may be, used for passenger transportation. The rate will be developed using OMB Circular A-126, Attachments A and B, incorporating the most recent 12 months of historical cost data available, and be used to determine the cost justification for Passenger Transportation flight requests. [395]

(1) The rate shall be reported to the HQ AMD, not later than September 15 of each year, and cannot be used until approved by that office. [396]

f. Annually review and document the Center's continuing need for aircraft, whose primary purpose is the transport of passengers, and the cost-effectiveness of such aircraft operations, as required by OMB Circular A-126 and reflected in the guidance from the HQ AMD. [397]

(1) Content of this review shall include, in narrative format, a comparison of the past years' use with future requirements. [398]

(2) Upon completion of the annual review, a copy shall be forwarded to the HQ AMD, not later than October 31 of each year. [399]

(3) When Government ownership of an aircraft is no longer justified, Center Directors shall identify such aircraft to the Assistant Administrator for the OSI for reassignment or disposal. [400]

g. Submit a monthly report of Passenger Transportation flight data to the HQ AMD to arrive not later than the 20th of the next month. [401]

(1) This data shall include all available Passenger Transportation flight request records for NASA aircraft under the control of the Center Director and reflect every flight flown by aircraft that has been, or may be, approved to transport passengers, regardless of whether the passengers were aboard that flight. [402]

(2) At a minimum, the following shall be provided:

(a) NASA Form 1653, Passenger Transportation Flight Request.

(b) NASA Form 1269, Flight Itinerary and Manifest.

(c) Cost Calculation Spreadsheet.

(d) NAMIS Form 1672, Aircraft Log. [403]

4.5.2.1 Certification documentation, demonstrating compliance with paragraph 4.3.5 for any nonofficial travel use and documentation of the required reimbursement described in paragraph 4.7, shall be included in the monthly Passenger Transportation flight data submission. This responsibility may be delegated. [404]

4.5.3 The Director of the HQ AMD is responsible for the following:

Providing oversight, functional management, and direct staff support to the Administrator concerning Agency-wide policies, procedures, and guidelines for the management and conduct of Passenger Transportation flights and Center compliance with NASA and OMB requirements.

Developing and coordinating plans for the acquisition, assignment, and disposition of NASA aircraft whose primary purpose is passenger transport.

Developing standard Agency-wide maintenance and operating requirements and policies, including minimum training and qualification requirements for aircrew and maintenance personnel.

Coordinating periodic meetings with Center Aircraft Operations Chiefs and Maintenance Chiefs to review and update Agency-wide operations and maintenance requirements, policies, and procedures.

In conjunction with the chair, IAOP, coordinating and participating in the conduct of operational reviews to ensure the adequacy and standardization of procedures, aircrew training and qualification programs, and aircraft maintenance and inspection programs at Centers operating Passenger Transportation flights.

Evaluating cost and utilization data for NASA aircraft used to conduct passenger transport.

Providing an annual summary analysis of all cost and utilization data for Passenger Transportation flight operations to the Assistant Administrator for the OSI.

Providing Centers with guidance and assistance in the development of aircraft variable cost rates for use in accomplishing cost comparisons.

Reviewing and approving Center-derived variable cost rates for Passenger Transportation flights.

Maintaining a centralized database of Passenger Transportation flight operations documentation to monitor usage, aircraft costs, and compliance with NASA and OMB requirements.

Providing an annual report to the Assistant Administrator for the OSI on the quality of Agency-wide compliance with NASA and OMB requirements for Passenger Transportation flight operations, no later than November 15 of each year.

Conducting annual audits of Center Passenger Transportation flight operations documentation.

4.5.4 The Inter-Center Aircraft Operations Panel (IAOP)

4.5.4.1 The IAOP performs Agency-wide coordination and communication to recommend requirements, policies, and operational improvements that can be used by the NASA Centers to improve local operations policies and procedures and, by the HQ AMD, to improve Agency policies, procedures, and guidelines.

4.5.4.2 For each aircraft type used to conduct Passenger Transportation flights, the IAOP chairperson may establish operations and maintenance subpanels with responsibility for standardizing aircrew and maintenance procedures, establishing aircrew and maintenance training/qualification standards, and conducting airworthiness reviews. For subpanels, the IAOP chairperson shall ensure that:

- a. Subpanel members are Chiefs of Aircraft Operations and Chiefs of Aircraft Maintenance or their designees, as well as a representative from the HQ AMD who will act as permanent Executive Secretary. [405]
- b. Subpanels will be convened at least annually in formal meetings; however, the subpanels will act as standing committees subject to call by the chairperson to review urgent business. Informal meetings may be conducted by teleconference. [406]
- c. Subpanels, with the IAOP chairperson's concurrence, will forward their recommendations through the HQ AMD to the Assistant Administrator for the OSI for final approval. [407]
- d. Headquarters-approved recommendations will be considered directive in nature and be reflected in NASA policy documents. [408]

4.5.5 Flightcrew Members

4.5.5.1 Maintaining the highest standards of safety is the primary concern of all crewmembers. Other concerns, such as passenger service, courtesy, promptness, and reliability are important, but shall always be secondary to safety. [409]

4.5.5.2 All crewmembers shall comply with the provisions set forth in this NPR and with FAA and OEM publications for their aircraft and other applicable directives, regulations, and instructions. [410]

4.5.6 Pilot in Command. A fully qualified pilot shall be designated as PIC and charged with the responsibility of conducting each NASA Passenger Transportation flight. [411]

4.5.6.1 The PIC is responsible for exercising complete authority, without limitation, over the command and supervision of assigned crewmembers during flight and crew duty time.

4.5.6.2 The PIC is solely responsible for accomplishing the mission assigned to the aircraft, for all facets of its operations, and for exercising final authority over the safety of the aircraft and its passengers. The PIC will make the decision to delay or divert a flight for operational reasons such as weather, aircraft conditions, or pilot fatigue. The PIC will not be overruled by other persons embarked. A decision by the PIC to delay or divert a flight for the above reasons or based on safety concerns will not be the basis for disciplinary action.

4.5.7 Second in Command (SIC). The pilot assigned to duty as SIC during flight shall be qualified as either a PIC or SIC, as specified in paragraph 4.11.4. [412] It is the SIC's responsibility to assist the PIC and to be able to assume command in the event of the PIC's absence or incapacitation.

4.5.7.1 A SIC may, at the discretion of the PIC, fly from the left seat or right seat on missions (such as ferry or training missions) when no passengers are on board. A SIC will not make takeoffs or landings from either seat with passengers on board. However, Center's Chiefs of Flight Operations may grant, in writing, authority for a PIC to allow a SIC to execute landings with passengers aboard. The final approval authority for such operations remains with the PIC for each flight.

4.6 Reporting Requirements

4.6.1 The HQ AMD will ensure strict compliance with the following reporting requirements:

4.6.1.1 NASA's aircraft programs shall be included in NASA's Management Control Plan and comply with the internal control requirements of OMB Circular A-123. [413]

4.6.1.2 Any material weaknesses found shall be reported in the next annual internal controls report to the President and Congress. [414]

4.6.1.3 OMB Circular A-76 reviews will be completed when required and submitted to GSA and OMB with the Agency's next budget submission. These reports will include plans for disposition of any aircraft not justified in the review or the identification of such additional aircraft, as may be required.

4.6.1.4 On a semiannual basis, NASA reports to GSA on each Passenger Transportation flight for "Other Official Travel" by senior Federal officials, staff of the Executive Office of the President, members of the families of such officials, and any non-Federal travelers. Such reports will be in a format as specified by GSA and list all such travel conducted during the preceding 6-month period. The report shall include, at a minimum:

- a. The name of each such traveler.
- b. The official purpose of the trip.
- c. Destination(s).
- d. For travel in which the report states that a Passenger Transportation flight would be less expensive than a commercial carrier, the allocated share of the full operating cost of each trip and the corresponding commercial cost for the trip. [415]

(1) Reports on classified trips will not be reported to GSA, but shall be maintained by the Agency using the Passenger Transportation flights and be available for review as authorized. [416]

4.6.1.5 Records of all Passenger Transportation flight operations shall be retained for at least 2 years and include, at a minimum:

- a. The tail number of the plane used.
- b. The date(s) used.
- c. The name(s) of the pilot(s) and flightcrew.
- d. The purpose(s) of the flight.
- e. The route(s) flown.
- f. The names and status of all passengers on all legs of the mission. [417]

4.6.1.6 When Passenger Transportation flights are used to support Other Official Travel, evidence that the applicable provisions of OMB Circular A-126 have been satisfied is required.

4.6.2 Center Directors shall ensure strict compliance with the following reporting requirements:

a. Monthly submission of Passenger Transportation flight data to the HQ AMD, as required in paragraph 4.5.2.7. [418]

b. Annually reviewing and documenting the Center's continuing need for aircraft, whose primary purpose is the transport of passengers, and the cost-effectiveness of such aircraft operations, as required by OMB Circular A-126 and reflected in the guidance from the HQ AMD. Content of this

review is to include, in narrative format, a comparison of the past years' use with future requirements. Upon completion of the annual review, a copy will be forwarded to the HQ AMD, not later than October 31 of each year. [419]

c. Establishing variable cost rates for each fiscal year for aircraft under their control that are, or may be, used for passenger transportation. [420]

(1) This rate is to be used to determine cost justification for Passenger Transportation flight requests and shall be reported to the HQ AMD, not later than September 15 of each year. [421]

(2) The variable rate will be developed per OMB Circular A-126, Attachments A and B, using the most recent 12 months of historical cost data available.

(3) The Center variable rate shall be approved by HQ AMD prior to being applied at the beginning of each fiscal year. [422]

(4) If, during the fiscal year, a Center needs to adjust the variable rate, substantiation shall be submitted and approved prior to being applied. [423]

4.7 Reimbursement for Nonofficial Travel Use

4.7.1 Reimbursement for nonofficial travel use shall be made in advance of the flight for travel on FAA aircraft, consistent with current FAA procedures. [424]

4.7.2 Reimbursement for nonofficial travel use of NASA-owned or -controlled aircraft shall be made in advance of the flight. [425]

4.7.2.1 Travelers aboard such flights shall reimburse the Agency at the full commercial coach fare for the most direct route possible between the origin and destination, except: (a) as authorized under 10 U.S.C., § 2648, Persons and Supplies: Sea, Land, and Air Transportation, and regulations implementing the statute and (b) by civilian personnel and their dependents in remote locations (i.e., locations not reasonably accessible to regularly scheduled commercial airline services). [426]

4.7.3 Reimbursement will consist of a noncash payment by personal check made payable to NASA for the amount as determined by the local NASA Travel Office. The check will be submitted to the Customer Payment Processor in the Center's Accounts Receivable Office. Receipt of the reimbursement will be fully documented and attached to the Passenger Transportation Flight Request, NF 1653. Any flight involving nonofficial travelers shall require notification to the HQ AMD, prior to the flight, to ensure application of the Agency-wide procedures for reimbursement. [427]

4.8 Operations

4.8.1 NASA Passenger Transportation flights are public aircraft, as defined by 49 U.S.C. § 40102, Definitions, but are operated as civil aircraft when carrying passengers.

4.8.2 NASA aircraft used to conduct Passenger Transportation flights shall meet the FAA certification standards required of Passenger Transportation flights. [428]

4.8.3 Airworthiness of NASA Passenger Transportation flights shall, at a minimum, meet the standards set forth in the Federal Aviation Regulations for similar business-type aircraft. [429]

4.8.3.1 Aircraft whose primary or secondary purpose is the transport of passengers shall be

maintained, as required, for retention of FAA Airworthiness Certification. [430]

4.8.4 The cost of operation and the utilization of Passenger Transportation flights shall be reported in accordance with OMB Circular A-126. [431]

4.9 Use of NASA Aircraft for Passenger Transportation Flight Purposes

4.9.1 NASA-owned and -controlled aircraft, including lease and charter, whose primary purpose is to meet other mission requirements of research or program support, are public aircraft and are not authorized to carry passengers (even if the classification of the flight is Mission Required) without written approval from the Assistant Administrator for the OSI prior to such use. Approval shall be coordinated with the HQ AMD. [432]

4.9.1.1 Once approval for such use has been obtained, Center Directors may approve Mission Required flights on those specifically authorized aircraft, subject to the reporting procedures of this chapter and the letter of authorization.

4.9.1.2 Absent such specific authorization, personnel aboard aircraft operated as public aircraft is limited to crewmembers or qualified non-crewmembers. The use of a NASA aircraft to provide passenger transportation shall be restricted to circumstances where such use does not conflict with program support or research operations. [433]

4.9.1.3 Strict compliance with this chapter and with OMB Circular A-126 is mandatory. Such use will only be approved subject to the following:

4.9.1.3.1 When using a NASA aircraft for Passenger Transportation flights, the aircraft shall be in a valid FAA-certificated configuration. [434]

4.9.1.3.2 When Passenger Transportation flights are not readily available or when such use would be impractical; e.g., when using an available Passenger Transportation flight would create excessive empty flights--deadheading--or would exceed crew duty restrictions.

4.9.1.3.3 The same cost comparisons required for Passenger Transportation flights, as required by paragraphs 4.1 through 4.4.

4.9.1.3.4 When such use has been approved by the Center Director and the Assistant Administrator for the OSI.

4.9.1.4 Centers shall document the justification for and approval of each flight used for Passenger Transportation purposes and retain the documentation for 2 years. [435]

a. Additionally, every flight in such aircraft, including flights without passengers, shall be accounted for in monthly documentation provided to the HQ AMD as described in paragraph 4.6.2a. [436]

4.10 Waivers and Supplements

4.10.1 Waivers. When deviations from this NPR are necessary, Center Directors shall submit requests for deviations or waivers to the Assistant Administrator for the OSI. [437] Written approval is required before implementing procedures that are less restrictive than those contained in this NPR.

4.11 Flightcrew Qualifications Specific to Passenger

Transportation

4.11.1 Designation. Prior to assigning personnel to flightcrew duties on NASA Passenger Transportation flights, the requirements contained in this chapter shall be met. [438] The crewmember shall be designated, in writing, to the respective crew position, and required training be completed and documented in the individual's training file.

4.11.2 Training File. A training file shall be maintained for each flightcrew member that contains all documentation pertaining to crew qualification and training. [439] The documents may be retained by the crewmember upon termination of the crewmember's assignment. At a minimum, the file will contain the following documentation:

a. Copies of certificates of professional and medical qualifications; e.g., copies of pilot's, flight engineer's, or mechanic's licenses and a copy of the letter designating the individual to the current crew position.

b. A list of ground training accomplishments (including simulator training) indicating dates, location, and amount of training. A record of refresher training shall be maintained for the past 2 calendar years. [440]

c. A list of flight training accomplishments and flight evaluations for the past 2 calendar years.

4.11.3 Medical Prerequisites. Pilots of aircraft used for Passenger Transportation flights shall possess a current FAA First-Class Medical Certificate. [441]

4.11.3.1 Flight Maintenance Technicians shall possess a valid FAA Third-Class Medical Certificate or NASA medical certificate issued within the past 12 months by a NASA-approved medical examiner. [442]

4.11.3.2 Examinations conducted by non-NASA Aircrew Medical Examiners (AME) will require a records review by a NASA Occupational Health Clinic physician prior to recommendation to the Center Director.

4.11.4 PICs/SICs shall possess an FAA Airline Transport Pilot (ATP) Certificate with appropriate category, class, and type rating in the aircraft assigned. [443]

4.11.4.1 To be designated an aircraft commander, the pilot shall meet the following minimum flight experience requirements:

a. 2,500 pilot hours (500 hours multi-engine).

b. 100 pilot hours in type. [444]

4.11.5 Instructor pilots shall be selected by the Center's Chief of Flight Operations from highly qualified PICs who have demonstrated the skill, maturity, and temperament to perform instructor duties. [445] Instructor pilots will conduct all pilot flight checks unless the Center designates flight examiners for that purpose.

4.11.6 Flight Examiner Pilots/Flight Examiner Maintenance Technicians. Centers may designate highly qualified IPs and flight maintenance technicians as flight examiners to fulfill Center evaluation requirements.

4.11.7 Flight maintenance technicians shall possess an FAA A&P Certificate. [446]

4.12 Crewmember Training

4.12.1 The Passenger Transportation training program is established to ensure that each crewmember is adequately trained to perform assigned duties safely and proficiently. To the extent practical, procedures training should be standardized for each type of Passenger Transportation flight.

4.13 Ground Training

4.13.1 Survival Training. Each primary crewmember shall receive basic survival training on a one-time basis. [447]

a. Additional survival training shall be required by appropriate Center management for those crewmembers engaged in frequent over-water or remote-area flights. [448]

b. Training received prior to NASA employment, such as military survival training courses, may be credited for this requirement. Newly assigned personnel with no previous survival training shall complete this requirement within 12 months of being assigned to flightcrew duties. [449]

c. Pilots shall not be assigned as PICs until this requirement has been met. [450]

4.13.2 Physiological Training. Prior to initial designation, primary crewmembers shall receive instruction in the physiological aspects of high-altitude flight, including altitude chamber indoctrination or recognized equivalent training; i.e., Reduced Oxygen Breathing Device training. [451]

a. Altitude chamber training received prior to initial designation meets this requirement. Refresher training academics shall be accomplished every 5 years. [452]

b. Refresher altitude chamber training is optional for primary crewmembers not conducting pressure suit operations.

4.13.3 Emergency Egress Training. Prior to initial designation and annually thereafter, each crewmember shall receive emergency egress training on each type of aircraft assigned. [453]

a. Training shall include instructions on the location and operation of normal and emergency exits and cabin emergency equipment, such as fire extinguishers and life vests. [454]

4.13.4 Aircraft Initial Training. Each primary crewmember shall complete an approved formal course of instruction in the type of aircraft to be flown, including a study of the systems and procedures applicable to the individual's crew position. [455] The term "formal course" is defined as one that is provided by a manufacturer, a commercial activity specializing in pilot training (14 C.F.R. Part 142, Training Centers), or other entity approved by the Center's Chief of Flight Operations.

4.13.5 Refresher Training. A formal systems training course that consists of a minimum of 7 hours of academic training shall be required every 6 months for pilots and every 18 months for flight maintenance technicians. [456] At the discretion of the Center's Chief of Flight Operations, a 7-hour local refresher ground training course may be substituted for one of the two annual formal systems training courses for highly experienced pilots who are qualified in multiple aircraft and attend multiple emergency procedure training sessions annually or who are single-aircraft qualified and have at least 3 years and 300 hours of experience in the specific aircraft type.

4.13.6 Maintenance Technicians shall attend refresher training that addresses changes to aircraft systems, test equipment, or critical troubleshooting and repair techniques every 24 months. [457]

4.14 Flight Training Phase

4.14.1 Flight training is designed to provide crewmembers with hands-on experience under controlled conditions. Flight training shall be conducted under the supervision of a NASA-designated flight IP or an FAA-certified flight instructor, either in an approved simulator or in an aircraft. [458] Flight training, except that which is associated with transportation procedures, will not be conducted while passengers are on board. Conduct of flightcrew training with simulated emergencies or abnormal situations with passengers on board is prohibited.

4.14.2 Initial Pilot Training. Prior to initial designation, each pilot shall receive a minimum of 10 hours of flight training, 8 hours of which may be conducted in a simulator. [459]

4.14.3 Refresher Pilot Training. In each 6-month period, pilots shall receive a minimum of 6 hours of flight or simulator training. [460]

4.14.3.1 At least one-half of this training shall be completed in the pilot's (left seat) position. [461]

4.14.3.2 Because of the safety and efficiency provided by modern visual simulators, maximum use should be made of these facilities to meet this training requirement.

4.14.3.3 With the approval of the Center's Chief of Flight Operations, one of the semiannual flight or simulator training requirements may be waived for pilots with 3 years and 300 hours of experience in type and for temporary pilots serving in SIC capacity. This can be done only after all other applicable requirements of this NPR have been met and the temporary pilot successfully completes a proficiency and instrument proficiency check-in type given by a designated NASA flight instructor.

4.14.4 Flight Maintenance Technician Training. Maintenance technicians perform in-flight duties involving passenger safety aboard certain NASA aircraft, such as Gulfstream aircraft.

4.14.4.1 Prior to initial designation, each maintenance technician shall receive training in such areas as traffic awareness and "see-and-avoid" techniques, aircraft servicing, weight and balance, and passenger care. [462]

4.14.4.2 This training may be conducted on a regular passenger mission under the supervision of a fully qualified flight maintenance technician or aircraft commander.

4.14.4.3 Initial training will consist of at least two passenger missions. One mission shall include an overnight stop away from the home duty station. [463]

4.15 Overdue Training

With the exception of systems and simulator training, which have a 2-month grace period, refresher flight training will be considered overdue if not completed by the end of the month in which it is due. Only crewmembers who have completed their required training shall be used as required crewmembers on any passenger missions. [464]

4.16 Minimum Currency Requirements

4.16.1 All flightcrew currency documentation shall be recorded in the NASA standard application, NASA Aircraft Management Information System (NAMIS). [465]

4.16.2 Minimum Requirements. In the interest of flight safety and to ensure that all crewmembers

have the opportunity to exercise their aeronautical skills and, thereby, maintain the proficiency level for which they have been trained, the following minimum currency requirements shall be met:

4.16.2.1 Pilots. Table 4-2 sets forth the minimum currency requirements for pilots [466]:

Table 4-2 Minimum Currency Requirements for Pilots

Minimum Currency Requirements for All Pilots in the Preceding 90 Days		
	All Types	In Type
Flight Hours	25	
Takeoffs and Landings (Total)	6	3
Takeoffs and Landings (Night)	3	1
Approaches	6	3
Notes: 1. Requirements under All Types are not limited to passenger transportation flights. 2. Total Flight Hours may include simulator hours. 3. Instrument hours, approaches, takeoffs, and landings (including night takeoffs and landings) may be accomplished in an FAA- or military-approved (Level C/D) simulator. Approaches need to include both precision and nonprecision types.		

a. Pilots with current qualifications in a NASA aircraft that is also FAA-certified for Passenger Transportation use, but that is infrequently used for that purpose, may perform the duties of PIC and SIC on that aircraft if they meet the stated currency. At Centers that operate multiple higher performance aircraft than those used for Passenger Transportation and where such aircraft have annual or semiannual simulator and other similar requirements (night landings, approaches, and hours), pilots will be considered to have met the recent experience requirements.

b. Total pilot/copilot hours may include simulator hours.

c. Instrument hours, approaches, and landings (including night landings) may be accomplished in an approved visual, motion simulator. Approaches should be evenly balanced between precision and nonprecision.

d. Private pilot time shall not be recorded in NASA information systems or utilized to meet any of the above currency requirements. [467]

4.17 Overdue Recent Experience

4.17.1 The following apply to pilots overdue for the recent experience provisions of Table 4-2:

4.17.1.1 Increased Minimums. A pilot at the controls who does not meet the 90-day total hour requirements, but is otherwise current, shall increase all instrument approach minimums by 200 feet and one-half mile visibility (or the Runway Visual Range equivalent). [468] In no case may the resulting minimums be less than a 400-foot ceiling and 1-mile visibility.

4.17.1.2 Step-Down Qualifications. PICs who are otherwise current but fail to meet the requirements outlined in Table 4-2 may revert to SIC status (if they are current in their respective positions) until the recent-experience provisions for aircraft commander are satisfied.

4.17.1.3 Multiple Currency. At the discretion of the Chief Pilot, pilots flying multiple types of aircraft who have met the all-types requirements may satisfy the in-type currency requirement by flying a training flight with a flight instructor. This training flight shall include a minimum of two instrument approaches, three takeoffs, and three landings. [469]

4.17.1.4 Night Landing Currency. Pilots not meeting the night-landing currency requirements of Table 4-2 cannot conduct night landings with passengers on board, but may be otherwise utilized until the night-landing requirements are satisfied. Night-landing requirements may be accomplished in an approved visual simulator.

4.17.1.5 Lapse in Qualification. Crewmembers overdue in any recent-experience requirement, except as modified above, are disqualified for assignment as PIC or SIC on passenger flights. A lapse in qualification of up to 90 days requires requalification in items that are deficient or require a proficiency flight check with an IP. Lapse in qualification greater than 90 days shall require retraining of at least 6 hours of dedicated flight or simulator training as determined by the Center's Chief of Flight Operations and requires a formal flight evaluation by an IP. [470]

4.18 Evaluation Phase

4.18.1 Evaluations. The intent of the NASA flightcrew evaluation program is to objectively evaluate aircrew performance and, thereby, measure the effectiveness of the training program.

a. Designated IPs shall administer all flight checks. [471]

b. An IP shall be designated for all flights in which instruction or evaluation is planned. [472]

4.18.2 Annual Proficiency Check. Prior to being designated in their crew position, and annually thereafter, pilots shall complete a proficiency evaluation flight conducted by a NASA-designated IP or an FAA-designated flight IP. [473]

4.18.2.1 When maintaining qualifications in more than one type of aircraft, an annual proficiency evaluation flight in each aircraft is required. Except for the initial check, proficiency checks may be accomplished in an approved simulator by a NASA IP or an FAA-designated examiner.

4.18.2.2 Flight checks are considered overdue if not completed by the end of the month in which they are due. Pilots with overdue proficiency checks shall be scheduled only on training flights (i.e., non-passenger flights) with an IP. [474]

4.18.2.3 The Annual Proficiency Check shall not be accomplished with passengers aboard, and no in-flight emergency training shall be conducted with passengers aboard. [475]

4.18.3 Line Checks. Prior to being designated an aircraft commander, and annually thereafter, pilots shall complete a line evaluation flight conducted by an IP. [476]

4.18.3.1 When maintaining qualification in more than one type of aircraft used for Passenger Transportation flights, a line evaluation in each aircraft is required annually.

4.18.3.2 The required annual line check may be conducted on typical passenger missions or in a Line Oriented Flight Training (LOFT) program in an approved simulator. Pilots with overdue line checks shall not be scheduled as a PIC until a check is completed. [477]

4.18.4 Documentation. Flight checks conducted by a NASA IP shall be recorded on NASA Form 1615 or Center equivalent, reviewed by the Center's Chief of Flight Operations, and filed in the individual's training file. [478] All items indicated on the Form 1615 or Center equivalent will be

evaluated during the flight checks. Flight instructors are urged to include meaningful remarks and recommendations on the check ride form. This will aid in focusing future training.

4.19 Coordination and Scheduling for Passenger Transportation Flights

4.19.1 In addition to approving the use of Passenger Transportation flights, the Assistant Administrator for the OSI and the Center Directors shall:

- a. Ensure that the most cost-effective aircraft is used to satisfy approved requirements. Exceptions to this will be documented in writing. [479]
- b. Coordinate trip itineraries and requirements with other NASA activities that could benefit from the use of available seats on each trip. [480]

4.20 Crew Complement

4.20.1 General. All personnel scheduled as primary flightcrew members on NASA Passenger Transportation flights shall be trained and qualified in accordance with this chapter. [481]

4.20.1.1 Crew assignment, including identification of a PIC, shall be designated in writing for each flight. [482]

4.20.2 Basic Crew. No aircraft carrying passengers shall be operated with less than the minimum basic crew specified below. Exception: G-II/III aircraft may be operated with three pilots, one of whom functions as the Flight Maintenance Technician, or the flight may be operated without a flight maintenance technician at the direction of the Center's Chief of Flight Operations.

- a. Gulfstream II/III -- PIC and SIC. Flight Maintenance Technician (optional).
- b. King Air B200 -- PIC and SIC. [483]

4.21 Crew Duty Time

4.21.1 Crew duty time is the total time a crew is on duty before the final termination of a flight. Crew duty time accrues consecutively and begins when a crew reports to a designated place of duty to start preparation for a flight and ends when the engines are cut at the end of the flight or series of flights. Using personnel as crewmembers who commenced other duties before reporting for a flight is not precluded. However, in this case, the crew duty time for the entire crew begins when those other duties commenced.

4.21.2 Duty Time Limitations. Basic crew duty time shall not be scheduled to exceed 14 consecutive hours, except as set forth below. [484]

4.21.2.1 The Center's Chief of Flight Operations may, for a particular flight, extend the basic crew duty time to 16 hours if the total time of crew duty is confined to the period between 4 a.m. and midnight (local time at departure point). The aircraft shall be pressurized and have a functional autopilot. [485]

4.21.2.2 Augmented crews will be used only as a last resort when all other options, such as rescheduling or pre-positioning other crews, are not possible.

- a. Consideration shall be given to limiting passenger load to ensure that an adequate crew rest capability is available. [486]
 - b. Augmented crew duty time shall not be scheduled to exceed 18 consecutive hours. [478]
 - c. The aircraft shall be pressurized and have a functional autopilot. [488]
 - d. Flights requiring augmentation shall be approved by the Center's Chief of Flight Operations and documented and maintained on file for a period of 12 months. [489]
- 4.21.2.3 Relief crews shall be pre-positioned if the mission schedule cannot be supported within the duty time limitations specified for a single or augmented crew. [490]

4.22 Crew Rest

4.22.1 Crew Rest Definition. Crew rest includes crew transportation prior to participating in flightcrew duties and will be provided prior to departure from the home station as well as at en route stops when mission schedule or crew duty limitations prevent the aircraft from returning to the home station.

4.22.2 Crew Rest Limitations

4.22.2.1 Crew rest shall normally provide at least 10 consecutive hours free of all official duties. [491]

4.22.2.2 At en route stops, crew rest shall not commence until 1 hour after termination of the mission in order to allow for necessary post-flight duties. [492]

4.22.2.3 The crew rest period shall end 1 hour prior to the crew beginning official duties in preparation for departure, normally at least 1 hour prior to scheduled takeoff time. [493]

4.22.2.4 The Center's Chief of Flight Operations may approve a reduced crew rest of no less than 8 hours total ground time, provided this time is confined to between the hours of 8 p.m. and 8 a.m. local time.

a. Approvals for reduced crew rest shall be limited to one occurrence per crewmember during any 7-day period. [494]

b. Such approvals shall be documented and maintained on file for a period of 12 months. [495]

4.22.2.5 Time accrued by any flightcrew member traveling as a passenger on an aircraft may not be credited to meet any of the crew rest requirements of this chapter.

4.23 Maximum Flight Time Limitations

4.23.1 Flightcrew members shall not be scheduled, nor permitted, to function as members of Passenger Transportation flightcrews, if their total professional flying time exceeds the following flight hours in Table 4-3: [496]

Table 4-3 Maximum Flight Time Limitations

Period	Flight Hours
7 consecutive days	35 hours

30 consecutive days	100 hours
90 consecutive days	300 hours
365 consecutive days	1,000 hours

4.24 Hazardous Cargo

4.24.1 Hazardous material, as defined in 49 C.F.R Part 105.5, shall not be transported aboard Passenger Transportation flights. [497]

4.24.1.1 Cargo to be shipped shall be routed through the Center's transportation office before acceptance or, if en route, normally only be accepted from a certified shipper or freight-forwarding agency. [498]

4.24.1.2 Unaccompanied baggage will be treated as cargo.

4.25 Sterile Cockpit Procedures

4.25.1 During all critical flight operations, cockpit activities and conversation shall be limited to those involved with the direct operation of the aircraft. [499]

4.25.1.1 This Sterile Cockpit environment shall be maintained when below 10,000 feet above ground level (AGL) during approach and departure, except during prolonged cruise at an altitude below 10,000 feet AGL. [500]

4.26 Crew Briefings

Before departure, the PIC shall brief the crew on all essential information concerning the flight, including weather, restrictions, and the duties and responsibilities of each flightcrew member. [501]

4.27 Flight Planning Considerations

4.27.1 Passenger Loading. Normally, all engines and propellers will be completely stopped when loading and unloading passengers or cargo from Passenger Transportation flights. In those instances when, in the determination of the PIC, an extenuating circumstance requires loading or unloading passengers or cargo with an engine running, the following minimum precautions shall be followed:

- a. Only the engine on the opposite side of the aircraft from the loading door will be operating and be operated at as low a power setting as practical.
- b. A flightcrew member will be positioned on the ground to ensure that passengers do not approach close to an operating engine or windmilling propeller. [502]

4.27.2 Passenger Briefings. The PIC shall ensure that all passengers have been briefed on the Disclosure for Persons Flying Aboard Federal Government Aircraft (see Appendix D-2). [503] In addition, the briefing will include the no smoking policy, use of seat belts, location and operation of emergency and survival equipment, operation of doors and exits, and any other Federally required information. This information will be supplemented by printed passenger information cards. Prerecorded passenger briefings may be used, provided the sound reproduction is of high quality and a crewmember is present in the cabin during the briefing to answer passenger questions.

4.27.3 Flight Planning. Thorough flight planning is essential to the safe and efficient conduct of Passenger Transportation passenger flights. A flight plan shall be filed for each flight. [504]

4.27.4 Passenger flights shall be operated under instrument flight rules and, to the maximum extent possible, in controlled airspace. However, daylight flights of less than 100 nautical miles may be operated under visual flight rules if weather conditions permit. [505] These flights should utilize radar advisory service to the maximum extent possible.

4.27.5 Fuel Planning. Considering weather forecasts and any known en route delays, the minimum amount of useable fuel required at takeoff shall be sufficient to do the following:

- a. Complete the flight to the destination airport.
- b. Fly from that airport to the alternate airport, if required.
- c. Fly after that for 45 minutes at normal cruising speed or, for helicopters, fly after that for 30 minutes at normal cruising speed. [506]

4.27.6 Refueling with Passengers On Board: An aircraft shall not be refueled when passengers are embarking, on board, or disembarking unless it is properly attended by qualified personnel ready to initiate and direct an evacuation of the aircraft by the most practical and expeditious means available. [507]

4.27.6.1 When refueling with passengers embarking, on board, or disembarking, two-way communications shall be maintained by the aircraft's intercommunication system or other suitable means between the ground crew supervising the refueling and the qualified personnel on board the aircraft. [508]

4.27.7 Weather Planning. Prior to takeoff, the PIC shall receive a thorough weather briefing concerning current weather and forecasts for the proposed route, destination, and alternate destination. [509]

4.27.7.1 Departure Weather. Weather minimums for takeoffs shall be not less than landing minimums unless a takeoff alternate is available. [510]

4.27.7.2 A takeoff may be made when the weather is below landing minimums but not less than 1/8-mile visibility or Runway Visual Range (RVR) of 800 feet and provided a suitable departure alternate is available within 30-minutes flight time with an engine inoperative.

4.27.7.3 The weather reported at the departure alternate shall be above landing minimums and forecast to remain so for at least 2 hours after takeoff, per the following:

- a. Precision Approach available: 200-foot ceiling and 1/2-statute mile (SM) visibility added to the published Precision Approach minimums.
- b. Non-Precision Approach (only) available: 300-foot ceiling and 1-SM visibility added to the published Non-Precision Approach minimums. [511]

4.27.7.4 En Route Weather. The following requirements with regard to en route weather are to be met:

- a. The PIC of a Passenger Transportation flight shall not file a flight plan requesting clearance into areas of reported or a forecast of severe icing conditions. [512]
- b. Airborne radar shall be operative for any flight into areas where current weather reports or forecasts indicate that thunderstorms may reasonably be expected and flight under daylight visual

meteorological conditions is not possible. [513]

c. All flights shall be planned to circumnavigate areas of thunderstorm activity. [514]

4.27.8 Destination Weather. The PIC of a Passenger Transportation flight may file for a destination that forecasts prevailing visibility equal to or greater than published landing minimums appropriate to the aircraft equipment, but not less than 1/2-mile or an RVR of 1,800 feet for time of arrival.

Also:

4.27.8.1.1 If the destination weather is reported and forecast to be less than a 2,000-foot ceiling or less than 3-mile visibility from 1 hour before, until 1 hour after, the estimated time of arrival (ETA), an alternate airport shall be listed on the flight plan. [515]

4.27.8.1.2 Airport weather minimums shall meet or exceed the requirements of FAR Part 91. [516]

4.27.9 New PIC. When the pilot has less than 100 hours PIC experience in the type (make and model) aircraft being operated, the minimum descent altitude (MDA) or the Decision Altitude (DA) and visibility landing minimums shall be increased by 200 feet and 1/2 mile (or the RVR equivalent) for all instrument approaches conducted by that pilot. [517]

4.27.9.1 In no case shall the landing minimums be less than a 400-foot ceiling and 1-mile visibility. [518]

4.27.9.2 Similarly, takeoffs shall not be made if the airfield is below these adjusted landing minimums. [519]

4.27.10 Aircraft Logs. Prior to activating any aircraft system, aircraft maintenance forms shall be reviewed and evaluated. [520]

4.27.10.1 Prior to flight, the PIC shall accept the aircraft by signing the form. DoD aircraft forms, NASA Aircraft Management Information System (NAMIS), or equivalent forms may be used as a substitute for specific NASA forms. [521]

4.27.11 Weight and Balance Data. A copy of the current weight and balance data shall be carried aboard each Passenger Transportation flight. [522] It is used to determine that the weight and center of gravity remain within limits for the duration of each flight.

4.28 Takeoff and Departure Procedures

4.28.1 Departure. On departure, navigational aids (NAVAIDS) shall be set up to aid in a possible expedited emergency return, as well as to aid in establishing the initial en route course. [523]

4.28.2 Cockpit Voice Recorder (CVR) and Flight Data Recorder (FDR). If installed and operative, the CVR and FDR shall be turned on during the entire flight. [524]

4.28.2.1 Should an incident occur, the CVR and FDR power shall be removed and appropriate circuit breakers pulled following completion of the after-shutdown checklist. [525]

4.28.3 Enhanced Ground Proximity Warning System (EGPWS)/ TAWS. EGPWS/TAWS shall be used on all flights. [526]

4.28.3.1 If the equipment tests satisfactorily prior to takeoff, it shall be assumed that any EGPWS/TAWS warning is valid unless the aircraft position can immediately and positively be verified by visual reference. [527]

4.28.3.2 Immediate and appropriate action shall be taken in response to all valid EGPWS/TAWS

warning calls. [528]

4.28.4 Landing Lights. Landing lights shall be used during all takeoffs and landings and when operating near airports or in high-density traffic areas. [529]

4.28.5 Outside Vigilance. The PIC is responsible for ensuring that, during visual conditions, at least one person maintains a lookout for conflicting traffic at all times. Unnecessary paperwork will not be accomplished in the cockpit during aircraft climbs or descents.

4.28.6 Outside Observers. Use of any additional crewmembers to aid in outside vigilance is highly encouraged, particularly while operating in visual conditions in heavy traffic areas. Flight Maintenance Technicians shall remain at their duty station throughout the climb and descent. [530] Their cabin duties are considered secondary in importance during these times.

4.28.7 Traffic Alert and Collision Avoidance System (TCAS) resolution advisories (RA) shall be followed. [531]

4.29 En Route Procedures

4.29.1 Passenger Considerations. The PIC is responsible for the safety and comfort of the passengers and shall make every reasonable effort to keep the senior passenger or trip coordinator apprised of any significant deviations from the itinerary or schedule. [532]

4.29.1.1 In-flight delays and readily discernible abnormal conditions shall be explained to the passengers. [533]

4.29.1.2 Safety Belts. The PIC shall require that all passengers and crewmembers have safety belts securely fastened for taxiing, takeoffs, landings, and before entering an area of in-flight turbulence. [534]

4.29.1.3 Admission to the Flight Deck. Passengers shall not be admitted to the flight deck during sterile cockpit phases of flight. [535]

4.29.2 Minimum Fuel. The PIC shall notify ATC of the aircraft's minimum fuel status at any time the fuel supply has reached a quantity where, upon reaching destination, little or no delay can be accepted. In no case may this quantity be less than that specified in Table 4-6. [536]

4.29.2.1 If fuel remaining indicates a need for traffic priority to ensure a safe landing, the PIC shall formally declare an emergency due to low fuel and report fuel remaining in minutes. [537]

4.29.3 Emergency Procedures. When an emergency or in-flight difficulty arises, the crew shall complete the checklists and report the nature and extent of the difficulty, intentions, and assistance required to the controlling ground agency. [538]

4.29.4 In the event of an engine failure or shutdown, the aircraft shall land at the nearest suitable airport at which a safe landing can be made. [539]

4.30 Arrival, Approach, and Landing Procedures

4.30.1 General. During instrument arrivals, all available navigational aids shall be used. When available, precision approach guidance (any precision approach) will be used for all night arrivals except for specific events during training flights. [540]

4.30.2 Weather Minimums. Pilots operating aircraft shall land the aircraft only when the flight

visibility is equal to or greater than the visibility prescribed in the standard instrument approach procedure being used. [541]

4.30.3 Destination Below Minimums. If the destination weather is marginal or below minimums, the PIC may proceed to a suitable alternate or may hold if the destination weather is forecast to improve and fuel for alternate and reserve requirements will not be compromised. The weather at the alternate shall be at or above alternate minimums and forecast to remain so until the new ETA plus one hour. [542]

4.30.4 Approach Briefing. Before starting an approach, the pilot flying shall brief the crew on the procedures to be followed during the approach and landing and in the event of a missed approach. [543] The briefing will include a review of the procedures, including key altitudes and restrictions, as well as specific crew duties during the approach and landing.

4.30.5 Approach. The following procedures will be followed during approach:

a. The pilot shall set up to execute a stabilized approach to landing. [544] The optimum stabilized approach is defined as a flight on the glide path (visual or electronic) at a steady rate of descent, on the target approach speed, in the landing configuration, in trim, and with the proper thrust setting.

b. A stabilized approach shall be established by 1,000 feet above airport elevation in instrument meteorological conditions (IMC) and by 500 feet above airport elevation in visual meteorological conditions (VMC). [545]

c. The pilot flying the approach shall announce his/her progress and intentions periodically. [546]

d. The pilot monitoring shall observe the approach and provide a continual cross-check of the navigational aids, instruments, air traffic control instructions, and approach procedures. [547]

e. Any deviations from the prescribed procedure shall immediately be brought to the attention of the pilot flying. [548]

f. The pilot monitoring shall call out "1,000 feet above" and "100 feet above" all key altitudes, as well as minimums upon reaching the Missed Approach position. [549]

g. When the runway is in sight, the pilot monitoring shall state, "runway in sight." [550]

h. If the runway is not in sight when the aircraft reaches the Missed Approach point, the pilot monitoring shall state, "go around." [551]

4.30.6 Use of Autopilot. Use of the autopilot during arrivals, descents, and approaches is encouraged, particularly during visual flight conditions, as an aid in collision avoidance.

4.30.6.1 To prevent excessive loss of altitude in the event of an autopilot failure, the pilot directing the aircraft shall maintain flight control contact throughout the final portion of an automatic coupler approach. [552]

4.30.6.2 Full manual control shall be assumed at or above published minimum altitude. [553]

4.30.6.3 Pilots shall observe all cautions on use of autopilots in icing. [554]

4.30.7 Canceling Instrument Flight Plans. Normally, instrument flight plans will not be canceled prior to landing.

4.31 Post-flight Procedures

4.31.1 Closing Flight Plan. On completion of the flight, the PIC shall ensure that the flight plan is closed with the appropriate facility. [555]

4.31.2 Aircraft Security. The PIC shall take prudent measures to secure and protect the aircraft at en route stops. [556] These measures should prevent unnecessary exposure to inclement weather, such as high winds and freezing precipitation, and also provide a reasonable degree of security from such activities as vandalism, theft, or terrorism.

4.31.2.1 State Department Advisories and the DoD Foreign Clearance Guide (FCG) shall be consulted for out-of-continental United States (CONUS) operations. [557]

4.31.3 Aircraft Flight Logs. The flightcrew shall enter in the aircraft flight log each mechanical irregularity discovered during the flight. [558] All unusual events (e.g., overweight or hard landings, lightning or bird strike, static discharge, or flight through hail or severe turbulence) will be recorded in the aircraft log.

4.32 Specific Operational Restrictions

4.32.1 Use of Flight Manual Data. Aircraft flight manual data shall be used to ensure that adequate takeoff, climb, approach, and landing performance is available for the actual conditions encountered. [559] Additional restrictions, as outlined in the tables below, are established to ensure a prudent level of safety during routine line operations.

4.32.2 Minimum Runway Lengths. Table 4-4 contains the minimum runway lengths that shall be used for the aircraft. A Headquarters waiver is required for takeoffs from or landings on runways of lesser length. [560]

Table 4-4 Minimum Runway Length for Passenger Transportation Operations

Aircraft	Runway
King Air B200	3,500 ft
Gulfstream III	6,000 ft
Gulfstream V	6,000 ft

4.32.3 Wind Restrictions. For normal operations, airfields shall be considered below minimums for takeoff and landing when winds, including gusts, are greater than those in Table 4-5. [561]

Table 4-5 Wind Restrictions

Aircraft	Maximum Component	Tailwind Component	Crosswind
King Air B200	45 kts	10 kts	25 kts
Gulfstream III	40 kts	10 kts	20 kts

Gulfstream V	40 kts	10 kts	28 kts
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4.32.4 Minimum Fuel for Landing. Minimum fuel for landing is established in recognition of three factors: (1) Fuel required to execute an unanticipated go-around and traffic pattern; (2) Fuel required for landing and rollout; and (3) Allowance for fuel quantity measuring system error. All flights shall be planned to have no less than the minimum indicated fuel shown in Table 4-6 available at touchdown on the final landing: [562]

Table 4-6 Minimum Landing Fuel

Aircraft	Minimum Landing Fuel
King Air B200	400 pounds
Gulfstream III	3,000 pounds
Gulfstream V	4,000 pounds

Chapter 5. Unmanned Aircraft Systems Operations

5.1 Policy

5.1.1 Background. UAS are aircraft and, therefore, shall comply with all Federal and Agency regulations pertaining to UAS, including operations, acquisition' and disposal. [563] Technological advances will continue to provide unprecedented leaps in UAS capability. NASA is primarily concerned with UAS technology as it applies to aeronautics, space science, and Earth science. Technology that permits the rapid dissemination of remote sensing data products will play an important role in this effort. While UAS capabilities offer a significant tool to capture data, UAS is an Agency asset and capability that will be managed within Agency internal controls.

5.1.2 Policy. Center Directors shall establish procedures to ensure that all UAS flights are properly approved, documented, and operated in accordance with this chapter. [564]

5.1.2.1 Center Directors also shall ensure that UAS flightcrews and operations receive direct oversight by the Center's Flight Operations Office or through another Center with a Flight Operations Department. [565]

5.1.2.2 All project managers will be made aware of this policy prior to any flight activity.

5.1.3 UAS Definition. In general, a UAS is a powered or unpowered aerial vehicle that does not carry a human operator, uses aerodynamic forces to provide vehicle lift, and can fly autonomously or be piloted remotely. UAS range from micro vehicles measuring inches in size and ounces in weight to large aircraft weighing more than 30,000 pounds. For example, a model or small UAS that weighs less than or equal to 55 pounds and whose top speed is less than or equal to 87 knots has fewer oversight requirements than a UAS that weighs more than 300 pounds and whose top speed is greater than 200 knots.

5.1.3.1 Due to the diverse nature of UAS performance and interface, requirements may need to be adjusted to ensure the appropriate level of operational control.

5.1.3.2 In all cases, waiver and oversight responsibility shall be in accordance with this NPR and applicable NASA HQ-approved Center guidelines. [566]

5.1.4 UAS Flightcrew Definition and Responsibilities. UAS flightcrew are responsible for the safe control and operation of the UAS and communications with Air Traffic Controllers. They shall be involved in all mission planning; complete prelaunch, mission, and recovery checklists; and assist in evaluating and disseminating in-flight data. [567] NASA utilizes the following definitions to define the human-vehicle interface for piloting positions and responsibilities for safe operations:

5.1.4.1 Pilot-Radio Control Operator (PRCO). The RC Pilot (also called Safety Pilot or External Pilot) is an individual who operates an unmanned aircraft by means of a remotely located, manually operated radio-controlled flight management system (direct control by means of stick-to-surface interface). An RC Pilot also may perform crewmember duties of a safety (or external) pilot who acts as a fail-safe to an unmanned aircraft system that is normally controlled by a pilot-operator. The safety (or external) pilot flight control system may be either stand-alone or be modified to function as a buddy box. In the buddy box configuration, the safety (or external) pilot controls the unmanned aircraft through a ground control station (GCS) communication link protocol. All flight operations

shall be within visual line of sight of the controlling pilot. [568]

5.1.4.2 Pilot-Computer Operator (PCO). A pilot-operator (also called Ground Control Operator (GCO) or Internal Pilot) is an individual who manages the operation of an unmanned aircraft by means of the remote GCS. The pilot-operator typically controls the unmanned aircraft autonomously by means of computer interface with an onboard flight management system (fly-by-mouse) through a command and control communications link.

5.1.4.3 Pilot-Manual Operator (PMO). Remote Pilot (also called Remotely Operated Aircraft (ROA) or Remotely Piloted Vehicle (RPV) Pilot) is an individual who operates a UAS by manual control in a remote GCS. The Remote Pilot typically manages the unmanned aircraft flight path through a command and control communication link using manual stick-and-rudder inputs, a forward-looking video camera feed, and a moving map display system located in the GCS.

5.1.4.4 Observer. An individual who is a primary crew member for UAS flight operations. The observer serves as the flight safety monitor to ensure noninterference between the unmanned aircraft and nonparticipating aircraft by means of see and avoid. The observer may perform these duties either on the ground or in a chase aircraft while in direct communication with the controlling pilot. Daisy chain observer operations are limited to 5 NM between the pilot in command and the airborne unmanned aircraft.

5.1.4.5 UAS Mission Commander (MC). The UAS MC exercises command over single NASA UAS or a formation of UAS. He/she is responsible for all phases of the assigned mission except those aspects of safety of flight that are related to the physical control of the aircraft and fall within the prerogatives of the PIC (unless the PIC and MC are the same individual).

a. The UAS MC shall understand the sections of 14 CFR Subpart E 61.105 and 61.107 that apply to all aircraft operations (public and civil) in the U.S. National Airspace System (NAS). [569]

b. Qualification as a NASA UAS MC requires a private pilot certificate or greater, military pilot rating, NASA pilot rating, or the completion of a formal military UAS training course where the UAS pilot has demonstrated an understanding of 14 CFR Subpart E 61.105 and 61.107.

c. If not qualified in type, UAS MCs shall receive all required ground training for the UAS under their purview. [570]

5.1.4.6 NASA UAS Instrument Rating. This is certification that an individual is qualified to operate a NASA UAS under IFR. The holder of a NASA UAS Instrument Rating shall understand the sections of 14 CFR Subpart F 61.125 and 61.127 that apply to instrument flight operations (public and civil) in the NAS. [571] Qualification for a NASA instrument rating requires an FAA instrument rating, military pilot rating, NASA pilot rating, or the completion of a formal military UAS training course where the UAS pilot has demonstrated an understanding of 14 CFR Subpart F 61.125 and 61.127 as applied to instrument flight.

5.1.4.7 Range Safety Officer (RSO). The RSO provides duties as assigned in accordance with NPR 8715.5 levied on UAS operations during FRR/Airworthiness and Flight Safety Review Board (AFSRB) reviews and during operations as required.

5.1.4.8 UAS flightcrew. The UAS flightcrew can consist of MCs, pilots, observers or range safety officers assigned to the flight. All individuals report to the assigned MC. If an MC is not required, all individuals report to the PIC.

5.1.5 UAS Command and Control Systems. UAS flightcrews shall have the capability to command, control, and manage the UAS and to coordinate access and integration into the airspace utilized to complete the mission. [572] These systems include aircraft control and airspace control as discussed

below.

5.1.5.1 Aircraft Control. Aircraft control is the authority to direct the physical maneuvers of a UAS in flight or to direct a UAS to gather data or operate in a specific area.

5.1.5.2 Airspace Control. Airspace control provides for the coordination, integration, and regulation of the use of a defined airspace and identification of all airspace users. Any airborne object that may interfere with the flight path or trajectory of any other object within the NAS airspace is of concern and requires airspace coordination and integration. Airspace control is the authority to direct the maneuvers of a UAS (along with other aircraft and airspace users) for the best use of the airspace. Airspace control is accomplished through established procedures for coordination of airspace by Air Traffic Control or range authorities. Principles and procedures of airspace control used in manned flight operations apply to UAS operations. UAS capable of long-distance flight are normally routed through existing air control points by airspace control agencies. Airspace control authority is inherent in the operator whose unit is responsible for particular blocks of airspace; positive separation between aircraft and UAS is required and is the responsibility of the PIC and airspace control agency. This may be accomplished by the following:

- a. Activating temporary flight restriction areas (TFRs); Class D airspace or restricted operations zones (ROZs) for UAS takeoffs and landings; and mission areas or flight routes. ROZs are also known as restricted operations areas (ROAs).
- b. Routing separation via existing air control points. Specific UAS routes may be created by connecting selected air control points.
- c. Altitude separation, which can be effected by having block altitudes or by deconflicting the altitude at which the UAS is flying with other airspace users.
- d. Time separation, which can be effected by having block times for UAS operations.
- e. Any combination of the above, as required.

5.2 Planning

5.2.1 Before any deployment, considerable planning takes place well in advance of a UAS operation. UAS increase the workload on personnel assigned, who very often know little about the unique requirements of UAS integration in operations in CONUS or overseas. Coordination with appropriate agencies or countries shall occur as soon as the decision is made to employ a UAS. [573] Currently, all NASA UAS operations are conducted under NASA's Public Use authority in accordance with Public Law 106-181 and Title 49 U.S.C., Chapter 401. Under this authority NASA UAS may operate using one of five options:

- a. Certificate of Authorization (COA) -- an authorization issued by the FAA to a public operator for a specific location and UAS activity.
- b. NASA-FAA Memorandum of Understanding (MOU) -- an agreement between NASA and the FAA for certain UAS operations in uncontrolled airspace.
- c. Special Use Airspace (i.e., Restricted Airspace) -- with the permission of the Controlling Authority.
- d. International Airspace -- airspace outside the 12-nautical-mile limit of the United States and its territories under NASA's State Authority.
- e. 14 CFR 107 -- FAA regulation for the operation of sUAS in the National Airspace System (NAS).

5.2.1.1 Each of these five options have varying operating requirements, restrictions, and limitations. Regardless of the operating rule a NASA UAS or sUAS operates under, compliance with NASA policies is still required.

5.2.1.2 The FAA is responsible for airspace management within the National Airspace System, commonly referred to as the NAS. If a UAS will be flown outside the boundaries of special-use airspace, sufficient time shall be allowed to process a COA request to the FAA to conduct UAS operations. [574] The FAA Administrator will issue a COA, which provides approval for flight within the requested airspace. A UAS cannot fly beyond the boundaries of special-use airspace without specific authorization of the FAA.

5.2.1.3 An MOU with the local air traffic control facility is required to ensure that they and the UAS flightcrews have a complete understanding and agree upon the air traffic control procedures that will be used to ensure safe UAS operations in the operating area. If additional air traffic control services are required, the UAS operator may be asked to augment the local air traffic control facility with additional air traffic control personnel.

5.2.1.4 Letter of Agreement (LOA). An LOA with local air facilities shall be completed to ensure that proper coordination of support requirements is understood and agreed upon. It will address:

- a. Fuel and hazardous material storage.
- b. Hangar facilities.
- c. Runway use.
- d. Any other logistical and support requirements. [575]

5.2.1.5 The option to utilize 14 CFR 107 (Part 107), as all NASA UAS operations are conducted under NASA's Public Use authority in accordance with Public Law 106-181 and Title 49 U.S.C., Chapter 401, still requires the applicable UAS oversight in this NPR.

5.2.2 International Operations. Foreign governments are sensitive to the capabilities and valuable information that could be collected by UAS, as well as to the inherent risks associated with unmanned flight operations. As NASA aircraft, NASA UAS have State Aircraft status.

5.2.2.1 UAS planners shall ensure that UAS operations are included at the outset of integration planning within host nation (HN) airspace. [576]

5.2.2.2 Planners shall have a firm understanding of the UAS to be employed so that they can satisfy any protests or concerns from the HN. [577]

5.2.2.3 The UAS planner shall work via the Office of International and Interagency Relations (OIIR) to gain diplomatic clearances prior to any UAS operations within their represented country. [578]

5.3 Preflight Planning

5.3.1 Operations Site. UAS managers and flightcrews shall ensure particular consideration is given to the location of the UAS operations site. [579]

5.3.1.1 Depending on the UAS, an adequate runway may be required for safe UAS operations. At a minimum, a proper landing surface shall be available to safely recover the UAS upon completing its mission and consideration given to the distance from the UAS launch site to the area of operations (AO). [580]

5.3.1.2 Many UAS are not particularly fast and require considerable time to fly to their mission area. The location of an adequate launch and recovery area and its distance to the AO and control station are very important considerations when employing a UAS.

5.3.1.3 Availability of adequate roads or other transportation methods for resupply of fuel and other UAS support requirements are critical to sustained UAS operations. If the UAS is expected to move from one site to another, transportation support becomes increasingly important.

5.3.2 Weather. UAS managers and flightcrews at all times shall consider the expected weather conditions in the AO at the time of operations. [581] Many UAS cannot operate in inclement weather (e.g., high winds and precipitation or when the cloud layer is below the UAS's operating altitude).

5.3.3 Communication. UAS managers and flightcrews shall ensure effective command and control architecture is linked to the UAS. [582] Most UAS have a GCS, a tracking and control unit, a portable control station (PCS), and remote receiving stations. The UAS is manually controlled by a pilot from a control station or is programmed to fly independently under control of its autopilot. More than one control station may be used to increase the UAS's effective range or to control more than one UAS.

5.3.4 Mission Planning. UAS operations are conducted similarly to manned aviation operations. The mission planning process begins once the UAS has the authority to conduct the mission.

a. The UAS managers and the flightcrew shall study the assigned mission and plan for its operation. [583]

b. The maintenance crew shall begin preparation of the UAS and the UAS ground control system. [584]

c. Communications personnel shall ensure that the proper communication connectivity is provided to fulfill the mission. [585]

5.3.5 Route Planning. UAS missions shall be planned by the UAS flightcrew in close coordination with the Center's Flight Operations Office and the Range Safety Officer. [586] This is necessary to ensure there is no conflict with other flight activities and to identify other potential operational risks, including route-related risks that will be addressed in the FRR process.

5.3.6 In-flight Emergencies. During planning, sufficient attention shall be given to the possibility that an in-flight emergency may occur. [587]

5.3.6.1 Particular attention should be given to the location of emergency landing sites if the UAS exits controlled flight and impacts the ground.

5.3.6.2 Flight paths, minimum-risk routes, and other air management tools shall be included. [588]

5.3.6.3 Loss of Link Procedures. When a UAS senses a significant delay or loss of the command uplink, the predetermined loss-of-link procedures shall be initiated to place the UAS on the return home profile or a suitable alternate route and recovery location. [589] The UAS return home or alternate profile is a preapproved route (at a preapproved altitude) to its preapproved return home or alternate site. During this emergency, the UAS pilot will attempt to reestablish communication with the UAS.

5.3.6.4 Agency Mishap Notification. The Center Flight Operations Office shall incorporate mishap reporting responsibilities into the Center Mishap Response Plan, to include UAS-specific notification requirements. [590]

5.4 Flight Operations

5.4.1 Flight Brief. A flight brief that includes the flightcrew, a program representative, and a maintenance representative shall be conducted prior to all flights. Centers will develop briefing guides appropriate to the operations, which include at a minimum:

- a. Weather update.
- b. Program brief.
- c. System update.
- d. Emergency divert airfields.
- e. Emergency procedures and terminology.
- f. Mission profile. [591]

5.4.2 Takeoff Method. The maintenance crew readies the UAS for launch as the flightcrew performs systems checks to ensure that systems perform in accordance with operating procedures.

5.4.2.1 Systems checks shall include an independent means to verify waypoints entered into a navigational system prior to takeoff. [592]

5.4.2.2 If a suitable runway is available, the UAS operator may perform a conventional rolling takeoff. The length of runway required depends on the UAS.

5.4.2.3 If a suitable runway is not available, then an alternate launch method shall be used. [593]

5.4.3 Preparing for Recovery. An adequate surface area shall be available for a safe landing for the UAS and safely accessible to personnel. [594]

5.4.3.1 Upon return to the UAS operations site, flight and maintenance crews prepare for UAS recovery.

5.4.3.2 The UAS recovery checklist shall be adhered to in accordance with the operations manual. [595]

5.5 Airworthiness Reviews

5.5.1 Centers shall conduct Airworthiness Reviews to establish the airworthiness and evaluate the safety of the aircraft in accordance with the Center processes outlined in Chapter 2 and will include Range Safety personnel. [596]

5.5.2 The following additional topics shall be addressed by a NASA Airworthiness Review to assess the risks associated with a UAS flight program:

- a. General overview of UAS.
- b. Communication links and frequency management plan.
- c. Flight control system and configuration control procedures.
- d. Backup systems and procedures.
- e. Flight terminations systems, including ground abort. [597]

5.5.2.1 Airworthiness certificate limitations. UAS shall operate only in airspace for which the degree of airworthiness allows. [598]

5.5.2.2 The airworthiness statement shall specifically clear each UAS for the appropriate Mission Qualification Standards (MQS) level (as defined in section 5.6.2.4). [599]

5.5.2.3 A UAS will hold either an airworthiness statement or airworthiness certificate in accordance with the requirements defined in Section 5.8.

5.5.3 Public Safety. The program/project manager shall limit the assessed collective risk associated with aerospace vehicle operation and ensure that the probability of doing harm to a member of the general public is not greater than the criteria established by NPR 8715.5. [600] The ability to achieve this level of protection can be demonstrated through a combination of analysis, tests, simulations, use of redundancy in design, and flight operational procedures.

5.5.4 Flight Readiness Reviews/Operational Readiness Reviews shall be conducted in accordance with Chapter 3 of this manual with additional UAS-specific personnel. [601]

5.6 UAS Flightcrew Requirements

5.6.1 Qualifications and Designation. UAS flightcrew members shall become qualified in accordance with written Center standards. [602]

5.6.1.1 The Center's Chief of Flight Operations, with the concurrence of the Center Director, shall designate UAS pilots for the specific type of UAS they operate. [603]

5.6.1.2 The Center's Chief of Flight Operations shall ensure that each UAS flightcrew possesses an adequate level of training and experience to perform the duties of the designated positions. [604]

5.6.1.3 Overall qualifications for the designations are made based on flightcrew's overall flight experience, experience in similar types of UAS aircraft, experience in the actual UAS aircraft type, other training, and demonstrated performance.

5.6.1.4 Designated UAS pilots are those who perform UAS piloting duties as a part of their official position descriptions, to fulfill NASA contract requirements, or in accordance with an interagency agreement.

5.6.2 Training. Initial UAS training shall be documented by each Center in accordance with this chapter with the approval of the Center's Chief of Flight Operations. [605].

5.6.2.1 Recurrent training shall be Center-developed and Chief of Flight Operations-approved. [606]

5.6.2.2 The training program may be tailored to consider previous experience in UAS aircraft, currency in similar types of UAS aircraft, previous training background, and availability of other resources to ensure an adequate level of training. Depending on the category of the UAS pilot, qualification training may be conducted under the direction of a military, civilian, or NASA UAS IP.

5.6.2.3 Qualification training will vary with the UAS type, but will normally include:

a. Ground training (including UAS GCS checkout), handbook study, attendance at formal UAS aircraft training programs, emergency procedure training, and the performance of a UAS aircraft written examination (open book).

b. Simulator training, if available, including normal and emergency procedure training.

- c. UAS aircraft checkout flights, including a prescribed number of UAS flights and landings (if applicable) under the supervision of a UAS IP.
- d. A mission profile flight monitored by a UAS IP to obtain full UAS mission qualification.
- e. In the case of prototype, experimental, or research UAS aircraft for which no formal schools are available, the services of the designers and the manufacturer's best qualified personnel shall be utilized to brief and familiarize the UAS pilots with the aircraft, UAS aircraft systems, and GCSs. [607] In addition, existing UAS simulators and UAS aircraft of a similar nature will be used to train pilots prior to flying a UAS research vehicle. [608]

5.6.2.4 UAS Mission Qualification Standards (MQS). Each UAS crew shall have the knowledge and knowledge-based skills needed to safely conduct flight in the required airspace and flight conditions. [609] This includes being interoperable with other air assets including manned aircraft, unmanned aircraft, and ATC agencies that exist in the same class of airspace. The MQS listed below are used to correlate NASA UAS operational certification requirements with airspace classes and flight profiles of varying complexity. It is important to note that MQS are independent of vehicle type/class and only depend on the airspace and flight profiles required for the mission.

- a. MQS Level I. VFR conditions below 1200 feet AGL in Class E, G, or special use airspace (or international equivalents). UAS Pilots shall complete a Center-developed training course on airspace procedures, but no other formal certification is required. [610] Operations are restricted to VLOS/daisy chain operations.
- b. MQS Level II. VFR conditions above 1200 feet AGL and below 18,000 feet MSL (or applicable international transition altitude) in all applicable classes of airspace or in special use airspace at any altitude. UAS Pilots at this level require a designated MC assigned to the flight. It is permissible for UAS Pilots to conduct flight in MQS Level II conditions under the authority of the UAS MC.
- c. MQS Level III. Any flight conducted under IFR. UAS Operations at this level requires a designated MC assigned to the flight with a NASA UAS instrument rating. It is permissible for UAS pilots to operate under the authority of the instrument rated MC.

5.6.2.5 Evaluation: All UAS pilots shall complete a Center-developed and administered annual flight check and be certified as qualified by a designated authority from the Chief of Flight Operations Office. [611]

5.6.2.6 Holders of a NASA UAS instrument rating shall pass a Center-developed UAS instrument rating exam. [612]

5.6.2.7 Medical. UAS MCs and observers shall pass an annual FAA Third-Class medical exam or NASA / Military equivalent with vision correctable to 20/20 (as determined by an FAA AME or NASA flight surgeon). [613] UAS Pilots are required to meet this same standard only if they are operating in MQS level II or III conditions under the supervision of an MC.

5.6.2.8 Fully qualified NASA pilots may be assigned as UAS pilots, but for UAS pilots to fly manned NASA aircraft, they shall meet NASA pilot qualification minimums. [614]

5.6.2.9 Training for all members of the UAS flightcrew shall include crew resource management training. [615]

5.6.2.10 UAS Currency. Currency is dependent on the category of UAS pilot. Center Directors have the authority to establish and approve UAS flight currency requirements. These include specific requirements established for particular UAS flight research programs and UAS aircraft. Records of qualification and flight evaluation are required. NASA UAS flight time for MQS level II and III

operations shall be kept separate from NASA manned aircraft flight time, by type, in NAMIS. [616]

5.6.2.11 A review of UAS pilot and crew qualifications shall be made prior to flight assignment to ensure that prerequisites for the intended mission are met. [617]

5.6.2.12 A PIC shall be designated for all NASA UAS flight operations and is responsible for safe flight conduct. [618]

5.6.2.13 When transferring from one control mode to another (i.e., Pilot Operator to RC Pilot), a new PIC shall be declared and PIC responsibilities be transferred when handing off from one control room to another MC or in all cases, a positive three-way change of control is required. [619]

5.6.2.14 The PIC has the responsibility to ensure appropriate communications are completed with ATC. Center directors shall establish policy to standardize all UAS control transfers. [620]

5.7 UAS Classifications

5.7.1 NASA UAS are divided into three categories (Category I, II, and III) based on aircraft takeoff gross weight, maximum airspeed in level flight, and class. If a vehicle's weight and operating airspeed fall under two different categories, the most restrictive guidance will be used. UAS that do not fully meet the aircraft characteristics identified in these matrices may require a waiver to meet a desired category. In all cases waiver authority is in accordance with guidelines approved by this NPR.

5.7.2 Category I UAS general characteristics:

Cat I	Model or sUAS (Micro-Small)
Weight	Takeoff gross weight does not exceed 55 lb.
Airspeed	Maximum airspeed in level flight does not exceed 87 KIAS.
Airworthiness	Aircraft are required to have an airworthiness statement provided by a designated NASA Flight Operation office.
Configuration Management	sUAS aircraft in this category typically operate on a fly to failure maintenance schedule. Flight-critical parts will be inspected at least once per day, prior to flight activities--normally accomplished during the first preflight of the day. An appropriate maintenance inspection schedule will be developed for critical components. Individual aircraft log books will be maintained for each aircraft.
Safety	Only requirements levied by the FRR/AFSRB will be required for this category of aircraft, except for cases in which the aircraft caused injury to people or property reaching NPR 8621.1 cost thresholds.

5.7.3 Category II UAS general characteristics:

Cat II	sUAS (Small-Medium)
Weight	Takeoff gross weight exceeds 55 lb but does not exceed 330 lb.
Airspeed	Maximum airspeed in level flight does not exceed 200 KIAS.

Airworthiness	Aircraft need to have an airworthiness statement provided by a designated NASA Flight Operation office.
Configuration Management	sUAS aircraft in this category typically operate under a program maintenance plan or planned maintenance schedule. Flight-critical parts will be inspected at least once per day, prior to flight activities--normally accomplished during the first preflight of the day. An appropriate maintenance inspection schedule will be developed for critical components. Individual aircraft log books will be maintained for each aircraft.
Safety	System safety analysis will be an integral part of system operation. A hazard analysis and accepted risk list will be developed. The Center flight safety office will review and approve the analyses. Mishap reporting in accordance with NPR 8621.1.

5.7.4 Category III UAS general characteristics:

Cat III	UAS (Medium-Large)
Weight	Takeoff gross weight exceeds 330 lb.
Airspeed	Maximum airspeed in level flight may exceed 200 KIAS.
Airworthiness	Aircraft need to have a Certificate of Airworthiness provided by a designated NASA Flight Operation office. NASA Center airworthiness and flight safety review and a flight readiness review are required. Any subsequent system modifications require technical review and FRR/AFSRB in accordance with Center requirements.
Configuration Management	Aircraft maintenance will be accomplished in accordance with this NPR and applicable NASA guidance and managed in NAMIS.
Safety	Accomplished in accordance with this NPR, NPR 8621.1, and applicable NASA and Center-developed reporting procedures.

Chapter 6. Aviation Safety

6.1 Introduction

6.1.1 This chapter describes the roles and responsibilities of NASA Aviation Management and Aviation Safety Professionals and defines minimum qualifications and training of Center ASOs. The chapter also provides the basic requirements for NASA's Aviation Safety Program and provides structure for managers and ASOs to establish and implement their Center's programs. Managers and ASOs will also find requirements regarding aircraft hazard and mishap reporting

6.1.2 The objectives of the NASA Aviation Safety Program are accomplished through the detection and mitigation of hazards, effective risk management, safety awareness training, and enforcement of high standards of conduct and performance. The primary purposes of the NASA Aviation Safety Program are:

- a. Preserving human and material resources by preventing damage and injury through the mitigation of aviation safety hazards and effective risk management throughout NASA.
- b. Enhancing safety awareness in all NASA employees and contractor personnel.

6.1.3 Safety Management System

6.1.3.1 While NASA has a robust Aviation Safety Program, that program is enhanced and validated by the Safety Management System (SMS), a recognized standard throughout the aviation industry. It is recognized by the International Civil Aviation Organization (ICAO) and civil aviation authorities (CAA) as the next step in the evolution of safety in aviation.

6.1.3.2 This NPR establishes policy and procedures for the NASA Aircraft Operations SMS in accordance with ICAO, Federal, and industry standards. Compliance is mandatory and shall be monitored during IAOP functional reviews. [621]

a. The SMS shall establish the mechanisms necessary to deliver and monitor safety performance. [622]

b. Specifically, SMS requires the following:

- (1) A structured means of safety risk management decision making.
- (2) A means of demonstrating safety management capability before system failures occur.
- (3) Increased confidence in risk controls through structured safety assurance processes.
- (4) An effective interface for knowledge sharing.
- (5) A safety promotion framework to support a sound safety culture.

6.1.3.3 Centers shall assign an individual within aircraft operations with the responsibility for managing the Center's aircraft operations SMS to include, at a minimum, documentation control, training of personnel, and promotion of the program to ensure all aircraft operations personnel are aware of their responsibilities. [623]

6.1.3.4 SMS non-conformances identified through either Agency internal or third-party audits will be mitigated in accordance with either Center specific or Agency overall policies or procedures based on the appropriate level of responsibility.

6.2 Aviation Safety Roles and Responsibilities

6.2.1 The Chief, Safety and Mission Assurance (SMA) is the Technical Authority for NASA Aviation Safety and has delegated the responsibility for NASA's Aviation Safety Program to the Director, AMD.

6.2.2 Center Directors are responsible for the safe operation of all aircraft, including UAS, assigned to or operating from their Centers including all commercial aviation services (CAS) supporting NASA mission requirements regardless of the location of the operations.

6.2.2.1 Center Directors shall support and maintain an Aviation Safety Program and organization in accordance with Agency safety policies and this NPR. [624]

6.2.2.2 Center Directors shall ensure that the Center ASO is granted formal and direct access to senior management when safety issues cannot be resolved at a lower level in the flight organization. [625]

6.2.3 The Center's Chief of Flight Operations is the senior line manager with authority and responsibility for all flight operations at the Center and is responsible to the Center Director for the safe and effective operation of all aircraft, including UAS. This is necessary to ensure that aviation management decisions are made only by designated and qualified individuals and to ensure that management actions do not create or contribute to unsafe conditions.

6.2.4 The Director, AMD, as the institutional authority, is responsible for the oversight and management of the Agency's Aviation Safety Program and requirements through this NPR. The Director, AMD, will ensure that periodic reviews of all NASA flight operations are conducted to ensure that NASA aircraft management policies are followed.

6.2.5 The Headquarters AMD Aviation Safety Manager (ASM) serves as the senior advisor to the Assistant Administrator for the OSI and the Director of the AMD on aviation safety matters. The AMD ASM shall be a qualified ASO in accordance with the Federal Management Regulation on the Management of Government Aircraft and meet the training requirements in section 6.2.7.4 within 3 years of appointment. [626] The AMD ASM is responsible for implementing the Agency's Aviation Safety Program, coordinating the annual NASA ASO meeting, and managing the Agency's IAOP review program. The AMD ASM also provides aviation safety support to Center aircraft managers and Center ASOs and serves as liaison to other Federal agencies and military services on aviation safety matters.

6.2.6 The IAOP ASO subpanel keeps the IAOP chair informed of safety developments and issues. The ASO subpanel chair serves as the main interface between Center ASOs and Headquarters, providing advice and counsel regarding aviation safety issues and concerns. The ASO subpanel chair is responsible for briefing aviation safety issues and concerns of the Centers to the IAOP and shall schedule and conduct subpanel meetings and teleconferences. [627] The chair is selected from the membership of the ASO subpanel and serves a term of 3 years.

6.2.7 The Center's Chief of Flight Operations shall recommend assignment of the Center Aviation Safety Officer (ASO), with the concurrence of the Center SMA Director, to the Center Director for approval. [628]

6.2.7.1 The ASO will be a civil servant assigned to the Flight Operations Department, serve as the Center's focal point for aviation safety, and act on behalf of the Center Director when discharging this responsibility.

6.2.7.2 The ASO has the duty to advise the Chief of Flight Operations regarding safety issues and concerns within the organization. Managers will use the advice of the ASO in formulating organizational decisions but should not expect or rely upon the ASO to make managerial decisions.

6.2.7.3 The ASO serves as a member of the Center's ARB and is responsible for managing the Center's Aviation Safety Program and ensuring that the goals of the program are clearly understood. If the ASO believes that a safety concern has not been dealt with sufficiently by the Flight Operations organization, the ASO shall take the concern directly to the Center Director, Chief, SMA, or the HQ Director, Aircraft Management Division without retribution. [629]

6.2.7.4 Center Aviation Safety Officer qualifications include the following:

a. The ASO shall hold qualification as a NASA PIC in primary research aircraft type used at the Center. [630]

b. The ASO, within 1 year of appointment, shall complete a course in Aviation Safety Program management and NASA STEP 1 for Aviation Safety. [631]

c. The ASO, within 2 years of appointment, shall:

(1) Have graduated from a recognized Military Aviation Safety Officer Course or an Academic Aviation Safety Certificate Program (of at least 6 weeks' duration). [632] Program should include courses in aviation safety management, accident/incident response preparedness, aircraft accident investigation, SMS, human factors in aviation operations (maintenance and flight operations), crew resource management theory, aviation ground safety, and aviation law.

(2) Have completed the necessary NASA courses to lead or act as an ex-officio member of a mishap investigation in accordance with NPR 8621.1, which shall include at a minimum:

(a) Overview of mishap investigations.

(b) Mishap investigation roles and responsibilities.

(c) Introduction to human factors in mishap and close call investigation.

(d) Completing the investigation and mishap report.

(e) Root cause analysis. [633]

6.2.7.5 Recurrent Training. Each Center shall establish a continuing education program to ensure that each ASO maintains adequate knowledge to discharge the duties of the office. [634]

a. To maintain familiarity with the latest aviation safety principles as a NASA ASO, the ASO shall be actively engaged in the Center's aviation operations program and complete 40 hours of continuing education in ASO course elements within 24 calendar months. [635]

b. ASOs should include portions of the NASA STEP requirements for Aviation Safety in their recurrent training program. Training for ASOs includes the following course elements:

(1) Aviation Safety Program management.

(2) System safety.

(3) Aviation accident investigation.

(4) Mishap planning.

(5) Human factors.

- (6) Maintenance safety.
- (7) Risk management.
- (8) Aviation law.
- (9) Crew resource management.
- (10) Occupation Safety and Health Administration (OSHA).
- (11) Aviation medicine/physiology.
- (12) Software assurance.
- (13) Quality management.

6.2.8 Center Aviation Ground Safety Officers (AGSO). The Center's Chief of Flight Operations shall appoint an AGSO. [636] The AGSO will be assigned to the Flight Operations Department, serve as the Center's focal point for aviation ground safety. The AGSO has the duty to advise the Chief of Flight Operations regarding safety issues and concerns within the organization. The AGSO serves as a member of the Center's Aviation Safety Working Group and is responsible for supporting the Center's Aviation Safety Program.

6.2.8.1 Aviation Ground Safety Officer qualifications include the following:

- a. The AGSO shall hold qualification as an aircraft or helicopter mechanic, aeronautics engineer, or in airport or aviation operations. [637]
- b. The AGSO, within 1 year of appointment, shall complete NASA STEP 1 for Aviation Safety. [638]

6.2.8.2 Recurrent Training. Each Center shall establish a continuing education program to ensure that each AGSO maintains adequate knowledge to discharge the duties of the office. [639]

- a. To maintain familiarity with the latest aviation safety principles as a NASA AGSO, the AGSO shall be actively engaged in the Center's aviation operations program and complete 40 hours of continuing education in AGSO course elements within 24 calendar months. [640]
- b. AGSOs should include the NASA STEP for Aviation Safety in their recurrent training program. Training for AGSOs include the following course elements in addition to the elements in 6.2.1a through 6.2.1m:

- (1) Human Factors in Aircraft Maintenance Aviation Safety Program Management.
- (2) NASA Root Cause Analysis System Safety.
- (3) Introduction to SMS Aviation Accident Investigation.
- (4) Basic Systems Safety Mishap Planning.
- (5) NMIS user.

6.2.8.3 The AGSO shall:

- a. Lead and manage quarterly maintenance aviation safety training. Facilitate monthly safety training by work Centers.
- b. Lead and manage process to identify and resolve hazards identified within the aircraft

maintenance activities.

c. Investigate initial reporting of hazardous events and hazardous conditions associated with aircraft maintenance activities.

d. Inspect and audit the effectiveness/health of Flight Operations processes addressing:

(1) Cargo safety for assigned aircraft.

(2) Ramp/hangar FOD.

(3) Vehicular traffic incursion and tool control.

e. Recommend safety policy for aircraft maintenance activities.

f. Participate as a member of the Aviation Safety Working Group.

g. Investigate and report on aircraft-related NPR8621.1 events as assigned.

h. Develop and manage portfolio of existing ground safety hazards associated with aircraft maintenance activities.

i. Facilitate periodic inspections/audits of aircraft maintenance-related facilities/ramps and resolution of identified deficiencies.

j. Serve as the safety liaison between the Center's airfield manager and related aircraft maintenance activities. [641]

6.3 Center's Aviation Safety Program

6.3.1 The Center's Aviation Safety Program shall be documented in a coherent set of directives maintained in a single comprehensive manual, The Aviation Safety Program shall provide a clear assignment of roles and responsibilities of the Center's SMS and implementation of requirements and policies outlined in this directive, NPR 8621.1, NPR 8715.3, and NPD 7900.4. [642] The program needs to address requirements of the aviation ground environment, as well as all aspects of the flight environment. NASA's Aviation Safety Programs are dynamic and provide oversight to the many changes that occur in the aviation operational environment. The following program elements are required by NASA policy or Federal regulation:

6.3.1.1 Center's Aviation Safety Working Group. The Center's Aviation Safety Working Group provides a forum to discuss and resolve Center aviation safety issues. The working group is chaired by the ASO, shall meet at least semiannually, and reports to the Chief of Flight Operations. [643] Areas represented on the working group include, but are not limited to, operations, maintenance, engineering, aviation safety, aviation ground safety, airfield facilities, and QA.

6.3.1.2 Inspections and Evaluations.

a. The Director, AMD shall conduct aviation safety reviews of each Center as part of the periodic IAOP functional reviews. The Office of Safety and Mission Assurance will support these reviews to ensure insight into the effectiveness of the Aviation Safety Program. [644]

b. Centers conducting flight operations shall perform a review of flight operations during the alternate year when an IAOP review is not scheduled by either an internal or external organization. [645]

(1) Internal self-assessment reviews should be conducted by the ASO using the IAOP Checklist and

should encompass at a minimum the sections on management, operations, maintenance, quality assurance, airfields, airworthiness, and aviation safety.

(2) External reviews may be conducted by review by the Center's Safety Office or an external aviation inspection organization that shall provide an objective evaluation of selected aircraft operations, maintenance, crew procedures, and facilities to ensure safe and efficient operations. [646]

(3) Centers that have completed an onsite SMS evaluation coordinated by Headquarters do not need to conduct an alternate year inspection or evaluation.

c. Alternate-year inspections and evaluations should focus on progress toward remedying findings and deficiencies identified in the past IAOP Reviews, the last SMS audit, and changes to Agency directives since the last IAOP Review.

d. The review should document and focus on progress toward remedying findings/deficiencies identified in the past IAOP inspections, the last SMS audit, and changes to Agency directives since the last IAOP inspection.

e. A written report summarizing the review, findings, and recommendations shall be provided to the Center Director, copy to AMD, within 75 days of the review. [647]

6.3.1.3 Hazardous Conditions and Events. The ASO will be the focal point between Center's processes to address the requirements of NPR8621.1 that relate to aviation activity under the Center's control and establish, as necessary, processes to identify and report hazardous conditions and hazardous events occurring within flight operations activities into the NMIS or other Center system. The ASO shall be the primary interface between NMIS and DoD Safety Investigation Databases for gleaning lessons learned and potential mitigations for their operations. [648] The ASO will establish a process for investigating, analyzing for root cause, and identifying and resolving deficiencies associated with hazardous conditions and hazardous events that do not satisfy the criteria of the Close Call category as defined in NPR 8621.1.

6.3.1.4 Cultural Surveys. The Chief of Flight Operations, with the assistance of the ASO, shall conduct a Government/industry-recognized cultural survey, assessment, or workshop within aircraft operations every 2 years. [649]

a. This survey shall:

Determine employees' expectations of the Center's Aviation Safety Program.

Evaluate the effectiveness of the current Aviation Safety Program. [650]

b. The goal of this survey is to provide anonymous feedback to management regarding perceptions of organizational climate, management practices, safety, and risk mitigation. These surveys will foster better communication by highlighting and addressing concerns within flight operations.

6.3.1.5 Quarterly Aviation Safety Training. ASOs shall conduct safety training for operations and maintenance personnel and establish a process to ensure that topics covered are disseminated to those who could not attend. [651]

6.3.1.6 Awards Program. Centers shall establish an Aviation Safety Awards program. [652]

6.3.1.7 Risk Assessment and Hazard Analysis. The ASO shall establish risk assessment and hazard-analysis procedures that address risks, hazards, and mitigation methods associated with aircraft modifications and research flights, in accordance with Chapter 2 of NPR 8715.3. [653]

6.3.1.8 Project and Program Safety Plans. The Center shall ensure that project and program safety plans are subject to a review process that ensures that the plans address associated risks and hazards with the specific project or program. [654]

a. Once approved, the Center shall ensure that the plans are disseminated to all involved personnel. [655]

b. The requirements for these safety plans may be satisfied by flight test plans or safety permits but still are subject to the review process.

6.3.1.9 Facilities and Equipment. The Chief of Flight Operations shall ensure that aviation facilities both at home and deployed locations are maintained and inspected in accordance with applicable OSHA and NASA safety standards. [656] These facilities include, but are not limited to, the airfield, aircrew spaces, maintenance shops, ground support equipment, Crash Fire Rescue (CFR) facilities, and ATC facilities.

6.3.1.10 Cargo Safety.

a. The ASO or AGSO shall ensure safety oversight is provided during the handling and stowage of cargo, including hazardous materials, aboard NASA aircraft. [657]

b. The Transportation Officer shall ensure that mixed cargo and passenger loads meet all Federal requirements and ensure that contract carriers and airlift services used by NASA comply with Department of Transportation (DoT) regulations, including 49 CFR Part 175, Carriage by Aircraft, in the transportation of hazardous materials and cargo. [658]

c. Transportation of lithium-ion batteries is not authorized in any quantities in the cargo hold of NASA aircraft.

6.3.1.11 Dissemination of Aviation Safety-Related Information. ASOs shall ensure that aviation safety-related information is distributed throughout aircraft operations and maintenance and that safety information that would be of interest Agency-wide is sent to the OSMA for distribution. [659]

6.4 Mishap Preparedness and Contingency Plans Involving Aircraft

6.4.1 Each Center shall publish and maintain Mishap Preparedness and Contingency Plans that involve aircraft in accordance with the procedures established in NPR 8621.1. [660] In addition to the requirements in NPR 8621.1, each Center's plan shall:

a. Ensure that Mishap Preparedness and Contingency Plans that involve aircraft contain provisions to comply with NTSB, FAA, and GSA investigation and reporting requirements in accordance with Federal regulations. [661]

b. Ensure that local fire/crash-rescue personnel are briefed annually and prior to operation of newly acquired aircraft on rescue and emergency procedures peculiar to the aircraft regularly operated at that facility. [662]

c. Ensure that mock mishap drills through desktop or simulation are held annually and that the ASO evaluates the results to ensure optimal coordination with stakeholders for the Mishap Preparedness and Contingency Plan. [663]

d. Establish procedures for notifying and working with the FAA for aircraft accidents or other reportable aircraft-related incidents under Federal regulations. [664]

6.4.2 The Center safety office, with the support of the IRT, and the Center Flight Operations, shall coordinate with the Agency NAMIS Manager the impounding of all NAMIS data and records for the aircraft, support equipment, and facilities that may be involved in the mishap to prevent their unauthorized use or modification. [665]

Chapter 7. Aviation Medical Program

7.1 Introduction

This section details requirements and procedures for medical certification of NASA aircraft's primary crewmembers. It is applicable to NASA Headquarters and Centers, including Component Facilities, and applies to both civil service and contractor pilots flying NASA aircraft. This section does not apply to space flight or to astronaut pilots.

7.2 Primary Aircrew Medical Requirements

7.2.1 Pilots. Pilots shall hold an FAA First-Class medical certificate, military pilot flight physical, or obtain a NASA flight medical certification, renewed annually or more frequently, if specified by the Center Director or a competent medical authority. [666] At the discretion of the Center's Chief of Flight Operations, records of aeromedical certification conducted by non-NASA Aviation Medical Examiners (AME) may be reviewed and accepted by a NASA Aeromedical Physician.

7.2.1.1 Flightcrew of high-performance jet aircraft or ejection-seat configured aircraft shall obtain a military pilot flight physical or NASA flight medical certification. [667]

7.2.1.2 Pilots 55 years of age and older shall be medically certified every 6 months. [668]

7.2.2 Flight Engineers. Flight Engineers shall hold either an FAA Second-Class medical certificate, military flight physical, or obtain NASA flight medical certification, which will be renewed annually or earlier if specified by a competent medical authority. [669]

7.2.3 Other Primary Aircrew. Other primary aircrew shall hold either an FAA Third-Class medical, military flight physical, or NASA flight medical certification, which will be renewed annually or earlier, if specified by a competent medical authority. [670]

7.2.4 Qualified Non-Crewmembers. Qualified non-crewmembers shall obtain medical clearances as required by Center procedures. At a minimum, a medical screening will be conducted by a NASA physician, as appropriate for the mission. [671]

7.2.5 Primary Aircrews Removed from Flight Status Due to Medical Disqualification. Center Directors shall establish procedures, in coordination with their personnel offices, to ensure that primary aircrews are assigned to duties not involving flight if they become medically disqualified. [672]

7.3 Flight Physical Records

7.3.1 Copies of current medical certification shall be kept on file at the primary aircrew and qualified non-crewmembers' operating site. [673]

7.3.2 Upon completion of a flight physical, the individual will notify the Chief of Flight Operations of the pass/fail status. The Chief of Flight Operations may request certificate confirmation from the awarding authority.

7.3.3 Centers may choose to accept flight physicals conducted by non-NASA AMEs (e.g., an FAA-AME). At the discretion of the Chief of Flight Operations, a review of the records of

aeromedical certification by a NASA Aeromedical Physician can be requested.

7.4 Review Boards

NASA Aerospace Medicine Board. When requested by the Center or individual, the medical examination results of pilots who do not meet the required standards may be reviewed by the NASA Aerospace Medicine Board and NASA Medical Policy Board and reviewed and adjudicated in accordance with the board's charter.

7.5 Waivers

7.5.1 Flightcrews shall report Special Issuances (FAA Waivers) and FAA Statements of Demonstrated Ability (SODA) to the Chief of Flight Operations for review and acceptance by a NASA Aeromedical Physician. [674] The NASA Aeromedical Physician is authorized to grant a waiver for Special Issuances.

7.5.2 Considerations for NASA-specific aeromedical waivers will be processed through the NASA Aerospace Medicine Board and the NASA Medical Policy Board, as appropriate.

Chapter 8. Aircraft Acquisitions and Dispositions

8.1 General

8.1.1 This chapter establishes policy for acquisition and disposition of all NASA aircraft, including UAS.

8.1.2 The Center's Aircraft Flight Operations organizations shall coordinate all aircraft acquisition and disposition actions with the cognizant Center Supply and Equipment Management Officer(s) in accordance with NPR 4200.1. [675]

8.1.3 In addition, transfer of aircraft between Federal agencies and disposal of aircraft, including exchange/sales by Federal agencies in accordance with 41 CFR Part 102-39, Replacement of Personal Property Pursuant to the Exchange/Sale Authority, shall be completed by GSA. [676]

8.2 Aircraft Inventory

8.2.1 All aircraft acquired by NASA for flight or the logistics support of aircraft operations are either in Active or Inactive status in accordance with the following definitions:

- a. An Active Aircraft is an aircraft being actively operated in support of the Agency's missions, being modified or prepared to perform planned Agency missions, or temporarily removed from operations for maintenance.
- b. An Inactive Aircraft is an aircraft being used as a parts aircraft, used as display, stored for developing requirements, or retained for the interim until final disposition.

8.2.2 In accordance with NPR 4200.1, Centers shall conduct annual physical inventories of Center-owned aircraft, including display aircraft, parts aircraft, and aircraft in flyable or non-flyable storage to determine the accuracy of the records and the PPES control system and adjustments made to ensure that financial statements are accurate. [677]

8.3 Aircraft Acquisition

8.3.1 Prior to acquiring aircraft and UAS that meet the Agency asset capitalization threshold established by NPR 9250.1, for operational use, the Mission Directorate, the Associate Administrator, or the Center Director shall submit an acquisition request to the HQ AMD, per Appendix I, along with a business case analysis in support of the aircraft acquisition, including the costs to purchase the aircraft and make it operational. [678]

8.3.1.1 The Business Case Analysis may be in a format of choice, but shall contain sufficient detail to answer capital asset planning questions posed in OMB Circular A-11, (Aviation Business Case-ABC). [679]

8.3.1.2 The purpose of the business case analysis is to determine the most economical acquisition alternative, over the life cycle of the program, in meeting stated aircraft requirements. The business case analysis also shall clearly link the aircraft acquisition to Agency strategic objectives and specific program/project goals and identify life-cycle budget requirements. [680]

8.3.1.3 Typical acquisition alternatives include use of existing Agency aircraft, use of other agencies' aircraft, aircraft lease, aircraft rental, turn-key aircraft services, and procurement. Procurement of aircraft shall be conducted in accordance with established FAR and guidelines, including OMB Circular A-126, and initiated only after approval from the Director, Aircraft Management Division and after the alternatives below have been considered in the following order:

- a. Use of available NASA aircraft resources.
- b. Use of public aircraft owned by other Government agencies through loan or transfer.
- c. Charter or lease of civil aircraft. [681]

8.3.1.4 The acquisition of UAS that are below the Agency asset capitalization threshold shall be approved by the Center Director in accordance with documented Center process for UAS acquisition. [682]

- a. Integral to the Center UAS acquisition process shall be an affirmation statement that the mission of the UAS, resources required, and the oversight burden are aligned with Center and Agency objectives and goals. [683]
- b. Mission Directorate concurrence with the UAS mission requirements shall be documented and the Center Director approval of the UAS acquisition forwarded to HQ AMD. [684]
- c. The Center process for acquisition of below-threshold UAS shall be evaluated for compliance during Inter-Center Aircraft Operations Panel (IAOP) Reviews. [685]

8.3.2 In completing the requirements of Appendix I, the program/project manager shall coordinate with the Center Environmental Management Office to determine whether the proposed aircraft acquisition requires preparation of an environmental assessment. [686]

8.3.3 The Director, Aircraft Management Division (AMD) reviews and approves aircraft acquisition requests, including long-term aircraft leases, after coordination and consultation with the appropriate Mission Directorate Associate Administrator, the Office of the General Counsel, the Office of the Chief Financial Officer (CFO), the Office of Legislative and Intergovernmental Affairs, and the Office of International and Interagency Relations (if DoD related).

8.3.4 Mission Directorates shall establish and Centers endorse the requirements and funding level for each aircraft assigned to support their programs and approve the program/project managers' acquisition requests prior to submission to HQ AMD. [687]

8.3.5 The HQ AMD coordinates and assists Mission Directorates, program/project managers, and Centers with acquisition, assignment, and disposition of all aircraft. AMD shall enter all acquired aircraft into the Federal Aircraft Interactive Reporting System (FAIRS). [688]

8.3.6 Centers shall record all acquired aircraft in the NASA Equipment Management System (Plant, Property, and Equipment System (PPES)) in accordance with NPR 4200.1. [689]

8.3.7 Centers shall register all aircraft, including UAS but excluding parts and DoD-loaned aircraft, with the FAA. [690]

8.4 Aircraft Materiel Acquisition Procedures

8.4.1 "Parts Aircraft" Acquisition. The program/project manager or Center Director shall notify the HQ AMD prior to acquisition of an aircraft whose intended use is for "parts aircraft." [691] In

addition to all applicable Federal regulations, acquisition of aircraft whose intended use is for "parts aircraft" are subject to the following procedures:

- a. Centers shall remove the data plates from all aircraft acquired solely for parts purposes and forward the data plates to HQ AMD for disposition. [692]
- b. Centers shall enter parts aircraft into each respective Center's property inventory records, in accordance with NPR 4200.1. [693]
- c. Centers shall dispose of parts aircraft within 5 years of initial acquisition unless otherwise extended by AMD. [694]
- d. Prior to operating any aircraft that were acquired for parts purposes, Centers shall submit a request to activate an aircraft as outlined in 8.2.1. [695]

8.4.2 Aircraft Materiel Acquisition. Aircraft materiel, such as spare parts, shall be acquired, managed, and controlled in compliance with NPR 4100.1 and 41 CFR Part 102-33. [696] Aircraft materiel will be maintained under proper storage, protection, maintenance procedures, and recordkeeping throughout their life cycles.

8.4.3 Flight Safety Critical Aircraft Parts (FSCAP) and Life Limited Parts.

8.4.3.1 For as long as FSCAP or Life Limited Parts are used or kept by NASA, the documentation that accompanies those parts shall be maintained and kept updated. [697]

8.4.3.2 When FSCAP and Life Limited Parts are disposed, the up-to-date documentation shall accompany the parts. [698]

8.4.3.3 The Criticality Code of an FSCAP shall be maintained and perpetuated on all property records and reports of excess. [699]

8.4.4 Dual Use Military FSCAP. Dual-use military FSCAP may be used on nonmilitary aircraft operated under restricted or standard airworthiness certificates if the parts are inspected and approved for such installation by the FAA. Guidance on such use is provided in FAA Advisory Circular 20-142, CHG 1, Eligibility and Evaluation of U.S. Military Surplus Flight Safety Critical Aircraft Parts, Engines, and Propellers.

8.5 Aircraft Disposition

8.5.1 NASA aircraft are usually unique, highly modified aircraft used to meet a requirement or capability not readily available in the marketplace. It is NASA policy to expeditiously disposition those Inactive Aircraft without mission requirements to reduce the Agency's infrastructure footprint and associated logistics support burden.

8.5.1.1 Unless extended or waived by AMD, all Inactive Aircraft shall be dispositioned within 5 years of inactive status in coordination with Center Logistics. [700]

8.5.1.2 Disposal of NASA aircraft identified as artifacts or heritage assets shall be in accordance with NPR 4310.1. [701]

8.5.1.3 Aircraft disposition shall be coordinated and approved in advance by HQ AMD. [702]

8.5.1.4 Loans of NASA Aircraft to External Organizations. External loan agreements shall be reviewed by the Center's Chief Counsel, other Center officials as appropriate, and approved by the Center Supply and Equipment Management Officer (SEMO), in accordance with NPR 4200.1. [703]

a. When the concurrence of the authorizing official has been obtained and the loan is to be made external to NASA, the SEMO will determine the appropriate method for accomplishing the loan.

b. Aircraft loaned externally by NASA for display, even when done as part of the NASA Exhibits Program, shall be accompanied by a loan agreement signed by the Center SEMO. [704]

8.5.1.5 Exchange/Sale. An exchange/sale generally occurs when a NASA organization desires to replace or upgrade an item of property. NASA aircraft can be exchanged or sold, but shall be coordinated with the General Services Administration (GSA). [705]

a. Requests accompanied by written justifications shall be coordinated through the NASA AMD and the NASA Property Disposal Officer (PDO) as outlined in NPD 4300.1. [706]

b. In addition, the following conditions apply:

(1) The property exchanged or sold is similar to the property acquired.

(2) The property exchanged or sold is not excess or surplus, and a continuing need exists for similar property.

(3) The property exchanged or sold was not acquired for the principal purpose of exchange or sale.

(4) When replacing personal property, the exchange allowance or sales proceeds from the disposition of that property can be used only to offset the cost of the replacement property, not services.

c. Aircraft with an FAA Certificate of Airworthiness. When an aircraft that has an FAA Certificate of Airworthiness is removed from the inventory, the Certificate shall be removed from the aircraft and forwarded to the HQ AMD for disposition, unless the aircraft is transferred to another Government agency that intends to operate it or it is sold through GSA to a civil operator. [707]

8.5.2 Aircraft without an FAA Certificate of Airworthiness. When an aircraft is removed from the inventory that is not capable of obtaining an FAA Certificate of Airworthiness or is deemed by the Center's Flight Operations Office to be unsafe for civil use, the manufacturer's data plate shall be removed and forwarded to HQ AMD for disposition. [708] Every effort will be made to ensure that aircraft parts that are not FAA certified are kept out of circulation.

Chapter 9. Inter-Center Aircraft Operations Panel Review

9.1 Purpose

9.1.1 NASA Inter-Center Aircraft Operations Panel (IAOP) Reviews provide peer review and an objective management evaluation of the procedures and practices that are being used at Centers operating or acquiring aircraft or aircraft services to ensure safe and efficient accomplishment of assigned missions, goals, and mitigate risks associated with aircraft operations. In addition to providing Center Directors and HQ management officials with an overview of the general health of all aspects of flight operations, the review teams also identify deficiencies in, or deviations from, Federal laws, policies, and regulations, NASA policies, procedures, and guidelines. Results of the reviews shall be used to update NASA-wide or local requirements in order to enhance standardization and improve productivity. [709] The evaluations are conducted primarily by Inter-Center teams and, thus, are a valuable method of communicating current information among Center Flight Operations personnel. (See Appendix E for an example review plan and Appendix F for the review sheet.)

9.1.1.1 NASA IAOP Reviews shall be conducted for commercial aircraft services (CAS) operators that exceed 1 year's period of performance, require a NASA Statement of Airworthiness, or involve NASA personnel participating in flight. [710]

9.1.1.2 IAOP Reviews of CAS operators shall be funded by the project or program procuring the services. [711]

9.1.1.3 NASA IAOP Reviews shall be conducted for Centers, including Federally Funded Research and Development Centers (FFRDC) that operate UAS, including Component Facilities; the Jet Propulsion Laboratory, a Federally Funded Research and Development Center, and other NASA contractors and grantees as specified in their contracts or grants; and to other organizations (i.e., commercial partners, other Federal agencies, international parties, and tenants on Centers) as specified and described in written operating agreements. [712] This NPR provides operational policy that may be applicable to mishaps and close calls for NASA-funded activities at any Government, contractor, subcontractor, or grantee site.

9.2 Responsibilities

9.2.1 It is important that the Inter-Center Aircraft Operations Panel support the review program. The HQ AMD shall establish IAOP Review teams to review all aspects of flight operations at NASA Centers, including the implementation of Center procedures, on a 36-month cycle, Center requested special IAOP Review, or as determined by the HQ AMD. [713] The Centers and appropriate HQ offices (e.g., AMD, OSMA) will provide personnel to serve on the teams. The HQ AMD will coordinate the review program.

9.2.1.1 Center Directors shall provide subject matter experts (SMEs) to the IAOP Review Teams as requested by AMD to support the IAOP Review Program. [714]

9.2.1.2 Flight Operations Chiefs shall designate a point of contact to coordinate IAOP Review support with HQ AMD. [715]

9.3 Procedures

9.3.1 In conducting reviews, including special or periodic reviews, the following guidelines will be used:

9.3.1.1 Team Composition. A review team will include a team leader who is a member of the IAOP and either a Center Flight Operations Chief or deputy.

a. The size and experience of the Team shall reflect the scope and depth of the review. [716]

b. Team members shall be selected from various Centers and HQ to provide SMEs in the areas of operations, maintenance, QA, facilities, airworthiness, Aviation Life Support Systems, security, UAS, finance, and aviation safety. [717]

c. The mix of members will vary for each review. The HQ AMD will provide a member for each review who is responsible for reviewing management practices and special interest items. In addition, the OSMA will provide a member for each review who is responsible for the independent assessment of aviation safety compliance

9.3.1.2 Coordination. The HQ AMD will maintain a current review schedule and, after coordination with Center Chief of Flight Operations, will notify Centers with sufficient time to adjust schedules or other factors as necessary. HQ AMD will write a memo to the appropriate Center Director describing the scope and time of the review.

9.3.1.3 Communications. The IAOP Team shall conduct an entrance and exit briefing as well as frequent debriefs to Center Management as necessary. [718]

a. The entrance briefing will be conducted prior to the Team's arrival on Center. At the entrance briefing, Center Management shall provide a brief on the Center's Flight Operations Program. [719]

b. The exit briefing shall be conducted onsite for the Center Director or, if the Center Director is unexpectedly and unavoidably absent, the Deputy Center Director. [720]

(1) The exit briefing will not be given to an official further down the Center chain of command and shall be rescheduled if the Center Director and Deputy are both unavailable. [721]

(2) A draft report concerning all findings and recommendations shall be provided at the exit brief. [722]

9.3.1.4 The entrance briefing given by the Center Flight Chief to the review team shall be a comprehensive review of aircraft operations procedures and documentation. [723] Local operations and maintenance documents will be made available to the team, and the team members will familiarize themselves with the documents before performing field work.

9.3.2 Reviewers shall ensure compliance with established NASA, FAA, DoD, manufacturer, industry, and association standards, processes, and procedures. [724]

9.3.3 The HQ AMD will maintain updated IAOP review checklists. Review checklists will be made available to each review team member to use as a guideline to ensure compliance with applicable instructions. Team members will discuss findings and recommendations with the affected Center party to ensure a mutual understanding of the observations. Minor discrepancy items will be brought to the attention of the first-line supervisor for immediate corrective action. The team leader shall hold daily team progress meetings to discuss discrepancies and recommendations. [725]

9.3.4 The team leader's exit briefing shall be in sufficient detail to inform Center management of the

status of local Flight Operations activities with particular emphasis on significant findings and recommendations requiring management's attention. [726]

9.3.4.1 In the interest of safety and clarity of communication, if the consensus of the review team and their findings reflects their view that the level of flight safety at the Center is such that there is a significant increase in the probability of an aviation mishap, the Team Leader shall inform the Center Director or Deputy of that view, to include, as appropriate, a recommendation to cease flight operations pending resolution of the underlying issue(s). [727]

9.3.5 The review team shall document results in a brief report that focuses on findings and recommendations. [728]

9.3.5.1 The review report will address those items that require senior management's attention and also identify those activities that are being performed in an outstanding manner. Findings shall be objective and impact assessments accurately stated. [729]

9.3.5.2 Criticality criteria will be used to assist management in prioritizing responses as follows: Required Action, Recommendation, and Commendable Finding.

- a. Required Actions cite the specific requirement that is not being met.
- b. Recommendations are provided as best practices that can be used for continuous improvement.
- c. Commendable findings document positive observations and highlight potential best practices.

9.3.5.3 Repeat findings will be highlighted and information identified that may be useful to the Center's Root Cause Analysis efforts.

9.3.5.4 The report shall be forwarded by the review team leader to the Assistant Administrator for the OSI for endorsement and forwarding to the Center Director for corrective action. A copy will be provided to the Director, AMD. [730]

9.3.6 The Center Director shall respond to the Assistant Administrator for the OSI concerning corrective actions. [731] The HQ AMD will review the response for adequacy, follow up as necessary, track required action responses, and close out the report.

Chapter 10. Commercial Aviation Services (CAS), Including UAS Operations

10.1 General

10.1.1 This chapter documents NASA's Flight Program Standards for CAS operations as required by the Federal Management Regulation (FMR) Part 102-33, Management of Government Aircraft.

10.1.2 CAS is a full-service contract agreement through which an executive agency acquires an aircraft and related aviation services (e.g., pilot, crew, maintenance) for exclusive use.

10.1.3 Except for passenger carriage, CAS flights shall be conducted as public-use aircraft operations under NASA's aircraft authority. [732] As such, NASA has a responsibility to ensure CAS aircraft are airworthy and such aircraft operations are conducted safely.

10.1.4 All CAS operations shall be inspected by NASA Center Flight Operations personnel prior to contract award. [733]

10.1.5 For all CAS contracts and agreements, NASA shall ensure that the operator hold and maintain a 14 CFR 121 Certificate or 14 CFR 135 Certificate and meet the requirements of this chapter. [734]

10.1.5.1 NASA may approve deviations to an operator's 14 CFR 135 Certificate under NASA's public-use authority while operating a NASA mission. Such deviations shall be authorized in writing by the Center Chief of Flight Operations. [735]

10.1.5.2 If a CAS aircraft has a valid FAA Standard Airworthiness Certificate and the aircraft is maintained and to be operated in accordance with that Certificate, the Center may accept the FAA Certificate after a Center airworthiness review. In this case, issuance of a separate NASA airworthiness statement is required.

10.1.5.3 If a CAS aircraft has a valid FAA Limited or Restricted Category Certificate and the operation is restricted to the limitations imposed by the Certificate, the Center may accept the FAA Certificate after a Center airworthiness review. In this case, issuance of a separate NASA airworthiness statement is required.

10.1.5.4 If a CAS aircraft has a FAA Experimental or Provisional Certificate, the airworthiness of the aircraft shall be reviewed and approved by the Center's airworthiness review process and a NASA Airworthiness Certificate issued. [736]

10.1.5.5 If a CAS aircraft has been modified as described in section 2.6, the aircraft configuration and airworthiness shall be reviewed and approved by the Center's airworthiness review process and a NASA airworthiness certificate or statement issued. [737]

10.1.5.6 If the aircraft has FAA Form 337 documentation (FAA Series 8110, 8100.9), the Center shall review the Designated Engineering Representative (DER)/Designated Airworthiness Representative (DAR) evaluation. [738]

10.2 CAS Management and Administrative Roles and Responsibilities

10.2.1 The Assistant Administrator, OSI shall ensure that the CAS policies are in compliance with applicable Federal regulations. [739]

10.2.2 Mission Directorates (MD) are responsible for establishing and documenting aircraft mission requirements and funding to support CAS requirements, including oversight of CAS. MDs shall coordinate with AMD as early as possible in the planning process when establishing program or project plans that involve the acquisition of CAS. [740]

10.2.3 Center Directors are responsible for establishing and documenting a written process to delineate CAS acquisition, operations, and oversight responsibilities. Oversight responsibilities include initial contractor review prior to contract award, surveillance during the contract period of performance and appropriate close-out responsibilities. Center Directors shall ensure Center flight operations is involved in the CAS planning and review process as soon as practical. [741] Early Flight Operations involvement can help identify problems involving requirements so solutions can be developed early in the process.

10.2.4 Center Flight Operations. All Center CAS contracts or agreements including Space Act Agreements that include aviation operations, shall be coordinated, reviewed, and concurred with by the Center's Flight Operations prior to contract award or execution of the agreement. [742]

10.2.4.1 Chief of Flight Operations. The Chief of Flight Operations oversees the Center's surveillance of contractor aircraft operations. The Chief of Flight Operations shall determine which requirements and regulations apply to the contract and then ensure the contractor meets those requirements. [743]

10.2.4.2 Chief of Quality Assurance. The Chief of Quality Assurance shall provide support for CAS oversight and Surveillance Plan development and implementation. [744]

10.2.4.3 The Center Engineering Technical Authority working with the Center Airworthiness Review Board shall provide airworthiness coordination and support for CAS operations as required. [745]

10.3 CAS Aircraft Maintenance Requirements

10.3.1 The contractor shall ensure that the aircraft and all required equipment are operated and maintained in accordance with the manufacturer's specifications. [746]

10.3.1.1 Airworthiness Directives (ADs) and Manufacturer's Mandatory Service Bulletins (MMSBs)

a. The contractor shall comply with MMSBs and FAA ADs before and during agreement performance. [747]

b. The contractor shall provide and make available a list of all completed MMSBs and FAA ADs applicable to the contract aircraft in the format shown in FAA Advisory Circular (AC) 43-9C complete with authorized signature, certificate, type, and number. [748]

10.4 Safety Requirements

10.4.1 The contractor shall have a documented Aviation Safety Program. [749]

10.4.2 The Chief of Flight Operations shall incorporate CAS mishap prevention and mishap notification in the Center's Aviation Safety Program. [750]

10.5 CAS Surveillance and Inspections

10.5.1 In accordance with Agency requirements, a Surveillance Plan shall be implemented for all CAS contracts due to the critical and complex nature of CAS operations as defined in NPR 8735.2. [751]

10.5.2 The CAS contract shall cite and allow NASA access to all maintenance and flight efforts performed under a NASA contract regardless of contractor/subcontractor status. [752]

10.5.3 Surveillance Functions. The Surveillance Plan shall be coordinated and supported by flight operations to ensure that qualified aircraft operations and maintenance personnel are involved through the life of the contract. [753]

10.5.4 Inspections. Inspections shall be conducted for all CAS operators, aircraft, pilots, and maintainers. [754]

10.5.4.1 Centers shall develop and use a standard checklist to document the inspection and associated results. This inspection will review as a minimum:

- a. The operator's flight operations and maintenance manuals, aircraft logbooks, and personnel training records.
- b. The aircraft for configuration control and material condition to meet NASA mission requirements. [755]

10.5.5 Surveillance and Inspection Teams. Surveillance and Inspection Teams shall include at a minimum a pilot and maintainer to provide expertise in the areas of operations, maintenance, quality assurance, airworthiness, and aviation safety. The mix of members may vary for each inspection. [756]

10.5.6 Funding for CAS Surveillance and Inspections. Program and/or project managers are responsible for funding the surveillance and inspections of CAS operations. Programs and projects that involve CAS shall ensure that the oversight and surveillance functions required for CAS operations are included in their budgets and allocated to the appropriate organizations. [757]

Chapter 11. Flight Operations Performance Measurements and Reporting

11.1 Purpose

The primary objective of measuring aircraft operations is to provide Agency stakeholders with the key indicators of program cost, aircraft operational effectiveness, and safety. Submission of timely, accurate, and auditable aircraft cost data to support the Agency budget process is essential. A secondary objective is to meet the reporting requirements of OMB Circular A-126 and GSA for collection of aircraft information, including aircraft cost data.

11.2 Responsibilities

11.2.1 Center Directors are responsible for reporting the aircraft operational and cost data to the HQ AMD and for ensuring that the reported data is accurate and auditable.

11.2.2 The HQ AMD is responsible for compiling Center inputs into an annual Agency aircraft report, as well as submitting compiled aircraft information to GSA.

11.3 Aircraft Data Reporting Requirements

11.3.1 General. Centers shall use the NASA Aircraft Cost and Performance worksheets in Appendix H to report aircraft data, including use of CAS, to HQ AMD within 45 days after the end of each quarter. [758] CAS includes leased aircraft, chartered aircraft, fractional ownership aircraft, otherwise-contracted aircraft, and aircraft services provided by other agencies. This data-reporting requirement is only for manned aircraft and capitalized UAS. Aircraft data reporting consists of the following:

11.3.1.1 Aircraft Inventory Data Reporting. Centers shall use the Aviation Inventory Report worksheet in Appendix H to report the number and type of aircraft operated. [759]

a. Aircraft value requested will be the capitalized values recorded in the Plant, Property, and Equipment System (PPES) database.

b. Additional blank sheets may be used in addition to the comment block of the attached Aviation Inventory Data worksheet to highlight projects, programs, or campaigns supported during the fiscal year.

c. For CAS aircraft operations, Centers will provide information on only the aircraft type and model flown, the programs and missions supported, and the contract performance period.

11.3.1.2 Aircraft Performance Data Reporting. Centers shall ensure all aircraft operational information is accurately recorded in NAMIS. [760] AMD will use NAMIS to track and report aircraft metrics.

a. CAS aircraft operations are not normally recorded in NAMIS. CAS hours and sorties flown but not reported in NAMIS shall be provided to AMD via other electronic means. [761]

11.3.1.3 Aircraft Safety Data. Centers shall ensure all mishap information with costs of mishaps to

the nearest dollar, including CAS aircraft operations, are accurately recorded in the NASA Mishap Information System (NMIS) to report aircraft operational safety metrics. [762]

11.3.1.4 Aircraft Cost Data Reporting. The Centers shall use the Aircraft Cost and Performance worksheets in Appendix H-5 to report aircraft costs, including contracted CAS. [763]

- a. Accrued costs, as opposed to disbursements or obligations, shall be reported for each aircraft type operated during the fiscal year. [764]
- b. One worksheet will be used to report one aircraft type and primary mission utilization category. Using the F/A-18 example, one worksheet is to be used for F/A-18 (PS) and another for F/A-18 (R&D).
- c. Costs shall be reported to the nearest dollar. [765]

The first priority in assembling aircraft costs is to extract cost data from the Core Finance Business Warehouse and to verify the accuracy of the aircraft cost data extracted.

(a) While it is not necessary to backtrack and correct the data in the Business Warehouse to report costs as requested, any data errors observed in the Business Warehouse and any data adjustments necessary to formulate and report accurate aircraft costs shall be documented. [766]

(b) Center CFOs shall implement actions to correct any financial errors uncovered in the Business Warehouse. [767]

In most cases, cost data extracted using aircraft function codes from the Core Finance Business Warehouse should be further broken down and allocated into the reportable aircraft cost categories on the Aircraft Cost and Performance worksheets. Each Center will establish and document local processes and the underlying rationale used to assess the Business Warehouse aircraft cost data into reportable cost categories.

The data requested in the Aircraft Cost and Performance worksheets is based on the 2011 revision of the U.S. Government Aircraft Cost Accounting Guide published by GSA. The Aircraft Cost and Performance worksheets break costs into three broad categories: investment expenditures, fixed costs, and variable costs. Investment expenditures are expenses that lead to ownership of an aircraft or major asset. Fixed costs are those that would be incurred whether aircraft are flown or not. Typical fixed costs are calendar based; e.g., depot maintenance. Variable costs are those incurred as aircraft are flown. Typical variable costs are flight hour based; e.g., fuel.

Chapter 12. Assignment and Removal from Flight Status, Including UAS Operations

12.1 Purpose

Aircrew members are assigned to flight status with approval from Center Directors and the Center's Human Resources Office. Aircrew members may be removed from flight status on a temporary basis subsequent to mishap or high-visibility Close Calls, as defined in NPR 8621.1. These procedures are not intended to replace those applicable to events classified as Close Calls, pursuant to NPR 8621.1. Removal from flight status does not apply to medical disqualification (temporary or permanent).

12.2 Assignment Procedures

12.2.1 In general, designated NASA pilots and aircrew are those who perform piloting and aircrew duties as a part of their official position description or fly in accordance with an interagency agreement, such as a military pilot on loan to NASA. To be eligible to be assigned to flight status, aircrew members shall meet all applicable requirements of Chapters 3 and 4, including any additional Center requirements, and will be assigned as either of the following:

- a. GS-2181, Aircraft Operations Series.
- b. GS-0861, Aerospace Engineering Series. [768]

12.2.1.1 Pilots and aircrew shall meet the applicable series and grade requirements of the applicable OPM standard. [769]

12.2.1.2 Only the Assistant Administrator for the OSI can waive the OPM qualification standard.

12.2.2 All series and grade requirements of OPM qualification standard for a GS-2181 apply to new hires (including contracted pilots flying NASA-owned aircraft) and current NASA pilots. Selecting officials may consider new hires who do not meet recency requirements when these candidates are otherwise qualified for the position and exceed all other GS-2181 series and grade requirements. For current NASA pilots, recency requirements in Chapters 3 and 4 apply.

12.2.3 Each Center Director and Chief of Flight Operations, in close coordination with the Center's Human Resources Office, shall establish a process to designate pilots and aircrew. [770]

12.2.3.1 At a minimum, the process will include reviewing experience, FAA licenses/military designations, and flight log books in relation to the Center's flight requirements.

12.2.3.2 To qualify for assignment as a NASA pilot of manned aircraft, only manned aircraft time shall apply. [771]

12.2.4 Each Center's Chief of Flight Operations shall establish procedures for assignment of aircrew to flight status and document those procedures in the Center Aviation Operations Manual. [772]

12.2.4.1 Fully qualified NASA pilots may be assigned as UAS pilots, but for UAS pilots to fly manned NASA aircraft, they shall meet NASA pilot qualification minimums. [773]

12.2.4.2 In addition, appropriate documentation should be contained in the aircrew member's official

position description, per human resources procedures.

12.3 Removal Procedures

12.3.1 Each Center's Chief of Flight Operations shall establish procedures for temporary removal of aircrew personnel from flight status for situations other than medical disqualification (Chapter 7). [774]

12.3.1.1 These procedures will be coordinated with the Center's human resources and legal offices. Chiefs of Flight Operations may, after consultation with the Center's legal and human resources offices, remove any aircrew member from flight status for 30 days or less.

12.3.1.2 The Center Director, in accordance with human resources procedures, shall review and approve any non-medical-related proposal for removal from flight status in excess of 30 days. [775]

12.3.1.3 Contract employee flightcrew members will be treated in accordance with the terms of the contract under which they are employed.

12.3.2 Prior to any action removing aircrew members from flight status, the Chief of Flight Operations and Center Director will inform the aircrew member of the circumstances leading to the action. The Center Director and the Chief of Flight Operations, in close coordination with the Center's human resources office, will determine how this action affects the member's ability to continue to perform the duties of his/her position description.

12.3.3 Removal from flight status can result from either a single event or multiple events that indicate the aviator has demonstrated:

- a. Faulty judgment in flight situations.
- b. Lack of general or specific flight skills.
- c. Traits of character, emotional tendencies, or lack of mental aptitude or motivation that make it questionable to continue the member in assigned flying duties.

12.3.4 Flight Performance Board. A Flight Performance Board may be convened if the Center Director or Chief of Flight Operations deems the circumstances warrant such action. The board should be convened within 90 days of removal from flight status. The board shall be composed of, at a minimum, two pilots and a flight surgeon. [776] The HQ AMD can provide board membership recommendations upon request. The Center Director or Chief of Flight Operations is the convening authority unless the Chief of Flights Operations is the subject of the removal; in which case, the convening authority would be the Center Director. The convening authority will consult with the Center's legal and human resources offices and HQ AMD prior to establishing a board. Membership will be based upon the circumstances of each individual case. It is preferred that board members have experience as qualified aircrew members and be selected for the board based on their objectivity, experience, and a clear understanding of NASA's aviation mission.

Note: Flight Performance Boards may be convened to adjudicate pilots operating UAS.

12.3.4.1 Board Members shall be assigned to the board at the discretion of the convening authority. At a minimum, one from each of the following specialties should be assigned as advisors:

- a. Flight surgeon. The board participating Flight Surgeon cannot be called as a witness for the process.
- b. Pilots senior to the individual being evaluated with at least one of the pilots thoroughly versed in

the type of flight operations involved.

c. When pilots or Flight Surgeons from the convening Center are not available, Centers will utilize pilots and/or Flight Surgeons from other Centers. [777]

12.3.4.2 If a Flight Performance Board is convened, a flight status recommendation shall be delivered to the Center Director. [778]

12.3.4.3 The recommendation from the Flight Performance Board shall recommend either Continuation of Flight Status or the Termination of Flight Status. [779]

Chapter 13. NASA Airfield, Ramp, and Movement Area Operations

13.1 General Requirements

13.1.1 This chapter applies to NASA Centers that own and operate an airfield. Center Directors shall equip airfield management personnel with sufficient budget and human resources to comply with the requirements of this NPR. [780]

13.1.2 Centers shall operate an airfield only when the Center adopts and complies with an Airfield Operations Manual, in accordance with paragraph 13.2. [781]

13.1.3 NASA heliports shall comply with the airfield requirements in this NPR. Specific references in this chapter also apply to NASA-owned and -maintained ramp and movement areas. [782]

13.1.4 A Center operating an airfield shall ensure that the FAA Regional Airports Division Manager is provided a complete copy of the Center's most current Airfield Operations Manual. [783]

13.1.5 Centers providing access to their airfield to the general public for aircraft operations conducted under civil regulations shall identify all deviations and noncompliance from 14 CFR Part 139, Certification of Airports, and provide this information to the Aircraft Management Division, OSI for approval. [784] This information also will be provided to all aircraft operators using the airfield.

13.1.6 Centers shall establish and maintain Pre-Mishap Plan/Aircraft Incident Response Plans, in accordance with NPR 8621.1 that meets the following requirements:

- a. Develop and maintain an airfield emergency plan designed to minimize the possibility and extent of personal injury and property damage on the airfield in an emergency. [785]
- b. Coordinate the plan with law enforcement agencies, rescue and firefighting agencies, medical personnel and organizations, the principal tenants at the airfield, and all other persons who have responsibilities under the plan. [786]
- c. Hold a full-scale airfield emergency plan exercise at least once every 24-consecutive calendar months. [787]

13.1.6.1 At least once every 12 consecutive calendar months, the plan shall be reviewed with all the parties with whom the plan is coordinated, as specified in this NPR, to ensure that all parties know their responsibilities and to ensure that all information in the plan is current. [788]

13.1.7 The Center shall conduct training needed to meet the following requirements prior to the initial performance of such duties and at least once every 12 consecutive calendar months:

- a. To provide qualified personnel to comply with the requirements of this NPR.
- b. To qualify personnel who access movement areas and safety areas and perform duties in compliance with the requirements of the Airfield Operations Manual and the requirements of this NPR. [789]

13.1.8 Centers operating airfields or aircraft ramp or movement areas shall conduct a Pavement Condition Index (PCI) survey at least once every 5 years. [790]

13.1.9 Airfield-condition reporting shall be conducted in a manner authorized by the Center Director and meet the following requirements:

- a. Provide for the collection and dissemination of airfield condition information to aircraft operators, including alerts on bird and other wildlife activity.
- b. Use the Notices to Airmen (NOTAM) system, as appropriate, and other systems and procedures authorized by the FAA.
- c. Provide information on the following airfield conditions that may affect the safe operations of aircraft:
 - (1) Construction or maintenance activity on movement areas, safety areas, or loading ramps and parking areas.
 - (2) Surface irregularities on movement areas, safety areas, or loading ramps and parking areas.
 - (3) Snow, ice, slush, or water on the movement area or loading ramps and parking areas.
 - (4) Snow piled or drifted on or near movement areas.
 - (5) Objects on the movement area or safety areas.
 - (6) Malfunction of any lighting system, holding position signs, or Instrument Landing System (ILS) critical area signs.
 - (7) Unresolved wildlife hazards.
 - (8) Non-availability of any rescue and firefighting capability required.
 - (9) Any other condition specified in the Airfield Operations Manual or that may otherwise adversely affect the safe operation of aircraft.

13.1.9.1 Procedures for identifying, marking, and lighting construction and other unserviceable areas.

13.1.9.2 Any other item that the Center Director finds is necessary to ensure safety in airfield operations. [791]

13.2 Contents of Airfield Operations Manual

13.2.1 The Center shall maintain an Airfield Operations Manual that includes descriptions of operating procedures, facilities and equipment, responsibility assignments, and any other information needed by personnel concerned with operating the airfield. [792] FAR, FAA advisory circulars, and the National Fire Protection Association (NFPA) standards contain acceptable methods and procedures for the development of a Center's Airfield Operations Manual.

13.2.2 The Center shall include in the Airfield Operations Manual the following required elements:

- a. Lines of succession of airfield operational responsibility.
- b. Copies of current waivers, variances, or deviations issued to the airfield.
- c. Any limitations imposed by the Administrator.
- d. A grid map or other means of identifying locations and terrain features on and around the airfield that are significant to emergency operations.

- e. The location of each obstruction within the airfield's area of authority required to be lighted or marked.
- f. A description of all movement areas that are available for civil and public aircraft operators and the airfield's safety areas and all roads that serve them.
- g. Procedures for avoidance of interruption or failure during construction work of utilities that serve facilities or NAVAIDS that support aircraft operations.
- h. A description of airfield personnel training detailed in paragraph 13.1.5.
- i. Procedures for maintaining paved areas.
- j. Procedures for maintaining unpaved areas.
- k. Procedures for maintaining safety areas.
- l. A plan showing the runway and taxiway identification system, including the location and inscription of signs, runway markings, and holding-position markings.
- m. A description of marking, signs, and lighting systems and procedures for maintaining them.
- n. A snow and ice control plan. Prompt notification will be given to all aircraft operators using the airfield when any portion of the movement area is less than satisfactorily cleared for safe operation of their aircraft.
- o. A description of the facilities, equipment, personnel, and procedures for meeting the aircraft rescue and firefighting requirements detailed in paragraph 13.3.
- p. Procedures for protecting persons and property during storing, dispensing, and handling fuel or other hazardous substances and materials.
- q. A description of traffic and wind direction indicators and procedures for maintaining them.
- r. The Pre-Mishap Plan/Aircraft Incident Response Plan, as specified in paragraph 13.1.4.
- s. Procedures for conducting a biennial self-inspection program.
- t. Procedures for controlling pedestrians and ground vehicles in movement areas and safety areas.
- u. Procedures for obstruction removal, marking, or lighting.
- v. Procedures for protection of NAVAIDS.
- w. A description of public protection.
- x. Procedures for wildlife hazard management, as specified in Section 13.4.
- y. Airfield condition reporting procedures, as specified in Section 13.1.6. [793]

13.3 Safety and Emergency Requirements

13.3.1 The Center shall provide and maintain facilities, equipment, personnel, and procedures for meeting the aircraft rescue and firefighting requirements, in accordance with NPR 8715.3 and NASA-STD-8719.11 for the capacity of aircraft and the level of aircraft operations being conducted at the airfield. [794]

13.3.1.1 During aircraft operations at the airfield, the Center shall provide the rescue and firefighting

capability specified for the level of operations. [795]

13.3.1.2 In the event that fire protection is temporarily not available due to lack of personnel, equipment, or other emergencies, the Center shall establish procedures to restrict the use of the airfield and notify aircraft operators of the temporary suspension of airfield operations. [796]

13.3.1.3 All rescue and firefighting personnel shall participate in at least one live-fire drill prior to initial performance of rescue and firefighting duties and every 12 consecutive calendar months thereafter. [797]

13.4 Wildlife Hazard Management

13.4.1 The Center shall take immediate action to eliminate wildlife hazards whenever they are detected. [798]

13.4.2 The Center shall ensure that a wildlife hazard assessment is conducted by a wildlife damage management biologist who has professional training and/or experience in wildlife hazard management at airfields or an individual working under direct supervision of such an individual. [799]

13.4.3 The Center shall conduct a training program by a qualified wildlife damage management biologist to provide airfield personnel with the knowledge and skills needed to successfully carry out the required wildlife hazard management plan. [800]

13.4.4 The Center shall track and report all bird strikes and other wildlife strikes either in NMIS or the NASA Aircraft Anomaly Reporting System (NAARS) in accordance with NPR 8621.1. [801]

13.4.5 The Center shall conduct a periodic review of bird hazards using a team similar to the U.S. Air Force Bird/Wildlife Aircraft Strike Hazard (BASH) team. [802]

13.4.6 The Center shall implement a wildlife hazard management plan using the wildlife hazard assessment as a basis. [803] The plan will:

- a. Provide measures to eliminate wildlife hazards to aircraft operations.
- b. Become a part of the Airfield Operations Manual.
- c. Include a list of the individuals having authority and responsibility for implementing each aspect of the plan.
- d. Include a list prioritizing the actions in Table 13-1, Wildlife Hazard Assessment, and specifying target dates for their initiation and completion.
- e. Provide procedures to review and evaluate the wildlife hazard management plan every 12 consecutive months or following an event described in this section, including the plan's effectiveness in dealing with known wildlife hazards on and in the airfield's vicinity and aspects of the wildlife hazards described in the wildlife hazard assessment that should be reevaluated.

Table 13-1 Wildlife Hazard Assessment

1. Wildlife population management.
2. Habitat modification.
3. Land-use changes.

4. Requirements for and, where applicable, copies of local, state, and Federal wildlife control permits.
5. Identification of resources that the Center will provide to implement the plan.
6. Procedures to be followed during aircraft operations that, at a minimum, include:
 - a. Provisions to conduct physical inspections of the aircraft movement areas and other areas critical to successfully manage known wildlife hazards before air carrier operations begin.
 - b. Wildlife hazard control measures.
 - c. Methods to communicate effectively between personnel conducting wildlife control or observing wildlife hazards and the air traffic control tower.
 - d. Methods for the air traffic control tower to communicate with and provide alerts to aircraft operating in the vicinity of the airfield of wildlife hazards and conditions.
 - e. Establishing bird watch conditions to alert crews of the level of potential bird activity.
 - f. A standard field brief for all users to view and sign, acknowledging all field operating procedures and hazards at the airfield and local flying area.

13.5 Noncomplying Conditions

13.5.1 Whenever the requirements of this NPR cannot be met to the extent that uncorrected, unsafe conditions exist on the airfield, the Center shall limit aircraft operations to those portions of the airfield not rendered unsafe by those conditions. [804]

13.6 Deviations

In emergency conditions requiring immediate action for the protection of life or property, the Center may deviate from any requirement of this NPR or the Airfield Operations Manual to the extent required for the emergency. Each Center that deviates from a requirement under this paragraph shall, within 14 days after the emergency, notify HQ AMD and OSMA of the nature, extent, and duration of the deviation. [805] All events will be reported in accordance with NMIS criteria and procedures in NPR 8621.1. Appendix A. Definitions

Appendix A: Definitions

Acquisition. Any means of bringing an aircraft under NASA control or into the property control inventory.

Aircraft Classification. NASA use of aircraft: Research and Development, Program Support, or Mission Management.

Aircraft Inventory. Aircraft inventory includes active, flyable storage, parts, and display aircraft.

Airworthiness. The capability of an aircraft to be operated within a prescribed flight envelope in a safe manner.

Bailed Aircraft. Any aircraft owned by one entity but under the operational control of another entity for an indefinite period under an agreement that may or may not include financial recompense. Thus, aircraft which are loaned to NASA, or which NASA loans to other entities, are bailed aircraft. As defined by 41 CFR Part 102-33, Bailed Aircraft means a Federal aircraft that is owned by one executive agency, but is in the custody of and operated by another executive agency under an agreement that may or may not include cost reimbursement. Bailments are executive agency-to-executive agency agreements and involve only aircraft, not services.

Borrowed Aircraft. As defined by 41 CFR Part 102-33, borrowed aircraft are aircraft owned by a non-executive agency and provided to an executive agency for use without compensation. The executive agency operates and maintains the aircraft.

Center's Chief of Flight Operations. The Center's Chief of Flight Operations is a generic term to indicate that individual who is responsible for overall supervision of all flight operations conducted by that Center, regardless of the specific Center title.

Chartered Aircraft. An aircraft procured under a one-time exclusive agreement that specifies performance and payment. The vendor operates chartered aircraft.

Note: The preceding Inter-Agency Committee on Aircraft Policy's (ICAP) definition does not preclude NASA from specifying what type aircraft they wish to charter nor is a separate agreement required for each flight. As defined by 41 CFR Part 102-33, Chartered aircraft are aircraft that an executive agency hires commercially under a contractual agreement specifying performance and one-time exclusive use. The commercial source operates and maintains charter aircraft.

Civil Aircraft. Aircraft that are other than "public," which include military aircraft. This includes aircraft engaged in carrying persons or property for commercial purposes, such as air carrier, commuter, charter, and leased aircraft, and Government aircraft carrying passengers. (Source: 49 U.S.C. § 40102 (16), (37))

Configuration Control. Conformity to type design is considered attained when the aircraft configuration and the components installed are consistent with drawings, specifications, and other data that are part of the type certificate and would include any supplemental type certificates and field-approved alterations incorporated into the aircraft.

Contracted Aircraft. An aircraft procured for an agency's exclusive use for a specified period of time by means of a formal contract under which the contractor is responsible for the operation,

safety, and maintenance of the aircraft.

Crew Duty Time. The total time a crew is on duty. Crew duty time accrues consecutively and begins when a crew reports to a designated place of duty to begin preparation for a flight and ends when the engines are cut at the end of the flight or series of flights.

Crew Rest. The total time flightcrew members are assigned no official duties to provide for adequate rest. This includes crew transportation prior to participating in flightcrew duties.

Deviation. A documented authorization releasing a program or project from meeting a requirement before the requirement is put under configuration control at the level the requirement will be implemented.

Disposition. Any means of deleting an aircraft from NASA control or from the property-control inventory.

Flight Envelope. Aircraft performance limits or limitations approved by the aircraft manufacturer (DoD, FAA) or established by a formal NASA airworthiness review.

Flight Termination System. A flight termination system (FTS) may be dependent, independent, or self-initiated. A dependent FTS uses its own command and control system to either automatically self-terminate or allow a remote pilot to terminate flight. An independent FTS contains a fully independent transmitter/receiver located onboard the aircraft that is activated remotely typically by a range safety officer. Self-initiated FTSS are typically associated with COTS RC controllers that are activated upon lost link.

Flyable Storage. A "flying hold" aircraft kept in near flyable condition in short-term, temporary storage; waiting for assignment to support a campaign or MD effort, transfer to another NASA Center, or Exchange/Sale consideration.

Functional Check Flight Pilot. A PIC who is adequately trained and authorized by the Center's Chief of Flight Operations to conduct Functional Check Flights of Center aircraft.

Government Aircraft. Any aircraft owned, leased, chartered, or rented and operated by an Executive Agency.

Hazard Analysis. The technique used to systematically identify, evaluate, resolve, and assess hazards.

Instructor Pilot. A qualified PIC who is designated by NASA to perform the functions of an instructor in the aircraft. An IP is qualified to instruct and evaluate other pilots.

Leased Aircraft. An aircraft that the Government has exclusive right (through a financial contract) to use for a specific period of time and for which the procuring agency is responsible for the operation and safety of the aircraft. Maintenance responsibility is defined under the terms of the contract. As defined by 41 CFR Part 102-33, Leased Aircraft are aircraft hired under a commercial contractual agreement in which an executive agency has exclusive use of the aircraft for an agreed-upon period of time. The acquiring executive agency operates and maintains the aircraft.

Loaned Aircraft. An aircraft owned by one entity, but under the operational control of another agency under an agreement that does not include financial recompense. As defined by 41 CFR Part 102-33, "loaned aircraft" are Federal aircraft owned by an executive agency, but in the custody of a non-executive agency under an agreement that does not include compensation.

Maintenance. Scheduled or unscheduled work on an aircraft that is required to attain or to sustain a state of airworthiness and meets all required standards, practices, and guidelines for airworthiness.

Mission Required. Mission management flights where failure to use a NASA aircraft would have a clear, negative impact on a NASA operational mission, prevent timely response to an aircraft or spacecraft accident, or threaten the health and safety of NASA personnel, and only when such travel could not be conducted using commercial airlines, chartered aircraft service, or ground transportation to fulfill that mission need.

Modification. Any alteration, addition, or removal of aircraft structure, components, equipment, computer software, or primary instrumentation.

Model Aircraft. A subscale aircraft built from balsa wood, plywood, foam, or other lightweight materials. The components may include aircraft flight parts and assemblies. This item is not intended for flight.

NASA Aircraft. Aircraft that are bought, borrowed, chartered, rented, or otherwise procured or acquired--including aircraft produced with the aid of NASA funding--regardless of cost, from any source for the purpose of conducting NASA airborne science, research, or other missions, and which are operated by NASA or whose operation is managed by NASA. Unmanned aircraft are defined as "aircraft" by the FAA and are included in the definition of NASA aircraft, unless specified otherwise.

NASA Inter-Center Aircraft Operations Panel. The IAOP is composed of the Chiefs of Flight Operations from Centers that operate aircraft, representatives from HQ AMD, advisors from appropriate Centers, and the OSMA.

NASA Pilot. Pilots who perform piloting duties as a part of their official NASA position description to fulfill NASA contract requirements or in accordance with an interagency agreement, such as a military pilot on loan to NASA.

Non-Flyable Storage. An aircraft at a NASA Center for long-term storage, to be maintained until recalled to active service. These aircraft have a potential to return to flying status. These aircraft are available for parts reclamation, as "aircraft storage bins" for parts, to keep other aircraft flying. The status of these aircraft will be reviewed every five years.

Observer. An individual who is a primary crew member for UAS flight operations. The observer serves as the flight safety monitor to ensure noninterference between the unmanned aircraft and nonparticipating aircraft by means of see and avoid. The observer may perform these duties either on the ground or in a chase aircraft while in direct communication with the controlling pilot. Daisy chain observer operations are limited to 5 NM between the pilot in command and the airborne unmanned aircraft.

Other Official Travel. Passenger transportation that is not classified as Required Use or Mission Required.

Passenger Transportation. Those administrative aircraft certified by the FAA and used primarily for passenger transport.

Pilot Flying. The pilot physically controlling the aircraft by hand-flying it or manipulating the controls through the autopilot.

Pilot in Command (PIC). A NASA pilot who holds the appropriate category, class, and, if appropriate, type rating or military qualification for the aircraft and is qualified in its operation by appropriate Center or mission management directives. The PIC has final authority and responsibility for the operation and safety of the flight.

Pilot-Operator. A pilot-operator (also called Ground Control Operator (GCO) or Internal Pilot) is

an individual who manages the operation of an unmanned aircraft by means of a remote flight control station (also called a ground control station (GCS)). The pilot-operator typically controls the unmanned aircraft autonomously by means of computer interface with an onboard flight management system (fly-by-mouse) through a command and control communications link. The pilot-operator is the designated PIC of the unmanned aircraft (e.g., a Global Hawk pilot).

Pilot Monitoring. The pilot not currently flying the aircraft, but who is monitoring the other pilot's and the aircraft's performance and position.

Primary Aircrew. The required pilot(s), flight engineer, and any other aircrew member so designated by the Center.

Program Support Aircraft. Aircraft used to support programs and operations other than the direct production and acquisition of data.

Public Aircraft. Aircraft used only in the service of a Government or a political subdivision. It does not include Government-owned aircraft engaged in carrying persons or property for commercial purposes. (Source: 49 U.S.C. § 40102 (16), (37))

Qualified Non-Crewmember. An individual other than a member of the crew whose presence is required to perform, or is associated with the performance of, the mission the aircraft is supporting.

Quality Assurance. The act of attaining certainty that maintenance performed on aircraft meets all required airworthiness standards, regulations, practices, and guidelines.

Radio Control Pilot. The RC Pilot (also called Safety Pilot or External Pilot) is an individual who operates an unmanned aircraft by means of a remotely located, manually operated radio-controlled flight management system (direct control by means of stick-to-surface interface). The flight controller is typically commercial off-the-shelf RC hobby equipment. Radio frequencies associated with the command and control function of the system are typically in the unlicensed spectrum suite (72 MHz, 900 MHz, or 2.4 GHz). The RC Pilot is the designated PIC of the unmanned aircraft. An RC Pilot also may perform crewmember duties of a safety (or external) pilot who acts as a failsafe to an unmanned aircraft system that is normally controlled by a pilot-operator. The safety (or external) pilot flight control system is typically commercial off-the-shelf RC hobby equipment that may be either stand alone or be modified to function as a buddy box. In the buddy box configuration, the safety (or external) pilot controls the unmanned aircraft through the GCS communication link protocol. When the safety (or external) pilot is controlling the unmanned aircraft, that person is considered the PIC. All flight operations are within visual line of sight of the controlling pilot.

Remote Pilot. Remote Pilot (also called Remotely Operated Aircraft (ROA) or Remotely Piloted Vehicle (RPV) Pilot) is an individual who operates an unmanned aircraft system by means of manual control in a remotely located GCS. The Remote Pilot typically manages the unmanned aircraft flight path through a command and control communication link using manual stick-and-rudder inputs, a forward-looking video camera feed, and a moving map display system located in the GCS. The Remote Pilot is the designated PIC of the unmanned aircraft (e.g., a Predator pilot).

Required Use. Passenger transportation mission management flights where the use of Government aircraft is required because of bona fide communications or security needs or exceptional scheduling requirements.

Research and Development Aircraft. All aircraft directly related to the production or acquisition of data.

Second in Command. A NASA Pilot who is qualified by NASA to be a SIC of an aircraft by

appropriate Center or passenger transportation mission management directives.

Small Unmanned Aircraft System (sUAS). A model or subscale aircraft designed and built to operate with an onboard flight management system. Small UAS may carry a variety of payloads and operate using either licensed or unlicensed spectrums for command and control. sUAS can be operated via a manual control, manually via an onboard flight management system, or autonomously.

State Aircraft. NASA aircraft being operated as public use in international airspace under diplomatic clearances are considered State Aircraft, per U.S. Department of State guidance.

UAS Flightcrew. The UAS flightcrew can consist of MCs, pilots, observers, or range safety officers assigned to a flight. All individuals report to the assigned MC.

Unmanned Aircraft System (UAS). A UAS is any airborne vehicle system without a pilot onboard that is controlled autonomously by an onboard control and guidance system or is controlled from a monitoring station outside of or remote from the UAS vehicle. A UAS is defined as an aircraft by the FAA. UAS also can be operated via a remotely located, manually operated flight control system or ground control system.

Waiver. A documented authorization releasing a program or project from meeting a requirement after the requirement is put under configuration control at the level the requirement will be implemented.

Appendix B. Acronyms

A&PP	Airframe and Power Plant
ACA	Airspace Coordination Areas
AD	Airworthiness Directives
AMD	Aircraft Management Division
AFSRB	Airworthiness and Flight Safety Review Board
AGL	Above Ground Level
AME	Aviation Medical Examiner
AO	Area of Operations
ARB	Airworthiness Review Board
ARP	Airworthiness Review Process
ASM	Aviation Safety Manager
ASO	Aviation Safety Officer
ATC	Air Traffic Control
ATP	Airline Transport Pilot
BASH	(U.S. Air Force) Bird/Wildlife Aircraft Strike Hazard
BCA	Business Case Analysis
BLOS	Beyond Line of Sight
CAD	Cartridge-Activated Device
CALSTD	Calibration Standard
CAS	Commercial Aviation Services
CCP	Configuration Control Process
CFIT	Controlled Flight into Terrain
CFO	Chief Financial Officer
CFR	Crash Fire Rescue
CONUS	Continental United States
COTR	Contracting Officer Technical Representative
COTS	Commercial Off-the-Shelf
CVR	Cockpit Voice Recorder
DA	Decision Altitude
DoD	Department of Defense
DoT	Department of Transportation

EGPWS	Enhanced Ground Proximity Warning System
EMI	Electromagnetic Interference
EOP	Executive Office of the President
ESD	Electrostatic Discharge
ETA	Estimated Time of Arrival
FAA	Federal Aviation Administration
FAIRS	Federal Aviation Interactive Reporting System
FAR	Federal Aviation Regulations
FBI	Federal Bureau of Investigation
FCF	Functional Check Flight
FCG	Foreign Clearance Guide
FDR	Flight Data Recorder
FECA	Federal Employees' Compensation Act
FMR	Federal Management Regulation
FOD	Foreign Object Damage
FRR	Flight Readiness Review
FSCAP	Flight Safety Critical Aircraft Parts
FTR	Federal Travel Regulation
FTS	Flight Termination System
GCO	Ground Control Operator
GCS	Ground Control Station
GIDEP	Government-Industry Data Exchange Program
GPS	Global Positioning System
GSA	General Services Administration
GSE	Ground Support Equipment
HQ	Headquarters
HN	Host Nation
IAOP	Inter-Center Aircraft Operations Panel
ICAO	International Civil Aviation Organization
ICAP	Inter-Agency Committee on Aircraft Policy
IG	Inspector General
ILS	Instrument Landing System
IMC	Instrument Meteorological Conditions
IP	Instructor Pilot

IRIS	Incident Reporting Information System
JPL	Jet Propulsion Laboratory
KSC	John F. Kennedy Space Center
LOFT	Line Oriented Flight Training
LOS	Line of Sight
LRU	Line Replaceable Unit
MC	Mission Commander
MDA	Minimum Descent Altitude
MEL	Minimum Equipment List
METCAL	Metrology and Calibration
MNPS	Minimum Navigation Performance Specifications
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MRR	Mission Readiness Review
MSL	Mean Sea Level
NAARS	NASA Aircraft Anomaly Reporting System
NALCOMIS	Naval Aviation Logistics Command Management Information System
NAMIS	NASA Aircraft Management Information System
NAS	National Airspace
NASA	National Aeronautics and Space Administration
NAVAIDS	Navigational Aids
NESC	NASA Engineering Safety Center
NEMS	NASA Equipment Management System
NFPA	National Fire Protection Association
NM	NASA Memorandum
NOTAM	Notices to Airmen
NPD	NASA Policy Directive
NODIS	NASA Online Directives Information System
NPR	NASA Procedural Requirements
NTSB	National Transportation Safety Board
OEM	Original Equipment Manufacturer
OPM	Office of Personnel Management
OSHA	Occupation Safety and Health Administration
OMB	Office of Management and Budget

ORR	Operations Readiness Review
OSI	Office of Strategic Infrastructure
OSMA	Office of Safety and Mission Assurance
OTI	One-Time Inspections
PAD	Propellant Actuated Device
PCI	Pavement Condition Index
PCS	Portable Control Station
PDM	Programmed Depot Maintenance
PIC	Pilot in Command
PIP	Product Improvement Publications
PPB	Power Plant Bulletin
PPC	Power Plant Change
PS	Program Support
QAI	Quality Assurance Inspector
R&D	Research and Development
RA	Resolution Advisories
RAC	Risk Assessment Code
RC	Radio Control
RID	Review Item Discrepancy
RNAV	Random Area Navigation
RNP	Required Navigation Performance
ROA	Restricted Operations Areas
ROA	Remotely Operated Aircraft
ROZ	Restricted Operations Zones
RPV	Remotely Piloted Vehicle
RVR	Runway Visual Range
RVSM	Reduced Vertical Separation Minimum
SB	Service Bulletin
SDLM	Scheduled Depot Level Maintenance
SEMO	Supply and Equipment Management Officer
SES	Senior Executive Service
SI	Service Instruction
SIC	Second in Command
SM	Statute Mile

SODA	Statements of Demonstrated Ability
SOP	Standard Operating Procedure
STC	Supplemental Type Certificate
sUAS	Small Unmanned Aircraft System
SUA	Special Use Airspace
SUP	Suspected Unapproved Parts
TAWS	Terrain Awareness and Warning System
TCAS	Traffic Alert and Collision Avoidance System
TCP	Tool Control Program
TCTO	Time Compliant Technical Order
TD	Technical Directive
TDY	Temporary Duty
TO	Technical Order
TOGW	Takeoff Gross Weight
UAS	Unmanned Aircraft System
VMC	Visual Meteorological Conditions
W&B	Weight and Balance

Appendix C. Compliance Matrix

Measurements and Reporting

Req #	Section	Requirement Statement	Responsible Party	Method to Ensure Compliance
1	1.1.2	NASA shall use its aircraft/UAS resources in an effective and efficient manner to conduct and support missions, approved/planned programs, and projects.	AMD/Center Directors	IAOP Review
2	1.1.3	NASA shall maintain the level of airworthiness and aircraft/UAS operating standards that will ensure the safe operation of aircraft/UAS.	Center's Chief of Flight Operations	IAOP Review
3	1.1.3 a	Except for flights operated to carry individual(s) other than crewmember(s) or qualified non-crewmember(s) (QNC) or operated for commercial purposes, NASA and NASA-contracted aircraft shall be operated as public use aircraft in accordance with public law and U.S. Code, regardless of whether the NASA or NASA-contracted aircraft possesses an FAA Airworthiness Certificate (49 U.S. Code Part 40125).	Center's Chief of Flight Operations	Flight Operations Performance Measurements and Reporting
4	1.1.4	NASA aircraft shall be operated in accordance with applicable provisions of the FAA's Federal Aviation Regulations (FAR)-14 CFR-except: a. Where this directive prescribes more stringent requirements. b. Where Center local directives are more stringent than this directive. c. Where deviations from the FAA regulations have been approved by the FAA, a Center airworthiness/flight readiness review board, or NASA policy.	NASA aircraft pilots	IAOP Review
5	1.1.5	For each Center operating aircraft/UAS, procuring, and/or acquiring aircraft/UAS services, the Center Director shall maintain a program-independent Flight Operations Office, the specific purpose of which will be to plan, organize, direct, and control the operations, maintenance, modification, safety, and support of all Center-assigned or -contracted aircraft.	Center Directors	IAOP Review

6	1.1.5.1	The head of this office, the Chief of Flight Operations, is responsible for all Center-assigned, newly acquired, or contracted aircraft. The head of this office shall be the senior line manager who is responsible for aviation activities at the Center.	Center Directors	IAOP Review
7	1.1.5.2	The Center Director shall assign the Chief of the Flight Operations Office the authority and responsibility and provide the resources necessary to manage and conduct safe, effective, and efficient operations in accordance with NASA directives, guidance, and other applicable Federal regulations.	Center Directors	IAOP Review
8	1.1.5.3	Prior to issuing an RFI (Request for Information) or RFP (Request for Proposal) solicitation, or award of a sole source contract, grant, or other aviation service procurement, the Chief of the Flight Operations Office shall review and concur upon any Center contract or agreement that includes aviation operations or aircraft modification	Center's Chief of Flight Operations	IAOP Review
9	1.1.5.4	If a Center does not have a Flight Operations Department, the Center Director shall coordinate with NASA HQ Aircraft Management Division (AMD) to have another Center's Flight Operations Department review and concur on such contracts or agreements for them each time the Center procures aviation services.	Center Directors	IAOP Review
10	1.2.1	The Director, AMD shall assign aircraft to the appropriate Center after consultation with the affected Mission Directorates and Center Directors.	Director AMD	MSD
11	1.2.1.1	Records created throughout flight operations management shall be maintained, managed, and disposed of by each Center's Flight Operations Office or designated office in accordance with NPR 1441.1.	Center's Chief of Flight Operations	IAOP Review
12	1.2.2.1	Mission Directorate Associate Administrators shall coordinate early with the OSI to establish program or project plans involving the requirement for acquisition or use of aircraft, including UAS meeting Agency capitalization threshold defined by NPR 9250.1.	Mission Directorate Associate Administrators	Flight Operations Performance Measurements and Reporting
13	1.2.2.2	Mission Directorate Associate Administrators shall comply with applicable OMB Circulars as they apply to the acquisition of aircraft/UAS and coordinate related documentation requirements with the Assistant Administrator for the OSI.	Mission Directorate Associate Administrators	Flight Operations Performance Measurements and Reporting

14	1.2.2.3	Mission Directorate Associate Administrators shall annually review aircraft mission and program requirements, use, and associated costs, and project those requirements and costs over 5 years in an annual report to the HQ AMD not later than March 31 of each year.	Mission Directorate Associate Administrators	Flight Operations Performance Measurements and Reporting
15	1.2.2.4	Mission Directorate Associate Administrators shall coordinate with the OSI and the Office of the Chief Financial Officer for the submission of all Aviation Business Cases per OMB Circular A-11, Preparation, Submission, and Execution of the Budget, for aircraft and aircraft programs funded by their Directorate.	Mission Directorate Associate Administrators	Flight Operations Performance Measurements and Reporting
16	1.2.3. a	Center Directors shall be responsible for: the airworthiness and flight safety of all Center-assigned aircraft and UAS, including commercial aircraft services (CAS).	Center Directors	IAOP Review
17	1.2.3. b	Center Directors shall be responsible for: coordination with the OSI in establishing program or project plans involving the requirement, assignment, and operation of aircraft/UAS.	Center Directors	IAOP Review
18	1.2.3. c	Center Directors shall be responsible for: annually reviewing aircraft mission and program requirements (for those programs controlled/funded by their respective Center), use, and associated costs and for projecting those requirements and costs over 5 years in an annual report to the AMD not later than March 31 of each year.	Center Directors	IAOP Review
19	1.2.3. d	Center Directors shall be responsible for: Ensuring compliance with the OCFO NPRs in the appropriate use and application of order codes that are used to account for, track, and report aircraft costs.	Center Directors	IAOP Review
20	1.2.3. e	Center Directors shall be responsible for: quarterly reporting of aircraft operations and costs to AMD, as stipulated in Chapter 11, and specific monthly passenger transportation reporting requirements detailed in Chapter 4.	Center Directors	IAOP Review
21	1.2.3. f	Center Directors shall be responsible for: ensuring compliance with 41 CFR Part 102-33, Management of Government Aircraft; 41 CFR Chapter 300, Federal Travel Regulation System-General; 41 CFR Chapter 301, Temporary Duty (TDY) Travel Allowance; and OMB Circular A-126, Improving the Management and Use of Government Aircraft	Center Directors	IAOP Review

22	1.2.3. g	Center Directors shall be responsible for: the budget for personnel and travel in support of the Inter-Center Aircraft Operations Panel (IAOP) semiannual meetings and the IAOP Review Program.	Center Directors	IAOP Review
23	1.2.3 .h	Center Directors shall be responsible for: Approving aircraft charters or leases for periods aggregating 30 days or less per year with 7 days' prior notice to the AMD.	Center Directors	IAOP Review
24	1.2.3. i	Center Directors shall be responsible for: technical assessment, cost evaluation, acquisition, use, and disposition of all aircraft/UAS under their control. This includes disposal of aircraft/UAS used solely in wind tunnels or other nonflyable test models.	Center Directors	IAOP Review
25	1.2.3. j	Center Directors shall be responsible for: coordinating and submitting all aircraft acquisition and disposition proposals to the Director, AMD for approval.	Center Directors	IAOP Review
26	1.2.3. k	Center Directors shall be responsible for: reporting all acquisition and disposal actions to the AMD to comply with Federal aircraft data reporting requirements.	Center Directors	IAOP Review
27	1.2.3. l	Center Directors shall be responsible for: ensuring that Center managers who acquire aircraft/UAS or commercial aviation services coordinate those acquisitions with the Center's Chief of Flight Operation Office to ensure compliance with the NASA Aviation Safety Program and aircraft management policies.	Center Directors	IAOP Review
28	1.2.4. a	Program/Project Managers shall: coordinate early with the Center Chief of Flight Operations expected to conduct the effort to establish program or project plans involving the requirement for acquisition or use of aircraft, including UAS.	Program/Project Managers	Flight Operations Performance Measurements and Reporting
29	1.2.4. b	Program/Project Managers shall: support the Mission Directorate or Center Director in the preparation of a Business Case Analysis (BCA) in accordance with OMB Circular A-11, as required.	Program/Project Managers	Flight Operations Performance Measurements and Reporting
30	1.2.4. c	Program/Project Managers shall: support the Mission Directorate and Center Directors in the annual review of aircraft mission and program requirements, use, and associated cost and project those requirements and costs over 5 years to support their annual report to the AMD, not later than March 31 of each year	Program/Project Managers	Flight Operations Performance Measurements and Reporting

31	1.2.5.1	<p>The Center's Chief of Flight Operations shall hold the following qualifications for assignment to this position:</p> <p>a. A minimum of 10 years of relevant aviation-related experience, of which a minimum of 3 years will be supervisory or managerial experience in aircraft operations similar to the primary aircraft type operated at the Center and a high level of familiarity with the organization's aircraft operations.</p> <p>b. Current or previously held qualifications as a NASA Pilot in Command (PIC), a military rating as an Aircraft Commander, or a FAA Airline Transport Pilot (ATP) certificate.</p>	Center's Chief of Flight Operations	IAOP Review
32	1.2.5.3 a	The Center's Chief of Flight Operations shall ensure the effective management of flight operations under that Center's cognizance, per NPD 7900.4.	Center's Chief of Flight Operations	IAOP Review
33	1.2.5.3 b	The Center's Chief of Flight Operations shall implement a process to ensure all CAS operations are appropriately approved.	Center's Chief of Flight Operations	IAOP Review
34	1.2.5.3 c	The Center's Chief of Flight Operations shall authorize personnel to operate and maintain aircraft under NASA's control. The Center Flight Operations Office has the final operational flight release authority for any NASA aircraft operating from or under the cognizance of that Center.	Center's Chief of Flight Operations	IAOP Review
35	1.2.5.3 d	The Center's Chief of Flight Operations shall determine the number of aircraft types in which an individual crewmember may maintain qualification at any given time and annually review that determination.	Center's Chief of Flight Operations	IAOP Review
36	1.2.5.3 e	The Center's Chief of Flight Operations shall recommend assignment of the Center Aviation Safety Officer (ASO), with the concurrence of the Center, Safety and Mission Assurance Director, to the Center Director for approval.	Center's Chief of Flight Operations	IAOP Review
37	1.2.5.3 f	The Center's Chief of Flight Operations shall fly as a crewmember or observer on all assigned aircraft, where practicable, and as necessary, to observe performance of assigned flightcrews.	Center's Chief of Flight Operations	IAOP Review
38	1.2.6.1	The ASO shall manage the Center's Aviation Safety Program as described in Chapter 6.	Aviation Safety Officer	IAOP Review

39	1.2.6.2	The ASO shall be a civil servant assigned to the Flight Operations Office, serve as the Center's focal point for aviation safety, and act on behalf of the Center Director when discharging this responsibility.	Aviation Safety Officer	IAOP Review
40	1.2.6.3	Managers may use the advice of the ASO in formulating decisions, but shall not expect or rely on the ASO to make managerial decisions.	Center's Chief of Flight Operations / Chief Pilot	IAOP Review
41	1.2.7.1	To qualify for assignment, the Chief Pilot shall: a. Hold and maintain qualification as a NASA PIC. b. Have at least 3 years' experience within the past 6 years as PIC of an aircraft similar in category and class to at least one of the aircraft used in the types of operations being conducted at the Center. c. Demonstrate satisfactory supervisory and managerial capabilities.	Chief Pilot	IAOP Review
42	1.2.8	The Chief of Maintenance shall be a civil servant assigned to the Flight Operations Office and serve as the Chief of Flight Operations' focal point for all aircraft maintenance activities.	Center Directors	IAOP Review
43	1.2.8.1	To qualify for assignment, the Chief of Maintenance shall: a. Have had at least 3 years of experience within the past 6 years in aircraft maintenance in a similar-size operation maintaining aircraft similar to those used by the Center, with management experience such as supervisor or lead in aircraft maintenance. b. Have held an FAA Airframe and Power Plant (A&P) Certification, have held an equivalent military designation, or demonstrate an equivalent level of qualifications and expertise.	Chief of Maintenance	IAOP Review
44	1.2.9	The Chief of Quality Assurance or Quality Inspection shall be a civil servant assigned to the Flight Operations Office and serve as the Chief of Flight Operations' focal point for all aircraft quality assurance activities.	Center Directors	IAOP Review
45	1.2.9.1	To qualify for assignment, the Chief of Quality Assurance or Quality Inspection shall: a. Hold a current FAA Inspection Authorization Certificate, have held an equivalent military designation, or demonstrate an equivalent level of qualifications and expertise. b. Maintain a level of inspection expertise and activity needed to meet FAA Inspection Authorization Certificate renewal requirements or	Chief of Quality Assurance	IAOP Review

		<p>c. Have had at least 3 years of maintenance experience within the last 6 years, 1 year of which shall have been as a maintenance inspector.</p> <p>d. Have at least 1 year of experience in a supervisory capacity.</p>		
46	1.2.10 a	The IAOP shall advise the Assistant Administrator for the OSI regarding operational, management, and safety policies for NASA aircraft.	IAOP	Flight Operations Performance Measurements and Reporting
47	1.2.10 b	The IAOP shall conduct periodic meetings with the HQ AMD to review policies and procedures related to aircraft/UAS operational matters affecting all Centers and to make recommendations to the AMD regarding policies, procedures, and guidelines that may be applicable to all Centers.	IAOP	Flight Operations Performance Measurements and Reporting
48	1.2.10 c	The IAOP shall conduct reviews of a special nature at the request of the Assistant Administrator for the OSI and support the conduct of periodic reviews of all aspects of flight operations at NASA Centers, including compliance with applicable Federal regulations and Headquarters and Center policies and procedures.	IAOP	Flight Operations Performance Measurements and Reporting
49	1.2.12 a	The Director of AMD shall coordinate the formulation of Agency-wide policies, procedures, and guidelines concerning aircraft/UAS operation and ensure their effective and efficient communication to Centers and appropriate Headquarters offices.	Director AMD	Flight Operations Performance Measurements and Reporting
50	1.2.12 b	The Director of AMD shall advise and assist the Assistant Administrator for the OSI, the Mission Directorates, and the Center Directors concerning the acquisition and disposition process.	Director AMD	Flight Operations Performance Measurements and Reporting
51	1.2.12 c	The Director of AMD shall advise the Assistant Administrator for the OSI regarding the establishment of policy for the use of NASA aircraft and UAS.	Director AMD	Flight Operations Performance Measurements and Reporting
52	1.2.12 d	The Director of AMD shall coordinate the findings and recommendations of IAOP reviews dealing with institutional management issues with the appropriate institutional Associate Administrator.	Director AMD	Flight Operations Performance Measurements and Reporting

53	1.2.12 e	The Director of AMD shall maintain liaison with other Government agencies and the private sector on matters pertaining to flight operations, maintenance, airworthiness, and aviation management practices common to all Centers.	Director AMD	Flight Operations Performance Measurements and Reporting
54	1.2.12 f	The Director of AMD shall provide coordination and other assistance in the assignment of IAOP teams as they review and evaluate the adequacy of Center organizations, facilities, and procedures for flight operations.	Director AMD	Flight Operations Performance Measurements and Reporting
55	1.2.12 g	The Director of AMD shall collect, collate, and report Agency aircraft data (e.g., Federal Aviation Interactive Reporting System (FAIRS) data) to GSA or other Federal agencies as required.	Director AMD	Flight Operations Performance Measurements and Reporting
56	1.2.12 h	The Director of AMD shall be responsible for the functional leadership, staff support to the Administrator, and central services as they relate to aircraft management and is the Agency's Aircraft Capability Leader and the Senior Aviation Management Official (SAMO) as required by Federal Management Regulation (FMR) 102-33.30.	Director AMD	Flight Operations Performance Measurements and Reporting
57	1.2.13	The Chief, Office of Safety and Mission Assurance shall provide leadership, policy direction, functional oversight, assessment, standards, and coordination for safety and mission assurance affecting NASA's aviation operations.	Chief, Safety and Mission Assurance	Flight Operations Performance Measurements and Reporting
58	1.5.1	Each NASA aircraft shall be operated in accordance with an aircraft manual providing standard operating procedures.	Center's Chief of Flight Operations	IAOP Review
59	1.5.1 a	For manned aircraft, these manuals (or checklists) shall be available electronically or carried onboard all NASA aircraft.	Center's Chief of Flight Operations	IAOP Review
60	1.5.1 b	For unmanned aircraft, manuals shall be immediately accessible to the pilots.	Center's Chief of Flight Operations	IAOP Review
61	1.5.2	All NASA Flight Operations flight planning libraries shall have available the necessary Flight Information Publications for U.S. and international operations.	Center's Chief of Flight Operations	IAOP Review
62	1.5.3	Each Center shall have a program for their aircrews to maintain a level of proficiency that will ensure their ability to safely operate an aircraft within governing regulations to include abnormal and emergency situations.	Center's Chief of Flight Operations	IAOP Review

63	1.5.4	Each Center shall establish and maintain a training program using check flights to assess its adequacy and ensure that personnel are competent to perform their assigned duties.	Center's Chief of Flight Operations	IAOP Review
64	1.6.1	When deviations from this NPR are necessary, Center Directors or Associate Administrators shall submit requests for waivers to the Assistant Administrator for the OSI via HQ AMD.	NASA officials who request waivers	IAOP Review
65	1.6.1.1	Prior written approval from the Assistant Administrator for the OSI shall be obtained before implementing procedures that are less restrictive than those contained in this NPR.	NASA officials who request waivers	IAOP Review
66	1.6.4	The waiver approval authority shall approve waivers only for a specific event, period, or duration and specify the boundaries of the requirements being waived.	NASA officials who request waivers	IAOP Review
67	1.6.5	The waiver approval authority shall review all who have current waivers against this NPR when the NPR is updated and request verification of continued validity.	NASA officials who request waivers	IAOP Review
68	1.6.6	NASA officials who request waivers shall document the following in the request for waiver: a. Identification of the directive and specific requirement(s) for which the waiver is requested. b. Scope (e.g., site, facility, operation, or activity) and duration of the waiver request. c. Justification for the waiver, including: (1) Purpose/rationale for requesting the waiver. (2) Whether application of the requirement in the particular circumstances would conflict with another requirement. (3) Whether application of the requirement in the particular circumstances would not achieve, or is not necessary to achieve, the underlying purpose of the requirement. (4) Any other pertinent data or information related to the waiver request (e.g., cost or schedule considerations). (5) Identification and justification of the acceptance of any additional risk that will be incurred if the waiver is granted. (6) A description of any special circumstances that warrant granting the waiver, including whether: (a) Application of the requirement in the particular circumstances would not be justified by any safety and health reason. (b) The waiver would result in a health and safety improvement that compensates for any detriment	NASA officials who request waivers	IAOP Review

		<p>that would result from granting the waiver.</p> <p>(c) There exists any other material circumstances that were not considered when the requirement was adopted, for which it is in the public interest to grant a waiver.</p> <p>(7) A description of any alternative or mitigating action that will be taken to ensure adequate safety and health and protection of the public, the workers, and the environment for the effective period of the waiver.</p>		
69	2.2.1	Airworthiness reviews shall be conducted for all aircraft modifications.	Center Directors	IAOP Review
70	2.2.2	Each Center shall clearly identify the appropriate airworthiness review process for experimental, research, and operational configurations and nonstandard ground or flight operations for all aircraft contracted or operated by the Center.	Center Directors	IAOP Review
71	2.2.3	In addition to being certified as airworthy through a Center airworthiness process, all NASA aircraft shall be cleared through separate flight readiness reviews as described in section 3.17.	Center Directors	IAOP Review
72	2.2.4	Centers and Component Facilities that do not have an aircraft operations department and desire to conduct NASA-conducted or NASA-sponsored operations (aircraft/UAS/CAS) shall coordinate with AMD and the IAOP for support from another NASA Center aircraft operations department with a standard airworthiness review process.	Center Directors	IAOP Review
73	2.3.1	NASA aircraft shall be operated in an airworthy condition as certified by a formal NASA Center airworthiness review process, under the authority of a NASA Center Director, in accordance with Federal public use aircraft laws and regulations.	Center Directors	IAOP Review
74	2.3.1.1	All NASA-owned aircraft performing a public use operation shall possess and maintain a NASA Certificate of Airworthiness (Appendix G) approved by the Center Director. This includes loaned and bailed aircraft to NASA.	Center Directors	IAOP Review
75	2.3.1.2	All NASA commercial aircraft services (CAS) aircraft shall possess and maintain a NASA Statement of Airworthiness (Appendix G) or Certificate of Airworthiness, approved by the Center Director in accordance with Chapter 10.	Center Directors	IAOP Review
76	2.3.1.3	For all CAS aircraft, the statement shall define the duration of applicability, as well as any limitations to that statement.	Center Directors	IAOP Review

77	2.3.1.3 a	If a CAS aircraft is altered outside of its FAA type certificate or not maintained under an FAA-accepted maintenance program during its operations for NASA, the NASA contract shall require the responsibility of the CAS owner to conduct a conformity inspection, which is required to ensure the aircraft meets all civil regulations, prior to operating that aircraft as a civil aircraft.	Center Contracting Officer	IAOP Review
78	2.3.1.4	All NASA-owned aircraft used for passenger transportation purposes shall operate in Civil Aircraft status and possess a Standard FAA Certificate of Airworthiness.	Center Directors	IAOP Review
79	2.3.1.4 a	If CAS aircraft are operated for NASA under a FAA Operating Certificate for passenger or cargo transportation, the aircraft shall be operated within the limitations imposed by the FAA Operating Certificate (with the exception of scheduled airline passenger transportation).	Center Directors	IAOP Review
80	2.3.1.4 b	Aircraft that have been modified from the FAA-approved configuration shall not be used for passenger transportation purposes.	Center Directors	IAOP Review
81	2.3.1.5	When NASA aircraft are transferred between Centers, a new NASA Certificate of Airworthiness approved by the receiving Center Director shall be obtained prior to commencing flight.	Center Directors	IAOP Review
82	2.3.1.6	If aircraft are used for a multi-Center mission, roles and responsibilities for airworthiness mission operational control, and mishap response shall be established in writing.	Center Directors	IAOP Review
83	2.3.1.7	If an aircraft is registered internationally and the operations are being conducted internationally, whether modified or flown in a certified condition, an airworthiness and on site flight readiness and safety review shall be conducted. Exception: An on-site review is not required for passenger operations if the aircraft is not modified and is being operated in compliance with recognized International Civil Aviation Organization (ICAO) scheduled passenger standards.	Center Directors	IAOP Review
84	2.3.1.8	All NASA UAS, whether NASA-owned, -sponsored, or -contracted, shall receive an airworthiness review per this chapter.	Center Directors	IAOP Review
85	2.3.1.9	For all NASA aircraft bailed or loaned outside of NASA, the aircraft Certificate of Airworthiness shall be removed and suspended.	Center Directors	IAOP Review

86	2.4.2	Aircraft Management Division (AMD) shall establish airworthiness policy and requirements and provide support and oversight of airworthiness process.	HQ AMD	IAOP Review
87	2.4.3	Center Directors shall establish airworthiness and configuration control review processes and procedures for overall engineering oversight to identify and review engineering analysis and limitations, to manage hazards and risks associated with flight programs, to ensure safe flight operations, to manage and thoroughly document aircraft configurations, and to ensure that flight objectives satisfy programmatic requirements.	Center Directors	IAOP Review
88	2.4.3.1	Center Directors shall ensure that these review processes and procedures are incorporated into the contracts of those who operate, maintain, and provide support for NASA aircraft as well as contracted aircraft used for NASA missions, with the exception of scheduled airline passenger transportation.	Center Directors	IAOP Review
89	2.4.3.2	Center Directors shall establish configuration control procedures to ensure that the configuration of each NASA aircraft is fully documented and reviewed.	Center Directors	IAOP Review
90	2.4.3.3	Center Directors shall establish a minimum equipment list (MEL) for all non-test-related equipment for all aircraft operations. Waivers to a MEL may be granted by the Chief of Flight Operations but may not be delegated to a lower office/position.	Center Directors	IAOP Review
91	2.4.3.5	The Center Engineering Technical Authority shall ensure all engineering documentation, reports, and analysis for aircraft airworthiness complies with this NPR, is readily accessible, is archived for the life of the aircraft while owned or operated by NASA and is properly reviewed based on sound engineering rationale through design reviews, which are scalable based on scope and magnitude of the engineering effort.	Center Engineering Technical Authority	
92	2.4.4	Program/Project Managers shall ensure Airworthiness Review Board and Center Engineering Technical Authority are made aware of missions and operations requiring airworthiness review early in the development phase of the Program/Project and provide all requisite documentation, analysis, resources, and presentations to support the review processes.	Program/Project Managers	IAOP Review

93	2.5.1.1	The Airworthiness Review Board (ARB) Chair shall be independent of flight operations and Project Management and the assignment documented in writing.	Center Directors	IAOP Review
94	2.5.1.2	All reviews shall include, at a minimum, representatives from safety, flight operations, and engineering and documentation for what constitutes a quorum for the ARB.	Center Directors	IAOP Review
95	2.5.1.3	The flight operations representative shall be a pilot who is either a qualified ASO or Test Pilot who is a graduate of a formal Test Pilot School.	Center Directors	IAOP Review
96	2.5.2	Any cockpit or cabin modifications that might interfere with aircrew egress shall be reviewed by a subpanel, including aircrew and life-support personnel.	Center Directors	IAOP Review
97	2.6.1	All aircraft conducting NASA or NASA-sponsored operations shall be evaluated and approved by a NASA Center Airworthiness Board.	Center Directors	IAOP Review
98	2.6.1.1	Test-related equipment will be handled through the flight test planning process. If test equipment remains on the aircraft for non-test-related missions, then such equipment shall be addressed in the aircraft documentation.	Center Directors	IAOP Review
99	2.6.2	The [Center ARB] review shall include the engineering rationale, substantiation documentation, and risk mitigations in an ARB package.	Center Directors	IAOP Review
100	2.6.4	The airworthiness process shall be continual throughout the course of a project.	Center Directors	IAOP Review
101	2.6.5	All aircraft modifications and/or configuration changes that require ARB approval shall go through an appropriate level of design reviews.	Center Directors	IAOP Review
102	2.6.5 a	Design review documentation shall be presented to the Center Engineering Technical Authority for review and approval and can be in conjunction with NPR 7120.5/NPR 7120.8 reviews if coordinated by the Program/Project Manager.	Chair of the Airworthiness Review Board	IAOP Review
103	2.6.5 b	Results of the [design] review shall be documented and action items or Review Item Discrepancies (RIDs) tracked using a closed-loop system.	Center Directors	IAOP Review
104	2.6.5 c	Design review results and action item status shall be presented to the Airworthiness Review Board during approval request.	Center Directors	IAOP Review

105	2.6.6	Prior to award of any CAS contract or other written agreement, the flight operations office at the NASA Center that manages the contract shall follow the requirements in Chapter 10.	Center Directors	IAOP Review
106	2.6.6 a	The [flight operations office] review shall be conducted in the initial planning stage and results of this review incorporated into the contractor selection process.	Center Directors	IAOP Review
107	2.6.6 b	If the contract is expected to provide long-term, continuous support (greater than 1 year), the aviation program shall be subject to the IAOP review process.	Center Directors	IAOP Review
108	2.7.1	Airworthiness request and approval requirements shall be documented in Center-level procedures.	Center Directors	IAOP Review
109	2.7.1 b	The results of tests conducted to verify the engineering analyses also shall be considered.	Center Directors	IAOP Review
110	2.7.1 c	Actions to be taken in the event of in-flight malfunctions or emergency conditions associated with the aircraft modifications or nonstandard operations also shall be described.	Center Directors	IAOP Review
111	2.7.2	Each Center shall establish the content of the Airworthiness Review package based on the aircraft mission, complexity of the modifications, and the inherent hazards associated with the operation.	Center Directors	IAOP Review
112	2.7.3	Requirements for design, documentation, and workmanship shall be established and meet or exceed standard aerospace industry practices for flight hardware if there are no NASA engineering standards in place for the following requirements: a. Engineering substantiation documentation and drawings. b. Material conformity for materials used in primary and secondary structures whose failure could result in loss of or damage to the aircraft or injury to or loss of personnel based on experience gained through past or current testing. c. Electrical design requirements to include electromagnetic interference. d. Avionics requirements, including a review of all system vulnerabilities. e. Structural load and stability requirements.	Center Directors	IAOP Review

113	2.7.4	Hazard Analysis shall be provided, identifying real or potential conditions that could cause injury, illness, or death to the personnel; damage to or loss of a system, equipment, or property; or damage to the environment.	Center Directors	IAOP Review
14	2.7.4.2	The following supporting documentation shall be included in the Airworthiness Review: a. All design review documentation, results, RIDs/action items and associated status. b. Weight and balance. c. Traceability to closed work packages associated with modification. d. Status of any review or audit findings affecting the modification or flight. If applicable, include any mitigations put in place to address issues. e. Minimum equipment list (MEL). f. Associated waivers and deviations. g. Product verification results. h. QA results and issues. i. Maintenance results and issues.	Center Directors	IAOP Review
115	2.7.5	Airworthiness approval is based on the results of Center-approved engineering and safety analyses. The final approval shall contain a description of the configuration of the aircraft, operating instructions and procedures, operating limitations and restrictions, and specific maneuvers or operations for which the aircraft is cleared.	Center Directors	IAOP Review
116	2.7.5.1	A NASA Certificate of Airworthiness (Appendix F) or Statement of Airworthiness shall be issued prior to flight.	Center Directors	IAOP Review
117	2.8.1	All maintenance and inspections shall be performed in accordance with this chapter and the applicable manufacturer and military manuals as appropriate.	Center Directors	IAOP Review
118	2.8.2	Any deviations from the procedures in the maintenance program shall conform to an airworthiness review and be substantiated by a risk analysis.	Center Directors	IAOP Review
119	2.8.3	NASA aircraft shall be maintained in accordance with an established and documented Center maintenance program, using standards of quality in workmanship, materials, and support equipment that will ensure airworthiness of aircraft for safety of flight.	Center's Chief of Flight Operations	IAOP Review

120	2.8.3.1	All NASA aircraft shall be maintained in a condition for safe operation and meet their respective type designs or properly altered condition.	Center's Chief of Flight Operations	IAOP Review
121	2.8.3.2	A maintenance program shall meet FAA regulations for any passenger-seating capacity for an aircraft that is used for passenger transportation.	Center's Chief of Flight Operations	IAOP Review
122	2.8.4.1	Center Flight Operations shall maintain continuous onsite oversight of vendors and facilities performing aircraft depot-level maintenance or major aircraft modifications to ensure quality of workmanship, adherence to NASA standards, schedule, and cost control.	Center's Chief of Flight Operations	IAOP Review
123	2.8.4.2	This oversight function shall be performed only by NASA employees or contractors that are independent of the vendor facility to reduce any conflict of interest and incorporate the requirement of NPR 8735.2.	Center's Chief of Flight Operations	IAOP Review
124	2.8.4.3	Individuals assigned onsite contractor's facility responsibilities shall have expertise and experience in aircraft maintenance and airworthiness standards and requirements.	Center's Chief of Flight Operations	IAOP Review
125	2.8.4.4 a	For maintenance performed external to NASA facilities, the Chief of Maintenance shall ensure that the person(s) performing the maintenance, preventive maintenance, or alteration is properly certificated and qualified to perform the assigned function.	Center's Chief of Maintenance	IAOP Review
126	2.8.4.4 b	For maintenance performed external to NASA facilities, the Chief of Maintenance shall ensure that the work performed is done in accordance with the NASA-approved continuous airworthiness maintenance program or Federal Aviation Regulations (FAR).	Center's Chief of Maintenance	IAOP Review
127	2.8.4.4 c	For maintenance performed external to NASA facilities, the Chief of Maintenance shall ensure that a record is made in NAMIS or the aircraft log book, where applicable, of the description of work performed, the date, certificate number, and type of certificate held by the person performing the work. Maintenance and inspection records will, at a minimum, contain a complete description of the maintenance/repair/inspection accomplished and will include technical manual and paragraph information references.	Center's Chief of Maintenance	IAOP Review

128	2.8.5 f	For maintenance conducted by any contractor, NPR 8735.2 provides the requirements for selection and assignment of Government Mandatory Inspection Points (GMIPs) and lists the sources of information that shall be evaluated during the GMIP definition process.	Center's Chief of Maintenance	IAOP Review
129	2.8.6	Each Center shall develop written maintenance procedures and practices in a Center's maintenance manual that supports the aircraft-specific (manufacturer, NASA, or DoD) maintenance programs and ensures that information and technical data appropriate to the work performed are used.	Center's Chief of Maintenance	IAOP Review
130	2.8.6.1	While this maintenance program may be completed by contractor maintenance, the contractor is required to follow the Center maintenance manual whose accuracy and currency shall be the responsibility of the Chief of Maintenance.	Center's Chief of Maintenance	IAOP Review
131	2.8.6.2	Maintenance procedures shall ensure that no person or organization performs maintenance on NASA aircraft unless the person is an authorized employee of NASA or has been authorized to perform the work under the terms of a written maintenance agreement or other form of authorization specified in the Center's operations manual or maintenance manual.	Center's Chief of Maintenance	IAOP Review
132	2.8.6.3	The maintenance manual also shall address how the flightcrew will obtain maintenance services when away from the Center.	Center's Chief of Maintenance	IAOP Review
133	2.8.6.4 a	At a minimum, the Center's maintenance manual shall include a description of how aircraft records and associated documentation for assigned aircraft and components are maintained.	Center's Chief of Maintenance	IAOP Review
134	2.8.6.4 a (1)	Aircraft records and documentation shall be maintained electronically in NAMIS.	Center Directors	IAOP Review
135	2.8.6.4 a (3)	NAMIS electronic records and documentation shall be promptly updated and used as the primary source of aircraft documentation.	Center Directors	IAOP Review
136	2.8.6.4 b	Persons signing entries on serviceable parts tags and all documentation in NAMIS for work performed on aircraft, systems, and components shall: (1) Be authorized in accordance with NASA requirements and applicable FARs and have satisfactorily completed maintenance training or	Center's Chief of Maintenance	IAOP Review

		<p>possess the equivalent current experience on the applicable type appliance, aircraft, engine, or propeller. The equivalent experience will be documented on the individual's training record, which is filed in the maintenance organization.</p> <p>(2) Understand and have knowledge of FARs and the applicable types of maintenance or overhaul manuals and follow the applicable procedures set forth in this manual.</p> <p>(3) Meet Center-defined certification processes.</p>		
137	2.8.6.4 c	At a minimum, the Center's maintenance manual shall include a documented aircraft release procedure that ensures that all maintenance release authorities are designated in writing and that ensures a maintenance release authorization been completed following maintenance.	Center's Chief of Maintenance	IAOP Review
138	2.8.6.4 c (1)	Additionally, there shall be a documented aircraft release process for aircraft that are deployed from the Center.	Center's Chief of Maintenance	IAOP Review
139	2.8.6.4 d	At a minimum, the Center's maintenance manual shall include the process to ensure that persons with maintenance release authority have at least 6 months' experience during the preceding 24 months in the inspection, servicing, or maintenance of an aircraft or system or maintenance control duty in accordance with Center maintenance procedures.	Center's Chief of Maintenance	IAOP Review
140	2.8.6.4 e	At a minimum, the Center's maintenance manual shall include written ground handling procedures that may be accomplished only by qualified ground handling personnel to perform fire guard, application of external electrical power, towing, engine run, and taxi operations that document aircraft-specific training and designate those qualified in writing.	Center's Chief of Maintenance	IAOP Review
141	2.8.6.4 f	At a minimum, the Center's maintenance manual shall include a documented Metrology and Calibration (METCAL) program that establishes policy, responsibilities, and requirements to ensure that calibrated and tested tools/special equipment performance is compared to referenced calibration standards (CALSTDs) of known and sufficiently greater accuracy.	Center's Chief of Maintenance	IAOP Review

142	2.8.6.4 g	At a minimum, the Center's maintenance manual shall include a documented foreign object damage (FOD) control program that addresses the periodicity and inspection criteria and effectively reduces the risk of FOD both during maintenance and flight operations.	Center's Chief of Maintenance	IAOP Review
143	2.8.6.4 g (1)	All flight operations personnel and employees shall be constantly on lookout for material that could be ingested into engines, struck by propeller blades, and/or blown by the exhaust of engines or propellers, causing injury to personnel or damage to aircraft.	Center's Chief of Maintenance	IAOP Review
144	2.8.6.4 g (2)	Maintenance personnel shall be assigned to perform a general inspection of hangar and ramp areas for FOD on a weekly basis, at a minimum.	Center's Chief of Maintenance	IAOP Review
145	2.8.6.4 h	At a minimum, the Center's maintenance manual shall include a documented tool control program (TCP) that ensures the accuracy of tool inventories at specific intervals, contains a lost tool process, and prohibits aircraft from flying until all tools used on an aircraft have been accounted for.	Center's Chief of Maintenance	IAOP Review
146	2.8.6.4 h (1)	The TCP shall apply to all commercial and Government activities performing contract maintenance, production, or other support functions on NASA aircraft.	Center's Chief of Maintenance	IAOP Review
147	2.8.6.4 h (2)	The TCP shall provide instant inventory capability.	Center's Chief of Maintenance	IAOP Review
148	2.8.6.4 i	At a minimum, the Center's maintenance manual shall include a documented process to ensure that all GSE used on aircraft are safe and operable.	Center's Chief of Maintenance	IAOP Review
149	2.8.6.4 i (1)	GSE shall be maintained per written requirements that document how to identify and remove equipment that is unserviceable.	Center's Chief of Maintenance	IAOP Review
150	2.8.6.4 i (3)	GSE shall be maintained and documented under an aviation maintenance system or other NASA-approved system.	Center's Chief of Maintenance	IAOP Review
151	2.8.6.4 j	At a minimum, the Center's maintenance manual shall include maintenance procedures and technical standards for Aviation Survival Equipment (including life support and ejection seats) for the equipment being flown that are an integrated function of aircraft maintenance.	Center's Chief of Maintenance	IAOP Review

152	2.8.6.4 j (1)	If the Center maintains explosive devices (propellant actuated devices (PADs)/cartridge-actuated devices (CADs)), the Center maintenance manual shall document the program for personnel training and qualifications.	Center's Chief of Maintenance	IAOP Review
153	2.8.6.4 j (2)	All tools shall be accounted for after the repack and inspection of each item (for example, parachutes and floatation equipment, since these items cannot be functionally checked prior to use).	Center's Chief of Maintenance	IAOP Review
154	2.8.6.4 k	At a minimum, the Center's maintenance manual shall include a documented confined space program that defines all aircraft confined spaces and ensures safety in these spaces prior to entry per NPR 8715.3.	Center's Chief of Maintenance	IAOP Review
155	2.8.6.4 l	At a minimum, the Center's maintenance manual shall include a documented program that ensures that aircraft maintenance complies with Center Electromagnetic Interference (EMI)/Electrostatic Discharge (ESD) programs.	Center's Chief of Maintenance	IAOP Review
156	2.8.6.4 m	At a minimum, the Center's maintenance manual shall include a Fuel Surveillance Program that ensures that fuel is free of contaminants prior to fuel entering any Center aircraft.	Center's Chief of Maintenance	IAOP Review
157	2.8.6.4 n	At a minimum, the Center's maintenance manual shall include a documented program that ensures aircraft maintenance is conducted in compliance with the Center Hazardous Material Program and the Protection of the Environment Act, 40 CFR Part 260, Part 261, Part 262, Part 263, Part 264, and Part 265.	Center's Chief of Maintenance	IAOP Review
158	2.8.6.4 n (1)	The program shall include use, disposal, and both long-term and worksite storage of hazardous materials.	Center's Chief of Maintenance	IAOP Review
159	2.8.6.4 n (2)	All chemicals, paints, and oils shall be stored in approved chemical lockers at the end of each shift.	Center's Chief of Maintenance	IAOP Review
160	2.8.6.4 o	At a minimum, the Center's maintenance manual shall include an oil analysis program, per original equipment manufacturer (OEM) and/or DoD maintenance instructions, to identify mechanical breakdown precursors that exist prior to catastrophic failure.	Center's Chief of Maintenance	IAOP Review
161	2.8.6.4 o (1)	The program shall be specific to the type of engine installed and provide trend analysis, immediate feedback, and recommended actions to the Center's Chief of Maintenance.	Center's Chief of Maintenance	IAOP Review

162	2.8.6.4 p	At a minimum, the Center's maintenance manual shall include a documented Weight and Balance (W&B) Program for each aircraft in compliance with any existing Center program, to include the procedure used to ensure that the W&B of an aircraft is maintained, current, and properly documented.	Center's Chief of Maintenance	IAOP Review
163	2.8.6.4 q	At a minimum, the Center's maintenance manual shall include a configuration control process (CCP) established to determine applicability and ensure compliance with Product Improvement Publications (PIP), which are defined as airworthiness directives, technical orders, service and safety bulletins, or other pertinent requirements, including those from FAA, DoD, or OEMs.	Center's Chief of Maintenance	IAOP Review
164	2.8.6.4 q (2)	The CCP shall provide a complete audit trail of decisions and design modifications.	Center's Chief of Maintenance	IAOP Review
165	2.8.6.4 r	At a minimum, the Center's maintenance manual shall include an Aviation Material Management process to ensure that aircraft and aircraft parts are qualified for flight and properly documented per Center procedures.	Center's Chief of Maintenance	IAOP Review
166	2.8.6.4 s	At a minimum, the Center's maintenance manual shall include general housekeeping procedures to ensure that aviation facilities are maintained by NASA standards for hangars, shops, and ramps.	Center's Chief of Maintenance	IAOP Review
167	2.8.6.4 s (1)	Housekeeping procedures shall ensure all electrical equipment connections are at least 18 in. above the hangar floor when aircraft are in a hangar with fuel onboard.	Center's Chief of Maintenance	IAOP Review
168	2.8.6.4 s (2)	Housekeeping procedures shall ensure no cell phone usage is allowed within 5 feet of any fuel vent and aircraft engines.	Center's Chief of Maintenance	IAOP Review
169	2.8.6.4 s (3)	Housekeeping procedures shall ensure, to maintain situational awareness, electronic devices with ear buds or headphones are not allowed while working on/near aircraft on the flight line or in hangars.	Center's Chief of Maintenance	IAOP Review
170	2.8.6.4 s (3) (a)	Supervisors shall make a concerted effort to ensure that all maintenance personnel maintain a reasonable situational awareness during maintenance conduct.	Center's Chief of Maintenance	IAOP Review

171	2.8.6.4 t	At a minimum, the Center's maintenance manual shall include a documented aircraft component inspection program to determine the serviceability, authenticity, traceability, and airworthiness of parts, components, accessories, and assemblies by subjecting them to inspections, tests, or operational checks.	Center's Chief of Maintenance	IAOP Review
172	2.8.6.4 t (1)	Organizations providing maintenance support to the Center shall have a procurement program to prevent the purchase of unapproved parts and material in type certificated products.	Center's Chief of Maintenance	IAOP Review
173	2.8.6.4 t (2)	The Center-approved parts program shall include, at a minimum, methods to establish qualified suppliers who are authorized to manufacture or distribute parts they supply and criteria to identify and screen potential unapproved parts suppliers.	Center's Chief of Maintenance	IAOP Review
174	2.8.6.4 u	At a minimum, the Center's maintenance manual shall include a detailed description of the procedure used to ensure that any maintenance tasks required by the maintenance schedule/program, an airworthiness directive, or any task required for the rectification of a defect is completed within the time constraints specified in maintenance procedures.	Center's Chief of Maintenance	IAOP Review
175	2.8.6.4 v	At a minimum, the Center's maintenance manual shall include a description of a fatigue management system for maintenance personnel, whose provisions are also required in all maintenance agreements to ensure that maintenance personnel do not carry out maintenance work when they are fatigued. This includes procedures to manage the risks associated with maintenance personnel working alone.	Center's Chief of Maintenance	IAOP Review
176	2.8.6.4 w	At a minimum, the Center's maintenance manual shall include a continuing structural integrity program, an aging aircraft program, a condition monitoring program, and reliability program descriptions for aircraft systems, components, and power plants.	Center's Chief of Maintenance	IAOP Review
177	2.8.6.5	Explosives-laden aircraft shall be parked in designated aircraft parking areas that meet airfield criteria and afford appropriate quantity distance criteria to eliminate hazards to personnel and resources per NASA STD 8719.12, paragraph 5.15.13.	Center's Chief of Maintenance	IAOP Review

178	2.8.7.1	A documented training program shall be defined in the Center's maintenance manual that ensures that maintenance personnel, Maintenance Inspectors (MI), and Quality Assurance (QA) personnel are trained and qualified prior to being assigned.	Center Directors	IAOP Review
179	2.8.7.2	In addition to a description of the maintenance training and required competencies of the maintenance staff, the program shall document the Center-defined recurrent and proficiency training requirements to ensure that maintenance personnel, MI, and QA personnel attend refresher training that addresses changes to aircraft systems, test equipment, or critical troubleshooting and repair techniques at least every 24 months.	Center Directors	IAOP Review
180	2.8.7.3	All maintenance personnel that are qualified to perform servicing, inspections, and functional tests shall have completed the required training program, which will be documented in their individual training records.	Center Directors	IAOP Review
181	2.8.7.4	The training program shall include all Center safety program training requirements, including training on fire protection equipment, medical stations, and hazardous materials.	Center Directors	IAOP Review
182	2.8.7.5	Within the training program, all required support functions shall be addressed. These include computer training, logistics training, and operator training for facilities and ground support equipment such as hoists, tow tractors, and lifts.	Center Directors	IAOP Review
183	2.8.7.6	Qualification records shall be kept up to date by the Chief of Maintenance or Center Training Officer to reflect both resident and onsite training.	Center Directors	IAOP Review
184	2.8.8.2	NAMIS shall be utilized to track servicing, inspections, and METCAL compliance.	Center Directors	IAOP Review
185	2.8.8.3	NAMIS can be used to track demands (i.e., requisitions) and shall be used to track receipts and issues, regardless of how or by whom the item was requisitioned.	Center Directors	IAOP Review
186	2.8.9.1 a	Each NASA Center that is responsible for the maintenance of NASA aircraft shall ensure that the quality program requirements are planned, implemented, maintained, and integrated into every aspect of aircraft maintenance and that only fully qualified personnel are assigned quality program responsibilities.	Center Directors	IAOP Review

187	2.8.9.1 c	The Center shall operate a program to provide for analysis and surveillance of its continuous airworthiness maintenance program, including work performed according to Center requirements by a non-NASA entity.	Center Directors	IAOP Review
188	2.8.9.5	Each Center shall develop a documented quality program (i.e., appropriate policies, procedures, and practices) that covers all aspects of maintenance, material acceptance, documentation review, maintenance instruction applicability, and currency that fits within the scope of the Center's quality management system (QMS).	Center Directors	IAOP Review
189	2.8.9.6	QA shall ensure that aircraft configuration and components have been properly maintained and that all requirements have been properly documented.	Center Directors	IAOP Review
190	2.8.9.7 a	Inspection for acceptance shall be performed by qualified persons other than those who performed or directly supervised the work being inspected.	Center Directors	IAOP Review
191	2.8.9.7 d	Sampling and surveillance verifications shall be used independently, or in combination, to accomplish the verification function of the quality program processes.	Center Directors	IAOP Review
192	2.8.9.8 a	QA responsibilities shall be performed to establish qualification requirements for QA personnel and collateral duty personnel.	Center Directors	IAOP Review
193	2.8.9.8 a (1)	Centers shall maintain a list of all personnel qualified and authorized to conduct inspections.	Center Directors	IAOP Review
194	2.8.9.8 b	QA responsibilities shall be performed to provide a continuous training program in techniques and procedures pertaining to aircraft maintenance quality program, per paragraph 2.6.4, and the conduct of inspections.	Center Directors	IAOP Review
195	2.8.9.8 c	QA responsibilities shall be performed to ensure that established standard procedures are observed for conducting scheduled and unscheduled inspections, ground tests, and bench check of components, including engines.	Center Directors	IAOP Review
196	2.8.9.8 d	QA responsibilities shall be performed to ensure that the configuration of aircraft and components is correct and all essential modifications have been incorporated.	Center Directors	IAOP Review

197	2.8.9.8 e	QA responsibilities shall be performed to ensure that an inspection is conducted on all equipment, parts, and materials received for use, returned for repair, or held awaiting repair to verify satisfactory material condition, identification, packaging, preservation, and configuration and, when applicable, that shelf-life limits are not exceeded.	Center Directors	IAOP Review
198	2.8.9.8 f	QA responsibilities shall be performed to ensure that check pilots and aircrew are briefed before post-maintenance functional check flights (FCF) so that the purpose and objectives of the flight are clearly understood. After completion of the FCF, debrief the check pilots, aircrew, maintenance control representative, and applicable work center representatives to determine compliance with objectives outlined on the FCF checklist and clarify noted discrepancies.	Center Directors	AOP Review
199	2.8.9.8 g	QA responsibilities shall be performed to review all incoming technical publications and directives to determine their applicability to Center-maintained aircraft.	Center Directors	IAOP Review
200	2.8.9.8 h	QA responsibilities shall be performed to conduct Parts and Hardware Certification of all items procured. All incoming serviceable aircraft material, parts, or components will be placed in a secured area and inspected by a QA inspector or designee, who will ensure that the part or material is in good condition and conforms to specifications and standards and that certification paperwork or data is correct for applicability and acceptance requirements.	Center Directors	IAOP Review
201	2.8.9.8 i	QA responsibilities shall be performed to ensure that personnel are trained in the Government-Industry Data Exchange Program (GIDEP) and FAA Suspected Unapproved Parts (SUP) Program and coordinate all actions with the Center's GIDEP office, HQ AMD, and the Inspector General (IG), as appropriate.	Center Directors	IAOP Review
202	2.8.9.8 j	QA responsibilities shall be performed to monitor weight and balance of all Center aircraft, in accordance with Center guidelines.	Center Directors	IAOP Review
203	2.8.9.8 k	QA responsibilities shall be performed to validate all work orders (excluding minor aircraft write-ups/gripes) and oversee the installation of all work orders on aircraft.	Center Directors	IAOP Review

204	2.8.9.8 1	QA responsibilities shall be performed to assist the Aviation Safety Officer (ASO) in the impounding of Center aircraft involved in a mishap or when directed by ASO.	Center Directors	IAOP Review
205	2.8.9.8 m	QA responsibilities shall be performed to monitor maintenance using a program to develop trend analysis of processes. This program analyzes all reports of findings and/or actions taken during aircraft and component maintenance.	Center Directors	IAOP Review
206	2.8.10.2 a	All manuals shall be maintained in accordance with the original manufacturers' updates or revisions (or DoD updates or revisions for DoD aircraft) as modified with NASA- or FAA-approved data.	Center Directors	IAOP Review
207	2.8.10.2 b	Centers shall maintain documentation to confirm that periodic revision status audits of the technical library have been conducted.	Center Directors	IAOP Review
208	2.8.10.2 c	Exceptions to this [document maintenance] policy, including additional changes to documents, shall be approved by the Chief of Flight Operations.	Center Directors	IAOP Review
209	3.1.1.1	Centers' Chiefs of Flight Operations shall establish procedures to ensure that all flights of NASA aircraft are properly approved and documented, allowing for all contingencies such as deployed aircraft and aircraft ferry approvals.	Center Chief of Flight Operations	IAOP Review
210	3.1.1.2	Emergency lifesaving, humanitarian operations, and Homeland Security missions, as pre-approved by the Center Director, may be carried out in any NASA aircraft. The circumstances shall be documented and reported to the Assistant Administrator for the OSI via the Director of AMD within 30 days of action.	Center Directors	IAOP Review
211	3.2.1.1	Considering weather forecasts and any known en route delays, the minimum amount of useable fuel required at takeoff shall be sufficient to do the following: a. Complete the flight to the destination airport. b. Fly from that airport to the alternate airport, if required. c. Fly after that for 45 minutes at normal cruising speed or, for helicopters, fly after that for 30 minutes at normal cruising speed.	Pilot in Command	IAOP Review
212	3.2.1.2	Fuel Planning Deviations shall be authorized in writing by the Center Chief of Flight Operations to enable Mission accomplishment.	Center Chief of Flight Operations	IAOP Review

213	3.2.1.3	An aircraft shall not be refueled when personnel are embarking, on board, or disembarking unless it is properly attended by qualified personnel ready to initiate and direct an evacuation of the aircraft by the most practical and expeditious means available.	Pilot in Command	IAOP Review
214	3.2.1.3 a	When refueling with personnel embarking, on board, or disembarking, two-way communications shall be maintained by the aircraft's intercommunication system or other suitable means between the ground crew supervising the refueling and the qualified personnel on board the aircraft.	Pilot in Command	IAOP Review
215	3.2.2	Prior to takeoff, the PIC shall receive a thorough weather briefing concerning current weather and forecasts for the proposed route, destination, and alternate destination.	Pilot in Command	IAOP Review
216	3.2.2.1	Weather minimums for takeoffs shall be not less than landing minimums unless a takeoff alternate is available.	Pilot in Command	IAOP Review
217	3.2.2.1 a	The weather reported at the departure alternate shall be above landing minimums and forecast to remain so for at least 2 hours after takeoff, per the following: (1) Precision Approach available: 200-foot ceiling and 1/2-statute mile (SM) visibility added to the published Precision Approach minimums. (2) Non-Precision Approach (only) available: 300-foot ceiling and 1-SM visibility added to the published Non-Precision Approach minimums.	Pilot in Command	IAOP Review
218	3.2.2.2	Airborne weather or weather-capable radar shall be operative for any flight into areas where current weather reports or forecasts indicate that thunderstorms may reasonably be expected and flight under daylight visual meteorological conditions is not possible.	Pilot in Command	IAOP Review
219	3.2.2.3 a	If the destination weather is reported and forecast to be less than a 2,000-foot ceiling or less than 3-mile visibility from 1 hour before, until 1 hour after, the estimated time of arrival (ETA), an alternate airport shall be listed on the flight plan.	Pilot in Command	IAOP Review
220	3.2.2.3 b	Airport weather minimums shall meet or exceed the requirements of FAR Part 91.	Pilot in Command	IAOP Review

221	3.2.3	International Operations: Flightcrews operating aircraft in international airspace shall be familiar with the relationship between State Regulations and the ICAO Rules of the Air.	Center Chief of Flight Operations	IAOP Review
222	3.2.3.1	Centers shall have a training program to provide familiarization with international procedures.	Center Chief of Flight Operations	IAOP Review
223	3.2.3.2	Prior to operating in international airspace, flightcrew members shall complete international procedures training.	Center Chief of Flight Operations	IAOP Review
224	3.2.3.3	NASA pilots shall secure diplomatic clearance approval prior to entry into the airspace of a foreign country, except for brief use of foreign airspace adjoining the United States, as directed by air traffic control (ATC).	Pilot in Command	IAOP Review
225	3.2.3.4	Those operations not conducted following ICAO flight procedures are conducted under the "due regard" or "operational prerogative of state aircraft" and aircraft shall satisfy one or more of the following conditions: a. Be operated in visual meteorological conditions (VMC). b. Be operated within radar surveillance and radio communications of a surface or airborne (AWACS or HAWKEYE) radar facility. c. Be equipped with airborne radar that is sufficient to provide separation between themselves, aircraft they may be controlling, and other aircraft. d. Be operated outside controlled airspace.	Center Chief of Flight Operations	IAOP Review
226	3.2.3.4 e	The conditions listed above [a-d] shall be followed in order to provide a level of safety equivalent to that normally given by ICAO ATC agencies and to fulfill U.S. obligations under Article 3 of the Chicago Convention.	Center Chief of Flight Operations	IAOP Review
227	3.2.3.5	All flightcrews conducting international, reduced vertical separation minimum (RVSM), minimum navigation performance specifications (MNPS), random area navigation (RNAV), or required navigation performance (RNP) shall complete (as appropriate to the operation) airspace operations training and be authorized by the Chief of Flight Operations to operate in such airspace in accordance with international requirements.	Center Chief of Flight Operations	IAOP Review
228	3.2.3.6	The Chief of Flight Operations shall establish a process to review the rules for flights operating outside U.S. airspace in accordance with the latest, most current ICAO and foreign nation rules.	Center Chief of Flight Operations	IAOP Review

229	3.2.3.7	Center Flight Operations shall utilize DOD 4500.54-M (DoD Foreign Clearance Guide) and DoD Flight Information Publications for proper international operations coordination.	Center Chief of Flight Operations	IAOP Review
230	3.2.3.8	The PIC of any NASA aircraft entering a foreign country or returning to the United States shall be responsible for the custody and care of disembarking crewmembers from the time they leave the aircraft until they are accepted for examination for entry into the country's immigration or Customs checkpoint.	Pilot in Command	IAOP Review
231	3.2.3.9	The Center Director shall be responsible for identifying and complying with all national and local environmental laws and requirements for the proper handling and disposal of international garbage on NASA aircraft.	Center Director	IAOP Review
232	3.2.4 a	All NASA aircraft operations shall establish applicable stabilized-approach criteria suited to their particular flight operation.	Pilot in Command	IAOP Review
233	3.2.4 b	In the absence of flight manual or aircraft directive guidance, for a straight-in approach a stabilized approach shall be established by 1,000 feet above airport elevation in instrument meteorological conditions (IMC) and by 500 feet above airport elevation in visual meteorological conditions (VMC).	Pilot in Command	Check Flight
234	3.2.4 c	In the event that a stabilized approach is not established by the altitudes required in paragraph 3.2.4 b, a missed approach shall be executed.	Pilot in Command	Check Flight
235	3.2.5	Centers shall have a Fatigue Management Plan and a mitigation process to address risks associated with flightcrew and maintenance crew fatigue.	Center Director	IAOP Review
236	3.2.5.1	Centers shall establish and implement a fatigue management system containing the following elements to ensure that personnel involved in the operation and maintenance of aircraft do not carry out their duties when fatigued: a. Fatigue management procedures. b. Appropriate training and education regarding preventive and operational fatigue countermeasures. c. Flight and duty time limitations. d. Fatigue reporting system. e. System for monitoring flightcrew fatigue. f. An evaluation process that assesses the effectiveness of the fatigue management system.	Center's Chief of Flight Operations	IAOP Review

237	3.2.5.2	If deviations from the flight and/or duty time limitations are permitted, the system shall include provisions to: a. Assess the associated risks and apply the appropriate mitigation to maintain an acceptable level of risk for that operation. b. Identify the management person who is authorized to approve the deviation. c. Record the deviations, the risk assessment, and related mitigation.	Center's Chief of Flight Operations	IAOP Review
238	3.2.5.3	Deviations [from the flight and/or duty time limitations] shall be made only with the express approval of all personnel involved.	Center's Chief of Flight Operations	IAOP Review
239	3.3.1	All manned NASA aircraft shall be configured with FAA-approved Traffic Alert and Collision Avoidance System (TCAS) and Terrain Awareness and Warning System (TAWS) for the specific type model aircraft to mitigate midair collisions and controlled flight into terrain, or FAA-approved alternative system.	Center Directors	IAOP Review
240	3.3.2	For NASA manned aircraft without an available TCAS/TAWS solution, all NASA flight operations shall develop a TCAS/TAWS Risk Management Plan in accordance with NPR 8000.4 and update it annually.	Center Directors	IAOP Review
241	3.3.4	All manned NASA aircraft contracted through commercial vendors shall be configured with FAA-approved TCAS and TAWS for the specific type model aircraft to mitigate midair collisions and controlled flight into terrain.	Center Directors	IAOP Review
242	3.3.5	All flight deck crew members of large or turbojet aircraft shall communicate through a boom or throat microphones below the transition level/altitude.	Flight Deck Crew Members	Check Flight
243	3.3.6	If installed and operative, the CVR and FDR shall be turned on during the entire flight.	Pilot in Command	IAOP Review
244	3.3.7	Should an incident occur, the CVR and FDR power shall be removed and appropriate circuit breakers pulled following completion of the after-shutdown checklist.	Pilot in Command	IAOP Review
245	3.4.1 b	A secondary or back up source of aeronautical information necessary for the flight will be available. If the secondary or backup information is an additional EFB/ECD, there shall be one more EFB on board the aircraft than the number of pilots.	Pilot in Command	IAOP Review

246	3.5.1	Unpressurized Aircraft. Oxygen shall be used at all altitudes above 10,000 feet above mean sea level (MSL).	Pilot in Command	IAOP Review
247	3.5.3 a	Oxygen masks shall be ready for immediate use when above flight level (FL) 180.	Pilot in Command	IAOP Review
248	3.5.3 b	Above FL 250, one pilot at the controls shall either use oxygen or have an approved quick-donning mask with instant intercommunication system (ICS) capability properly adjusted and positioned for use within 5 seconds.	Pilot in Command	IAOP Review
249	3.5.3 c	When above FL 250, when one pilot leaves his flight control position, the other pilot shall use oxygen.	Pilot in Command	IAOP Review
250	3.6.1	Only designated NASA pilots specifically authorized by the Center Chief of Flight Operations shall be allowed to manipulate the flight controls of a NASA aircraft and only in performance of NASA missions.	Center Chief of Flight Operations	IAOP Review
251	3.6.1.1	Only pilots designated in type, or in training for designation in type, crewmembers, or maintenance personnel designated in writing by the Center Chief of Flight Operations as being qualified to perform taxiing operations shall taxi a fixed-wing (F/W) aircraft.	Center Chief of Flight Operations	IAOP Review
252	3.6.1.2	Only pilots designated in type, or in training for designation in type, shall taxi a rotary-wing (R/W) aircraft.	Center Chief of Flight Operations	IAOP Review
253	3.6.2	Instructor pilots shall be selected by the Center's Chief of Flight Operations from highly qualified PICs who have demonstrated the skill, maturity, and temperament to perform instructor duties.	Center Chief of Flight Operations	IAOP Review
254	3.7.1	All personnel scheduled as primary flightcrew members on NASA aircraft shall be trained and qualified in accordance with this chapter.	Center Chief of Flight Operations	IAOP Review
255	3.7.2	Crew assignment, including identification of a PIC, shall be designated in writing for each flight.	Center Chief of Flight Operations	IAOP Review
256	3.7.3	No aircraft shall be operated with less than the minimum basic crew specified by the Center.	Center Chief of Flight Operations	IAOP Review
257	3.7.5.1	The PIC of a NASA aircraft shall be a designated NASA pilot.	Center Chief of Flight Operations	IAOP Review
258	3.5.7.2	The PIC shall refuse to carry any person, or accept any aircrew for duty, who appear to be intoxicated or under the influence of alcohol or drugs.	Pilot in Command	IAOP Review

259	3.7.5.3	The PIC of a NASA aircraft shall ensure that the crew is briefed on the mission plan, safety procedures, and emergency information, including emergency egress.	Pilot in Command	IAOP Review
260	3.7.5.4	Center Chiefs of Flight Operations shall have a written process to train, designate, and document individuals authorized to pilot Functional Check Flight operations.	Center Chief of Flight Operations	IAOP Review
261	3.7.5.5	All NASA PICs shall be trained on the operating rules and procedures of the FAA FARs and the ICAO Rules of the Air when operating in international airspace.	Center Chief of Flight Operations	IAOP Review
262	3.7.5.6	The duties and responsibilities of the PIC shall be specified in the Center's policy, in accordance with NPR 7900.3.	Center Director	IAOP Review
263	3.7.5.7	The PIC will direct the duties of the SIC. In the event of PIC incapacitation, the pilot flying as second-in-command (SIC) on a NASA aircraft shall assume PIC duties.	Pilot in Command	IAOP Review
264	3.7.5.8	The PIC shall ensure that each occupant of a NASA aircraft in motion occupies an aircraft seat and wears a properly fastened safety belt or Center-approved personnel retention system unless otherwise directed by the PIC.	Pilot in Command	IAOP Review
265	3.7.5.9	Where installed, both a safety belt and shoulder harness shall be worn.	Pilot in Command	IAOP Review
266	3.8.1	Center directives shall establish separate aircrew qualification and currency requirements for unique aircraft (e.g., project, military, experimental) in which the aircrew cannot meet the following requirements.	Center Director	IAOP Review
267	3.8.2	NASA flightcrews shall be qualified in accordance with written standards set forth in Center-developed competency criteria, including flying skills, airmanship, stabilized approach, runway excursions, autopilot/automation procedures, and upset recovery.	Center Director	IAOP Review
268	3.8.2.1	Prior to assigning personnel to flightcrew duties on NASA flights, the requirements contained in this chapter shall be met.	Center Chief of Flight Operations	IAOP Review
269	3.8.2.2	Records of qualification and flight evaluation are required and shall be maintained in aircrew training records in accordance with NPR 1441.1.	Center Chief of Flight Operations	IAOP Review

270	3.8.2.3	A review of pilot and crew qualifications shall be made prior to flight assignment to ensure that prerequisites for the intended mission are met.	Center Chief of Flight Operations	IAOP Review
271	3.8.2.4	The Center's Chief of Flight Operations shall designate in writing the crewmembers for aircraft that are under the Center's purview.	Center Chief of Flight Operations	IAOP Review
272	3.8.2.6	Flight Engineers shall possess an FAA Flight Engineer Certificate appropriate for the aircraft category or equivalent military certification.	Center Chief of Flight Operations	IAOP Review
273	3.8.2.6 a	Centers with one-of-a-kind NASA aircraft may develop a documented local certification equivalent.	Center Chief of Flight Operations	IAOP Review
274	3.8.2.6 b	Centers shall develop alternate training programs to satisfy this requirement should commercial training sources or personnel not be available for the requisite training.	Center Chief of Flight Operations	IAOP Review
275	3.8.3	Qualified non-crewmembers (QNC) shall be authorized by the Chief of Flight Operations to participate in flight operations to support mission requirements.	Center Chief of Flight Operations	IAOP Review
276	3.8.3.1	Qualified non-crewmembers shall be trained and will maintain qualification (in accordance with local Center policies and procedures), which will include, at a minimum, cabin emergency egress procedures and medical clearances.	Center Chief of Flight Operations	IAOP Review
277	3.8.3.3	Media Representatives. The Center shall establish policies for qualifying media representatives for flight.	Center Chief of Flight Operations	IAOP Review
278	3.8.4.1	Center Flight Operations shall develop sufficient proficiency requirements or flight time/sortie requirements on flightcrews to meet mission needs.	Center Chief of Flight Operations	IAOP Review
279	3.8.4.2	Private pilot time shall not be recorded in NAMIS or utilized to meet any proficiency requirements.	Center Chief of Flight Operations	IAOP Review
280	3.8.4.3	Each Center shall develop a written flightcrew training plan incorporating pilot competency, emergency procedures, abnormal procedures, high altitude training, and the upgrade process which, at a minimum, meets the following requirements: a. Annual night flying requirements. b. Landings in category (fixed-wing/rotorcraft). c. Six instrument approaches under actual or simulated conditions within 6 calendar months. d. Completing 100 hours of flight time per year (fiscal or calendar year to be determined by Center policy) in any NASA manned aircraft or flight simulator approved by the Center's Chief of Flight	Center Chief of Flight Operations	IAOP Review

		simulator approved by the Center's Chief of Flight Operations or 80 hours of flight time and 100 sorties if all are flown in the same model, design, and series of aircraft or flight simulator.		
281	3.8.4.4	Lapse in Proficiency. Crewmembers overdue the annual flight time requirement shall not be assigned as PIC or SIC.	Center Chief of Flight Operations	IAOP Review
282	3.8.4.4 a	The Center's Chief of Flight Operations shall document the method to regain qualification in the flightcrew training plan and notify the Assistant Administrator for the OSI, via HQ AMD, of this action in a letter from the Center's Director.	Center Chief of Flight Operations	IAOP Review
283	3.8.4.4 b	The Center's Chief of Flight Operations shall establish requalification procedures for pilots not meeting any of the remaining requirements above.	Center Chief of Flight Operations	IAOP Review
284	3.8.5.1	All flightcrew currency documentation shall be recorded in NAMIS.	Center Chief of Flight Operations	IAOP Review
285	3.8.5.1 d	Private pilot time shall not be recorded in NASA information systems or utilized to meet any of the above currency requirements.	Center Chief of Flight Operations	IAOP Review
286	3.8.5.1 e (1)	A pilot at the controls who does not meet the 90-day total hour requirements but is otherwise current shall increase all instrument approach minimums by 200 feet and one half mile visibility (or the Runway Visual Range equivalent).	Center Chief of Flight Operations	IAOP Review
287	3.8.5.2	At the discretion of the Chief Pilot, pilots flying multiple types of aircraft who have met the all-types requirements may satisfy the in-type currency requirement by flying a training flight with a flight instructor. This training flight shall include a minimum of two instrument approaches, three takeoffs, and three landings.	Center Chief of Flight Operations	IAOP Review
288	3.9.1	Each primary crewmember shall complete an approved formal course of instruction in the type aircraft to be flown, including a study of the systems and procedures applicable to the individual's crew position.	Center Chief of Flight Operations	IAOP Review
289	3.9.3	Survival Training. Each primary crewmember shall receive basic survival training on a one-time basis.	Center Chief of Flight Operations	IAOP Review
290	3.9.3.1	Additional survival training shall be required by appropriate Center management for those crewmembers engaged in frequent over-water or remote-area flights.	Center Chief of Flight Operations	IAOP Review

291	3.9.3.2	Newly assigned personnel with no previous survival training shall complete this requirement within 12 months of being assigned to flightcrew duties.	Center Chief of Flight Operations	IAOP Review
292	3.9.3.3	Pilots shall not be assigned as PICs until this requirement has been met. This requirement does not apply to UAS/sUAS crews.	Center Chief of Flight Operations	IAOP Review
293	3.9.4	Prior to initial designation, primary crewmembers shall receive instruction in the physiological aspects of high-altitude flight, including altitude chamber indoctrination or recognized equivalent training; i.e., Reduced Oxygen Breathing Device training.	Center Chief of Flight Operations	IAOP Review
294	3.9.4.1	Altitude chamber training received prior to initial designation meets this requirement. Refresher training academics shall be accomplished every 5 years.	Center Chief of Flight Operations	IAOP Review
295	3.9.5	Prior to initial designation and annually thereafter, each crewmember shall receive emergency egress training on each type of aircraft assigned.	Center Chief of Flight Operations	IAOP Review
296	3.9.5 .1	Training shall include instructions on the location and operation of normal and emergency exits and cabin emergency equipment, such as fire extinguishers and life vests.	Center Chief of Flight Operations	IAOP Review
297	3.9.6	In-Flight Technicians shall attend refresher training that addresses changes to aircraft systems, test equipment, or critical troubleshooting and repair techniques every 24 months.	Center Chief of Flight Operations	IAOP Review
298	3.9.7	All NASA aircrew personnel shall, at least once per calendar year, attend a crew resource management course of at least 4 hours (instruction per year) in duration.	Center Chief of Flight Operations	IAOP Review
299	3.9.8	All NASA maintenance and QA personnel shall, at least once biennially, attend a maintenance resource management course of at least 4 hours' (instruction per year) duration.	Center Chief of Flight Operations	IAOP Review
300	3.10.1.1	Designated instructor pilots (IPs) shall administer all flight checks.	Center Chief of Flight Operations	IAOP Review
301	3.10.1.2	An IP shall be designated for all flights in which instruction or evaluation is planned.	Center Chief of Flight Operations	IAOP Review

302	3.10.2	Flight checks conducted by a NASA IP shall be recorded on NASA Form 1615 or Center equivalent, reviewed by the Center's Chief of Flight Operations, and filed in the individual's training file.	Center Chief of Flight Operations	IAOP Review
303	3.10.3	Flight proficiency shall be evaluated at least annually by a NASA or NASA-designated pilot, who is an instructor or examiner pilot, in the aircraft used for the evaluation.	Center Chief of Flight Operations	IAOP Review
304	3.10.4	Instrument flying proficiency shall be evaluated at least annually using professional aeronautical standards such as FAA Instrument Practical Test Standards.	Center Chief of Flight Operations	IAOP Review
305	3.10.5	Written tests shall be administered and reviewed annually by a check pilot to ensure current pilot knowledge of air traffic control procedures, aircraft systems, and normal and emergency operating procedures, Agency and local instructions, and other pertinent regulations and procedures.	Center Chief of Flight Operations	IAOP Review
306	3.10.6	Pilot annual flight evaluations shall be reviewed by the Center's Chief of Flight Operations as part of a comprehensive review of all flight-related aspects of the assigned pilot under review. These aspects include, but are not limited to, mishap and close call reports, observed behavior reflecting CRM principles, and management counseling necessitated by concerning in-flight and work behaviors.	Center Chief of Flight Operations	IAOP Review
307	3.11.1	Each crewmember shall be designated, in writing, to the respective crew position, and required training be completed and documented in the individual's training file.	Center Chief of Flight Operations	IAOP Review
308	3.11.2	A training file shall be maintained for each flightcrew member and contain all documentation pertaining to crew qualification and training.	Center Chief of Flight Operations	IAOP Review
309	3.11.2 b	At a minimum, the file will contain a list of ground training accomplishments (including simulator training) indicating dates, location, and amount of training. A record of refresher training shall be maintained for the past 2 calendar years.	Center Chief of Flight Operations	IAOP Review
310	3.11.3	All flightcrew currency documentation shall be recorded in NAMIS.	Center Chief of Flight Operations	IAOP Review

311	3.11.4	NASA UAS pilot flight time shall be kept separate from NASA manned flight time, by type, in NAMIS.	Center Chief of Flight Operations	IAOP Review
312	3.11.5	Each Center shall establish a means to document that flight critical information has been passed to all flightcrews.	Center Chief of Flight Operations	IAOP Review
313	3.11.5.1	Records pertaining to NASA's flight activities shall include, at a minimum, the following: a. Approval of mission. b. Name and functions of all on board. c. Purpose of the flight. d. Routing (route of flight) or flight events and takeoff /landing times.	Center Chief of Flight Operations	IAOP Review
314	3.12.1	There are two categories of readiness reviews that shall be applied to both piloted aircraft and UAS. These readiness reviews may be referred to as flight readiness reviews or operational readiness reviews and mission readiness reviews where the purpose is to ensure that hazards associated with aircraft performance, mission profile, research, payloads, and other operational limitations are identified and that risks are adequately managed to enhance the likelihood of mission and program success for all aircraft missions or operations and to minimize the risks to persons or property.	Center Chief of Flight Operations	IAOP Review
315	3.12.1 a	For CAS, the reviews shall also include the terms of the contract and the capabilities of the contractor.	Center Director	IAOP Review
316	3.12.1 b	NASA Centers shall have written Flight Readiness Review (FRR)/Operations Readiness Review (ORR) and Mission Readiness Review (MRR) processes.	Center Director	IAOP Review
317	3.12.1.1	FRR/ORR shall focus on the flight operational safety aspects of a specific aircraft flight, mission, or campaign.	Center Director	IAOP Review
318	3.12.1.2	MRR shall focus on mission operational safety using multiple aircraft and multiple activities to ensure mission success.	Center Director	IAOP Review
319	3.12.2	Chief of Flight Operations from one of the participating NASA Centers shall ensure a MRR is conducted when multiple aircraft operations are to be conducted.	Center Chief of Flight Operations	IAOP Review
320	3.12.3	Prior to conducting an FRR/ORR, each individual aircraft involved in the flight or campaign shall have an approved Certificate of Airworthiness or Statement of Airworthiness.	Center Chief of Flight Operations	IAOP Review

321	3.12.4	The Chair of the Center Airworthiness Process Program or a representative shall attend all readiness reviews.	Chair of the Center Airworthiness Process Program	IAOP Review
322	3.12.5	A supervisory Flight Operations pilot or other Flight Operations supervisory personnel shall chair and approve the FRR/ORR flight authorization.	Center Chief of Flight Operations	IAOP Review
323	3.12.6	The review should address a description of the required flight operations, including operating procedures, test conditions, maneuvers, required instrumentation, mission control operations, mission rules and flight limitations, nonstandard operation or inspection criteria, and associated checklists. Actions to be taken in the event of in-flight malfunctions or emergency conditions associated with the aircraft modifications or nonstandard operations also shall be described.	Center Directors	IAOP Review
324	3.12.6.1	Areas of consideration shall include: a. Science mission requirements. b. Flight operations procedures. c. Operational Go/No-Go criteria. d. Pilot qualifications, flight operations training, and flight manuals. e. UAS operations requirements. f. Aircraft configuration. g. Aircraft maintenance. h. Science payload and operations. i. Payload combination. j. Status of reviews. k. Special weather conditions. l. Science functional flight test plan. m. Pre-accident and/or incident plan.	Chair of the Center Airworthiness Process Program	IAOP Review
325	3.12.7	Prior to conducting an MRR, each aircraft involved in the flight or campaign shall have an approved FRR/ORR.	Center Chief of Flight Operations	IAOP Review
326	3.12.7.1	The program/project management of the flight/campaign event shall assign an individual who has authorization to proceed with the flight program to chair and make the MRR evaluation.	Program/Project Manager	IAOP Review
327	3.12.7.3	Information required for a MRR include the following: a. Airspace management, including aircraft separation/coordination. b. Checklists. c. Communication plan, including inter-Center/interagency communication/coordination.	Center Chief of Flight Operations	IAOP Review

		<p>Deployment.</p> <p>e. Flight experiment and science flight requirements, including test conditions and science coordination requirements.</p> <p>f. Flight operations procedures, including maneuvers and nonstandard operation.</p> <p>g. Ground operations procedures dealing with hazardous systems.</p> <p>h. Inspection criteria.</p> <p>i. Liability coverage.</p> <p>j. Logistics.</p> <p>k. Mission control operations, including mission rules and flight limitations.</p> <p>l. Organizational and functional chart, including roles and responsibilities.</p> <p>m. Payload status.</p> <p>n. Program/Project Mishap Preparedness and Contingency Plan.</p> <p>o. Public affairs/outreach.</p> <p>p. Required instrumentation,</p> <p>q. Safety and mission assurance, including actions to be taken in the event of in-flight malfunctions or emergency conditions associated with the aircraft modifications or nonstandard operations.</p> <p>r. Schedule timeline.</p>		
328	3.12.8	Centers, Component Facilities, and contractors that do not have an aircraft operations department and operate NASA aircraft/UAS shall coordinate with an alternate NASA Center aircraft operations department for FRR/ORR and MRR services and support.	Center Director	IAOP Review
329	3.14.1	Flight personnel shall comply with applicable Federal laws governing drug and alcohol use by aircrew members. See 14 CFR 91.17.	Center Chief of Flight Operations	IAOP Review
330	4.2.1	When carrying passengers, NASA aircraft shall be operated as civil aircraft. NASA aircraft are prohibited from carrying passengers when operating as public aircraft.	Center Chief of Flight Operations	IAOP Review
331	4.2.1.1	When operated as civil aircraft, maintenance and aircrew standards shall meet the requirements for retention of FAA Airworthiness Certification and operation.	Center Chief of Flight Operations	IAOP Review
332	4.2.1.1 a	Those requirements [for retention of FAA Airworthiness Certification and operation] shall be followed for any NASA flight that carries passengers.	Center Chief of Flight Operations	IAOP Review

333	4.2.1.2	The Certificate of Airworthiness shall be displayed, per 14 C.F.R § 91.203, Subparts (a) and (b).	Center Chief of Flight Operations	IAOP Review
334	4.2.1.3	Passenger Transportation flights shall be operated and maintained in accordance with 14 CFR Part 21, Part 21, Part 39, Part 61, Part 65, and Part 91.	Center Chief of Flight Operations	IAOP Review
335	4.2.1.4	Centers shall develop policies/procedures to operate Passenger Transportation flights in accordance with the procedures specified in OMB Circular A-126 and 41 CFR, Section 101-37, as well as the provisions of this chapter.	Center Director	IAOP Review
336	4.2.2	Passenger Transportation flights shall be conducted only in support of activities that constitute the discharge of NASA's official responsibilities and only when the aircraft is not otherwise scheduled for Mission Required or Required Use flight operations.	Center Director	IAOP Review
337	4.2.2.1	NASA employees shall not use Passenger Transportation flights if commercial airlines, charter aircraft services, or ground transportation are reasonably available to meet the mission need, unless the flight is cost justified in accordance with OMB Circular A-126 and this chapter.	Center Director	IAOP Review
338	4.2.3	Flights that require excessive deadheading or involve long, unproductive layovers shall be avoided, absent special emergency situations.	Center Director	IAOP Review
339	4.2.4	Whenever practicable, inter-Center airlift requirements shall be combined.	Center Director	IAOP Review
340	4.2.5	Each passenger traveling aboard NASA Passenger Transportation flights shall be a U.S. Government employee or contractor on official U.S. Government business and have either an approved NASA travel authorization, in accordance with NASA directives, or a travel authorization approved by another Federal agency or Congressional committee.	Center Director	IAOP Review
341	4.2.5.1	Travel authorized by another Federal agency or Congressional committee also shall be approved by an Official-in-Charge of a Headquarters Office or a NASA Center Director.	Center Director	IAOP Review
342	4.2.5.3	The names of the passengers and purpose of travel for such passengers shall be documented in the Passenger Transportation flight request form.	Center Director	IAOP Review
343	4.2.5.4	Reimbursement by nonofficial travelers shall comply with paragraph 4.7.	Center Chief of Flight Operations	IAOP Review

344	4.2.6	All passengers shall be manifested on NASA Form 1269, Flight Itinerary and Passenger Manifest.	Center Director	IAOP Review
345	4.2.6.1	Prior to departure of any Passenger Transportation flight, the PIC shall certify the accuracy of the manifest and file a copy with a responsible ground agency such as a military, civil, or NASA operations office.	Center Chief of Flight Operations	IAOP Review
346	4.2.7	NASA Passenger Transportation flight operations shall be conducted under the cognizance of the Assistant Administrator for the OSI.	Pilot in Command	IAOP Review
347	4.3.1	Required Use designation shall be controlled solely by the NASA Administrator and approved in accordance with paragraph 4.4.2 of this chapter.	Assistant Administrator for the OSI	Flight Operations
348	4.3.2	Classification of a Passenger Transportation (passenger or cargo) flight as Mission Required requires approval from the Assistant Administrator for the OSI before the flight and shall be coordinated with the HQ AMD.	NASA Administrator	IAOP Review
349	4.3.3	Travel on Passenger Transportation flights that are designated as Other Official Travel shall be authorized in advance on a trip-by-trip basis as detailed in Section 4.4.	Assistant Administrator for the OSI	IAOP Review
350	4.3.3.1	NASA employees shall not use Passenger Transportation flights for Other Official Travel if commercial airline, charter aircraft services, or ground transportation are reasonably available, unless the flight is cost justified in accordance with OMB Circular A-126 and this chapter.	Assistant Administrator for the OSI	IAOP Review
351	4.3.5 a	When using "no commercial airline or aircraft service is reasonably available" to justify the use of Passenger Transportation flights, actual airline schedule information shall be provided as part of, and attached to, the aircraft request.	Center Director	IAOP Review
352	4.3.5	Other Official Travel that is not Required Use or Mission Required, as defined in paragraph 4.3.3, shall be authorized only when one of the following conditions is met: a. No commercial airline or aircraft (including charter) service is reasonably available (i.e., able to meet the traveler's departure or arrival requirements within a 24-hour period), unless extraordinary circumstances require a shorter period to effectively fulfill Agency requirements. b. The actual cost of using a Government aircraft is not more than the cost of using commercial airline or aircraft (including charter service).	Center Director	IAOP Review

353	4.3.5.1	Such cost justification shall be computed consistent with paragraph 4.4.5. a.	Center Director	IAOP Review
354	4.3.7	Use of NASA aircraft for passenger transportation purposes, regardless of travel classification category, shall follow the same requirements as used for all other Passenger Transportation flights, including: compliance with 41 CFR Part 101-37, Government Aviation Administration and Coordination, and OMB Circular A-126, flight request and approval using NASA Form 1653, cost justification on NASA Form 1653 as required, and obtaining travel authorization approvals.	Center Director	IAOP Review
355	4.3.7.1	When operated as civil aircraft, maintenance and aircrew standards shall meet those required for retention of FAA Airworthiness Certification and operation and be followed for any NASA Passenger Transportation flight that carries passengers.	Center Director	IAOP Review
356	4.3.7.2	Centers shall exercise caution to ensure that aircraft are returned to their FAA-certificated configuration after being modified for program support or research purposes.	Center Director	IAOP Review
357	4.3.8	Nonofficial travel on NASA Passenger Transportation flights shall be authorized only when all the following conditions are met: a. The aircraft is already scheduled for use for an official purpose. b. Such nonofficial travel use does not require a larger aircraft than needed or alteration of flight itinerary for the official purpose. c. Nonofficial travel use results only in minor additional cost to the Government.	Center Director	IAOP Review
358	4.3.8.2	All nonofficial travelers shall reimburse the U.S. Treasury, in accordance with Section 4.7.	Center Director	IAOP Review
359	4.3.9	The Center Director shall certify, in writing, that nonofficial travel on a scheduled flight has met the above conditions.	Center Director	IAOP Review
360	4.3.9.1	The Center shall retain this certification [that nonofficial travel on a scheduled flight has met the above conditions] for a minimum of 2 years.	Center Director	IAOP Review
361	4.4.1	All flights with passengers aboard NASA aircraft assigned to a Center shall be reviewed by the Center's Chief Counsel for compliance with 41 CFR, Part 101-37, Government Aviation Administration and Coordination, and OMB Circular A 126 and approved in advance by the	Center Director	IAOP Review

		Circular A-126, and approved in advance by the Center Director.		
362	4.4.1.1	In the case of aircraft assigned to HQ, those flights shall be reviewed by the General Counsel or Deputy General Counsel and approved in advance by the Assistant Administrator for the OSI.	Center Director	IAOP Review
363	4.4.1.2	All flights classified as Other Official Travel that have senior Federal officials aboard shall be reviewed by the General Counsel and approved in advance by the appropriate NASA HQ or Center approval authority.	Assistant Administrator for the Office of Strategic Infrastructure	IAOP Review
364	4.4.2	Passenger Transportation flights also shall be approved in advance, in writing, and generally on a trip-by-trip basis.	Center Director	IAOP Review
365	4.4.2.1	The Administrator shall in each instance determine the appropriateness of Required Use flights following a finding of compliance with OMB Circular A-126 requirements by the General Counsel.	Center Director	IAOP Review
366	4.4.2.2	While the Administrator may make a blanket determination that all use of NASA aircraft by certain employees, or travel in specified categories, qualifies as Required Use travel, such determinations shall likewise be in writing, be determined to be compliant with OMB Circular A-126 requirements by the General Counsel, and set forth the justification for that determination.	NASA Administrator	IAOP Review
367	4.4.2.3 a	The Center Director will complete the following when a member of the flightcrew also is considered a passenger: The justification shall be annotated in the remarks section of NASA Form 1653.	NASA Administrator	IAOP Review
368	4.4.2.3 b	The Center Director will complete the following when a member of the flightcrew also is considered a passenger: The flightcrew member shall have either a NASA travel authorization approved in accordance with NASA directives or a travel authorization approved by another Federal agency or Congressional committee for purposes or activities beyond their crew flight duties.	Center Director	IAOP Review
369	4.4.2.3 c	The Center Director will complete the following when a member of the flightcrew also is considered a passenger: The flightcrew member shall be listed as a passenger on Form 1653.	Center Director	IAOP Review

370	4.4.2.3 d	The Center Director will complete the following when a member of the flightcrew also is considered a passenger: If the flightcrew member is a Senior Federal Official, a family member of such Senior Federal Official, or a non-Federal traveler, the flight request shall be reviewed by the General Counsel.	Center Director	IAOP Review
371	4.4.3	Flights classified as Mission Required, where NASA personnel are traveling to meet mission requirements, also shall be reviewed by the General Counsel and approved in advance by the Assistant Administrator for the OSI.	Center Director	IAOP Review
372	4.4.3.1	The Assistant Administrator for the OSI shall ascertain, prior to authorizing the flight, whether the trip is for Mission Required travel, as described in paragraph 4.3.2.	Assistant Administrator for the OSI	IAOP Review
373	4.4.3.2	Should special emergency situations preclude preflight review and approval, immediate action to review and approve the flight shall be taken as soon as practicable following the flight.	Assistant Administrator for the OSI	IAOP Review
374	4.4.3.3 a	General Counsel shall review the flight [classified as Mission Required conducted on research or program support aircraft, where passengers are aboard but the primary purpose of the flight is not passenger transport] in advance, if a Senior Federal Official, families of such senior Federal officials, or non-Federal travelers are passengers.	Center Director	IAOP Review
375	4.4.3.3 b	Authorization shall be coordinated with the HQ AMD.	Center Director	IAOP Review
376	4.4.3.3 c	A Passenger Transportation Flight Request (NASA Form 1653) is required, and the passenger manifest (NASA Form 1269) shall clearly distinguish aircrew from passengers.	Center Director	IAOP Review
377	4.4.3.3 d	The remarks section of the NASA Form 1653 shall indicate what training and for whom the flight is being conducted.	Center Director	IAOP Review
378	4.4.4	Travel by the following categories of people shall be authorized in advance and in writing when traveling aboard Passenger Transportation flights on Other Official Travel and their status annotated on the flight request and manifest: a. Senior Federal officials. b. Members and families of such Senior Federal officials. c. Non-Federal travelers.	Center Director	IAOP Review

379	4.4.4.2	<p>Authorizations for Other Official Travel flights with senior Federal officials, families of such senior Federal officials, and non-Federal travelers aboard shall be:</p> <p>a. Reviewed in advance on a trip-by-trip basis by the Center's Chief Counsel.</p> <p>b. Approved by the Center Director.</p> <p>c. Reviewed by the NASA General Counsel.</p>	Center Director	IAOP Review
380	4.4.4.3	At NASA HQ, all flights shall be reviewed by the General Counsel and approved in advance by the Assistant Administrator for the OSI.	Center Director	IAOP Review
381	4.4.4.4	Other Official Travel flights on Center-assigned aircraft with no senior Federal officials aboard shall be reviewed by the Center's Chief Counsel and approved by the Center Director without HQ review.	Assistant Administrator for the OSI	IAOP Review
382	4.4.5	<p>When a Passenger Transportation flight is for Other Official Travel, the approving official shall determine that one of the following criteria has been satisfied:</p> <p>a. No commercial aircraft or airline service is reasonably available in accordance with paragraph 4.3.5a.</p> <p>b. The actual cost of Passenger Transportation flights does not exceed the cost of using commercial airlines or aircraft (including charter service).</p>	Center Director	IAOP Review
383	4.4.5.1	<p>For such cost-justified flights, the cost of using commercial airline or aircraft services for justifying the use of Government aircraft shall:</p> <p>a. Be the current Government contract fare or price or the lowest fare or price known to be available for the trip(s) in question.</p> <p>b. Include any differences in the costs of any additional ground or air travel, per diem and miscellaneous travel (e.g., taxis, parking), and lost employee work time (computed at gross hourly costs to the Government, including benefits) between commercial air, charter air service, and Government aircraft.</p>	Center Director	IAOP Review
384	4.4.5.1 b (1)	To capture the cost, including fringe benefits, of the employee's lost work time, a multiplier of 1.3285 shall be applied to the locality-adjusted hourly salaries of the individual travelers for the additional travel time.	Center Director	IAOP Review

385	4.5.1 a.	The Assistant Administrator for the OSI shall have the following responsibilities: approving policies and other matters involving NASA Passenger Transportation flights (except those specifically outlined above) and ensuring that the number of NASA-owned aircraft and their capacity to carry passengers and cargo does not exceed the level necessary to meet NASA's mission requirements.	Center Director	IAOP Review
386	4.5.1 b.	The Assistant Administrator for the OSI shall have the following responsibilities: coordinating acquisition, assignment, or disposition of aircraft whose primary purpose is the conduct of Passenger Transportation flights with the appropriate Associate Administrators and Center Directors, in accordance with OMB Circular A-76, Performance of Commercial Activities.	Assistant Administrator for the OSI	IAOP Review
387	4.5.1 c.	The Assistant Administrator for the OSI shall have the following responsibilities: annually reviewing Passenger Transportation flight requirements, use, and associated costs, including variable cost rates for each aircraft used to conduct Passenger Transportation flights.	Assistant Administrator for the OSI	IAOP Review
388	4.5.1 d.	The Assistant Administrator for the OSI shall have the following responsibilities: periodically reviewing the need for all NASA aircraft whose primary purpose is Passenger Transportation flight operations, and the cost effectiveness of NASA Passenger Transportation flight operations, in accordance with the requirements of OMB Circular A-76.	Assistant Administrator for the OSI	IAOP Review
389	4.5.1 d (1)	Each such review of NASA-owned aircraft whose primary purpose is Passenger Transportation flight operations shall be submitted to GSA when completed and to OMB with NASA's next budget submission.	Assistant Administrator for the OSI	IAOP Review
390	4.5.1 e.	The Assistant Administrator for the OSI shall have the following responsibilities: Ensuring that current (by fiscal year) variable cost rate for each aircraft utilized to conduct Passenger Transportation flights is used by all NASA officials who operate and account for NASA Passenger Transportation flights to calculate the flight-by-flight cost justification required by OMB Circular A-126.	Assistant Administrator for the OSI	IAOP Review

391	4.5.2 a	Center Directors shall ensure that aircraft are used properly and that the functions, including contract functions, performed by their aircraft comply, at a minimum, with NASA, FAA, OMB, and other Federal requirements, policies, and procedures.	Assistant Administrator for the OSI	IAOP Review
392	4.5.2 b	Center Directors shall ensure compliance with 41 CFR, Part 101-37, and OMB Circular A-126.	Center Director	IAOP Review
393	4.5.2 c	Center Directors shall approve the use of their assigned aircraft to conduct Passenger Transportation flights where passenger transport is not the primary mission.	Center Director	IAOP Review
394	4.5.2 d	Center Directors shall designate aircrew to conduct Passenger Transportation flights and ensure continuing compliance with all governing regulations.	Center Director	IAOP Review
395	4.5.2 e	Center Directors shall establish variable cost rates for aircraft under their control that are, or may be, used for passenger transportation. The rate will be developed using OMB Circular A-126, Attachments A and B, incorporating the most recent 12 months of historical cost data available, and be used to determine the cost justification for Passenger Transportation flight requests.	Center Director	IAOP Review
396	4.5.2 e (1)	The rate shall be reported to the HQ AMD, not later than September 15 of each year, and cannot be used until approved by that office.	Center Director	IAOP Review
397	4.5.2 f	Center Directors shall annually review and document the Center's continuing need for aircraft, whose primary purpose is the transport of passengers, and the cost-effectiveness of such aircraft operations, as required by OMB Circular A-126 and reflected in the guidance from the HQ AMD.	Center Director	IAOP Review
398	4.5.2 f (1)	Content of this review shall include, in narrative format, a comparison of the past years' use with future requirements.	Center Director	IAOP Review
399	4.5.2 f (2)	Upon completion of the annual review, a copy shall be forwarded to the HQ AMD, not later than October 31 of each year.	Center Director	IAOP Review
400	4.5.2 f (3)	When Government ownership of an aircraft is no longer justified, Center Directors shall identify such aircraft to the Assistant Administrator for the OSI for reassignment or disposal.	Center Director	IAOP Review

401	4.5.2 g	Center Directors shall submit a monthly report of Passenger Transportation flight data to the HQ AMD to arrive not later than the 20th of the next month.	Center Director	IAOP Review
402	4.5.2 g (1)	This data shall include all available Passenger Transportation flight request records for NASA aircraft under the control of the Center Director and reflect every flight flown by aircraft that has been, or may be, approved to transport passengers, regardless of whether the passengers were aboard that flight.	Center Director	IAOP Review
403	4.5.1 g (2)	At a minimum, the following shall be provided: (a) NASA Form 1653, Passenger Transportation Flight Request. (b) NASA Form 1269, Flight Itinerary and Manifest. (c) Cost Calculation Spreadsheet. (d) NAMIS Form 1672, Aircraft Log.	Center Director	IAOP Review
404	4.5.2.1	Certification documentation, demonstrating compliance with paragraph 4.3.5 for any nonofficial travel use and documentation of the required reimbursement described in paragraph 4.7, shall be included in the monthly Passenger Transportation flight data submission. This responsibility may be delegated.	Center Director	IAOP Review
405	4.5.4.2 a	For subpanels, the IAOP chairperson shall ensure that subpanel members are Chiefs of Aircraft Operations and Chiefs of Aircraft Maintenance or their designees, as well as a representative from the HQ AMD who will act as permanent Executive Secretary.	Center Director	IAOP Review
406	4.5.4.2 b	For subpanels, the IAOP chairperson shall ensure that subpanels will be convened at least annually in formal meetings; however, the subpanels will act as standing committees subject to call by the chairperson to review urgent business. Informal meetings may be conducted by teleconference.	IAOP Chair	IAOP Review
407	4.5.4.2 c	For subpanels, the IAOP chairperson shall ensure that subpanels, with the IAOP chairperson's concurrence, will forward their recommendations through the HQ AMD to the Assistant Administrator for the OSI for final approval.	IAOP Chair	IAOP Review
408	4.5.4.2 d	For subpanels, the IAOP chairperson shall ensure that HQ-approved recommendations will be considered directive in nature and be reflected in NASA policy documents.	IAOP Chair	IAOP Review

409	4.5.5.1	Maintaining the highest standards of safety is the primary concern of all crewmembers. Other concerns, such as passenger service, courtesy, promptness, and reliability are important, but shall always be secondary to safety.	IAOP Chair	IAOP Review
410	4.5.5.2	All crewmembers shall comply with the provisions set forth in this NPR, and with FAA and OEM publications for their aircraft and other applicable directives, regulations, and instructions.	NASA Crewmembers	IAOP Review
411	4.5.6	A fully qualified pilot shall be designated as PIC and charged with the responsibility of conducting each NASA Passenger Transportation flight.	NASA Crewmembers	IAOP Review
412	4.5.7	The pilot assigned to duty as SIC during flight shall be qualified as either a PIC or SIC, as specified in paragraph 4.11.4.	Pilot in Command	IAOP Review
413	4.6.1.1	NASA's aircraft programs shall be included in NASA's Management Control Plan and comply with the internal control requirements of OMB Circular A-123.	Pilot in Command	IAOP Review
414	4.6.1.2	Any material weaknesses found shall be reported in the next annual internal controls report to the President and Congress.	Center Director	IAOP Review
415	4.6.1.4	On a semiannual basis, NASA reports to GSA on each Passenger Transportation flight for "Other Official Travel" by senior Federal officials, staff of the Executive Office of the President, members of the families of such officials, and any non-Federal travelers. Such reports will be in a format as specified by GSA and list all such travel conducted during the preceding 6-month period. The report shall include, at a minimum: a. The name of each such traveler. b. The official purpose of the trip. c. Destination(s). d. For travel in which the report states that a Passenger Transportation flight would be less expensive than a commercial carrier, the allocated share of the full operating cost of each trip and the corresponding commercial cost for the trip.	Center Director	IAOP Review
416	4.6.1.4 d (1)	Reports on classified trips will not be reported to GSA, but shall be maintained by the Agency using the Passenger Transportation flights and be available for review as authorized.	Center Director	IAOP Review

417	4.6.1.5	Records of all Passenger Transportation flight operations shall be retained for at least 2 years and include, at a minimum: a. The tail number of the plane used. b. The date(s) used. c. The name(s) of the pilot(s) and flightcrew. d. The purpose(s) of the flight. e. The route(s) flown. f. The names and status of all passengers on all legs of the mission.	Center Director	IAOP Review
418	4.6.2 a.	Center Directors shall ensure strict compliance with the following reporting requirements: Monthly submission of Passenger Transportation flight data to the HQ AMD, as required in paragraph 4.5.2.7.	Center Director	IAOP Review
419	4.6.2 b.	Center Directors shall ensure strict compliance with the following reporting requirements: Annually reviewing and documenting the Center's continuing need for aircraft, whose primary purpose is the transport of passengers, and the cost-effectiveness of such aircraft operations, as required by OMB Circular A-126 and reflected in the guidance from the HQ AMD. Content of this review is to include, in narrative format, a comparison of the past years' use with future requirements. Upon completion of the annual review, a copy will be forwarded to the HQ AMD, not later than October 31 of each year.	Center Director	IAOP Review
420	4.6.2 c.	Center Directors shall ensure strict compliance with the following reporting requirements: Establishing variable cost rates for each fiscal year for aircraft under their control that are, or may be, used for Passenger Transportation.	Center Director	IAOP Review
421	4.6.2 c (1)	This rate is to be used to determine cost justification for Passenger Transportation flight requests and shall be reported to the HQ AMD, not later than September 15 of each year.	Center Director	IAOP Review
422	4.6.2 c (3)	The Center variable rate shall be approved by HQ AMD prior to being applied at the beginning of each fiscal year.	Center Director	IAOP Review
423	4.6.2 c (4)	If, during the fiscal year, a Center needs to adjust the variable rate, substantiation shall be submitted and approved prior to being applied.	Center Director	IAOP Review
424	4.7.1	Reimbursement for nonofficial travel use shall be made in advance of the flight for travel on FAA aircraft, consistent with current FAA procedures.	Center Director	IAOP Review

425	4.7.2	Reimbursement for nonofficial travel use of NASA-owned or -controlled aircraft shall be made in advance of the flight.	Center Director	IAOP Review
426	4.7.2.1	Travelers aboard such flights shall reimburse the Agency at the full commercial coach fare for the most direct route possible between the origin and destination, except: (a) as authorized under 10 U.S.C., § 2648, Persons and Supplies: Sea, Land, and Air Transportation, and regulations implementing the statute and (b) by civilian personnel and their dependents in remote locations (i.e., locations not reasonably accessible to regularly scheduled commercial airline services).	Center Director	IAOP Review
427	4.7.3	Any flight involving nonofficial travelers shall require notification to the HQ AMD, prior to the flight, to ensure application of the Agency-wide procedures for reimbursement.	Center Director	IAOP Review
428	4.8.2	NASA aircraft used to conduct Passenger Transportation flights shall meet the FAA certification standards required of Passenger Transportation flights.	Center Director	IAOP Review
429	4.8.3	Airworthiness of NASA Passenger Transportation flights shall, at a minimum, meet the standards set forth in the Federal Aviation Regulations for similar business-type aircraft.	Center Director	IAOP Review
430	4.8.3.1	Aircraft whose primary or secondary purpose is the transport of passengers shall be maintained, as required, for retention of FAA Airworthiness Certification.	Center Director	IAOP Review
431	4.8.4	The cost of operation and the utilization of Passenger Transportation flights shall be reported in accordance with OMB Circular A-126.	Center Director	IAOP Review
432	4.9.1	NASA-owned and -controlled aircraft, including lease and charter, whose primary purpose is to meet other mission requirements of research or program support, are public aircraft and are not authorized to carry passengers (even if the classification of the flight is Mission Required) without written approval from the Assistant Administrator for the OSI prior to such use. Approval shall be coordinated with the HQ AMD.	Center Director	IAOP Review
433	4.9.1.2	The use of a NASA aircraft to provide Passenger Transportation shall be restricted to circumstances where such use does not conflict with program support or research operations.	Center Director	IAOP Review

434	4.9.1.3 a	When using a NASA aircraft for Passenger Transportation flights, the aircraft shall be in a valid FAA-certificated configuration.	Center Director	IAOP Review
435	4.9.1.4	Centers shall document the justification for and approval of each flight used for Passenger Transportation purposes and retain the documentation for 2 years.	Center Director	IAOP Review
436	4.9.1.4 a	Additionally, every flight in such aircraft, including flights without passengers, shall be accounted for in monthly documentation provided to the HQ AMD as described in paragraph 4.6.2a.	Center Director	IAOP Review
437	4.10.1	When deviations from this NPR are necessary, Center Directors shall submit requests for deviations or waivers to the Assistant Administrator for the OSI.	Center Director	IAOP Review
438	4.11.1	Prior to assigning personnel to flightcrew duties on NASA Passenger Transportation flights, the requirements contained in this chapter shall be met.	Center Director	IAOP Review
439	4.11.2	A training file shall be maintained for each flightcrew member that contains all documentation pertaining to crew qualification and training.	Center Chief of Flight Operations	IAOP Review
440	4.11.2 b	A record of refresher training shall be maintained for the past 2 calendar years [in a crewmember's training file].	Center Chief of Flight Operations	IAOP Review
441	4.11.3	Pilots of aircraft used for Passenger Transportation flights shall possess a current FAA First-Class Medical Certificate.	Center Chief of Flight Operations	IAOP Review
442	4.11.3.1	Flight Maintenance Technicians shall possess a valid FAA Third-Class Medical Certificate or NASA medical certificate issued within the past 12 months by a NASA-approved medical examiner.	Center Chief of Flight Operations	IAOP Review
443	4.11.4	PICs/SICs shall possess an FAA Airline Transport Pilot (ATP) Certificate with appropriate category, class, and type rating in the aircraft assigned.	Center Chief of Flight Operations	IAOP Review
444	4.11.4.1	To be designated an aircraft commander, the pilot shall meet the following minimum flight experience requirements: a. 2,500 pilot hours (500 hours multi-engine). b. 100 pilot hours in type.	Center Director	IAOP Review
445	4.11.5	Instructor pilots shall be selected by the Center's Chief of Flight Operations from highly qualified PICs who have demonstrated the skill, maturity, and temperament to perform instructor duties.	Center Chief of Flight Operations	IAOP Review

446	4.11.7	Flight maintenance technicians shall possess an FAA A&P Certificate.	Center Chief of Flight Operations	IAOP Review
447	4.13.1	Each primary crewmember shall receive basic survival training on a one-time basis.	Center Chief of Flight Operations	IAOP Review
448	4.13.1 a	Additional survival training shall be required by appropriate Center management for those crewmembers engaged in frequent over-water or remote-area flights.	Center Chief of Flight Operations	IAOP Review
449	4.13.1 b	Newly assigned personnel with no previous survival training shall complete this requirement within 12 months of being assigned to flightcrew duties.	Center Chief of Flight Operations	IAOP Review
450	4.13.1 c	Pilots shall not be assigned as PICs until this requirement has been met.	Center Chief of Flight Operations	IAOP Review
451	4.13.2	Prior to initial designation, primary crewmembers shall receive instruction in the physiological aspects of high-altitude flight, including altitude chamber indoctrination or recognized equivalent training; i.e., Reduced Oxygen Breathing Device training.	Center Chief of Flight Operations	IAOP Review
452	4.13.2 a	Altitude chamber training received prior to initial designation meets this requirement. Refresher training academics shall be accomplished every 5 years.	Center Chief of Flight Operations	IAOP Review
453	4.13.3	Emergency Egress Training. Prior to initial designation and annually thereafter, each crewmember shall receive emergency egress training on each type of aircraft assigned.	Center Chief of Flight Operations	IAOP Review
454	4.13.3 a	Training shall include instructions on the location and operation of normal and emergency exits and cabin emergency equipment, such as fire extinguishers and life vests.	Center Chief of Flight Operations	IAOP Review
455	4.13.4	Each primary crewmember shall complete an approved formal course of instruction in the type aircraft to be flown, including a study of the systems and procedures applicable to the individual's crew position.	Center Chief of Flight Operations	IAOP Review
456	4.13.5	A formal systems training course that consists of a minimum of 7 hours of academic training shall be required every 6 months for pilots and every 18 months for flight maintenance technicians.	Center Chief of Flight Operations	IAOP Review

457	4.13.6	Maintenance Technicians shall attend refresher training that addresses changes to aircraft systems, test equipment, or critical troubleshooting and repair techniques every 24 months.	Center Chief of Flight Operations	IAOP Review
458	4.14.1	Flight training shall be conducted under the supervision of a NASA-designated flight IP or an FAA-certified flight instructor, either in an approved simulator or in an aircraft.	Center Chief of Flight Operations	IAOP Review
459	4.14.2	Prior to initial designation, each pilot shall receive a minimum of 10 hours of flight training, 8 hours of which may be conducted in a simulator.	Center Chief of Flight Operations	IAOP Review
460	4.14.3	Refresher Pilot Training. In each 6-month period, pilots shall receive a minimum of 6 hours of flight or simulator training.	Center Chief of Flight Operations	IAOP Review
461	4.14.3.1	At least one-half of this training shall be completed in the pilot's (left seat) position.	Center Chief of Flight Operations	IAOP Review
462	4.14.4.1	Prior to initial designation, each maintenance technician shall receive training in such areas as traffic awareness and "see-and-avoid" techniques, aircraft servicing, weight and balance, and passenger care.	Center Chief of Flight Operations	IAOP Review
463	4.14.4.3	Initial training will consist of at least two passenger missions. One mission shall include an overnight stop away from the home duty station.	Center Chief of Flight Operations	IAOP Review
464	4.15.1	Only crewmembers who have completed their required training shall be used as required crewmembers on any passenger missions.	Center Chief of Flight Operations	IAOP Review
465	4.16.1	All flightcrew currency documentation shall be recorded in the NASA standard application NAMIS.	Center Chief of Flight Operations	IAOP Review
466	4.16.2.1	In the interest of flight safety and to ensure that all crewmembers have the opportunity to exercise their aeronautical skills and, thereby, maintain the proficiency level for which they have been trained, pilots shall meet the minimum currency requirements of Table 4-2.	Center Chief of Flight Operations	IAOP Review
467	4.16.2.1 d	Private pilot time shall not be recorded in NASA information systems or utilized to meet any of the above currency requirements.	Center Chief of Flight Operations	IAOP Review
468	4.17.1.1	A pilot at the controls who does not meet the 90-day total hour requirements, but is otherwise current, shall increase all instrument approach minimums by 200 feet and one-half mile visibility (or the Runway Visual Range equivalent).	Center Chief of Flight Operations	IAOP Review

469	4.17.1.3	At the discretion of the Chief Pilot, pilots flying multiple types of aircraft who have met the all-types requirements may satisfy the in-type currency requirement by flying a training flight with a flight instructor. This training flight shall include a minimum of two instrument approaches, three takeoffs, and three landings.	Center Chief of Flight Operations	IAOP Review
470	4.17.1.5	Lapse in qualification greater than 90 days shall require retraining of at least 6 hours of dedicated flight or simulator training as determined by the Center's Chief of Flight Operations and requires a formal flight evaluation by an IP.	Center Chief of Flight Operations	IAOP Review
471	4.18.1 a	Designated IPs shall administer all flight checks.	Center Chief of Flight Operations	IAOP Review
472	4.18.1 b	An IP shall be designated for all flights in which instruction or evaluation is planned.	Center Chief of Flight Operations	IAOP Review
473	4.18.2	Prior to being designated in their crew position, and annually thereafter, pilots shall complete a proficiency evaluation flight conducted by a NASA-designated IP or an FAA-designated flight IP.	Center Chief of Flight Operations	IAOP Review
474	4.18.2 .2	Pilots with overdue proficiency checks shall be scheduled only on training flights (i.e., non-passenger flights) with an IP.	Center Chief of Flight Operations	IAOP Review
475	4.18.2.3	The Annual Proficiency Check shall not be accomplished with passengers aboard, and no in-flight emergency training shall be conducted with passengers aboard.	Center Chief of Flight Operations	IAOP Review
476	4.18.3	Prior to being designated an aircraft commander, and annually thereafter, pilots shall complete a line evaluation flight conducted by an IP.	Center Chief of Flight Operations	IAOP Review
477	4.18.3.2	Pilots with overdue line checks shall not be scheduled as a PIC until a check is completed.	Center Chief of Flight Operations	IAOP Review
478	4.18.4	Flight checks conducted by a NASA IP shall be recorded on NASA Form 1615 or Center equivalent, reviewed by the Center's Chief of Flight Operations, and filed in the individual's training file.	Center Chief of Flight Operations	IAOP Review
479	4.19.1 a	The Assistant Administrator for the OSI and the Center Directors shall ensure that the most cost-effective aircraft is used to satisfy approved requirements. Exceptions to this will be documented in writing.	Center Directors	IAOP Review

480	4.19.1 b	The Assistant Administrator for the OSI and the Center Directors shall coordinate trip itineraries and requirements with other NASA activities that could benefit from the use of available seats on each trip.	Assistant Administrator for the OSI	IAOP Review
481	4.20.1	All personnel scheduled as primary flightcrew members on NASA Passenger Transportation flights shall be trained and qualified in accordance with this chapter.	Center Chief of Flight Operations	IAOP Review
482	4.20.1.1	Crew assignment, including identification of a PIC, shall be designated in writing for each flight.	Center Chief of Flight Operations	IAOP Review
483	4.20.2	Basic Crew. No aircraft carrying passengers shall be operated with less than the minimum basic crew specified below. Exception: G-II/III aircraft may be operated with three pilots, one of whom functions as the Flight Maintenance Technician, or the flight may be operated without a flight maintenance technician at the direction of the Center's Chief of Flight Operations. a. Gulfstream II/III -- PIC and SIC. Flight Maintenance Technician (optional). b. King Air B200 -- PIC and SIC.	Center Chief of Flight Operations	IAOP Review
484	4.21.2	Duty Time Limitations. Basic crew duty time shall not be scheduled to exceed 14 consecutive hours, except as set forth below.	Center Chief of Flight Operations	IAOP Review
485	4.21.2.1	The aircraft shall be pressurized and have a functional autopilot.	Center Directors	IAOP Review
486	4.21.2.2 a	Consideration shall be given to limiting passenger load to ensure that an adequate crew rest capability is available.	Center Chief of Flight Operations	IAOP Review
487	4.21.2.2 b	Augmented crew duty time shall not be scheduled to exceed 18 consecutive hours.	Center Chief of Flight Operations	IAOP Review
488	4.21.2.2 c	The aircraft shall be pressurized and have a functional autopilot.	Center Directors	IAOP Review
489	4.21.2.2 d	Flights requiring augmentation shall be approved by the Center's Chief of Flight Operations and documented and maintained on file for a period of 12 months.	Center Chief of Flight Operations	IAOP Review
490	4.21.2.3	Relief crews shall be pre-positioned if the mission schedule cannot be supported within the duty time limitations specified for a single or augmented crew.	Center Chief of Flight Operations	IAOP Review
491	4.22.2.1	Crew rest shall normally provide at least 10 consecutive hours free of all official duties.	Pilot in Command	IAOP Review

492	4.22.2.2	At en route stops, crew rest shall not commence until 1 hour after termination of the mission in order to allow for necessary post-flight duties.	Pilot in Command	IAOP Review
493	4.22.2.3	The crew rest period shall end 1 hour prior to the crew beginning official duties in preparation for departure, normally at least 1 hour prior to scheduled takeoff time.	Pilot in Command	IAOP Review
494	4.22.2.4 a	Approvals for reduced crew rest shall be limited to one occurrence per crewmember during any 7-day period.	Center Chief of Flight Operations	IAOP Review
495	4.22.2.4 b	Such approvals shall be documented and maintained on file for a period of 12 months.	Center Chief of Flight Operations	IAOP Review
496	4.23.1	Flightcrew members shall not be scheduled, nor permitted, to function as members of Passenger Transportation flightcrews, if their total professional flying time exceeds the following flight hours in Table 4-3.	Center Chief of Flight Operations	IAOP Review
497	4.24.1	Hazardous material, as defined in 49 C.F.R Part 105.5, shall not be transported aboard Passenger Transportation flights.	Pilot in Command	IAOP Review
498	4.24.1.1	Cargo to be shipped shall be routed through the Center's transportation office before acceptance or, if en route, normally only be accepted from a certified shipper or freight-forwarding agency.	Pilot in Command	IAOP Review
499	4.25.1	During all critical flight operations, cockpit activities and conversation shall be limited to those involved with the direct operation of the aircraft.	Pilot in Command	IAOP Review
500	4.25.1.1	This Sterile Cockpit environment shall be maintained when below 10,000 feet above ground level (AGL) during approach and departure, except during prolonged cruise at an altitude below 10,000 feet AGL.	Pilot in Command	IAOP Review
501	4.26.1	Before departure, the PIC shall brief the crew on all essential information concerning the flight, including weather, restrictions, and the duties and responsibilities of each flightcrew member.	Pilot in Command	IAOP Review
502	4.27.1	In those instances when, in the determination of the PIC, an extenuating circumstance requires loading or unloading passengers or cargo with an engine running, the following minimum precautions shall be followed: a. Only the engine on the opposite side of the aircraft from the loading door will be operating and be operated at as low a power setting as practical. b. A flightcrew member will be positioned on the	Pilot in Command	IAOP Review

		... flight crew member will be positioned on the ground to ensure that passengers do not approach close to an operating engine or windmilling propeller.		
503	4.27.2	The PIC shall ensure that all passengers have been briefed on the Disclosure for Persons Flying Aboard Federal Government Aircraft.	Pilot in Command	IAOP Review
504	4.27.3	Thorough flight planning is essential to the safe and efficient conduct of Passenger Transportation passenger flights. A flight plan shall be filed for each flight.	Pilot in Command	IAOP Review
505	4.27.4	Passenger flights shall be operated under instrument flight rules and, to the maximum extent possible, in controlled airspace. However, daylight flights of less than 100 nautical miles may be operated under visual flight rules if weather conditions permit.	Pilot in Command	IAOP Review
506	4.27.5	Considering weather forecasts and any known en route delays, the minimum amount of useable fuel required at takeoff shall be sufficient to do the following: a. Complete the flight to the destination airport. b. Fly from that airport to the alternate airport, if required. c. Fly after that for 45 minutes at normal cruising speed or, for helicopters, fly after that for 30 minutes at normal cruising speed.	Pilot in Command	IAOP Review
507	4.27.6	Refueling with Passengers On Board: An aircraft shall not be refueled when passengers are embarking, on board, or disembarking unless it is properly attended by qualified personnel ready to initiate and direct an evacuation of the aircraft by the most practical and expeditious means available.	Pilot in Command	IAOP Review
508	4.27.6.1	When refueling with passengers embarking, on board or disembarking, two-way communications shall be maintained by the aircraft's intercommunication system or other suitable means between the ground crew supervising the refueling and the qualified personnel on board the aircraft.	Pilot in Command	IAOP Review
509	4.27.7	Prior to takeoff, the PIC shall receive a thorough weather briefing concerning current weather and forecasts for the proposed route, destination, and alternate destination.	Pilot in Command	IAOP Review
510	4.27.7.1	Weather minimums for takeoffs shall be not less than landing minimums unless a takeoff alternate is available.	Pilot in Command	IAOP Review

511	4.27.7.3	The weather reported at the departure alternate shall be above landing minimums and forecast to remain so for at least 2 hours after takeoff, per the following: a. Precision Approach available: 200-foot ceiling and 1/2-statute mile (SM) visibility added to the published Precision Approach minimums. b. Non-Precision Approach (only) available: 300-foot ceiling and 1-SM visibility added to the published Non-Precision Approach minimums.	Pilot in Command	IAOP Review
512	4.27.7.4 a	The PIC of a Passenger Transportation flight shall not file a flight plan requesting clearance into areas of reported or a forecast of severe icing conditions.	Pilot in Command	IAOP Review
513	4.27.7.4 b	Airborne radar shall be operative for any flight into areas where current weather reports or forecasts indicate that thunderstorms may reasonably be expected and flight under daylight visual meteorological conditions is not possible.	Pilot in Command	IAOP Review
514	4.27.7.4 c	All flights shall be planned to circumnavigate areas of thunderstorm activity.	Pilot in Command	IAOP Review
515	4.27.7.5 a	If the destination weather is reported and forecast to be less than a 2,000-foot ceiling or less than 3-mile visibility from 1 hour before, until 1 hour after, the estimated time of arrival (ETA), an alternate airport shall be listed on the flight plan.	Pilot in Command	IAOP Review
516	4.27.7.5 b	Airport weather minimums shall meet or exceed the requirements of FAR Part 91.	Pilot in Command	IAOP Review
517	4.27.8	When the pilot has less than 100 hours PIC experience in the type (make and model) aircraft being operated, the minimum descent altitude (MDA) or the Decision Altitude (DA) and visibility landing minimums shall be increased by 200 feet and 1/2 mile (or the RVR equivalent) for all instrument approaches conducted by that pilot.	Pilot in Command	IAOP Review
518	4.27.8.1	In no case shall the landing minimums be less than a 400-foot ceiling and 1-mile visibility.	Pilot in Command	IAOP Review
519	4.27.8.2	Similarly, takeoffs shall not be made if the airfield is below these adjusted landing minimums.	Pilot in Command	IAOP Review
520	4.27.9	Prior to activating any aircraft system, aircraft maintenance forms shall be reviewed and evaluated.	Pilot in Command	IAOP Review
521	4.27.9.1	Prior to flight, the PIC shall accept the aircraft by signing the form. DoD aircraft forms, NAMIS, or equivalent forms may be used as a substitute for specific NASA forms.	Pilot in Command	IAOP Review

522	4.27.10	A copy of the current weight and balance data shall be carried aboard each Passenger Transportation flight.	Pilot in Command	IAOP Review
523	4.28.1	On departure, navigational aids (NAVAIDS) shall be set up to aid in a possible expedited emergency return, as well as to aid in establishing the initial en route course.	Pilot in Command	IAOP Review
524	4.28.2	Cockpit Voice Recorder (CVR) and Flight Data Recorder (FDR). If installed and operative, the CVR and FDR shall be turned on during the entire flight.	Pilot in Command	IAOP Review
525	4.28.2.1	Should an incident occur, the CVR and FDR power shall be removed and appropriate circuit breakers pulled following completion of the after-shutdown checklist.	Pilot in Command	IAOP Review
526	4.28.3	Enhanced Ground Proximity Warning System (EGPWS)/Terrain Awareness and Warning System (TAWS) shall be used on all flights.	Pilot in Command	IAOP Review
527	4.28.3.1	If the equipment tests satisfactorily prior to takeoff, it shall be assumed that any EGPWS/TAWS warning is valid unless the aircraft position can immediately and positively be verified by visual reference.	Pilot in Command	IAOP Review
528	4.28.3.2	Immediate and appropriate action shall be taken in response to all valid EGPWS/TAWS warning calls.	Pilot in Command	IAOP Review
529	4.28.4	Landing lights shall be used during all takeoffs and landings and when operating near airports or in high-density traffic areas.	Pilot in Command	IAOP Review
530	4.28.6	Flight Maintenance Technicians shall remain at their duty station throughout the climb and descent.	Pilot in Command	IAOP Review
531	4.28.7	Traffic Alert and Collision Avoidance System (TCAS) resolution advisories (RA) shall be followed.	Pilot in Command	IAOP Review
532	4.29.1	The PIC is responsible for the safety and comfort of the passengers and shall make every reasonable effort to keep the senior passenger or trip coordinator apprised of any significant deviations from the itinerary or schedule.	Pilot in Command	IAOP Review
533	4.29.1.1	In-flight delays and readily discernible abnormal conditions shall be explained to the passengers.	Pilot in Command	IAOP Review
534	4.29.1.2	The PIC shall require that all passengers and crewmembers have safety belts securely fastened for taxiing, takeoffs, landings, and before entering an area of in-flight turbulence.	Pilot in Command	IAOP Review

535	4.29.1.3	Admission to the Flight Deck. Passengers shall not be admitted to the flight deck during sterile cockpit phases of flight.	Pilot in Command	IAOP Review
536	4.29.2	The PIC shall notify ATC of the aircraft's minimum fuel status at any time the fuel supply has reached a quantity where, upon reaching destination, little or no delay can be accepted. In no case may this quantity be less than that specified in Table 4-6.	Pilot in Command	IAOP Review
537	4.29.2.1	If fuel remaining indicates a need for traffic priority to ensure a safe landing, the PIC shall formally declare an emergency due to low fuel and report fuel remaining in minutes.	Pilot in Command	IAOP Review
538	4.29.3	When an emergency or in-flight difficulty arises, the crew shall complete the checklists and report the nature and extent of the difficulty, intentions, and assistance required to the controlling ground agency.	Pilot in Command	IAOP Review
539	4.29.4	In the event of an engine failure or shutdown, the aircraft shall land at the nearest suitable airport at which a safe landing can be made.	Pilot in Command	IAOP Review
540	4.30.1	During instrument arrivals, all available navigational aids shall be used. When available, precision approach guidance (any precision approach) will be used for all night arrivals except for specific events during training flights.	Pilot in Command	IAOP Review
541	4.30.2	Pilots operating aircraft shall land the aircraft only when the flight visibility is equal to or greater than the visibility prescribed in the standard instrument approach procedure being used.	Pilot in Command	IAOP Review
542	4.30.3	The weather at the alternate shall be at or above alternate minimums and forecast to remain so until the new ETA plus one hour.	Pilot in Command	IAOP Review
543	4.30.4	Before starting an approach, the pilot flying shall brief the crew on the procedures to be followed during the approach and landing and in the event of a missed approach.	Pilot in Command	IAOP Review
544	4.30.5 a	The pilot shall set up to execute a stabilized approach to landing.	Pilot in Command	IAOP Review
545	4.30.5 b	A stabilized approach shall be established by 1,000 feet above airport elevation in instrument meteorological conditions (IMC) and by 500 feet above airport elevation in visual meteorological conditions (VMC).	Pilot in Command	IAOP Review

546	4.30.5 c	The pilot flying the approach shall announce his/her progress and intentions periodically.	Pilot in Command	IAOP Review
547	4.30.5 d	The pilot monitoring shall observe the approach and provide a continual cross-check of the navigational aids, instruments, ATC instructions, and approach procedures.	Pilot in Command	IAOP Review
548	4.30.5 e	Any deviations from the prescribed procedure shall immediately be brought to the attention of the pilot flying.	Pilot in Command	IAOP Review
549	4.30.5 f	The pilot monitoring shall call out "1,000 feet above" and "100 feet above" all key altitudes, as well as minimums upon reaching the Missed Approach position.	Pilot in Command	IAOP Review
550	4.30.5 g	When the runway is in sight, the pilot monitoring shall state, "runway in sight."	Pilot in Command	IAOP Review
551	4.30.5 h	If the runway is not in sight when the aircraft reaches the Missed Approach point, the pilot monitoring shall state, "go around."	Pilot in Command	IAOP Review
552	4.30.6.1	To prevent excessive loss of altitude in the event of an autopilot failure, the pilot directing the aircraft shall maintain flight control contact throughout the final portion of an automatic coupler approach.	Pilot in Command	IAOP Review
553	4.30.6.2	Full manual control shall be assumed at or above published minimum altitude.	Pilot in Command	IAOP Review
554	4.30.6.3	Pilots shall observe all cautions on use of autopilots in icing.	Pilot in Command	IAOP Review
555	4.31.1	On completion of the flight, the PIC shall ensure that the flight plan is closed with the appropriate facility.	Pilot in Command	IAOP Review
556	4.31.2	The PIC shall take prudent measures to secure and protect the aircraft at en route stops.	Pilot in Command	IAOP Review
557	4.31.2.1	State Department Advisories and the DoD Foreign Clearance Guide (FCG) shall be consulted for out-of-continental United States (CONUS) operations.	Pilot in Command	IAOP Review
558	4.31.3	Aircraft Flight Logs. The flightcrew shall enter in the aircraft flight log each mechanical irregularity discovered during the flight.	Pilot in Command	IAOP Review
559	4.32.1	Aircraft flight manual data shall be used to ensure that adequate takeoff, climb, approach, and landing performance is available for the actual conditions encountered.	Pilot in Command	IAOP Review

560	4.32.2	Table 4-4 contains the minimum runway lengths that shall be used for the aircraft. An HQ waiver is required for takeoffs from or landings on runways of lesser length.	Pilot in Command	IAOP Review
561	4.32.3	For normal operations, airfields shall be considered below minimums for takeoff and landing when winds, including gusts, are greater than those in Table 4-5.	Pilot in Command	IAOP Review
562	4.32.4	Minimum Fuel for Landing. Minimum fuel for landing is established in recognition of three factors: (1) Fuel required to execute an unanticipated go-around and traffic pattern; (2) Fuel required for landing and rollout; and (3) Allowance for fuel quantity measuring system error. All flights shall be planned to have no less than the minimum indicated fuel shown in Table 4-6 available at touchdown on the final landing:	Center Director	IAOP Review
563	5.1.1	UAS are aircraft and therefore, shall comply with all Federal and Agency regulations pertaining to UAS, including operations, acquisition and disposal.	Center Director	IAOP Review
564	5.1.2	Center Directors shall establish procedures to ensure that all UAS flights are properly approved, documented, and operated in accordance with this chapter.	Center Director	IAOP Review
565	5.1.2.1	Center Directors also shall ensure that UAS flightcrews and operations receive direct oversight by the Center's Flight Operations Office or through another Center with a Flight Operations Department.	Center Director	IAOP Review
566	5.1.3.2	In all cases, waiver and oversight responsibility shall be IN ACCORDANCE WITH this NPR and applicable NASA HQ-approved Center guidelines.	Center Director	IAOP Review
567	5.1.4	UAS flightcrew are responsible for the safe control and operation of the UAS and shall be involved in all mission planning; complete prelaunch, mission, and recovery checklists; and assist in evaluating and disseminating in-flight data.	Center Director	IAOP Review
568	5.1.4.1	All flight operations shall be within visual line of sight of the controlling pilot.	UAS Pilot/Mission Commander	IAOP Review

569	5.1.4.5 a	The UAS Mission Commander shall understand the sections of 14 CFR Subpart E 61.105 and 61.107 that apply to all aircraft operations (public and civil) in the U.S. National Airspace System (NAS).	Center Chief of Flight Operations	IAOP Review
570	5.1.4.5 c	If not qualified in type, UAS Mission Commanders shall receive all required ground training for the UAS under their purview.	Center Chief of Flight Operations	IAOP Review
571	5.1.4.6	The holder of a NASA UAS Instrument Rating shall understand the sections of 14 CFR Subpart F 61.125 and 61.127 that apply to instrument flight operations (public and civil) in the NAS.	Center Chief of Flight Operations	IAOP Review
572	5.1.5	UAS flightcrews shall have the capability to command, control, and manage the UAS and to coordinate access and integration into the airspace utilized to complete the mission.	Center Chief of Flight Operations	IAOP Review
573	5.2.1	Before any deployment, considerable planning takes place well in advance of a UAS operation. UAS increase the workload on personnel assigned, who very often know little about the unique requirements of UAS integration in operations in CONUS or overseas. Coordination with appropriate agencies or countries shall occur as soon as the decision is made to employ a UAS.	Center Director	IAOP Review
574	5.2.1.2	If a UAS will be flown outside the boundaries of special-use airspace, sufficient time shall be allowed to process a COA request to the FAA to conduct UAS operations.	Center Director	IAOP Review
575	5.2.1.4	Letter of Agreement (LOA). An LOA with local air facilities shall be completed to ensure that proper coordination of support requirements is understood and agreed upon. It will address: a. >Fuel and hazardous material storage. b. Hangar facilities. c. Runway use. d. Any other logistical and support requirements.	Center Director	IAOP Review
576	5.2.2.1	UAS planners shall ensure that UAS operations are included at the outset of integration planning within host nation (HN) airspace.	Center Director	IAOP Review
577	5.2.2.2	Planners shall have a firm understanding of the UAS to be employed so that they can satisfy any protests or concerns from the HN.	Center Director	IAOP Review

578	5.2.2.3	The UAS planner shall work via the Office of International and Interagency Relations (OIIR) to gain diplomatic clearances prior to any UAS operations within their represented country.	Center Director	IAOP Review
579	5.3.1	UAS managers and flightcrews shall ensure particular consideration is given to the location of the UAS operations site.	Pilot in Command	IAOP Review
580	5.3.1.1	At a minimum, a proper landing surface shall be available to safely recover the UAS upon completing its mission and consideration given to the distance from the UAS launch site to the area of operations (AO).	Pilot in Command	IAOP Review
581	5.3.2	UAS managers and flightcrews at all times shall consider the expected weather conditions in the AO at the time of operations.	Pilot in Command	IAOP Review
582	5.3.3	UAS managers and flightcrews shall ensure effective command and control architecture is linked to the UAS.	Pilot in Command	IAOP Review
583	5.3.4 a	The UAS managers and the flightcrew shall study the assigned mission and plan for its operation.	Pilot in Command	IAOP Review
584	5.3.4 b	The maintenance crew shall begin preparation of the UAS and the UAS ground control system.	Center's Chief of Flight Operations	IAOP Review
585	5.3.4 c	Communications personnel shall ensure that the proper communication connectivity is provided to fulfill the mission.	Center's Chief of Flight Operations	IAOP Review
586	5.3.5	UAS missions shall be planned by the UAS flightcrew in close coordination with the Center's Flight Operations Office.	Center's Chief of Flight Operations	IAOP Review
587	5.3.6	During planning, sufficient attention shall be given to the possibility that an in-flight emergency may occur.	Center's Chief of Flight Operations	IAOP Review
588	5.3.6.2	Flight paths, minimum-risk routes, and other air management tools shall be included.	Center's Chief of Flight Operations	IAOP Review
589	5.3.6.3	When a UAS senses a significant delay or loss of the command uplink, the predetermined loss-of-link procedures shall be initiated to place the UAS on the return home profile or a suitable alternate route and recovery location.	Pilot in Command	IAOP Review
590	5.3.6.4	The Center Flight Operations Office shall incorporate mishap reporting responsibilities into the Center Mishap Response Plan, to include UAS-specific notification requirements.	Center's Chief of Flight Operations	IAOP Review

591	5.4.1	Flight Brief. A flight brief that includes the flightcrew, a program representative, and a maintenance representative shall be conducted prior to all flights. Centers will develop briefing guides appropriate to the operations, which include at a minimum: a. Weather update. b. Program brief. c. System update. d. Emergency divert airfields. e. Emergency procedures and terminology. f. Mission profile.	Center's Chief of Flight Operations	IAOP Review
592	5.4.2.1	Systems checks shall include an independent means to verify waypoints entered into a navigational system prior to takeoff.	Pilot in Command	IAOP Review
593	5.4.2.3	If a suitable runway is not available, then an alternate launch method shall be used.	Pilot in Command	IAOP Review
594	5.4.3	An adequate surface area shall be available for a safe landing for the UAS and safely accessible to personnel.	Pilot in Command	IAOP Review
595	5.4.3.2	The UAS recovery checklist shall be adhered to in accordance with the operations manual.	Pilot in Command	IAOP Review
596	5.5.1	Centers shall conduct Airworthiness Reviews to establish the airworthiness and evaluate the safety of the aircraft in accordance with the Center processes outlined in Chapter 2 and will include Range Safety personnel.	Center Directors	IAOP Review
597	5.5.2	The following additional topics shall be addressed by a NASA Airworthiness Review to assess the risks associated with a UAS flight program: a. General overview of UAS. b. Communication links and frequency management plan. c. Flight control system and configuration control procedures. d. Backup systems and procedures. e. Flight terminations systems, including ground abort.	Center Directors	IAOP Review
598	5.5.2.1	UAS shall operate only in airspace for which the degree of airworthiness allows.	Center's Chief of Flight Operations	IAOP Review
599	5.5.2.2	The airworthiness statement shall specifically clear each UAS for the appropriate Mission Qualification Standards (MQS) level (as defined in section 5.6.2.4).	Center Directors	IAOP Review

600	5.5.3	The program/project manager shall limit the assessed collective risk associated with aerospace vehicle operation and ensure that the probability of doing harm to a member of the general public is not greater than the criteria established by NPR 8715.5.	Center Directors	IAOP Review
601	5.5.4	Flight Readiness Reviews/Operational Readiness Reviews shall be conducted in accordance with Chapter 3 of this manual with additional UAS-specific personnel.	Center Directors	IAOP Review
602	5.6.1	UAS flightcrew members shall become qualified in accordance with written Center standards.	Center Director	IAOP Review
603	5.6.1.1	The Center's Chief of Flight Operations, with the concurrence of the Center Director, shall designate UAS pilots for the specific type of UAS they operate.	Chief of Flight Operations	IAOP Review
604	5.6.1.2	The Center's Chief of Flight Operations shall ensure that each UAS flightcrew possesses an adequate level of training and experience to perform the duties of the designated positions.	Chief of Flight Operations	IAOP Review
605	5.6.2	Initial UAS training shall be documented by each Center in accordance with this chapter with the approval of the Center's Chief of Flight Operations.	Chief of Flight Operations	IAOP Review
606	5.6.2.1	Recurrent training shall be Center-developed and Chief of Flight Operations-approved.	Chief of Flight Operations	IAOP Review
607	5.6.2.3 e	In the case of prototype, experimental, or research UAS aircraft for which no formal schools are available, the services of the designers and the manufacturer's best qualified personnel shall be utilized to brief and familiarize the UAS pilots with the aircraft, UAS aircraft systems, and ground control stations.	Chief of Flight Operations	IAOP Review
608	5.6.2.3	Qualification training will vary with the UAS type, but will normally include: a. Ground training (including UAS ground control station checkout), handbook study, attendance at formal UAS aircraft training programs, emergency procedure training, and the performance of a UAS aircraft written examination (open book). b. Simulator training, if available, including normal and emergency procedure training. c. UAS aircraft checkout flights, including a prescribed number of UAS flights and landings (if applicable) under the supervision of a UAS IP. d. A mission profile flight monitored by a UAS IP to obtain full UAS mission qualification	Chief of Flight Operations	IAOP Review

		<p>e. In the case of prototype, experimental, or research UAS aircraft for which no formal schools are available, the services of the designers and the manufacturer's best qualified personnel shall be utilized to brief and familiarize the UAS pilots with the aircraft, UAS aircraft systems, and ground control stations. In addition, existing UAS simulators and UAS aircraft of a similar nature will be used to train pilots prior to flying a UAS research vehicle.</p>		
609	5.6.2.4	Each UAS crew shall have the knowledge and knowledge-based skills needed to safely conduct flight in the required airspace and flight conditions.	Chief of Flight Operations	IAOP Review
610	5.6.2.4 a	MQS Level I. VFR conditions below 1200 feet AGL in Class E, G, or special use airspace (or international equivalents). UAS Pilots shall complete a Center-developed training course on airspace procedures, but no other formal certification is required.	Chief of Flight Operations	IAOP Review
611	5.6.2.5	All UAS pilots shall complete a Center-developed and administered annual flight check and be certified as qualified by a designated authority from the Chief of Flight Operations Office.	Chief of Flight Operations	IAOP Review
612	5.6.2.6	Holders of a NASA UAS instrument rating shall pass a Center-developed UAS instrument rating exam.	Chief of Flight Operations	IAOP Review
613	5.6.2.7	UAS Mission Commanders and observers shall pass an annual FAA Third-Class medical exam or NASA / Military equivalent with vision correctable to 20/20 (as determined by an FAA AME or NASA flight surgeon).	Center Directors	IAOP Review
614	5.6.2.8	Fully qualified NASA pilots may be assigned as UAS pilots, but for UAS pilots to fly manned NASA aircraft, they shall meet NASA pilot qualification minimums.	Center Directors	IAOP Review
615	5.6.2.9	Training for all members of the UAS flightcrew shall include crew resource management training.	Chief of Flight Operations	IAOP Review
616	5.6.2.10	NASA UAS flight time for MQS level II and III operations shall be kept separate from NASA manned aircraft flight time, by type, in NAMIS.	Chief of Flight Operations	IAOP Review
617	5.6.2.11	A review of UAS pilot and crew qualifications shall be made prior to flight assignment to ensure that prerequisites for the intended mission are met.	Chief of Flight Operations	IAOP Review

618	5.6.2.12	A PIC shall be designated for all NASA UAS flight operations and is responsible for safe flight conduct.	Chief of Flight Operations	IAOP Review
619	5.6.2.13	When transferring from one control mode to another (i.e., Pilot Operator to RC Pilot), a new PIC shall be declared and PIC responsibilities be transferred when handing off from one control room to another MC or in all cases, a positive three-way change of control is required.	Chief of Flight Operations	IAOP Review
620	5.6.2.14	Center Directors shall establish policy to standardize all UAS control transfers.	Center Directors	IAOP Review
621	6.1.3.2	This NPR establishes policy and procedures for the NASA Aircraft Operations SMS in accordance with ICAO, Federal, and industry standards. Compliance is mandatory and shall be monitored during IAOP functional reviews.	Center Directors	IAOP Review
622	6.1.3.2 a	The SMS shall establish the mechanisms necessary to deliver and monitor safety performance.	Chief of Safety and Mission Assurance	IAOP Review
623	6.1.3.3	Centers shall assign an individual within aircraft operations with the responsibility for managing the Center's aircraft operations SMS to include at a minimum documentation control, training of personnel, and promotion of the program to ensure all aircraft operations personnel are aware of their responsibilities.	Center Directors	IAOP Review
624	6.2.2.1	Center Directors shall support and maintain an Aviation Safety Program and organization in accordance with this NPR and this chapter.	Center Directors	IAOP Review
625	6.2.2.2	Center Directors shall ensure that the Center ASO is granted formal and direct access to senior management when safety issues cannot be resolved at a lower level in the flight organization.	Center Directors	IAOP Review
626	6.2.5	The AMD ASO shall be a qualified ASO in accordance with the Federal Management Regulation on the Management of Government Aircraft and meet the training requirements in section 6.2.7.4 within 3 years of appointment.	Center Directors	IAOP Review
627	6.2.6	The ASO subpanel chair is responsible for briefing aviation safety issues and concerns of the Centers to the IAOP and shall schedule and conduct subpanel meetings and teleconferences.	IAOP Aviation Safety Officer Subpanel Chair	IAOP Review

628	6.2.7	The Center's Chief of Flight Operations, shall recommend assignment of the Center Aviation Safety Officer (ASO), with the concurrence of the Center, Safety and Mission Assurance Director, to the Center Director for approval.	Center Directors	IAOP Review
629	6.2.7.3	If the ASO believes that a safety concern has not been dealt with sufficiently by the Flight Operations organization, the ASO shall take the concern directly to the Center Director, Chief, Safety and Mission Assurance or the HQ Director, Aircraft Management Division without retribution.	Aviation Safety Officer	IAOP Review
630	6.2.7.4 a	The ASO shall hold qualification as a NASA PIC in primary research aircraft type used at the Center.	Center Directors	IAOP Review
631	6.2.7.4 b	The ASO, within 1 year of appointment, shall complete a course in Aviation Safety Program management and NASA STEP 1 for Aviation Safety.	Center Directors	IAOP Review
632	6.2.7.4 c (1)	The ASO, within 2 years of appointment, shall have graduated from a recognized Military Aviation Safety Officer Course or an Academic Aviation Safety Certificate Program (of at least 6 weeks' duration).	Center Directors	IAOP Review
633	6.2.7.4 c (2)	The ASO, within 2 years of appointment, shall have completed the necessary NASA courses to lead or act as an ex-officio member of a mishap investigation in accordance with NPR 8621.1, which shall include at a minimum: (a) Overview of mishap investigations. (b) Mishap investigation roles and responsibilities. (c) Introduction to human factors in mishap and close call investigation. (d) Completing the investigation and mishap report. (e) Root cause analysis.	Center Directors	IAOP Review
634	6.2.7.5	Each Center shall establish a continuing education program to ensure that each ASO maintains adequate knowledge to discharge the duties of the office.	Center Directors	IAOP Review
635	6.2.7.5 a	To maintain familiarity with the latest aviation safety principles as a NASA ASO, the ASO shall be actively engaged in the Center's aviation operations program and complete 40 hours of continuing education in ASO course elements within 24 calendar months.	Center Directors	IAOP Review
636	6.2.8	Center Aviation Ground Safety Officers (AGSO). The Center's Chief of Flight Operations shall appoint an AGSO.	Center Chief of Flight Operations	IAOP Review

637	6.2.8 .1 a	The AGSO shall hold qualification as an aircraft or helicopter mechanic, aeronautics engineer, or in airport or aviation operations.	Center's Chief of Flight Operations	IAOP Review
638	6.2.8 .1 b	The AGSO, within 1 year of appointment, shall complete NASA STEP 1 for Aviation Safety.	Center's Chief of Flight Operations	IAOP Review
639	6.2.8.2	Each Center shall establish a continuing education program to ensure that each AGSO maintains adequate knowledge to discharge the duties of the office.	Center's Chief of Flight Operations	IAOP Review
640	6.2.8.2 a	To maintain familiarity with the latest aviation safety principles as a NASA AGSO, the AGSO shall be actively engaged in the Center's aviation operations program and complete 40 hours of continuing education in AGSO course elements within 24 calendar months.	Center's Chief of Flight Operations	IAOP Review
641	6.2.8.3	Aviation Ground Safety Officer shall: a. Lead and manage quarterly maintenance aviation safety training. Facilitate monthly safety training by work centers. b. Lead and manage process to identify and resolve hazards identified within the aircraft maintenance activities. c. Investigate initial reporting of hazardous events and hazardous conditions associated with aircraft maintenance activities. d. Inspect and audit the effectiveness/health of Flight Operations processes addressing: (1) Cargo safety for assigned aircraft. (2) Ramp/hangar FOD. (3) Vehicular traffic incursion and tool control. e. Recommend safety policy for aircraft maintenance activities. f. Participate as a member of the Aviation Safety Working Group. g. Investigate and report on aircraft-related NPR8621.1 events as assigned. h. Develop and manage portfolio of existing ground safety hazards associated with aircraft maintenance activities. i. Facilitate periodic inspections/audits of aircraft maintenance-related facilities/ramps and resolution of identified deficiencies. j. Serve as the safety liaison between the Center's airfield manager and related aircraft maintenance activities.	Center's Chief of Flight Operations	IAOP Review

642	6.3.1	The Center's Aviation Safety Program shall be documented in a coherent set of directives maintained in a single comprehensive manual, The Aviation Safety Program shall provide a clear assignment of roles and responsibilities of the Center's SMS and implementation of requirements and policies outlined in this directive, NPR 8621.1, NPR 8715.3, and NPD 7900.4.	Center Directors	IAOP Review
643	6.3.1.1	Center's Aviation Safety Working Group. The Center's Aviation Safety Working Group provides a forum to discuss and resolve Center aviation safety issues. The working group is chaired by the ASO, shall meet at least semiannually, and reports to the Chief of Flight Operations.	Center Directors	IAOP Review
644	6.3.1.2 a	HQ AMD, together with independent oversight from the OSMA, shall conduct an aviation safety review of each Center utilizing the IAOP Review Program.	Aircraft Division	IAOP Review
645	6.3.1.2 b	Centers conducting flight operations shall perform a review of flight operations during the alternate year when an IAOP review is not scheduled by either an internal or external organization.	Center Directors	IAOP Review
646	6.3.1.2 b (2)	External reviews may be conducted by the Center's Safety Office or an external aviation inspection organization that shall provide an objective evaluation of selected aircraft operations, maintenance, crew procedures, and facilities to ensure safe and efficient operations.	Center Directors	IAOP Review
647	6.3.1.2 e	A written report summarizing the review, findings, and recommendations shall be provided to the Center Director, copy to AMD, within 75 days of the review.	Chief of Flight Operations	IAOP Review
648	6.3.1.3	The ASO shall be the primary interface between NMIS and DoD Safety Investigation Databases for gleaned lessons learned and potential mitigations for their operations.	Aviation Safety Officer	IAOP Review
649	6.3.1.4	Cultural Surveys. The Chief of Flight Operations, with the assistance of the ASO, shall conduct a Government/industry-recognized cultural survey, assessment, or workshop within aircraft operations every 2 years.	Chief of Flight Operations	IAOP Review
650	6.3.1.4 a	This survey shall: (1) Determine employees' expectations of the Center's Aviation Safety Program. (2) Evaluate the effectiveness of the current Aviation Safety Program.	Chief of Flight Operations	IAOP Review

651	6.3.1.5	Quarterly Aviation Safety Training. ASOs shall conduct safety training for operations and maintenance personnel and establish a process to ensure that topics covered are disseminated to those who could not attend.	Aviation Safety Officers	IAOP Review
652	6.3.1.6	Centers shall establish an Aviation Safety Awards program.	Center Directors	IAOP Review
653	6.3.1.7	The ASO shall establish risk assessment and hazard-analysis procedures that address risks, hazards, and mitigation methods associated with aircraft modifications and research flights, in accordance with Chapter 2 of NPR 8715.3.	Aviation Safety Officers	IAOP Review
654	6.3.1.8	The Center shall ensure that project and program safety plans are subject to a review process that ensures that the plans address associated risks and hazards with the specific project or program.	Aviation Safety Officers	IAOP Review
655	6.3.1.8 a	Once approved, the Center shall ensure that the [project and program safety] plans are disseminated to all involved personnel.	Aviation Safety Officers	IAOP Review
656	6.3.1.9	Facilities and Equipment. The Chief of Flight Operations shall ensure that aviation facilities both at home and deployed locations are maintained and inspected in accordance with applicable OSHA and NASA safety standards.	Aviation Safety Officers	IAOP Review
657	6.3.1.10 a	The ASO or AGSO shall ensure safety oversight is provided during the handling and stowage of cargo, including hazardous materials, aboard NASA aircraft.	Aviation Safety Officers	IAOP Review
658	6.3.1.10 b	The Transportation Officer shall ensure that mixed cargo and passenger loads meet all Federal requirements, and ensure that contract carriers and airlift services used by NASA comply with Department of Transportation (DoT) regulations, including 49 CFR Part 175, Carriage by Aircraft, in the transportation of hazardous materials and cargo.	Center Directors	IAOP Review
659	6.3.1.11	Dissemination of Aviation Safety-Related Information. ASOs shall ensure that aviation safety-related information is distributed throughout aircraft operations and maintenance and that safety information that would be of interest Agency-wide is sent to the OSMA for distribution.	Aviation Safety Officers	IAOP Review
660	6.4.1	Each Center shall publish and maintain Mishap Preparedness and Contingency Plans that involve aircraft in accordance with the procedures established in NPR 8621.1.	Center Directors	IAOP Review

661	6.4.1 a	In addition to the requirements in NPR 8621.1, each Center's plan shall ensure that Mishap Preparedness and Contingency Plans that involve aircraft contain provisions to comply with NTSB, FAA, and GSA investigation and reporting requirements in accordance with Federal regulations.	Center Directors	IAOP Review
662	6.4.1 b	In addition to the requirements in NPR 8621.1, each Center's plan shall ensure that local fire/crash-rescue personnel are briefed annually, and prior to operation of newly acquired aircraft, on rescue and emergency procedures peculiar to the aircraft regularly operated at that facility.	Center Directors	IAOP Review
663	6.4.1 c	In addition to the requirements in NPR 8621.1, each Center's plan shall ensure that mock mishap drills through desktop or simulation are held annually and that the ASO evaluates the results to ensure optimal coordination with stakeholders for the Mishap Preparedness and Contingency Plan.	Center Directors	IAOP Review
664	6.4.1 d	In addition to the requirements in NPR 8621.1, each Center's plan shall establish procedures for notifying and working with the FAA for aircraft accidents or other reportable aircraft related incidents under Federal regulations.	Center's Chief of Flight Operations	IAOP Review
665	6.4.2	The Center safety office, with the support of the IRT, and the Center Flight Operations, shall coordinate with the Agency NAMIS Manager the impounding of all NAMIS data and records for the aircraft, support equipment, and facilities that may be involved in the mishap to prevent their unauthorized use or modification.	Center's Chief of Flight Operations	IAOP Review
666	7.2.1	Pilots shall hold an FAA First-Class medical certificate, military pilot flight physical, or obtain a NASA flight medical certification, renewed annually or more frequently, if specified by the Center Director or a competent medical authority.	Center's Chief of Flight Operations	IAOP Review
667	7.2.1.1	Flightcrew of high-performance jet aircraft or ejection-seat configured aircraft shall obtain a military pilot flight physical or NASA flight medical certification.	Center's Chief of Flight Operations	IAOP Review
668	7.2.1.2	Pilots 55 years of age and older shall be medically certified every 6 months.	Center's Chief of Flight Operations Operations	IAOP Review

669	7.2.2	Flight Engineers shall hold either an FAA Second-Class medical certificate, military flight physical, or obtain NASA flight medical certification, which will be renewed annually or earlier if specified by a competent medical authority.	Center's Chief of Flight Operations	IAOP Review
670	7.2.3	Other primary aircrew shall hold either an FAA Third-Class medical, military flight physical, or NASA flight medical certification, which will be renewed annually or earlier, if specified by a competent medical authority.	Center's Chief of Flight Operations	IAOP Review
671	7.2.4	Qualified non-crewmembers shall obtain medical clearances as required by Center procedures. At a minimum, a medical screening will be conducted by a NASA physician, as appropriate for the mission.	Center's Chief of Flight Operations	IAOP Review
672	7.2.5	Center Directors shall establish procedures, in coordination with their personnel offices, to ensure that primary aircrews are assigned to duties not involving flight if they become medically disqualified.	Center Directors	IAOP Review
673	7.3.1	Copies of current medical certification shall be kept on file at the primary aircrew and qualified non-crewmembers' operating site.	Center's Chief of Flight Operations	IAOP Review
674	7.5.1	Flightcrews shall report Special Issuances (FAA Waivers) and FAA Statements of Demonstrated Ability (SODA) to the Chief of Flight Operations for review and acceptance by a NASA Aeromedical Physician.	Center's Chief of Flight Operations	IAOP Review
675	8.1.1	The Center's Aircraft Flight Operations organizations shall coordinate all aircraft acquisition and disposition actions with the cognizant Center Supply and Equipment Management Officer(s) in accordance with NPR 4200.1.	Center Directors	IAOP Review
676	8.1.2	In addition, transfer of aircraft between Federal agencies and disposal of aircraft, including exchange/sales by Federal agencies in accordance with 41 CFR Part 102-39, Replacement of Personal Property Pursuant to the Exchange/Sale Authority, shall be completed by GSA.	Center Directors	GSA Review
677	8.2.2	In accordance with NPR 4200.1, Centers shall conduct annual physical inventories of Center-owned aircraft, including display aircraft, parts aircraft, and aircraft in flyable or non-flyable storage to determine the accuracy of the records and the PPEFS control system and adjustments made	Center Directors	IAOP Review

		and the FASB control system and adjustments must to ensure that financial statements are accurate.		
678	8.3.1	Prior to acquiring aircraft and UAS that meet the Agency asset capitalization threshold established by NPR 9250.1, for operational use, the Mission Directorate, the Associate Administrator, or the Center Director shall submit an acquisition request to the HQ AMD, per Appendix H, along with a business case analysis in support of the aircraft acquisition, including the costs to purchase the aircraft and make it operational.	Center Directors	IAOP Review
679	8.3.1.1	The Business Case Analysis may be in a format of choice, but shall contain sufficient detail to answer capital asset planning questions posed in OMB Circular A-11, (Aviation Business Case-ABC).	Center Directors	IAOP Review
680	8.3.1.2	The Business Case Analysis also shall clearly link the aircraft acquisition to Agency strategic objectives and specific program/project goals and identify life-cycle budget requirements.	Center Directors	IAOP Review
681	8.3.1.3	Procurement of aircraft shall be conducted in accordance with established FAR and guidelines, including OMB Circular A-126, and initiated only after approval from the Director, Aircraft Management Division and after the alternatives below have been considered in the following order: a. Use of available NASA aircraft resources. b. Use of public aircraft owned by other Government agencies through loan or transfer. c. Charter or lease of civil aircraft.	Center Directors and Mission Directorates	IAOP Review
682	8.3.1.4	The acquisition of UAS that are below the Agency asset capitalization threshold shall be approved by the Center Director in accordance with documented Center process for UAS acquisition.	Center Directors	IAOP Review
683	8.3.1.4 a	Integral to the Center UAS acquisition process shall be an affirmation statement that the mission of the UAS, resources required, and the oversight burden are aligned with Center and Agency objectives and goals.	Center Directors	IAOP Review
684	8.3.1.4 b	Mission Directorate concurrence with the UAS mission requirements shall be documented and the Center Director approval of the UAS acquisition forwarded to HQ AMD.	Center Directors	IAOP Review
685	8.3.1.4 c	The Center process for acquisition of below-threshold UAS shall be evaluated for compliance during IAOP Reviews.	Center Directors	IAOP Review

686	8.3.2	In completing the requirements of Appendix H, the program/project manager shall coordinate with the Center Environmental Management Office to determine whether the proposed aircraft acquisition requires preparation of an environmental assessment.	Center Directors	IAOP Review
687	8.3.4	Mission Directorates shall establish and Centers endorse the requirements and funding level for each aircraft assigned to support their programs and approve the program/project managers' acquisition requests prior to submission to HQ AMD.	Mission Directorates	Concurrent Clearance Process
688	8.3.5	AMD shall enter all acquired aircraft into the Federal Aircraft Interactive Reporting System (FAIRS).	Aircraft Division	IAOP Review
689	8.3.6	Centers shall record all acquired aircraft in the NASA Equipment Management System (Plant, Property, and Equipment System (PPES)) in accordance with NPR 4200.1.	Center Directors	IAOP Review
690	8.3.7	Centers shall register all aircraft, including UAS but excluding parts and DoD-loaned aircraft, with the FAA.	Center Directors	IAOP Review
691	8.4.1	"Parts Aircraft" Acquisition. The program/project manager or Center Director shall notify the HQ AMD prior to acquisition of an aircraft whose intended use is for "parts aircraft."	Center Directors	IAOP Review
692	8.4.1 a	Centers shall remove the data plates from all aircraft acquired solely for parts purposes and forward the data plates to HQ AMD for disposition.	Center Directors	IAOP Review
693	8.4.1 b	Centers shall enter parts aircraft into each respective Center's property inventory records, in accordance with NPR 4200.1.	Center Directors	IAOP Review
694	8.4.1 c	Centers shall dispose of parts aircraft with 5 years of initial acquisition unless otherwise extended by AMD.	Center Directors	IAOP Review
695	8.4.1 d	Prior to operating any aircraft that were acquired for parts purposes, Centers shall submit a request to activate an aircraft as outlined in 8.2.1.	Center Directors	IAOP Review
696	8.4.2	Aircraft materiel, such as spare parts, shall be acquired, managed, and controlled in compliance with NPR 4100.1 and 41 CFR Part 102-33.	Center Directors	IAOP Review

697	8.4.3.1	For as long as FSCAP or Life Limited Parts are used or kept by NASA, the documentation that accompanies those parts shall be maintained and kept updated.	Center Directors	IAOP Review
698	8.4.3.2	When FSCAP and Life Limited Parts are disposed, the up-to-date documentation shall accompany the parts.	Center Directors	IAOP Review
699	8.4.3.3	The Criticality Code of an FSCAP shall be maintained and perpetuated on all property records and reports of excess.	Center Directors	IAOP Review
700	8.5.1.1	Unless extended or waived by AMD, all Inactive Aircraft shall be dispositioned within 5 years of inactive status in coordination with Center Logistics.	Center Directors	IAOP Review
701	8.5.1.2	Disposal of NASA aircraft identified as artifacts or heritage assets shall be in accordance with NPR 4310.1.	Center Directors	IAOP Review
702	8.5.1.3	Aircraft disposition shall be coordinated and approved in advance by HQ AMD.	Center Directors	IAOP Review
703	8.5.1.4	External [aircraft] loan agreements shall be reviewed by the Center's Chief Counsel, other Center officials as appropriate, and approved by the Center Supply and Equipment Management Officer (SEMO), in accordance with NPR 4200.1.	Center Directors	IAOP Review
704	8.5.1.4 b	Aircraft loaned externally by NASA for display, even when done as part of the NASA Exhibits Program, shall be accompanied by a loan agreement signed by the Center SEMO.	Center Directors	IAOP Review
705	8.5.1.5	NASA aircraft can be exchanged or sold, but shall be coordinated with the GSA.	Center Directors	GSA Review
706	8.5.1.5 a	Requests accompanied by written justifications shall be coordinated through the NASA AMD and the NASA Property Disposal Officer (PDO) as outlined in NPD 4300.1.	Center Directors	IAOP Review
707	8.5.1.5 c	When an aircraft that has an FAA Certificate of Airworthiness is removed from the inventory, the Certificate shall be removed from the aircraft and forwarded to the HQ AMD for disposition, unless the aircraft is transferred to another Government agency that intends to operate it or it is sold through GSA to a civil operator.	Center Directors	IAOP Review

708	8.5.2	When an aircraft is removed from the inventory that is not capable of obtaining an FAA Certificate of Airworthiness or is deemed by the Center's Flight Operations Office to be unsafe for civil use, the manufacturer's data plate shall be removed and forwarded to HQ AMD for disposition.	Center Directors	IAOP Review
709	9.1.1	Results of the [IAOP] reviews shall be used to update NASA-wide or local requirements in order to enhance standardization and improve productivity.	Center Directors	IAOP Review
710	9.1.1.1	NASA IAOP Reviews shall be conducted for commercial aircraft services (CAS) operators that exceed 1 year's period of performance, require a NASA Statement of Airworthiness, or involve NASA personnel participating in flight.	Center Directors	IAOP Review
711	9.1.1.2	IAOP Reviews of CAS operators shall be funded by the project or program procuring the services.	Program/Project Managers	IAOP Review
712	9.1.1.3	NASA IAOP Reviews shall be conducted for Centers, including Federally Funded Research and Development Centers (FFRDC) that operate UAS, including Component Facilities; the Jet Propulsion Laboratory, a Federally Funded Research and Development Center, and other NASA contractors and grantees as specified in their contracts or grants; and to other organizations (i.e., commercial partners, other Federal agencies, international parties, and tenants on Centers) as specified and described in written operating agreements.	Program/Project Managers	IAOP Review
713	9.2.1	The HQ AMD shall establish IAOP Review teams to review all aspects of flight operations at NASA Centers, including the implementation of Center procedures, on a 30-month cycle, Center requested special IAOP Review, or as determined by the HQ AMD.	AMD	IAOP Review
714	9.2.1.1	Center Directors shall provide SMEs to the IAOP Review Teams as requested by AMD to support the IAOP Review Program.	Center Directors	IAOP Review
715	9.2.1.2	Flight Operations Chiefs shall designate a point of contact to coordinate IAOP Review support with HQ AMD.	Center's Chief of Flight Operations	IAOP Review
716	9.3.1.1 a	The size and experience of the [IAOP] Team shall reflect the scope and depth of the review.	AMD	IAOP Review

717	9.3.1.1 b	Team members shall be selected from various Centers and HQ to provide SMEs in the areas of operations, maintenance, QA, facilities, airworthiness, Aviation Life Support Systems, security, UAS, finance, and aviation safety.	AMD	IAOP Review
718	9.3.1.3	Communications. The IAOP Team shall conduct an entrance and exit briefing as well as frequent debriefs to Center Management as necessary.	IAOP Review Team Lead	IAOP Review
719	9.3.1.3 a	The entrance briefing will be conducted prior to the Team's arrival on Center. At the entrance briefing, Center Management shall provide a brief on the Center's Flight Operations Program.	IAOP Review Team Lead	IAOP Review
720	9.3.1.3 b	The exit briefing shall be conducted onsite for the Center Director or, if the Center Director is unexpectedly and unavoidably absent, the Deputy Center Director.	IAOP Review Team Lead	IAOP Review
721	9.3.1.3 b (1)	The exit briefing will not be given to an official further down the Center chain of command and shall be rescheduled if the Center Director and Deputy are both unavailable.	IAOP Review Team Lead	IAOP Review
722	9.3.1.3 b (2)	A draft report concerning all findings and recommendations shall be provided at the exit brief.	IAOP Review Team Lead	IAOP Review
723	9.3.1.4	The entrance briefing given by the Center Flight Chief to the review team shall be a comprehensive review of aircraft operations procedures and documentation.	IAOP Review Team Leader	IAOP Review
724	9.3.2	Reviewers shall ensure compliance with established NASA, FAA, DoD, manufacturer, industry, and association standards, processes, and procedures.	IAOP Review Team Leader	IAOP Review
725	9.3.3	The team leader shall hold daily team progress meetings to discuss discrepancies and recommendations.	IAOP Review Team Leader	IAOP Review
726	9.3.4	The team leader's exit briefing shall be in sufficient detail to inform Center management of the status of local Flight Operations activities with particular emphasis on significant findings and recommendations requiring management's attention.	IAOP Review Team Leader	IAOP Review
727	9.3.4.1	In the interest of safety and clarity of communication, if the consensus of the review team and their findings reflects their view that the level of flight safety at the Center is such that there is a significant increase in the probability of an aviation mishap the Team Leader shall inform the	IAOP Review Team Leader	IAOP Review

		Center Director or Deputy of that view, to include, as appropriate, a recommendation to cease flight operations pending resolution of the underlying issue(s).		
728	9.3.5	The review team shall document results in a brief report that focuses on findings and recommendations.	IAOP Review Team Leader	IAOP Review
729	9.3.5.1	[Review report] findings shall be objective and impact assessments accurately stated.	IAOP Review Team Leader	IAOP Review
730	9.3.5.4	The report shall be forwarded by the review team leader to the Assistant Administrator for the OSI for endorsement and forwarding to the Center Director for corrective action. A copy will be provided to the Director, AMD.	IAOP Review Team Leader	IAOP Review
731	9.3.6	The Center Director shall respond to the Assistant Administrator for the OSI concerning corrective actions.	Center Directors	IAOP Review
732	10.1.3	Except for passenger carriage, CAS flights shall be conducted as public use aircraft operations under NASA's aircraft authority.	Center Contracting Officer	IAOP Review
733	10.1.4	All CAS operations shall be inspected by NASA Center Flight Operations personnel prior to contract award.	Center Contracting Officer	IAOP Review
734	10.1.5	For all CAS contracts and agreements NASA shall ensure that the operator hold and maintain a 14 CFR 121 Certificate or 14 CFR 135 Certificate and meet the requirements of this chapter.	Center Contracting Officer	IAOP Review
735	10.1.5.1	NASA may approve deviations to an operator's 14 CFR 135 Certificate under NASA's public use authority while operating a NASA mission. Such deviations shall be authorized in writing by the Center Chief of Flight Operations.	Center Chief of Flight Operations	IAOP Review
736	10.1.5.4	If a CAS aircraft has a FAA Experimental or Provisional Certificate, the airworthiness of the aircraft shall be reviewed and approved by the Center's airworthiness review process and a NASA airworthiness certificate issued.	Center Directors	IAOP Review
737	10.1.5.5	If a CAS aircraft has been modified as described in section 2.6, the aircraft configuration and airworthiness shall be reviewed and approved by the Center's airworthiness review process and a NASA Airworthiness Certificate or statement issued.	Center Directors	IAOP Review

738	10.1.5.6	If the aircraft has FAA Form 337 documentation (FAA Series 8110, 8100.9), the Center shall review the Designated Engineering Representative (DER)/Designated Airworthiness Representative (DAR) evaluation.	Center Directors	IAOP Review
739	10.2.1	The Assistant Administrator, OSI, shall ensure that the CAS policies are in compliance with applicable Federal regulations.	Assistant Administrator, OSI	IAOP Review
740	10.2.2	MDs shall coordinate with AMD as early as possible in the planning process when establishing program or project plans that involve the acquisition of commercial aircraft services.	Mission Directorates	IAOP Review
741	10.2.3	Center Directors shall ensure Center Flight Operations is involved in the CAS planning and review process as soon as practical.	Center Directors	IAOP Review
742	10.2.4	All Center CAS contracts or agreements including Space Act Agreements that include aviation operations, shall be coordinated, reviewed, and concurred with by the Center's Flight Operations prior to contract award or execution of the agreement.	Center Contracting Officer	IAOP Review
743	10.2.4 .1	The Chief of Flight Operations oversees the Center's surveillance of contractor aircraft operations. The Chief of Flight Operations shall determine which requirements and regulations apply to the contract and then ensure the contractor meets those requirements.	Center Chief of Flight Operations	IAOP Review
744	10.2.4 .2	The Chief of Quality Assurance shall provide support for CAS oversight and Surveillance Plan development and implementation.	Chief of Quality Assurance	IAOP Review
745	10.2.4 .3	The Center Engineering Technical Authority working with the Center Airworthiness Review Board shall provide airworthiness coordination and support for CAS operations as required.	Center Chief Engineer	IAOP Review
746	10.3.1	The contractor shall ensure that the aircraft and all required equipment are operated and maintained in accordance with the manufacturer's specifications.	Center Contracting Officer	IAOP Review
747	10.3.1.1 a	The contractor shall comply with Manufacturer's Mandatory Service Bulletins (MMSBs) and FAA Airworthiness Directives (Ads) before and during agreement performance.	Center Contracting Officer	IAOP Review

748	10.3.1.1 b	The contractor shall provide and make available a list of all completed MMSBs and FAA ADs applicable to the contract aircraft in the format shown in FAA Advisory Circular (AC) 43-9C complete with authorized signature, certificate, type, and number.	Center Contracting Officer	IAOP Review
749	10.4.1	The [CAS] contractor shall have a documented Aviation Safety Program.	Center's Chief of Flight Operations	IAOP Review
750	10.4.2	The Chief of Flight Operations shall incorporate CAS mishap prevention and mishap notification in the Center's Aviation Safety Program.	Center's Chief of Flight Operations	IAOP Review
751	10.5.1	In accordance with Agency requirements, a Surveillance Plan shall be implemented for all CAS contracts due to the critical and complex nature of CAS operations as defined in NPR 8735.2.	Center's Chief of Flight Operations	IAOP Review
752	10.5.2	The CAS contract shall cite and allow NASA access to all maintenance and flight efforts performed under a NASA contract regardless of contractor/subcontractor status.	Center Contracting Officer	IAOP Review
753	10.5.3	The Surveillance Plan shall be coordinated and supported by flight operations to ensure that qualified aircraft operations and maintenance personnel are involved through the life of the contract.	Center's Chief of Flight Operations	IAOP Review
754	10.5.4	Inspections shall be conducted for all CAS operators, aircraft, pilots, and maintainers.	Center's Chief of Flight Operations	IAOP Review
755	10.5.4.1	Centers shall develop and use a standard checklist to document the inspection and associated results. This inspection will review as a minimum: a. The operator's flight operations and maintenance manuals, aircraft logbooks, and personnel training records. b. The aircraft for configuration control and material condition to meet NASA mission requirements.	Center's Chief of Flight Operations	IAOP Review
756	10.5.5	Surveillance and Inspection Teams shall include, at a minimum, a pilot and maintainer to provide expertise in the areas of operations, maintenance, quality assurance, airworthiness, and aviation safety. The mix of members may vary for each inspection.	Center's Chief of Flight Operations	IAOP Review

757	10.5.6	Programs and projects that involve CAS shall ensure that the oversight and surveillance functions required for CAS operations are included in their budgets and allocated to the appropriate organizations.	Program/Project Managers	IAOP Review
758	11.3.1	Centers shall use the NASA Aircraft Cost and Performance worksheets in Appendix H to report aircraft data, including use of Commercial Aviation Services (CAS), to HQ AMD within 45 days after the end of each quarter.	Center Directors	IAOP Review
759	11.3.1.1	Aircraft Inventory Data Reporting. Centers shall use the Aviation Inventory Report worksheet in Appendix H to report the number and type of aircraft operated.	Center Directors	IAOP Review
760	11.3.1.2	Centers shall ensure all aircraft operational information is accurately recorded in NAMIS.	Center Directors	IAOP Review
761	11.3.1.2 a	CAS aircraft operations are not normally recorded in NAMIS. CAS hours and sorties flown but not reported in NAMIS shall be provided to AMD via other electronic means.	Center Directors	IAOP Review
762	11.3.1.3	Centers shall ensure all mishap information with costs of mishaps to the nearest dollar, including CAS aircraft operations, are accurately recorded in NMIS (NASA Mishap Information System) to report aircraft operational safety metrics.	Center Directors	IAOP Review
763	11.3.1.4	Aircraft Cost Data Reporting. The Centers shall use the Aircraft Cost and Performance worksheets in Appendix H-5 to report aircraft costs, including contracted CAS.	Center Directors	IAOP Review
764	11.3.1.4 a	Accrued costs, as opposed to disbursements or obligations, shall be reported for each aircraft type operated during the fiscal year.	Center Directors	IAOP Review
765	11.3.1.4 c	Costs shall be reported to the nearest dollar.	Center Directors	IAOP Review
766	11.3.1.4 c (1) (a)	While it is not necessary to backtrack and correct the data in the Business Warehouse to report costs as requested, any data errors observed in the Business Warehouse and any data adjustments necessary to formulate and report accurate aircraft costs shall be documented.	Center Directors	IAOP Review
767	11.3.1.4 c (1) (b)	Center CFOs shall implement actions to correct any financial errors uncovered in the Business Warehouse.	Center Chief Financial Officer	IAOP Review

768	12.2.1	To be eligible to be assigned to flight status, aircrew members shall meet all applicable requirements of Chapters 3 and 4, including any additional Center requirements, and will be assigned as either of the following: (1) GS-2181, Aircraft Operations Series. (2) GS-0861, Aerospace Engineering Series.	Center Directors	IAOP Review
769	12.2.1.1	Pilots and aircrew shall meet the applicable series and grade requirements of the applicable OPM standard.	Center Directors	IAOP Review
770	12.2.3	Each Center Director and Chief of Flight Operations, in close coordination with the Center's Human Resources Office, shall establish a process to designate pilots and aircrew.	Center Directors	IAOP Review
771	12.2.3.2	To qualify for assignment as a NASA pilot of manned aircraft, only manned aircraft time shall apply.	Center Directors	IAOP Review
772	12.2.4	Each Center's Chief of Flight Operations shall establish procedures for assignment of aircrew to flight status and document those procedures in the Center Aviation Operations Manual.	Center's Chief of Flight Operations	IAOP Review
773	12.2.4.1	Fully qualified NASA pilots may be assigned as UAS pilots, but for UAS pilots to fly manned NASA aircraft, they shall meet NASA pilot qualification minimums.	Center's Chief of Flight Operations	IAOP Review
774	12.3.1	Each Center's Chief of Flight Operations shall establish procedures for temporary removal of aircrew personnel from flight status for situations other than medical disqualification (Chapter 7).	Center's Chief of Flight Operations	IAOP Review
775	12.3.1.2	The Center Director, in accordance with human resources procedures, shall review and approve any non-medical-related proposal for removal from flight status in excess of 30 days.	Center Directors	IAOP Review
776	12.3.4	The [flight performance] board shall be composed of, at a minimum, two pilots and a flight surgeon.	Center's Chief of Flight Operations	IAOP Review
777	12.3.4.1	Board Members shall be assigned to the board at the discretion of the convening authority. At a minimum, one from each of the following specialties should be assigned as advisors: (1) Flight Surgeon. The board participating Flight Surgeon cannot be called as a witness for the process. (2) Pilots senior to the individual being evaluated with at least one of the pilots thoroughly versed in the type of flight operations involved. (3) When pilots or Flight Surgeons from the	Center Directors	IAOP Review

		(c) When photos of flight surgeons from the convening Center are not available, Centers will utilize pilots and/or Flight Surgeons from other Centers.		
778	12.3.4.2	If a Flight Performance Board is convened, a flight status recommendation shall be delivered to the Center Director.	Center's Chief of Flight Operations	IAOP Review
779	12.3.4.3	The recommendation from the Flight Performance Board shall recommend either Continuation of Flight Status or the Termination of Flight Status.	Center Directors	IAOP Review
780	13.1.1	a. Center Directors shall equip airfield management personnel with sufficient budget and human resources to comply with the requirements of this NPR.	Center Directors	IAOP Review
781	13.1.2	Centers only shall operate an airfield when the Center adopts and complies with an Airfield Operations Manual, in accordance with paragraph 13.2.	Center Directors	IAOP Review
782	13.1.3	NASA heliports shall comply with the airfield requirements in this NPR. Specific references in this chapter also apply to NASA-owned and -maintained ramp and movement areas.	Center Directors	IAOP Review
783	13.1.4	A Center operating an airfield shall ensure that the FAA Regional Airports Division Manager is provided a complete copy of the Center's most current Airfield Operations Manual.	Center Directors	IAOP Review
784	13.1.5	Centers providing access to their airfield to the general public for aircraft operations conducted under civil regulations shall identify all deviations and noncompliance from 14 CFR Part 139, Certification of Airports, and provide this information to the Aircraft Management Division, OSI for approval.	Center Directors	IAOP Review
785	13.1.6 a	Centers shall establish and maintain Pre-Mishap Plan/Aircraft Incident Response Plans, in accordance with NPR 8621.1, that meet the following requirements: develop and maintain an airfield emergency plan designed to minimize the possibility and extent of personal injury and property damage on the airfield in an emergency.	Center Directors	IAOP Review
786	13.1.6 b	Centers shall establish and maintain Pre-Mishap Plan/Aircraft Incident Response Plans, in accordance with NPR 8621.1, that meet the following requirements: coordinate the plan with law enforcement agencies, rescue and firefighting agencies, medical personnel and organizations, the principal tenants at the airfield and all other	Center Directors	IAOP Review

		principal tenants at the airport, and all other persons who have responsibilities under the plan.		
787	13.1.6 c	Centers shall establish and maintain Pre-Mishap Plan/Aircraft Incident Response Plans, in accordance with NPR 8621.1, that meet the following requirements: hold a full-scale airfield emergency plan exercise at least once every 24-consecutive calendar months.	Center Directors	IAOP Review
788	13.1.6.2	At least once every 12 consecutive calendar months, the plan shall be reviewed with all the parties with whom the plan is coordinated, as specified in this NPR, to ensure that all parties know their responsibilities and to ensure that all information in the plan is current.	Center Directors	IAOP Review
789	13.1.7	The Center shall conduct training needed to meet the following requirements prior to the initial performance of such duties and at least once every 12 consecutive calendar months: a. To provide qualified personnel to comply with the requirements of this NPR. b. To qualify personnel who access movement areas and safety areas and perform duties in compliance with the requirements of the Airfield Operations Manual and the requirements of this NPR.	Center Directors	IAOP Review
790	13.1.8	Centers operating airfields or aircraft ramp or movement areas shall conduct a Pavement Condition Index (PCI) survey at least once every 5 years.	Center Directors	IAOP Review
791	13.1.9	Airfield-condition reporting shall be conducted in a manner authorized by the Center Director and meet the following requirements: a. Provide for the collection and dissemination of airfield condition information to aircraft operators, including alerts on bird and other wildlife activity. b. Use the Notices to Airmen (NOTAM) system, as appropriate, and other systems and procedures authorized by the FAA. c. Provide information on the following airfield conditions that may affect the safe operations of aircraft: (1) Construction or maintenance activity on movement areas, safety areas, or loading ramps and parking areas. (2) Surface irregularities on movement areas, safety areas, or loading ramps and parking areas. (3) Snow, ice, slush, or water on the movement area or loading ramps and parking areas. (4) Snow piled or drifted on or near movement	Center Directors	IAOP Review

		<p>areas.</p> <p>(5) Objects on the movement area or safety areas.</p> <p>(6) Malfunction of any lighting system, holding position signs, or Instrument Landing System (ILS) critical area signs.</p> <p>(7) Unresolved wildlife hazards.</p> <p>(8) Non-availability of any rescue and firefighting capability required.</p> <p>(9) Any other condition specified in the Airfield Operations Manual or that may otherwise adversely affect the safe operation of aircraft.</p> <p>d. Procedures for identifying, marking, and lighting construction and other unserviceable areas.</p> <p>e. Any other item that the Center Director finds is necessary to ensure safety in airfield operations.</p>		
792	13.2.1	The Center shall maintain an Airfield Operations Manual that includes descriptions of operating procedures, facilities and equipment, responsibility assignments, and any other information needed by personnel concerned with operating the airfield.	Center Directors	IAOP Review
793	13.2.2	<p>The Center shall include in the Airfield Operations Manual the following required elements:</p> <p>a. Lines of succession of airfield operational responsibility.</p> <p>b. Copies of current waivers, variances, or deviations issued to the airfield.</p> <p>c. Any limitations imposed by the Administrator.</p> <p>d. A grid map or other means of identifying locations and terrain features on and around the airfield that are significant to emergency operations.</p> <p>e. The location of each obstruction within the airfield's area of authority required to be lighted or marked.</p> <p>f. A description of all movement areas that are available for civil and public aircraft operators and the airfield's safety areas and all roads that serve them.</p> <p>g. Procedures for avoidance of interruption or failure during construction work of utilities that serve facilities or NAVAIDS that support aircraft operations.</p> <p>h. A description of airfield personnel training detailed in paragraph 13.1.5.</p> <p>i. Procedures for maintaining paved areas.</p> <p>j. Procedures for maintaining unpaved areas.</p> <p>k. Procedures for maintaining safety areas.</p> <p>l. A plan showing the runway and taxiway identification system, including the location and inscription of signs, runway markings, and</p>	Center Directors	IAOP Review

		<p>holding-position markings.</p> <p>m. A description of marking, signs, and lighting systems and procedures for maintaining them.</p> <p>n. A snow and ice control plan. Prompt notification will be given to all aircraft operators using the airfield when any portion of the movement area is less than satisfactorily cleared for safe operation of their aircraft.</p> <p>o. A description of the facilities, equipment, personnel, and procedures for meeting the aircraft rescue and firefighting requirements detailed in paragraph 13.3.</p> <p>p. Procedures for protecting persons and property during storing, dispensing, and handling fuel or other hazardous substances and materials.</p> <p>q. A description of traffic and wind direction indicators and procedures for maintaining them.</p> <p>r. The Pre-Mishap Plan/Aircraft Incident Response Plan, as specified in paragraph 13.1.4.</p> <p>s. Procedures for conducting a biennial self-inspection program.</p> <p>t. Procedures for controlling pedestrians and ground vehicles in movement areas and safety areas.</p> <p>u. Procedures for obstruction removal, marking, or lighting.</p> <p>v. Procedures for protection of NAVAIDS.</p> <p>w. A description of public protection.</p> <p>x. Procedures for wildlife hazard management, as specified in Section 13.4.</p> <p>y. Airfield condition reporting procedures, as specified in Section 13.1.6.</p>		
794	13.3.1	The Center shall provide and maintain facilities, equipment, personnel, and procedures for meeting the aircraft rescue and firefighting requirements, in accordance with NPR 8715.3 and NASA-STD-8719.11 for the capacity of aircraft and the level of aircraft operations being conducted at the airfield.	Center Directors	IAOP Review
795	13.3.1.1	During aircraft operations at the airfield, the Center shall provide the rescue and firefighting capability specified for the level of operations.	Airfield Manager	IAOP Review
796	13.3.1.2	In the event that fire protection is temporarily not available due to lack of personnel, equipment, or other emergencies, the Center shall establish procedures to restrict the use of the airfield and notify aircraft operators of the temporary suspension of airfield operations.	Center Director	IAOP Review

797	13.3.1.3	All rescue and firefighting personnel shall participate in at least one live-fire drill prior to initial performance of rescue and firefighting duties and every 12 consecutive calendar months thereafter.	Airfield Manager	IAOP Review
798	13.4.1	The Center shall take immediate action to eliminate wildlife hazards whenever they are detected.	Airfield Manager	IAOP Review
799	13.4.2	The Center shall ensure that a wildlife hazard assessment is conducted by a wildlife damage management biologist who has professional training and/or experience in wildlife hazard management at airfields or an individual working under direct supervision of such an individual.	Airfield Manager	IAOP Review
800	13.4.3	The Center shall conduct a training program by a qualified wildlife damage management biologist to provide airfield personnel with the knowledge and skills needed to successfully carry out the required wildlife hazard management plan.	Airfield Manager	IAOP Review
801	13.4.4	The Center shall track and report all bird strikes and other wildlife strikes either in NMIS or the NASA Aircraft Anomaly Reporting System (NAARS) in accordance with NPR 8621.1.	Airfield Manager	IAOP Review
802	13.4.5	The Center shall conduct a periodic review of bird hazards using a team similar to the U.S. Air Force Bird/Wildlife Aircraft Strike Hazard (BASH) team.	Airfield Manager	IAOP Review
803	13.4.6	The Center shall implement a wildlife hazard management plan using the wildlife hazard assessment as a basis.	Airfield Manager	IAOP Review
804	13.5.1	Whenever the requirements of this NPR cannot be met to the extent that uncorrected, unsafe conditions exist on the airfield, the Center shall limit aircraft operations to those portions of the airfield not rendered unsafe by those conditions.	Center Directors	IAOP Review
805	13.6.1	In emergency conditions requiring immediate action for the protection of life or property, the Center may deviate from any requirement of this NPR or the Airfield Operations Manual to the extent required for the emergency. Each Center that deviates from a requirement under this paragraph shall, within 14 days after the emergency, notify HQ AMD and OSMA of the nature, extent, and duration of the deviation.	Center Directors	IAOP Review

Appendix D. Flight on Public Aircraft

D.1 Flying on Public Aircraft (Crewmembers and Qualified Non-Crewmembers)

Subject: Disclosure Statement for Crewmembers and Qualified Non-Crewmembers Flying on Board Government Aircraft Operated as Public Aircraft.

Reference: 41 CFR Part 102-33, Management of Government Aircraft, section 102-33.165; (e)

Crewmembers and qualified non-crewmembers flying on board Government aircraft operated as either civil or public aircraft on the behalf of NASA shall have on file in Flight Operations a record of acknowledgement of the following disclosure statement:

Generally, an aircraft used exclusively for the U.S. Government may be considered a "public aircraft" as defined in Public Law 106-181, Wendell H. Ford Aviation Investment and Reform Act for the 21st Century, provided it is not a Government-owned aircraft transporting passengers or operating for commercial purposes. A public aircraft is not subject to many Federal Aviation Regulations, including requirements relating to aircraft certification, maintenance, and pilot certification. If an agency transports passengers on a Government-owned aircraft or uses that aircraft for commercial purposes, the agency shall comply with all Federal Aviation Regulations applicable to civil aircraft. If you have any questions concerning whether a particular flight will be a public aircraft operation or a civil aircraft operation, you should contact the agency sponsor of that flight.

You have certain rights and benefits in the unlikely event you are injured or killed while working aboard a Government-owned or -operated aircraft. Federal employees and some private citizens are eligible for workers' compensation benefits under the Federal Employees' Compensation Act (FECA). When FECA applies, it is the sole remedy. For more information about FECA and its coverage, consult with your agency's benefits office or contact the Branch of Technical Assistance at the Department of Labor's Office of Workers' Compensation Programs at (202) 693-0044. State or foreign laws may provide for product liability or "third-party" causes of actions for personal injury or wrongful death. If you have questions about a particular case or believe you have a claim, you should consult with an attorney.

Some insurance policies may exclude coverage for injuries or death sustained while working or traveling aboard a Government or military aircraft or while within a combat area. You may wish to check your policy or consult with your insurance provider before your flight. The insurance available to Federal employees through the Federal Employees Group Life Insurance Program does not contain an exclusion of this type.

If you are the victim of an air disaster resulting from criminal activity, Victim and Witness Specialists from the Federal Bureau of Investigation (FBI) and/or the local U.S. Attorney's Office will keep you or your family informed about the status of the criminal investigation(s) and provide you or your family with information about rights and services, such as crisis intervention, counseling, and emotional support. State crime victim compensation may be able to cover crime-related expenses, such as medical costs, mental health counseling, funeral and burial costs, and lost wages or loss of support. The Office for Victims of Crime (an agency of the Department of Justice) and the U.S. Attorney's Office are authorized by the Antiterrorism and Effective Death Penalty Act of 1996 to provide emergency financial assistance to state programs for the benefit of victims of terrorist acts or mass violence.

If you are a Federal employee. If you are injured or killed on the job during the performance of duty, including while traveling or working aboard a Government aircraft or other Government-owned or -operated conveyance for official Government business purposes, you and your family are eligible to collect workers' compensation benefits under FECA. You and your family may not file a personal injury or wrongful death suit against the United States or its employees. However, you may have cause of action against potentially liable third parties.

You or your qualifying family member shall normally also choose between FECA disability or death benefits and those payable under your retirement system (either the Civil Service Retirement System or the Federal Employees Retirement System). You may choose the benefit that is more favorable to you.

If you are a private citizen not employed by the Federal Government. Even if the Federal Government does not regularly employ you, if you are rendering personal service to the Federal Government on a voluntary basis or for nominal pay, you may be defined as a Federal employee for purposes of FECA. If that is the case, you and your family are eligible to receive workers' compensation benefits under FECA, but may not collect in a personal injury or wrongful death lawsuit against the United States or its employees. You and your family may file suit against potentially liable third parties. Before you board a Government aircraft, you may wish to consult with the department or agency sponsoring the flight to clarify whether you are considered a Federal employee.

If the agency determines that you are not a "Federal employee," you and your family will not be eligible to receive workmen's compensation benefits under FECA. If you are on board the aircraft for purposes of official Government business, you may be eligible for workman's compensation benefits under state law. If an accident occurs within the United States or its territories, its airspace, or over the high seas, you and your family may claim against the United States under the Federal Tort Claims Act or Suits in Admiralty Act. If you are killed aboard a military aircraft, your family may be eligible to receive compensation under the Military Claims Act or if you are an inhabitant of a foreign country under the Foreign Claims Act.

NOTE: This disclosure statement is not all-inclusive. You should contact your agency's personnel office or, if you are a private citizen, your agency sponsor or point of contact for further assistance.

D.2 Flying on Public Aircraft (Passengers)

Subject: Disclosure Statement for Passengers Flying on Board Government Aircraft Operated as Public Aircraft.

Passengers flying on board Government aircraft operated on the behalf of NASA will have been briefed on the following disclosure statement, and a single-sheet laminated copy of the following disclosure statement shall be made available at each passenger's seat. Each passenger manifest shall be annotated that all passengers were briefed on their rights and benefits.

DISCLOSURE FOR PERSONS FLYING ABOARD FEDERAL GOVERNMENT AIRCRAFT (41 CFR 300.3, 301.10, and 301.70, Federal Travel Regulation (FTR), Section 301-70.909)

NOTE: The disclosure contained herein is not all-inclusive. You should contact your

sponsoring agency for further assistance.

Generally, an aircraft used exclusively for the U.S. Government may be considered a "public aircraft" as defined in 49 U.S.C. 40102 and 40125, unless it is transporting passengers or operating for commercial purposes. A public aircraft is not subject to many Federal Aviation Regulations, including requirements relating to aircraft certification, maintenance, and pilot certification. If a U.S. Government agency transports passengers on a Government aircraft, that agency must comply with all Federal Aviation Regulations applicable to civil aircraft. If you have questions about the status of a particular flight, you should contact the agency sponsoring the flight.

You and your family have certain rights and benefits in the unlikely event you are injured or killed while riding aboard a Government aircraft. Federal employees and some private citizens are eligible for workers' compensation benefits under the Federal Employees' Compensation Act (FECA). When FECA applies, it is the sole remedy. For more information about FECA and its coverage, consult with your agency's benefits office or contact the Branch of Technical Assistance at the Department of Labor's Office of Workers' Compensation Programs at (202) 693-0044. (These rules also apply to travel on other Government-owned or -operated conveyances such as cars, vans, or buses.)

State or foreign laws may provide for product liability or "third party" causes of actions for personal injury or wrongful death. If you have questions about a particular case or believe you have a claim, you should consult with an attorney. Some insurance policies may exclude coverage for injuries or death sustained while traveling aboard a Government or military aircraft or while within a combat area. You may wish to check your policy or consult with your insurance provider before your flight. The insurance available to Federal employees through the Federal Employees Group Life Insurance Program does not contain an exclusion of this type.

If you are the victim of an air disaster resulting from criminal activity, Victim and Witness Specialists from the Federal Bureau of Investigation (FBI) and/or the local U.S. Attorney's Office will keep you or your family informed about the status of the criminal investigation(s) and provide you or your family with information about rights and services, such as crisis intervention, counseling and emotional support. State crime victim compensation may be able to cover crime-related expenses, such as medical costs, mental health counseling, funeral and burial costs, and lost wages or loss of support. The Office for Victims of Crime (an agency of the Department of Justice) is authorized by the Antiterrorism Act of 1996 to provide emergency financial assistance to State programs, as well as the U.S. Attorney's Office, for the benefit of victims of terrorist acts or mass violence.

If you are a Federal employee:

1. If you are injured or killed on the job during the performance of duty--including while traveling aboard a Government aircraft or other Government-owned or -operated conveyance for business purposes, you and your family are eligible to collect workers' compensation benefits under FECA. You and your family may not file a personal injury or wrongful death suit against the United States or its employees. However, you may have cause of action against potentially liable third parties.

2. You or your qualifying family member must normally also choose between FECA disability or death benefits, and those payable under your retirement system (either the Civil

Service Retirement System or the Federal Employees Retirement System). You may choose the benefit that is more favorable to you.

If you are a private citizen not employed by the Federal Government:

1. Even if you are not regularly employed by the Federal Government, if you are rendering personal service to the Federal Government on a voluntary basis or for nominal pay, you may be defined as a Federal employee for purposes of FECA. If that is the case, you and your family are eligible to receive workers' compensation benefits under FECA, but may not collect in a personal injury or wrongful death lawsuit against the United States or its employees. You and your family may file suit against potentially liable third parties. Before you depart, you may wish to consult with the department or agency sponsoring the flight to clarify whether you are considered a Federal employee.

2. If there is a determination that you are not a Federal employee, you and your family will not be eligible to receive workman's compensation benefits under FECA. If you are traveling for business purposes, you may be eligible for workman's compensation benefits under State law. If the accident occurs within the United States, or its territories, its airspace, or over the high seas, you and your family may claim against the United States under the Federal Tort Claims Act or Suits in Admiralty Act. If you are killed aboard a military aircraft, your family may be eligible to receive compensation under the Military Claims Act or, if you are an inhabitant of a foreign country, under the Foreign Claims Act.

Appendix E. Inter-Center Aircraft Operations Review Plan

Action Item	Responsible Party	Timing
Update annual schedule, designate Team Leaders, and assign Inter-Center team members.	IAOP Chair/HQ AMD	Yearly, amended as required
Notify team members, request travel orders.	HQ AMD/Team Leader	6-8 weeks before review
Letter to Center Director.	HQ AMD	4-6 weeks before review
Team Leader packet containing IAOP checklist and recent reviews.	HQ AMD	2-4 weeks before review
Entrance briefing.	Team Leader	First day of review
Center briefing.	Applicable Center	First day of review
Individual observations and recommendations.	Team Member	During review
Exit briefing.	Team Leader	Last day of review
Write review report and forward to HQ AMD.	Team Leader/HQ AMD assist	2-4 weeks after review
Forward Final Report to Center Director.	HQ AMD Signature	Within 1 week of receipt
Center Director forwards review report response to AA OSI.	Applicable Center	12 weeks after receipt of report
Analyze response for adequacy, followup, tracking, and closure.	HQ AMD	As necessary

Appendix F. NASA Inter-Center Aircraft Operations Program Review Sheet

FACILITY:

DATE:

AREA REVIEWED: MANAGEMENT OPERATIONS _____

AVIATION SAFETY AVIONICS QA _____

AIRCRAFT MAINTENANCE FACILITIES _____

AIRWORTHINESS/FLIGHT READINESS HAZARD ANALYSIS _____

MAINTENANCE FACILITIES MAINTENANCE TRAINING _____

SECURITY PASSENGER TRANSPORTATION MISSION MANAGEMENT OPERATIONS

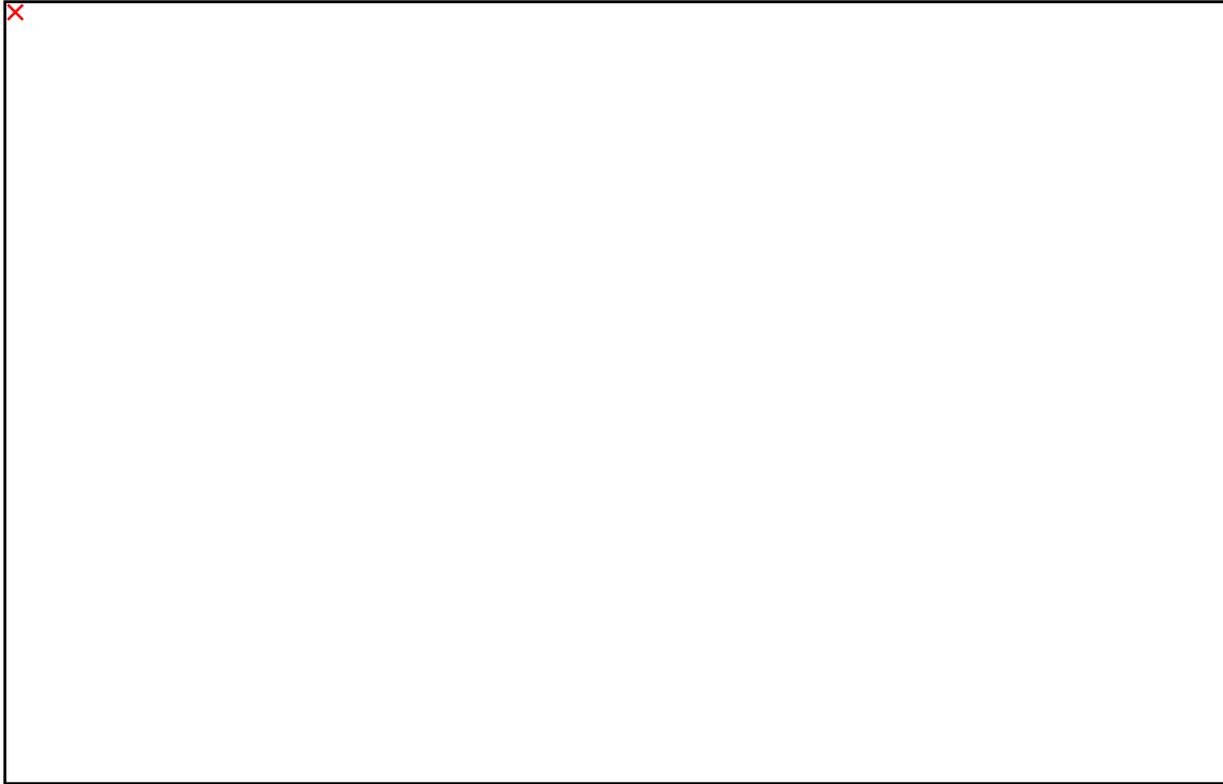
TEAM MEMBER:

LOCAL CONTACT:

OBSERVATION TITLE:

OBSERVATION (Factual Information):

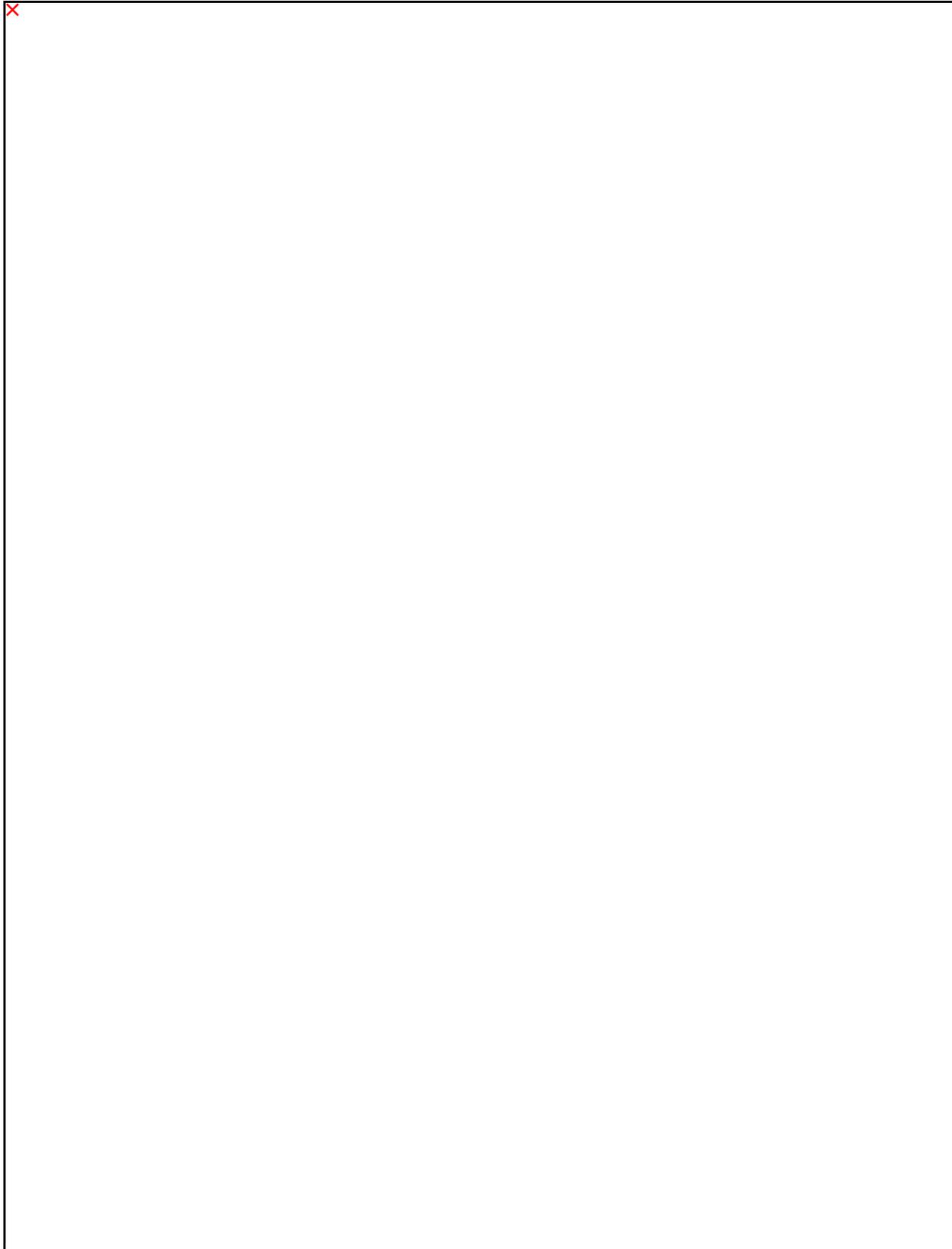
REQUIRED ACTION, RECOMMENDATION, OR COMMENDABLE FINDING:



<ftp://ftp.hq.nasa.gov/forms/pdf/nfl677.pdf>

Appendix H. NASA Aircraft Cost and Performance Worksheets

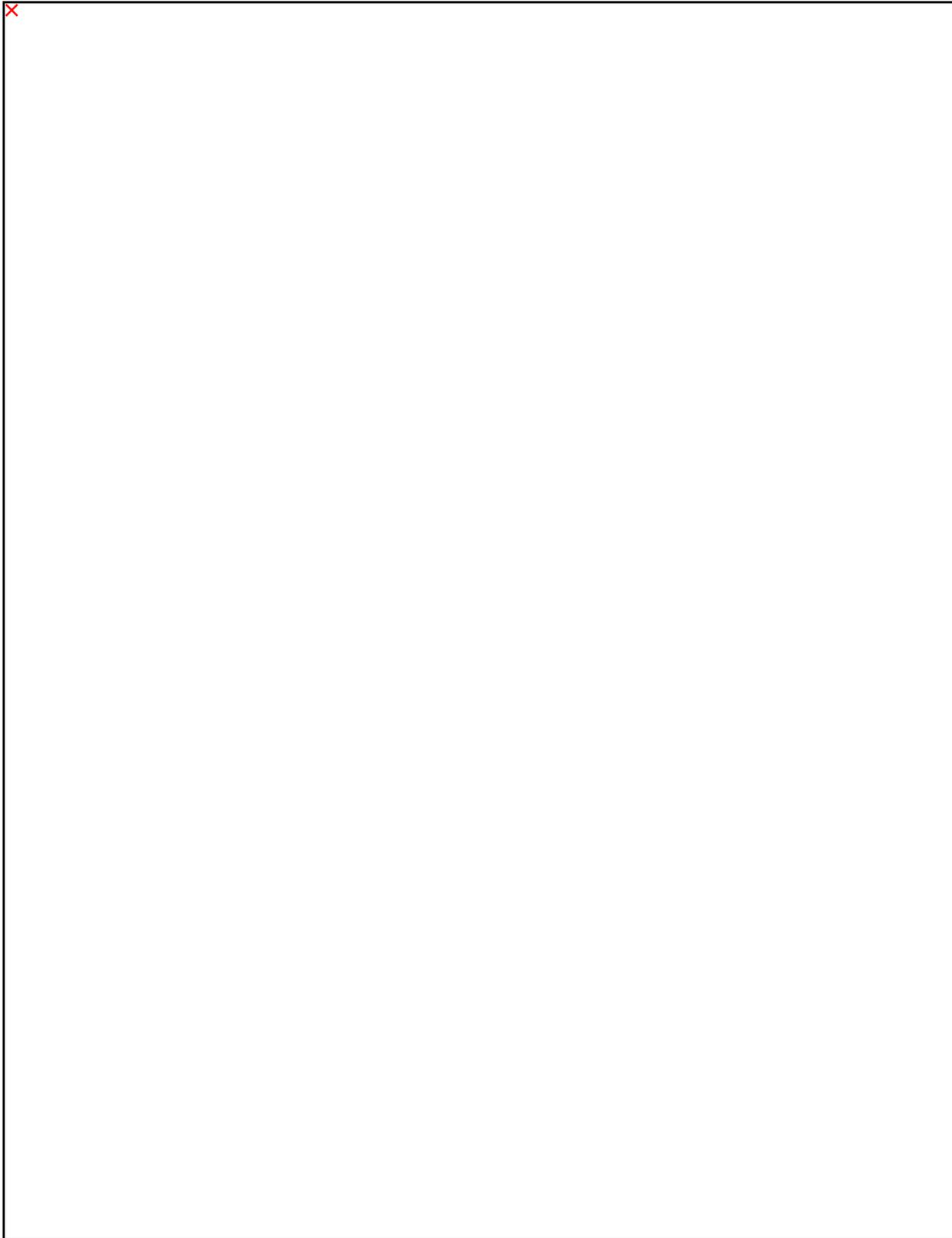
H.1 NASA Aircraft Cost and Performance Worksheets



H.2 NASA Aircraft Cost and Performance Worksheets

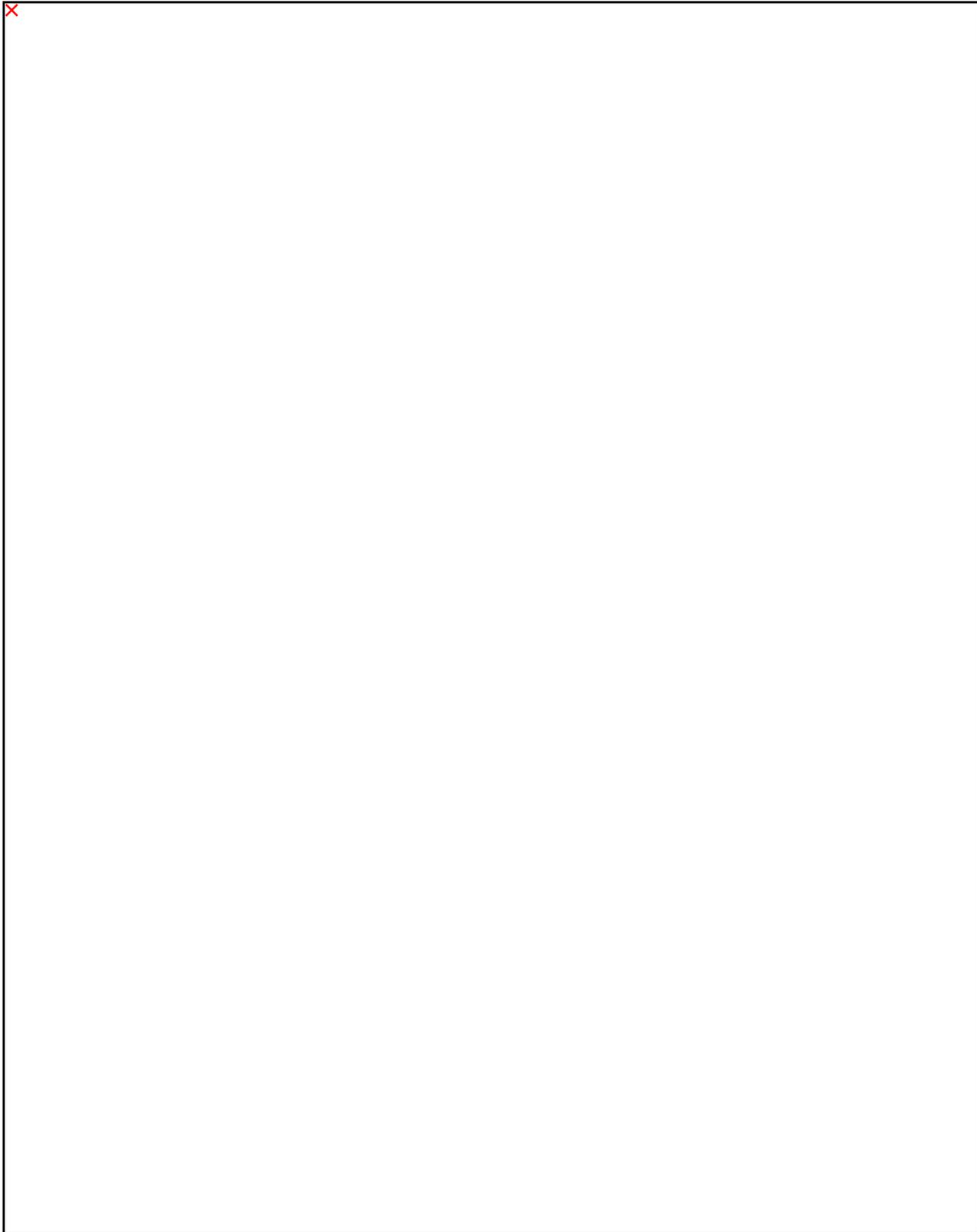
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H.3 NASA Aircraft Cost and Performance Worksheets

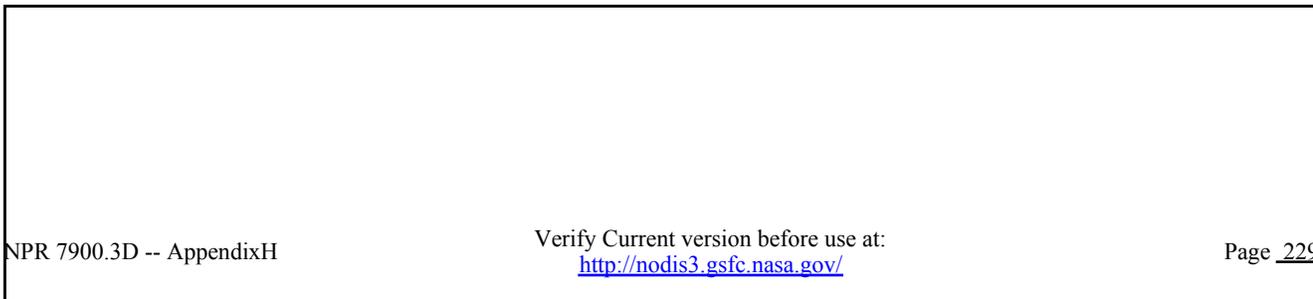


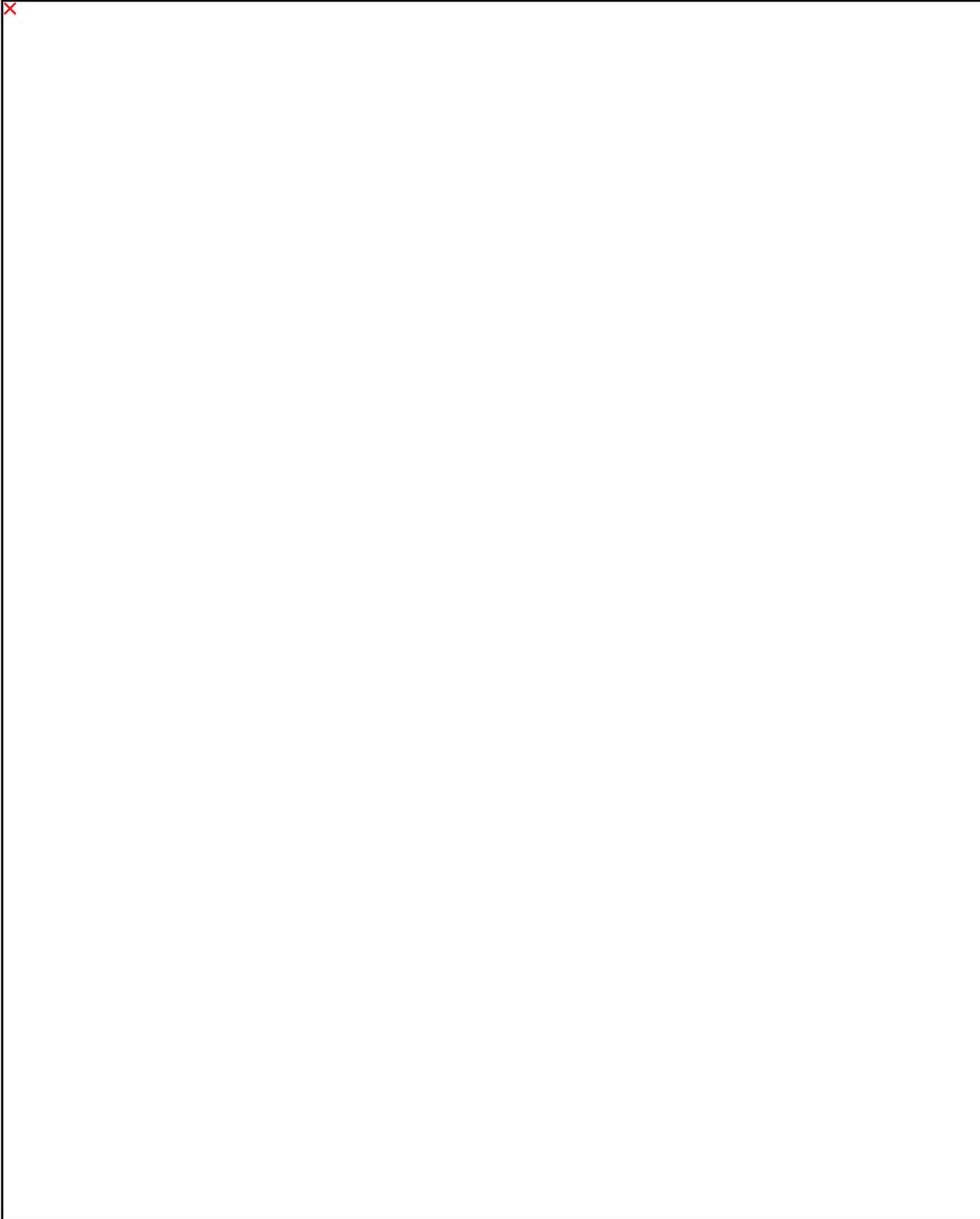
H.4 NASA Aircraft Cost and Performance Worksheets





H.5 NASA Aircraft Cost and Performance Worksheets





Appendix I. Sample Approval Request to Acquire/Transfer/Dispose of Aircraft

TO: Assistant Administrator for the OSI

FROM: Director, (NASA Center)

SUBJECT: Request Approval to Acquire/Transfer/Dispose (number) (type) Aircraft

Statement of Need. This should be a summary of the reasons for acquiring/transferring/disposing the aircraft, including the program and primary requirements it will satisfy or, in the case of support, the secondary or derived requirements (such as chase, pilot training, cargo) or, on the other hand, discontinued requirements.

Estimated Acquisition/Transfer/Disposal Cost. This should include all the costs associated with providing a resource ready for use by the program. It could be divided into two distinct areas which differentiate the costs associated with obtaining the basic aircraft and placing it into flying condition (such as engine overhauls, aircraft inspections, and programmed depot maintenance/scheduled depot level maintenance (PDM/SDLM)), and the costs of modifying the aircraft to meet generic research or program support requirements, which can be applied to any number of programs (including traffic alert and collision avoidance system (TCAS) or Reduced Vertical Separation Minimum (RVSM) upgrades, or aircraft system modifications that make it a better platform in general). These costs should not include the costs of specific research equipment or aircraft modifications that will not be permanent.

Estimated Support Cost. Include an estimate of the costs associated with any increase in civil servant or contractor staffing, additional equipment, increased inventory, additional storage or other support facilities, and any other increase in fixed costs. It also should include an estimate of the annual operating (variable) costs.

Method of Funding. Describe how the aircraft acquisition and support will be acquired, i.e., via purchase or lease through normal procurement or via surplus, bail, or loan from another agency. Also include the program fund source.

Logistic Support. Describe how the aircraft will be supported logistically; e.g., organic support within the Center (including existing support contracts); through a new contract; or through a memorandum of agreement (MOA) with another Center, DoD, or another Federal agency. Describe any continuing logistic support requirements for disposal requests.

Environmental Impact. Describe projected environmental impact(s) of the aircraft acquisition/transfer/ disposal.

Center Point of Contact (POC): Name, phone number, and e-mail address of the POC at the Center.

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